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The Etiological Profile of Seizures in Children in a Tertiary Care Hospital, Hapur, Uttar Pradesh

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ABSTRACT

Objectives: 1) To study the incidence of seizures in children (1month – 18 years of age).

2) To elucidate the clinical and etiological profile of seizures

Setting: Children with seizures admitted in paediatric ward and paediatric intensive care unit of SIMS, Hapur.

Duration: Four years (January 2013- December 2017)

Design: Longitudinal observational study

Participants: All children admitted in paediatrics with convulsions were studied according to the performa designed with especial emphasis on detailed history, clinical examination and relevant investigations in stepwise manner.

Results: out of the 808 were cases of seizure (6.9% of the total admissions) there were 468 (58%) boys and 340 (42 %) girls. Maximum number (n= 523; 64.6%) were below 5 years. The most common presentation was GTCS (68%). The associated symptoms were fever (76%) followed by altered sensorium (58%). The most common cause was febrile seizure (48%), CNS infections (19.7%) and idiopathic cases (16.9%).

Conclusion: Childhood seizures are common neurological problem with maximum number of cases occurring at a younger age group. Improvement of basic health facilities, hygiene and immunization can bring down the various infective causes of seizures. Enabling the parents through the awareness programmes can facilitate the overall success in the good results of outcome of the seizure episodes.

Keywords: convulsions, seizure, febrile seizure, immunization

INTRODUCTION

Seizures are one of the most common form of neurological illness among children admitted to the hospital¹. A seizure or convulsion is a time limited change in motor activity and/or behavior that results from abnormal electrical activity in the brain³. An acute

symptomatic seizure occur secondary to an acute problem like electrolyte disturbances, meningitis, encephalitis, acute stroke or brain tumor. An unprovoked seizure is one that is not an acute symptomatic seizure. Remote seizure is one that is considered secondary to a distant brain injury such as an old stroke, neonatal hypoxic brain injury. Reflex seizures are usually precipitated by a sensory stimulus such as flashing lights. Epilepsy is a disorder of the brain characterized by an enduring predisposition to generate seizures. For clinical purposes epilepsy is considered to be present when two or more unprovoked seizures occur in a time frame of more than 24 hours. The manifestations of the seizure depend upon

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the threshold of the brain to manifest a clinical seizure. The age and neurodevelopmental maturity status determine the clinical manifestations and the type of seizure encountered. The protean clinical manifestations and the complexity associated with the cause and management has led to the revised classification of seizures by the International League Against Epilepsy (ILAE)²⁰.

When the data from the developed nations are compared with developing nations, surprisingly similar results of incidence and prevalence is found in childhood seizures, with the cause being different even in different regions of the same nation^{15,16,18}.

In most studies, the febrile seizures are the most common cause of seizure in children below 5 years of age. Electrolyte disturbances like hypocalcaemia was common between 1 month to 1 year of age⁵.

Causes like viral encephalitis, pyogenic meningitis, tubercular meningitis, epilepsy, head injury, late HDN, cerebral palsy, developmental anomaly of brain were other causes. Not to mention, neurocysticercosis shows predominance in certain regions of India^{5,6,12}.

The outlook for most children with symptomatic seizures or those associated with epilepsy is generally good but seizures may signal a potentially serious underlying systemic or central nervous system disorder that requires an aggressive resuscitation, stabilization and concurrent implementation of diagnostic testing, monitoring and pharmacological interventions.

Seizures perplex both the parents regarding the occurrence and prognosis and paediatricians regarding cause and management. Due to paucity of the epidemiological study on seizures, the present study was conducted to emphasize the evidence based knowledge, attitude and practice towards the seizure in children.

METHOD

This longitudinal observational study was conducted in the Department of Paediatrics, Saraswathi Institute of Medical Sciences, Hapur (U.P.) between 1st January, 2014 to 31st December, 2017. All children of age 1 month to 18 years with acute seizures (history of seizures at home witnessed by relatives or seizures during hospitalization witnessed by staff) were included in the study. The study was approved by the Ethical Committee

of the Institution. Patients were enrolled after written informed consent from parents and guardians.

Inclusion Criteria:

All children between 1 month to 18 years of age with seizures were included in the study.

Exclusion Criteria:

1. Neonates
2. Toxicological causes of convulsions
3. Children with seizure mimicking disorders like breath holding spells, migraine, apnea, syncope, panic attacks

Data Collection:

The history and clinical findings of subjects who were included in the study were recorded in the preformed Performa designed for the study. Relevant investigations were done to diagnose the cause of the seizure in step wise manner.

Complete blood count

C-reactive protein

Metabolic screening like serum electrolytes, serum calcium, serum glucose

Cerebrospinal fluid analysis

Imaging studies (CECT, MRI) of brain

Electroencephalograph

Chest x-ray, Montoux test

Statistical method:

As the present study was a descriptive study, the data was expressed as percentages and frequencies.

OBSERVATIONS AND RESULTS

Out of the 11680 children admitted during the study period, 808(6.9%) children fulfilled the criteria of cases with convulsions.

In our study the incidence as calculated by the percentage of seizure cases in total indoor pediatric patients was found to be 6.9%. In the age wise cohort, maximum number of cases were below 5 years(523) as shown in Table 1.

Table 1: Incidence of convulsions in different age groups

Age group	No. of cases	Percentages
1month-1 year	177	21.9
1year – 3years	193	23.8
3 years – 5years	153	18.9
5years -7 years	75	9.2
7 years- 9 years	58	7.1
9 years- 11years	40	4.9
11years – 13 years	56	6.9
13years-15 years	24	2.9
15years-18 years	32	3.95

There were 468 boys and 340 girls in the study group accounting for 58% and 42% of the study population respectively.

GTCS was the most common type of clinical seizure seen in 550 cases followed by complex partial seizure in 245 cases as shown in table 2.

Table 2: Type of seizure at presentation

Type of seizure	No. of Cases	Percentages
Generalized tonic clonic	550	68%%
Complex partial seizure	245	30%
Absence	1	0.01%
Simple Partial	3	0.3%
Infantile spasms	3	0.3%
Myoclonic	6	1%

There was a wide spectrum of presentation at the time of admission, with most common symptom being fever (76%), followed by altered sensorium (58% cases) and headache (40% cases). There were 614 children who were febrile at the time of admission, reflecting infections as a major cause precipitating the abnormal movements either as URI, ASOM, diarrhea, meningoencephalitis, localized brain infections etc as shown in table 3.

Table 3: Symptoms Associated with Convulsions

Clinical Features	Cases	Percentage
Fever	614	76%
Rash	64	8%
Altered sensorium	468	58%
Headache	323	40%
Cough	307	38%
Vomiting	185	23%
Loose motions	121	15%
Pain abdomen	24	3%
Lethargy	387	48%
Ear discharge	24	3%
Trauma	7	0.8%
Focal deficits	131	16%
Todds palsy	16	2%

Serum Calcium

Of all patients, 24 (2.4%) had low serum Baseline serum calcium (<8.4%).

Serum Glucose

All the cases had their serum glucose level done, of which 16 had hypoglycemia (<70mg/dl).

Lumbar puncture was done in 387 cases (47%) which showed low CSF glucose in 94 cases; with CSF picture suggestive of viral meningoencephalitis in 8%, pyogenic in 6% and tubercular in 5.8% of the total cases.

For the uniformity of the protocol CT scan of the brain was done in all cases .There were abnormal findings in about 260 cases with tuberculoma in 40, TBM in 46, NCC in 89, trauma in 7 and miscellaneous malformations in 14.

EEG was done in those cases where high electrical activity were expected. We had 194 abnormal EEGs showing generalized epileptiform activity (100), focal lesions in 77 cases and benign rolandic epilepsy 17 cases.

Amalgamating, the history at presentation, clinical findings and laboratory analysis febrile convulsions were the most common cause of seizure in about 38 % of cases followed by CNS infections 35% cases and

idiopathic 16.9% of cases as shown in detail in table 4. There were 19 cases of congenital CNS infections, malformations and syndromic presentations.

Table 4: Etiology of Convulsion

Aetiology	Cases	Percentage
Simple Febrile seizure	226	28.2
Atypical Febrile seizure	80	10
Pyogenic meningitis	48	5.9
Tuberculous meningitis	46	5.6
Tuberculoma	40	4.9
Neurocysticercosis	89	11
Viral encephalitis	67	8.2
Idiopathic Epilepsy	137	16.9
Acute infarcts	8	0.9
TORCH infections	3	0.3%
Benign Rolandic Epilepsy	17	2.9
Hypocalcaemic	24	2.4
Hypoglycemia	12	1.5%
Trauma	7	0.8
Miscellaneous	16	1.9

DISCUSSIONS

Seizures are the most common paediatric neurologic problem which presents as a medical emergency, perplexing both the parents and the paediatricians. Due to the protean manifestations and scarcity of literature regarding the seizures, still there is a lacunae in the whole some approach for the management of the same. To emphasize on the evidence based management of seizure, the present study was done in our hospital over a period of four years among the children of age group of 1 month to 18 years.

The incidence of seizure in our study was nearly 6.9%, which is similar to the findings of other authors^{1,2}. There was slight male preponderance in our study with 468 boys and 340 girls. One of the reasons for this finding could be that conditions like febrile seizure are more common in males (male to female sex ratio of 1.4 to 1.2 :1)^{4,5,6,7}.

There was an age wise variation of incidence of the seizure with maximum number of cases below five years and minimum between 13-15 years. The maximum number were between 1 year to 3 years closely followed by 1 month to 1 year and then 3 to 5 years group. Seizures have been found to have a higher incidence in younger children in many studies with a decreasing frequency in the older age group^{1,8,9}. A survey done to know the prevalence of epilepsy, found that the peak age of onset was around 1 year and 90% of the attacks occurred during the first three years⁷.

In our study the most common clinical type of seizure was GTCS followed by CPS. The literature tells generalized tonic clonic, (GTC) seizures are the most common type of childhood seizures, occurring in almost 61% of cases^{7,9,10}. Generalized epilepsies were twice as common as partial epilepsies in one community survey, possibly due to the over estimation as generalized tonic clonic seizures are more dramatic and more likely to be noticed⁶. Partial seizures are generally less common with an exception to developing countries with high incidence of neurocysticercosis, where partial seizures are reported commonly¹².

The most common presenting symptom was fever (76%) followed by altered sensorium(58%),lethargy (48%), headache(40%), cough(38%), vomiting(23%), loose motions(15%), rash (8%), pain abdomen(3%) , ear discharge, focal deficit. Infectious causes of fever such as tonsillitis, upper respiratory tract infections and otitis media as precipitants to seizure are also noted by others. There are studies which reported diarrhea as a highly associated symptom in patients with seizures, and rotavirus infection was an identified etiology¹¹ & also rotavirus related seizures could occur in both febrile (41%) and afebrile (59%) children¹². Only 16% seizures were associated with neurological deficit which was slightly higher than reported earlier⁷.

Of the 387 CSF examinations done, 94 were abnormal. 54% of them had an elevated protein level, while 27 % had low CSF glucose. An elevated PMN count suggests bacterial meningitis while lymphocytosis indicates aseptic, tuberculous or fungal meningitis; elevated CSF protein indicates infectious, immunologic, vascular or degenerative etiology or tumors of brain and spinal cord while hypoglycorrhachia is classically suggestive of pyogenic etiology⁶.

CT scan was performed in all patients which revealed abnormalities in 32% cases (n=260) including diffuse cerebral edema (9%), basal exudates, hydrocephalus, cerebral atrophy, ring enhancing lesions, malformations and trauma. Maytal et al concluded that routine practice of obtaining brain CT scans for all patients with new onset of nonfebrile seizures is unjustified. Emergent CT is not indicated for patients with no known seizure risk factors, normal neurological examinations, no acute symptomatic cause other than fever, and neurological follow up. For these patients, referral to a pediatric neurologist for further workup, including EEG and the more diagnostically valuable MRI would be appropriate¹³.

EEG is recommended as part of the neurodiagnostic evaluation of the child with an apparent first unprovoked seizure¹². It is not helpful in children with simple febrile seizures but are probably most helpful if there is doubt about whether FS has really occurred, because EEGs carried out on the day of the seizure are abnormal in as many as 88% of patients¹³. We found EEG abnormalities in 194 cases, with maximum number showing generalized epileptiform activity (100) followed by focal trigger in 77 cases. The electrical activity resembled benign rolandic epilepsy 17 cases.

There were a total of 306 cases of febrile seizures with typical cases being 226 in number (28.2%). The Yelandur survey¹⁶ estimated the prevalence to be 3.28-5.71 per 1000 whilst the more recent Uttarakhand survey found a prevalence of 2.27 per 1000 population¹⁴.

Infective pathology like bacterial and viral meningoencephalitis accounted for 5.9% and 8.2% cases respectively. Bacterial meningitis has been ascribed differently as a cause of seizure varying from as low as 0.4-1.2% to 13%^{5,16}.

We found neurocysticercosis in 11% cases (n=89), which is slightly lower than that of other reported series 24.4% of active lesions and 9.9% calcified granuloma of NCC as a cause of seizures¹².

We had 5.6% (n=46) TBM cases and tuberculoma 4.9% (N=40). Murthy et al have reported that approximately 50% of children and 5% of adults with tuberculous meningitis manifest seizure at some point of time¹⁸.

Metabolic causes like hypocalcemia and

hypoglycemia were present in 2.4% (n=24) and 1.5% (n=12) children respectively. Hypocalcemic seizures have been found as high as 13% to 25.6% of cases in the age group of 1 month to 1 year⁵. Of course in developing countries rickets with hypocalcemia is a leading cause of afebrile seizures in toddlers.

We had 137 (16.9%) idiopathic cases of seizure. A German study reveals as high as 47% cases of epilepsies to be idiopathic in origin, and also generalized epilepsies are twice more common than focal in being idiopathic¹⁹.

CONCLUSION

Childhood seizures are common neurological problem with maximum number of cases occurring at a younger age group. Pediatricians have to be vigilant on subtle clinical manifestations and a stepwise approach to the diagnosis and management of it while keeping the age specific etiological variation in mind. Improvement of basic health facilities, hygiene and immunization can bring down the various infective causes of seizures. Enabling the parents through the awareness programmes can facilitate the overall success in the good results of outcome of the seizure episodes.

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Does Pregnant Mother are aware about PMTCT of HIV? What is their Attitude and Do they Practice the Measures on PMTCT of HIV?: A Narrative Review

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ABSTRACT

Introduction:-Human Immunodeficiency Virus (HIV) or Acquired Immunodeficiency Syndrome (AIDS) is a dreadful disease and it is more prevalent in the world ^[1]. In these circumstances people must have adequate knowledge on HIV/AIDS and its prevention .On account of that, this paper aims to assess the awareness, attitude and practices of pregnant women on HIV/AIDS, its transmission and prevention. **Method:** - A computerized search for published literature and journal articles was undertaken through Pub Med and EBSCO databases. Typical search strategies have used for each data bases .During initial search 12445 articles were retrieved and after screening 20 articles were selected for full text assessment and finally 8 articles were included in the study. **Results:-** Out of 8 literatures ,7 research studies concluding that there is a low level of awareness of HIV/AIDS, Mother to Child Transmission(MTCT) and its prevention and 1 study suggests that there is adequate knowledge among the pregnant women regarding HIV/AIDS ,mother to child transmission and its prevention. **Discussion:-**Various review of research studies published from 2017 to 2017 concluded that the level of awareness regarding Prevention of Mother to Child Transmission(PMTCT) of HIV among the pregnant women as well as the adolescents has been revealed in all the studies, whereas the attitude and practice on HIV/AIDS and its prevention has been concluded in two studies respectively.

Overall analysed data from the eight studies suggests the gap between awareness and practice. This gap can be eliminated when women lead a safe sexual life.

Conclusion--:- Effective use of Prevention of Mother to Child Transmission (PMTCT) of HIV services can be enhanced by changing the attitude towards HIV/AIDS and improving the awareness on HIV/AIDS and its prevention.

Keywords: Awareness, attitude, practice, prevention of mother to child transmission, pregnant women.

INTRODUCTION

Human Immunodeficiency Virus (HIV) or Acquired Immunodeficiency Syndrome (AIDS) is one of the dreadful challenges to human life and their dignity. It has adverse effects on all levels of society and has enormous impact on global economic and social development ^[1]. HIV and AIDS disease has been around the world, although no one has been able to pinpoint its origin.

Moreover there are many theories and beliefs which are floating around the medical world regarding the origin of HIV/AIDS, there are certain causes which

is primarily responsible for the transmission of virus from one human to another, such as unprotected sexual intercourse, transfusion of infected blood products and from mother to child. Despite of having these many causes, still there are various myths and stigma existing in the world regarding the transmission of HIV ^[1]. Many people speak about the late stages of AIDS without knowing the facts that HIV does not produce AIDS always. The Prevention of Parent to Child Transmission of HIV (PPTCT) programme was launched in the year of 2002, in all major hospitals in five HIV prevalent states. At the end of 2016, there were 20756 integrated

counselling and HIV testing centre, all over India and mostly these services are offering by Government hospitals ^[2].

When we focus on the transmission of HIV, pregnancy is a period, where the transmission of virus from mother to child occurs and develops a condition that endangers both mother and baby. The epidemic of HIV has a devastating effect on children who are less than 15 years of age due to vertical transmission of HIV. So it's a crucial period, where the incidence of HIV should be prevented by mother and family members. For that what are all the requisites to be taken by them? Do they have adequate knowledge on prevention of mother to child transmission of HIV? What is their attitude towards HIV/AIDS? Do they practice it well before? ^[3]

Taking this into account; various studies have been conducted to assess the awareness, attitude and practice towards prevention of mother to child transmission of HIV among pregnant women.

NEED FOR THE STUDY

There is vast literature which suggests that the significant portion of population have low level of awareness and also have unfavourable attitude towards AIDS and its prevention. These are the threat to our country, as people are becoming the victim of HIV/AIDS. The latest estimate shows that India is the country where third largest number of people living with HIV in the world ^[4].

Evidence suggests that there is low awareness on timing of mother to child transmission of HIV as well as its prevention. Hence strengthening of PMTCT services are recommended in the antenatal care settings ^[5].

Researchers also concluded that the level of knowledge among pregnant regarding prevention of mother to child transmission of HIV is low. So appropriate strategies to be carried out to help them make informed decisions ^[6].

Keeping this in view it is very essential to focus on awareness attitude and practice of pregnant women towards HIV/AIDS and its prevention, to prevent the transmission of HIV from mother to baby and thereby to save the life of mother and baby and to lead a healthy life ahead.

AIM

The aim of this review is to assess the level of awareness and attitude of pregnant women towards PMTCT services as well as the various practices which has been followed by mother to prevent the transmission of mother to child transmission of HIV.

OBJECTIVES

- To assess the level of awareness, attitude and various preventive practices following by the mother who lives in the different part of the world to prevent the transmission of HIV from mother to child.
- To determine the demographic factors which is associated with the awareness attitude and practice on Prevention of Mother to Child transmission of HIV

MATERIAL AND METHOD

Search strategy method:

A computerised search have done to collect the articles which are available in different databases from the year of 2007 to 2017. The search strategy was limited to only English language and considered only the studies which are conducted on human species.

Initial search strategy made by using the terminologies and its synonyms which are processed in databases such as Pub Med and EBSCO. The terminologies which have been used to collect the article are as follows:

Keywords: awareness, knowledge, attitude, practice, utilization, prevention, mother to child transmission, perinatal transmission, HIV, ANC

Type of studies

Comparative studies, Descriptive studies, Cross-sectional studies.

Type of participants

Women in reproductive age, pregnant women, male and female adolescent

Settings

Antenatal clinics in hospitals, schools and obstetrics

and gynaecological clinics.

Outcomes

Findings from these studies will lead to a clearer understanding regarding the awareness, attitude and practice of pregnant women on Prevention of Mother to Child Transmission of HIV and will be act as baseline information in order to strengthen the prenatal educational programmes for the creation of awareness among the public. Thereby it enhances the utilization of PMTCT services.

RESULTS

Description of extracted data

Rastogi, Saumya, Charles Bimal, Sam E Asirvatham (2009) ^[6] conducted a cross sectional study to assess Knowledge of antiretroviral in preventing parent to-child-transmission of HIV among women living with HIV in Tamil Nadu, India and the findings suggested that One fifth of the participants were not having adequate knowledge about Prevention of Parent To Child Transmission of HIV and about 40% participants didn't know that ARV can prevent the transmission of HIV from parent to child and the findings concludes that while looking at the risk of transmission of HIV from an HIV infected mother to her child, the knowledge level regarding PMTCT and ARV among them is low and formulation of appropriate guidelines and strategies to generate awareness among them is to be taken into consideration.

Asfer Anteneh, Beyene Habtamu (2013) ^[5] carried out a cross sectional study to assess the awareness and knowledge on timing of mother-to-child transmission of HIV among antenatal care attending women in Southern Ethiopia. The analysed data found that all Antenatal women who attended the ANC were aware about HIV/AIDS and its transmission and only few of the pregnant women were aware that HIV is transmittable from mother to child during pregnancy, labour and delivery. So the available findings concludes that awareness and knowledge were low among pregnant women regarding the time of MTCT.

Emah Irene, Yakanana, Monebenimp, Fransecisca et al., (2009) ^[7] conducted a descriptive cross sectional study to assess the knowledge of pregnant women on Mother-to-Child Transmission of HIV in Yaoundé. The

findings from the study revealed that almost 99% of the pregnant women had heard about HIV/AIDS and its transmission, hence it reveals that the pregnant women have good knowledge on HIV and PMTCT.

Haider, Gifareen., Zohra, Nishat., Nisar, Nusrat et al., (2007)^[8] conducted a descriptive study to determine the knowledge about AIDS/HIV infection among women attending obstetrics and gynaecology clinic at a university hospital, Pakistan. The results from the study stated that out of total pregnant women 86% were heard about HIV/AIDS and the majority of women knew about its transmission. It concludes that the level of awareness on HIV/AIDS infection among pregnant women is satisfactory. But there are few misconceptions regarding transmission of HIV and that to be considered.

Bhavna T, Puwal., Dr. Vaibhavi, Patel., Dr. Sheetal, Vyaset al., (2010)^[9] carried out a Quantitative, Cross sectional study to assess the knowledge about transmission and prevention of HIV/AIDS among the high risk groups (HRG) population of Ahmadabad city. Findings from the study suggested that about 85% high risk groups aware about HIV and knew that the transmission rate was highest through sexual route. About half of high risk groups knew about all major modes of prevention. This study concludes that it is important to have adequate knowledge about transmission and prevention of AIDS among high risk group to change its high risk behaviour and improve the health.

Byamugisha Robert, Tumwine K James, Ndeezi et al. (2009)^[10] conducted a cross sectional study to determine the attitudes to routine HIV counselling and testing, and knowledge about prevention of mother to child transmission of HIV among antenatal attendees in eastern Uganda. The result shown that almost all the ANC attendees had a positive attitude towards testing of HIV and the HIV status helped the women to lead a healthy life and about 65% of the participants have the knowledge that the HIV can transmit from her mother to baby. This study reveals that a routine check up HIV testing and counselling during the Antenatal period is largely accepted by the pregnant woman who are residing in Uganda.

Gupta Onam, Lal Dhruvendra & Sindhu Kaur (2016) ^[11] carried out a comparative study to assess knowledge, attitude and practice of HIV/AIDS among adolescents in Two Districts of Punjab. Results from this study stated

that total adolescents from different places heard about HIV/AIDS and many of them aware that HIV/AIDS could be prevented by condom. The result concludes that various interventions at different level is enquired to enhance the awareness among the adolescents as they are tomorrow's citizens.

Kuete Martin, Yuan Hongfens, Ite Qiuan et al (2014)^[12] carried out a find out a cross sectional study to find out the Sexual Practices, Fertility Intentions, and awareness to Prevent Mother-to-Child Transmission of HIV Among Infected Pregnant Women at the Yaoundé Central Hospital, Cameroon. The results suggested that sexual desire has been significantly changed since their HIV diagnosis and about 19% of participants had multiple sexual partner. 94 pregnant women with HIV infection provided appropriate information on socio-demographic character, sexual and fertility patterns and they have adequate awareness on preventing Mother to Child Transmission of HIV. Over all findings concludes that Cameroon women who infected with HIV and living with HIV infected partner, expressed high sexual and fertility intentions with severe unmet needs including safer sexual practice and conception

SUMMARY OF FINDINGS

Available 8 literature are quantitative and cross sectional studies. Out of 8 literatures, 7 research studies concluding that there is low level of awareness of HIV/AIDS and MTCT and its prevention and 1 study suggests that there is adequate knowledge among the pregnant women regarding HIV/AIDS, mother to child transmission and its prevention.

DISCUSSION

A comprehensive review of research studies published from 2017 to 2017 found that the level of awareness regarding Prevention of Mother to Child Transmission of HIV among the pregnant women as well as the adolescents has been revealed in all the studies, whereas the attitude and practice on HIV/AIDS and its prevention has been concluded in two studies respectively.

Overall analysed data from the eight studies suggests the gap between awareness and practice. This gap can be eliminated when women lead a safe sexual life.

A favourable attitude towards HIV/AIDS and its prevention have the significant impact on the practices of

adolescents and pregnant women towards the prevention of HIV transmission, from one person to another as well as from mother to baby.

Practices among the adolescents on prevention of HIV/AIDS are satisfactory. But their preventive practices only limited to the use of contraceptives during sexual intercourse. More precautions to be taken out by the adolescents throughout their life, in order to prevent the transmission of HIV from parent to child, also to have a healthy sexual life.

Implementation of certain awareness programmes to be encouraged among the adolescents and reproductive aged women helps them to have a satisfactory marital life.

IMPORTANCE IN EDUCATION

Today's children are tomorrow's citizens. Creating awareness on HIV/AIDS, its transmission and its preventive measures among the children in educational settings make the individual to follow the aspects of PMTCT services in the future. There by it helps the people to lead a healthy and safe life ahead. More over public educational programmes through mass media and prenatal educational programmes which focuses on the needed information regarding HIV/AIDS, its transmission and prevention will improve mother's awareness as well as the public.

So it is a great concern to give adequate information regarding PMTCT programmes in educational settings. By this we can strengthen the campaign and ensure the maternal and child survival.

FUTURE SIGNIFICANCE

The National AIDS Control Organisation states that annually there are estimated 29 million of pregnancies occur in India and around 35255 occur in HIV positive pregnant women. In the absence of preventive measures or intervention an estimated cohort of 10361 babies will be infected and born annually. Hence strengthening of PPTCT services is essential to prevent the perinatal transmission of HIV. So enhancing the awareness among pregnant women regarding PMTCT services, will make them to have favourable attitude and it improve the practice on PMTCT services and thereby it helps to achieve the goal of reducing the number of children born with HIV.

LIMITATIONS

- Computerized data bases were limited
- Was limited to only in pregnant women
- Was limited to only English language

CONCLUSION

The number of HIV positive babies is higher in recent years. Lack of knowledge regarding poor diagnostic facilities, problems in Antiretroviral therapy (ART), these are the great concern which adversely affects PMTCT services.

Lack of awareness about HIV/AIDS, its transmission and prevention are the determined factors which facilitate the spread of HIV/AIDS in developing countries. So women living with or without HIV/AIDS, need to know the risk behaviour of pregnancy which affects their own health as well as the risk of transmission to their foetus or infants.

Strengthening of prenatal educational programme on HIV/AIDS with the emphasis on its preventive measures and various services available to prevent the Mother to Child Transmission of HIV, among the pregnant women seems to be necessary.

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Ethical Clearance: Ethical clearance is not applicable for this study as it is a narrative review.

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Recent Resting Habit of Adult *Phlebotomus argentipes* the Vector of *Visceral leishmaniasis* in a Kala Azar Endemic Foci of Bihar India

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ABSTRACT

From 1976 to 2014, DDT, and from 2015 till date, alpha cypermethrin insecticide is being sprayed as indoor residual spray up to 1.8 meter i.e 6 feet height in human dwellings as well as in cattle sheds in, India, as a part of Kala -azar elimination programme. This is being a practice out of the belief that *Phlebotomus argentipes* the vector of kala azar is endophilic in nature and cannot hop beyond 1.8 meters height. Sixteen months study was therefore conducted in three villages in a kala azar endemic block Warisnagar, district Samastipur, Bihar from September 2016 to November 2017 to note the vertical distribution of *P. argentipes* in indoors and their distribution in outdoors aswell. In all the three study villages, density of adult *P. argentipes* was found more in Cattle sheds than in human dwellings. Irrespective of IRS and non IRS villages, significant numbers (*p* value 0.47) of *P. argentipes* were found above 1.8 meter in CS and HD of which 33.37 percent were blood fed and gravid females. Sizable number of *P. argentipes* was also found in outdoor peridomestic situations throughout the study period. Therefore it may be the time to evaluate vector control strategies in kala azar endemic areas of Bihar for successful elimination of the disease from India.

Keywords: Distribution of *Phlebotomus argentipes* in indoor and outdoor. Kala azar endemic villages. Bihar

INTRODUCTION

Phlebotomus argentipes, the vector of visceral leishmaniasis or Kala azar in the endemic states like Bihar, West Bengal are predominantly endophilic in nature. They rest in cracks and crevices on walls, in dark corners of rooms, especially in mud huts and cattle sheds. They are found more in cattle sheds than human dwellings. It has also been noted that *P. argentipes* do not fly / rest above 1.8meter (6 feet) from ground level^{1, 2, 3}. Since 1976, as a part of kala azar vector control programme, indoor residual spray with DDT was done in human dwellings and cattle sheds up to 1.8meter for control of *Phlebomus argentipes* in India. Noting the wide spread DDT resistance problem^{4, 5, 6, 7}, since 2015 Government of India have started vector control

programme with two rounds of IRS with Alpha-cypermethrine at the dose of 25mgm per sq.meter twice a year up to 1.8meter (6 feet)^{7, 8}. The state of Bihar is yet to achieve successful Elimination of Kala azar, may be one of the reason that, the flies have changed their resting behaviours. A sixteen months study was conducted in a highly kala azar endemic Block Warisnagar, District Samastipur, Bihar starting from August 2016 till November 2017 to note the population of *P. argentipes* in different heights at cattle sheds and human dwellings as well as to note availability of the files in outdoor peridomestic conditions.

MATERIALS AND METHOD

In comparison to India, Bihar state alone contributed more than 72 percent of total kala azar cases per year between 2012 to 2017 (Dpt. of NVBDCP. Government of India). Since 2014 district Samastipur, alone has contributed more than 8.5 percent Kala Azar cases of Bihar (Personal communication Dpt. NVBDCP.

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Government of Bihar). Two villages i.e. Mannipur and Satmalpur which are reporting perennial transmission of kala azar and are under insecticidal pressure and village Kishanpur which is without any kala azar case in Block Warisnagar, were selected random method for the study.

All human dwellings and cattle sheds were searched thoroughly by standard entomological methods⁹. Cattle sheds and human dwellings had good density of *P. argentipes* were noted and marked. Out of marked houses, three human dwellings and three cattle sheds in each village were selected by random method. For outdoor collection, ten dark and damp outdoors with five to eight meters diameter surrounding each of the noted house and cattle shed were selected. In each village three human dwellings, three cattle sheds and ten peridomestic outdoor situations were selected for longitudinal study between August 2016 to November 2017. In each human dwelling and cattle shed, three CDC miniature light traps model 512, specially designed for sand fly collection (made by John W. Hock) were installed overnight at the heights of 0.6 meter (2feet), 1.2 meter (4feet) and above 1.8 meters (above 6 feet) by standard WHO method⁹. In outdoor situations ten CDC light traps per village were installed for overnight at a height of 0.6 meter (2feet).

In each village a total of twenty eight light traps (nine in human dwellings, in nine cattle sheds and ten at peridomestic outdoor situations) were installed per night per months. The sand flies, collected in individual trap were brought to the laboratory separately and height wise species identification has been done by the method of Lewis¹⁰.

RESULTS AND DISCUSSION

Results on distribution of indoor and outdoor population of *P. argentipes* in three study villages of block Warisnagar, district Samastipur are shown in Tables 1,2 and 3.

Month wise adult *P. argentipes* were collected from different heights from indoors of selected human dwellings and cattle sheds are shown in Table 1 and 2.

Village Kishanpur, is non endemic kala azar, sixteen months observation on density of *P. argentipes* from September 2016 to November 2017 is shown in Table 1. As per Table 1, 46.7% flies were found above 1.8 meter height in human dwellings. 26.5 and 27.8

percent flies were found up to 0.6 meter height in HD and CS respectively. 24.8 and 31.8 percent *P. argentipes* were also found up to 1.4 meter height in HD and CS respectively. Therefore statistically significant (p value 0.051) number of *P. argentipes* were found above 1.8 meters in unsprayed non endemic village Kishanpur. Very low density of *P. argentipes* in both human dwellings and cattle sheds were noted in the winter months between December 16 to February 2017. Density started increasing from the month of March on the onset of warm weather with a peak in the months of June-July and September – October.

Villages Mannipur and Satmalpur are endemic for Kala azar transmission and under Indoor Residual Spray (IRS) with Alpha-cypermethrin.

During study period, village Mannipur were sprayed in every third week of months September 2016, April 2017 and September 2017. Density of *P. argentipes* in different altitudes are shown in Table 2. lowest density was noted here in the winter months of December 2016 to February 2017. Throughout the study period 32.0 and 29.2 percent *P. argentipes* were found above 1.8 meter height in HD and CS respectively. It was noted that population of *P. argentipes* in CS (411) is more than that of in HD (366). Peak density was noted in September- October, 2016 and in the month of May 2017. Throughout the study period maximum number of flies in this village was found as 33.8 percent in HD and 43.2 percent in CS up to 1.4 meter height. (p value 0.390).

Village Satmalpur, as shown in Table 2, had a very high density of *P. argentipes* in CS as 962 in comparison to HD as 281.26.0 and 37.9 percent *P. argentipes* found above 1.8 meters in HD and CS respectively which is statistically significant with p value 0.565. 50.9 and 36.3 percent of *P. argentipes* were found within 1.4 meters in HD and CS respectively. Like other two study villages, minimum density was also noted in the winter months of December 2016 to February 2017 and maximum in the months of September, October 2016 and May 2017 in Satmalpur.

As per present observations, significant numbers (p value 0.051, 0.390, & 0.565) of *P. argentipes* adults prefers to rest more in Cattle sheds than Human dwellings In villages Kishanpur, Mannipur and Satmalpur respectively, which corroborates with the early findings

of Smith ¹, Hati et al ^{2,3}. In earlier literatures it was mentioned that *P.argentipes* in India cannot hop or rest beyond 1.8 meters height ^{1,2,3,10}. In our present study is clearly showing presence of significant number (*p* value 0.47) of *P.argentipes* beyond the height of 1.8 meter in three study villages of which 33.37 percent females were full blood fed and gravid females.

The present observations corroborate with our previous four months observations from July to November 2016 in the same area ¹¹. Thus our present findings clearly show that *P.argentipes* adults have changed their behaviour over the period of time and significant numbers are available above 1.8 meter. This invites for a change in policy of IRS (*on the basis of findings*) by national programme.

Month wise and village wise number of *P.argentipes* collected by CDC light traps in outdoor and indoor are shown in Table 4. During the study period ten Light traps were installed per village per month in outdoor peridomestic situations. In indoor 18 traps were installed per month per village in different height in HD and CS.

In outdoor no *P.argentipes* were trapped in the month of January 17 and Maximum numbers were recorded 122 (average 4.06/ trap/night) and 138 (average 4.6/trap/night) in the months of May and June 2017 respectively. In indoor collection only 2 *P.argentipes* were trapped (average 0.03/ trap/night) in the month of January 2017. Maximum numbers were trapped 591(Average 10.94/ trap/night) in September'17, 494 (Average 9.14/trap/night) in October 2016 and 341 (average 6.31/night/ trap) in the month of May 2017. Significant numbers of *P.argentipes* were found in outdoor (*p* value 0.001) in comparison to indoor (Table 3).

In the present study reveals irrespective of IRS and non IRS villages *P.argentipes* found in greater numbers in cattle sheds than human dwellings. In general significant numbers (*p* value 0.47) were found above 1.8 meter height. They are also found in significant numbers (*p* value 0.001) in outdoor peridomestic situations. Therefore it is the time to evaluate vector control strategies in kala azar endemic areas of Bihar for successful elimination of the disease from India.

Table: 1 Month wise/Height wise density of *P.argentipes* in non kala azar endemic village Kishanpur, District Samastipur

Village	Kishanpur (C)							
Month & year	Human Dwelling				Cattle Sheds			
	I	II	III	T	I	II	III	T
September '16	11 17%	13 21%	39 62%	63	1 1%	75 38%	119 61%	195
October '16	9 26%	8 24%	17 50%	34	33 49%	31 45%	4 6%	68
November '16	2 22%	0 0%	7 78%	9	17 50%	10 29%	7 21%	34
December '16	1 50%	1 50%	0 0%	2	1 50%	0 0%	1 50%	2
January '17	0 0%	0 0%	0 0%	0	0 0%	0 0%	0 0%	0
February '17	0 0%	0 0%	3 100%	3	3 60%	2 40%	0 0%	5
March '17	3 38%	2 24%	3 38%	8	12 57%	6 29%	3 14%	21
April '17	0 0%	0 0%	0 0%	0	5 28%	4 22%	9 50%	18
May '17	8 47%	3 18%	6 35%	17	4 9%	5 11%	37 80%	46
June '17	14 54%	7 27%	5 19%	26	30 60%	10 20%	10 20%	50
July '17	0 0%	6 67%	3 33%	9	33 44%	10 13%	32 43%	75

Cont... Table: 1 Month wise/Height wise density of P. argentipes in non kala azar endemic village Kishanpur, District Samastipur

August '17	2 13%	6 40%	7 47%	15	0 0%	2 50%	2 50%	4
September '17	1 4%	2 7%	24 89%	27	10 91%	1 9%	0 0%	11
October '17	18 86%	0 0%	3 14%	21	1 25%	2 50%	1 25%	4
November '17	9 23%	20 50%	11 27%	40	5 21%	19 79%	0 0%	24
TOTAL	78	68	128	274	155	177	225	557
Percentage	28%	25%	47%		28%	32%	40%	

Abbreviations: **I** = Height up to 0.6 meter (2 feet). **II**= Height up to 1.4 meters (4 feet). **III** = Height above 1.8 meters (6 feet). **C** = control

Table 2 : Month wise / height wise density of Phlebotomus argentipes in kala azar endemic villages Mannipur & Satmalpur , District: Samastipur, Bhiar.

Village Month & year	Mannipur								Satmalpur							
	Human Dwelling				Cattle Sheds				Human Dwelling				Cattle Sheds			
	I	II	III	T	I	II	III	T	I	II	III	T	I	II	III	T
September '16	13 23%	35 63%	8 14%	56	38 48%	4 5%	37 47%	79	5 31%	2 13%	9 56%	16	56 29%	62 32%	75 39%	193
October '16	21 26%	43 54%	16 20%	80	10 15%	24 37%	31 48%	65	7 25%	17 61%	4 14%	28	40 27%	12 8%	98 65%	150
November '16	0 0%	1 14%	6 86%	7	2 24%	3 38%	3 38%	8	0 0%	3 75%	1 25%	4	12 10%	62 51%	48 39%	122
December '16	1 35%	0 0%	2 67%	3	7 78%	2 22%	0 0%	9	0 0%	0 0%	1 100%	1	1 20%	2 40%	2 40%	5
January '17	0 0%	0 0%	0 0%	0	0 0%	0 0%	0 0%	0	0 0%	0 0%	0 0%	0	0 0%	0 0%	2 100%	2
February '17	0 0%	0 0%	0 0%	0	1 100%	0 0%	0 0%	1	0 0%	1 100%	0 0%	1	0 0%	0 0%	1 100%	1
March '17	8 62%	3 23%	2 15%	13	15 27%	27 49%	13 24%	55	3 100%	0 0%	0 0%	3	1 25%	1 25%	2 50%	4
April '17	10 45%	10 45%	2 10%	22	23 32%	38 52%	12 16%	73	4 50%	2 25%	2 25%	8	5 29%	10 59%	2 12%	17
May '17	12 12%	37 36%	53 52%	102	12 26%	22 48%	12 26%	46	3 43%	1 14%	3 43%	7	52 46%	29 26%	31 28%	112
June '17	7 27%	7 27%	12 46%	26	8 29%	13 46%	7 25%	28	8 40%	6 30%	6 30%	20	9 26%	13 37%	13 37%	35
July '17	7 64%	4 36%	0 0%	11	4 57%	0 0%	3 43%	7	21 28%	53 71%	1 1%	75	17 26%	23 37%	23 37%	63
August '17	1 33%	1 33%	1 33%	3	1 25%	2 50%	1 25%	4	1 5%	15 71%	5 24%	21	3 16%	8 42%	8 42%	19
September '17	1 6%	8 50%	7 44%	16	13 76%	4 24%	0 0%	17	0 0%	8 38%	13 62%	21	23 21%	61 57%	23 21%	107
October '17	10 43%	5 22%	8 35%	23	16 100%	0 0%	0 0%	16	0 0%	17 39%	27 61%	44	29 22%	63 49%	37 29%	129
November '17	0 0%	4 100%	0 0%	4	2 67%	0 0%	1 33%	3	13 41%	18 56%	1 3%	32	0 0%	3 100%	0 0%	3
TOTAL	91	158	117	366	152	139	120	411	65	143	73	281	248	349	365	962
Percentage	25%	43%	32%		37%	34%	29%		23%	51%	26%		26%	36%	38%	

Abbreviations: **I** = Height up to 0.6 meter (2 feet). **II**= Height up to 1.4 meters (4 feet). **III** = Height above 1.8 meters (6 feet).

Table 3 : Comparative Month wise/Village wise density of *P. argentipes* trapped from Indoor and Out door

Month & Year	OUTDOOR				Avg den/ N/T/Vill	INDOOR				Avg den/ N/T/Vill	OD:ID
	Kishanpur	Mannipur	Satmalpur	Total		Kishanpur	Mannipur	Satmalpur	Total		
September '16	14	32	31	77	2.56	258	135	198	591	10.94	01:05
October '16	8	11	19	38	1.26	102	145	247	494	9.14	01:09
November '16	6	12	24	42	1.4	43	15	171	229	4.24	01:04
December '16	0	0	2	2	0.06	4	16	5	25	0.46	03:23
January '17	0	0	0	0	0	0	0	2	2	0.03	00:03
February '17	3	0	1	4	0.13	8	3	0	11	0.2	13:20
March '17	22	3	7	32	1.06	29	68	129	226	4.18	01:04
April '17	14	38	31	83	2.76	18	95	24	137	2.53	01:01
May '17	19	77	26	122	4.06	63	148	130	341	6.31	02:03
June '17	62	41	35	138	4.6	76	50	90	216	4	01:01
July '17	25	24	46	95	3.16	84	18	138	240	4.44	03:04
August '17	1	7	19	27	0.09	19	7	40	66	1.22	00:01
September '17	4	43	17	64	2.13	38	30	164	232	4.29	01:02
October '17	17	47	19	83	2.76	25	5	173	203	3.75	02:03
November '17	3	7	22	32	1.06	58	7	35	100	1.85	01:01

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Substance Use Disorder - Vital Hurdle in Sustainable Development of Nigeria

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ABSTRACT

On the global front, Millenium Developmental Goals (MDGs) were recently replaced with Sustainable Developmental Goals (SDGs) keeping in view the importance of inclusive growth. Thus, the SDGs have been designed so that people belonging to all economic strata can get benefitted by them. Differences in economic status can have severe consequences, including increased levels of drug addiction and related crimes. It creates a huge burden on the healthcare system on local level and on the society at large. This problem is very prominent in many sub-African countries, including Nigeria. This study made an attempt towards identifying and analyzing various factors that may be contributing towards economic disparities, its burdens on the society (with reference to substance use disorder, in particular) and the various inclusive growth measures that can contribute towards addressing this problem. All concerned stakeholders including government, semi-private, private organizations, NGOs and global organizations need to work together to handle the deteriorating conditions so that the situation can be brought under control before it gets too late.

Keywords: SDGs, Financial inequality, Healthcare facility affordability, Addiction, Substance use disorder

INTRODUCTION

The Millenium Development Goals (MDGs) were generated as part of the UN Millenium Declaration in September 2000¹. However, the targets could not be achieved within the deadline of September 2015. The UN General Assembly, in September 2015, replaced the MDGs with Sustainable Development Goals (SDGs) with deadline of 2030². An Inter-Agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs) has also been formed for monitoring the progress towards achieving these goals³.

Like many other nations, Nigeria also failed to achieve the MDGs. The major reasons for this failure include improper resource management, pitfalls at the levels of bureaucracy, extreme poverty, strong presence

of insurgent groups such as Boko Haram, unavailability of properly trained healthcare workers etc⁴. An UN report has indicated that in 2011, around sixty percent of the poorest human population lived in only five countries (China, India, Nigeria, South Africa and Uganda)⁵.

MATERIALS AND METHOD

Getting addicted to alcohol and other substances is growing into a major concern for the society. Mainly the target group is either women, adolescents or young adults. Once addicted, they become highly vulnerable and often move towards anti-social activities. They also become cause of huge healthcare expenditures (both aimed towards treatment and rehabilitation). This study aimed towards understanding the current situation in this context with reference to Nigeria, in particular. For this purpose, various publications, articles and reports available and related to it were searched for, reviewed and analyzed. Rising levels of poverty, inequality in availability and distribution of basic facilities (such as food, housing, sanitation, primary healthcare facilities and education), unemployment and presence of insurgent

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groups are pushing a significant proportion of the Nigerian population towards substance abuse disorder.

FINDINGS

Overview of Substance use disorder

Drugs abuse could be seen as making bad use of drugs, wrong usage of drugs alone, but it includes buying and using of drugs for treating self without doctor's prescription⁶. Law enforcement official said drugs abuse is the use of illicit drugs⁷. And medical authorities see drug abuse as the failure of the people or patient to comply with directions for using prescribed medicines, engaging in dangerous self medication. Substance use disorder has been a topic of interest to many professionals in the area of health, particularly mental health. An area with enormous implication for public health, it has generated a substantial amount of interest in the field of research⁸.

Epidemiological survey all over the world has indicated that substance use disorder is common and is one of the most disturbing health related problems among the youth⁹⁻¹⁴. The situation is not different in Nigeria, and several studies have reported their widespread presence¹⁵⁻¹⁸. Substance use disorder is primary reason why many youths are incarcerated as well as a source of crime and health problems in our society today. It has become unprecedented in Nigeria that the number of youth incarcerated in various prisons across the country has increased dramatically over the last few decades: Majority of these youths have been arrested for substance offences, either drugs, alcohol or tobacco addiction.

Substance use disorder remains a public health problem in many countries, Nigeria included, and are associated with many social and economic factors^{19,20}. The disorder mostly starts among school children during adolescence stage, as a result of the several factors including peer group influence, curiosity, bad friends, environment, social pressure, the school and "I don't care attitude from teachers", self medication²¹⁻²³.

Using these substances for prolonged periods can have severe consequences, both at the level of the individual as well as the society. Some of the most prominent damages include increased rates of diseases such as cancer and sexually transmitted diseases, higher numbers of homicides and suicides, personality

disorders, higher incidences of depression, increased frequency of unplanned sexual activities, increase in the number of school dropouts, higher rates of crime, higher rates if unemployment, leading to poverty²⁴⁻²⁶.

World scenario on Substance use disorder

Survey in the United Kingdom indicated that 5-20% of secondary school students use substance with 2-5% , using them weekly and with a peak prevalence at 14-16 years of age^{27,28}. A baseline survey on drug use and abuse commissioned by the National Agency for Campaign against drug abuse in the year 2001 and 2006 revealed that more than a fifth of secondary school, students in Kenya have taken alcohol and the figure rise to more than three-fourth for university students (Republic of Kenya, 2004). It has been observed that in Kenya, more than 22.7% of secondary school students have taken alcohol 68% among university¹¹. A large number of students across all age groups have been exposed to alcohol, tobacco, Mirae (khaf), bhang and marijuana, and even substance such as heroine and cocaine^{29,30}.

Most of these young people begin with alcohol, cigarette, Indian hemp, abasic gum solutions and cough syrups, and later progress to more dangerous ones such as heroine, cocaine^{29,30}. The menace of drug abuse in socio-economic, political, health education section brings a setback in our day to day life. The probable adverse effects of these psychoactive substances have caused international concern over many years and international legislations have been enacted at various times to control their circulation and use. These include formation of United Nations International Drug Control Programme (UNDCP) and surveys conducted by this organization³¹.

Situation of Substance use disorder in Nigeria

International drug trafficking is becoming a growing concern for Nigeria. Reports have shown that at least five states of Nigeria (Kano, Borno, Kaduna, Rivers and Plateau) are heavily involved in this process and show a corelative increase in levels of violence and unrest³². It has also been found that dependence on drugs is also being exploited to gain political mileage³³. In addition to well known narcotic drugs (mainly marijuana and cannabis), prescription drugs (such as codiene syrup, tramadol and Rohypnol) are also being for drug abuse. Studies have shown that even these prescription drugs, when consumed in excess quantities can lead

to impairment of judgemental abilities and withdrawal symptoms similar to hard drugs³⁴.

Just like many other countries, the healthcare, rehabilitation and accessory support systems that are available for catering to the needs of these growing numbers of patients suffering from substance use disorder in Nigeria are inadequate³⁵.

Moreover, although Nigeria has bodies such as National Directorate of Employment (NDE), National Economic and Empowerment Development Scheme (NEEDS) and National Poverty Eradication Programme (NAPEP) which have been established with the aim of reducing/alleviating poverty and unemployment among youths, both of them remain serious threats till date³⁶. This has led to increase in frustration and hopelessness among the youth thereby pushing them towards temporary solitude in drug addiction.

Measures that can be implemented to improve the existing scenario

Since the problem of substance use disorder has multiple contributing factors ranging from non-availability of basic requirements for survival with dignity to corruption and high crime rates, preventive measures are required to take care of each of these lacunae.

The existing healthcare system needs a complete overhaul. It has been found that there is shortage of drug rehabilitation treatment centres worldwide, and Nigeria is no exception³⁵. Formation of special “community-care centres” with participation of members from the community can serve to fill this gap as these patients can be holistically treated by joint efforts of these community members and healthcare workers. The government should encourage such “treatment-focussed policies” as they have shown promising results in other countries³⁷.

Since Nigeria is the most populated country in the African sub-continent³⁸, special priority must be given towards an effective policy of inclusive growth. This will ensure that the basic amenities reach the most economically deprived citizens. This, in turn, will help in overall upliftment of their lives, in terms of food security, education, access to healthcare facilities and employment³⁹. Moreover, they will become more aware of the pitfalls of getting into drug addiction. Awareness, thus generated, will also empower them to stand up to

drug traffickers and corrupt administrators.

National policies must also be developed so that corruption can be handled across all levels. In fact, the National Drugs Law Enforcement Agency (NDLEA) was established in 1985 with the aim of curbing drug trafficking and making provisions for punitive measures against all those who would get involved in this process⁴⁰. The National Agency for Food and Drug Administration and Control (NAFDAC) should also be provided with adequate power and logistic support so that it can monitor production of banned habituating products. Anybody found guilty of promoting or helping in the process of drug addiction or drug trafficking should be subjected to very harsh punishments.

CONCLUSION AND FUTURE DIRECTIONS

This study aims to give an overview of the factors that are leading to the increasingly disturbing trend of getting addicted to unwanted substances and prohibited drugs. The most severely affected group is very young in age. The factors which are primarily responsible for this inclination range from poor economic status of the family to distorted environment in which the child is forced to stay. Differential distribution of healthcare and educational facilities across various sub-sections of the population and its subsequent effects on the society are equally responsible for their increased incidences among children, adolescents and young adults. This study also aimed towards analysing how alterations in the economic status might affect this distribution pattern, especially among Nigerian populations. Inclusive growth models that pay due attention towards addressing this issue are urgently required for being able to remove these economic differences and the downstream effects.

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A Study of Urinary Uric Acid/Creatinine Ratio as an Additional Marker of Birth Asphyxia

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ABSTRACT

Perinatal asphyxia refers to an impairment of the normal oxygenation during parturition and the ensuing adverse effects on the fetus/neonate. It is one of the major causes of early neonatal mortality in India. Among the institutional births, incidence is 5% and accounts for 24.3% of neonatal deaths. It is an insult to fetus or newborn due to lack of oxygen (hypoxia) or lack of perfusion (ischemia) to various organs of sufficient magnitude and duration. The aim of the study was to observe the urinary uric acid to creatinine ratio in patients with perinatal birth asphyxia in a hospital setting. It was concluded that UUA/Cr concentration increase considerably after birth asphyxia, and the increase is associated with severity of HIE with a poorer outcome. Hence, UUA/Cr might have an important role in diagnosing and predicting the outcome of perinatal asphyxia.

Keywords: Birth asphyxia, perinatal asphyxia, uua/cr ratio.

INTRODUCTION

Perinatal asphyxia refers to an impairment of the normal oxygenation during parturition and the ensuing adverse effects on the fetus/neonate. It is one of the major causes of early neonatal mortality in India. Among the institutional births, incidence is 5% and accounts for 24.3% of neonatal deaths.¹ It is an insult to fetus or newborn due to lack of oxygen (hypoxia) or lack of perfusion (ischemia) to various organs of sufficient magnitude and duration.

Over 9 million children die each year during the perinatal and neonatal periods, and nearly all of these deaths occur in developing countries.² Birth asphyxia remains a major cause of global mortality, contributing to almost one quarter of the world's 3 million neonatal deaths and almost half of 2.6 million third-trimester stillbirths.³ Every year approximately 4 million babies are born asphyxiated; this results in 1 million deaths and an equal number of serious neurological consequences

ranging from cerebral palsy and mental retardation to epilepsy.⁴

In term infants, 90% of insults occur in the antepartum or intrapartum periods as a result of placental insufficiency. The remainder is postpartum usually secondary to pulmonary, CVS or neurologic abnormalities. The proportion of postpartum events is higher in premature neonates, especially in ELBW infants.⁵ According to a study conducted at Thailand, inappropriate antenatal care, vacuum extraction, male sex, prolapsed cord and 1 and 5-minute low Apgar scores, were significant risk factors for hypoxic ischaemic encephalopathy (HIE).⁶

Outcome of birth asphyxia depends on apgar score at 5 minutes, heart rate at 90 seconds, time to first breath, duration of resuscitation arterial blood gases and acid – base status at 10, and 30 minutes of age.⁷ Although apgar score does not exactly predict the neurodevelopmental outcome it is still the most feasible and practical to perform. The early outcome is either death/or presence of hypoxic ischaemic encephalopathy (HIE) stage I, II or III, according to Sarnat and Sarnat staging. Most of the HIE cases presented with depressed neonatal reflexes, seizures, lethargy, and papillary abnormalities. The common acid base disturbance was metabolic acidosis,

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observed mainly in babies with HIE stage III.⁸

This study is to evaluate the utility of urinary uric acid to creatinine ratio (UA/Cr ratio) as marker for early, easy and cost effective detection of perinatal asphyxia and also find out co-relate with birth asphyxia and its severity with ratio of uric acid & Creatinine.

AIMS AND OBJECTIVES

To observe the urinary uric acid to creatinine ratio in patients with perinatal birth asphyxia in a hospital setting.

MATERIAL & METHOD

This prospective case-control study was carried out in the Department of Pediatrics at Muzaffarnagar Medical College, Muzaffarnagar College name . All the term babies (39-41 weeks) born in the hospital or delivered outside, were admitted in NICU of the hospital with Birth Asphyxia were included. Babies with other major illness or any congenital abnormality were excluded.

RESULTS

The cases comprised of 33 (66.0%) male & 17 (34.0%) females, controls consisted of 29 (58.0%) male & 21 (42.0%) female. While 16 (32.0%) cases & 12 (24.0%) controls were ≤ 2.5kg at birth, 34 (68.0%) cases & 38 (76.0%) controls were >2.5kg at birth as observed and recorded in the table. Further, whereas mean of birth weight of cases was 2.73±0.62 kg the same was 2.83±0.55kg for control group. While 14 (28.0%) Inborn among cases & 35 (70.0%) Inborn among controls were afflicted with perinatal asphyxia, 36 (72.0%) Out born from among cases and 15 (30.0%) from controls were found afflicted with the disease.

Table no 1: Distribution of perinatal asphyxia among inborn and out born neonates

Neonates	Case (n=50)		Control (n=50)	
	Frequency	Percentage	Freq- uency	Percen- tage
Inborn	14	28.0	35	70.0
Out Born	36	72.0	15	30.0

A great variety of perinatal risk factors for birth asphyxia were enumerated in the table 2. Out of eight

number of risk factors for birth asphyxia mentioned in the table, major being Meconium Stained Amniotic Fluid (MSAF) 19 (38.0%), Assisted breech 14 (28.0%) and LOC(loop of cord around the neck)6 (12.0%). All other causes or **Risk factors** are commonly not encountered.

Table no 2: Distribution of perinatal risk factors for birth asphyxia

Risk factors	Case (n=50)	
	Frequency	Percentage
MSAF	19	38.0
Prolonged second stage	3	8.0
LOC(loop of cord around the neck)	6	12.0
Assisted breech	14	28.0
APH	3	6.0
Cord prolapsed	1	2.0
Difficult extraction by ISCS	2	4.0
Obstructed Labour	2	4.0

In medicine Sarnat staging, or the Sarnat Grading Scale is a classification scale for hypoxic-ischaemic encephalopathy (HIE), of the newborn, a syndrome caused by a lack of adequate oxygenation around the time of birth which manifests as altered consciousness, altered muscle tone, and seizures(table 3). Based on above while 10 (20.0%) cases were categorized under Stage-1, 31 (62.0%) under Stage-2 and 9 (18.0%) were placed under Stage-3. Of Sarnat Grading Scale

Table no 3: HIE staging distribution

HIE Staging	Frequency (n=50) (%)
Stage-1	10 (20.0)
Stage-2	31 (62.0)
Stage-3	9 (18.0)

Comparison between various parameters of cases and control group was made and results were tabulated. On perusal of the results we find that there was great difference in the mean values of Urinary uric acid (mg/dl), as well as the values of Urinary uric acid and creatinine ratio between the cases and controls (table 4). Variations in respect of both these values was statistically highly significant P<0.001. As for difference in the mean Urinary creatinine (mg/dl) values between the two groups the same was not significant P=0.536.

Table no 4: Comparison between various parameters of case and control group

Parameters	Case (n=50)	Control (n=50)	p-value
Urinary uric acid (mg/dl)	35.97±2.23	19.17±2.74	<0.001
Urinary creatinine (mg/dl)	12.13±3.14	11.74±3.14	0.536
Urinary uric acid and creatinine ratio	3.18±0.85	1.76±0.54	<0.001

Table 5, shows Co-relation with birth asphyxia and its severity with the ratio of uric acid & Creatinine was established and recorded in the table. On scrutiny we find that maximum no. of 31 neonates were under stage2 where Urinary uric acid and creatinine ratio was also maximum being 3.24±0.82. Under stage 1 & stage 2, where Urinary uric acid and creatinine ratio was 3.04±1.02 & 3.12±0.83 respectively, the no. of asphyxiated neonates were also 10 & 9 only. As such we may conclude that higher values of Urinary uric acid and creatinine ratio were attributable to the severity of perinatal asphyxia.

Table 5: Co-relate with birth asphyxia and its severity with ratio of uric acid & Creatinine

Parameters	Frequency (n=50)	Urinary uric acid (mg/dl)	Urinary creatinine (mg/dl)	Urinary uric acid and creatinine ratio
Stage 1	10	35.66±1.64	12.76±3.45	3.04±1.02
Stage 2	31	35.96± 2.36	11.85±3.11	3.24±0.82
Stage 3	9	36.28±2.47	12.34±3.12	3.12±0.83
p-value	-	0.833	0.721	0.806

DISCUSSION

Perinatal hypoxia is one of the leading causes of perinatal mortality in developing countries. Birth asphyxia is an important cause of static developmental and neurological handicap both in term and preterm infants (in 3 to 13% of infants with cerebral palsy (CP) have evidence of intrapartum asphyxia).⁹ In addition to pulmonary, renal, and cardiac dysfunction, HIE develops in one third of asphyxiated newborns.¹⁰ Mild encephalopathy carries a good prognosis, although in moderate and severe encephalopathy the risk of death or neurologic sequelae increases greatly.¹¹ Though there are more and more studies and understanding of the mechanisms leading to birth asphyxia, early determination of tissue damages due to birth asphyxia are still lacking. Brief hypoxia impairs cerebral oxidative metabolism leading to an anaerobic glycolysis to generate ATP. During anerobic conditions one molecule of glucose yields only 2 molecules of ATP as opposed to producing 38 molecules of ATP during aerobic conditions. During prolonged hypoxia, cardiac output falls, cerebral blood flow (CBF) is compromised and a combined hypoxic-ischemic insult produces further failure of oxidative phosphorylation and ATP

production, sufficient to cause cellular damage. Lack of ATP and increase excitotoxic cellular damage leads to an accumulation of adenosine diphosphate (ADP) and adenosine monophosphate (AMP), which is then catabolized to adenosine, inosine and hypoxanthine. If there is uninterrupted tissue hypoxia and there is also reperfusion injury, hypoxanthine is oxidized to xanthine and uric acid in presence of xanthine oxidase leading to an increase in uric acid production, which come out in blood from tissues and excreted in urine.

Present study found that perinatal asphyxia is one of the commonest causes of admission and morbidity. In our study, males (58%) were affected more than females (42%) which is similar to a study done by Siva Saranappa SB et al¹² where males were 70% and 67% respectively. It is also comparable with most other studies where male dominance was recorded, 55.88% in study by Dongol et al¹³ 55.5% in study by Kumar et al¹⁴, 61% by Shrestha et al¹⁵.

In this study, majority (100%) was appropriate for gestation age. Post maturity has been noted to be an important risk factor of birth asphyxia by earlier workers like Azam Multan which was not seen in this

study.¹⁶ Among the maternal risk factors associated with perinatal asphyxia, MSAF was the major contributing factor, accounting for 38% of the cases. This study is comparable with the study done by Lalsclottir et al¹⁷ in Iceland where 50% of the women of asphyxiated babies had meconium stain amniotic fluid. Bahubali Gane et al reported meconium stained amniotic fluid independently associated with perinatal asphyxia.¹⁸

The present study revealed significant increase in UA/Cr ratio in early spot urine samples from asphyxiated full term newborns and also proved positive correlation between the urinary UA/Cr ratio. In a study by Pallab Basu et al¹⁹ it was found that urinary UA/Cr ratio was significantly higher in cases than controls (3.1 ± 1.3 vs 0.96 ± 0.54 ; $p < 0.001$) which is similar to our study. Another study by Bader et al²⁰ also showed UA/Cr was higher in the asphyxiated group when compared to controls ($2.06 + 1.12$, vs $0.64 + 0.48$; $P < 0.001$) which is similar to our study. The results of the present study were in concordance with those of Reem Mahmoud and Dina El Abd²¹ who reported Urinary UA/Cr ratios were higher in asphyxiated infants (2.9 ± 0.73) when compared with the controls (0.72 ± 0.35 , $P < 0.001$).

Purine degradation products such as hypoxanthine, xanthine and uric acid are useful clinical indicator of tissue hypoxia.²² Detection of hypoxanthine and xanthine requires sophisticated techniques (like, High Performance Liquid Chromatography or HPLC)²³ and instruments which are impractical in maximum neonatal setup. But for urinary uric acid and creatinine estimations, only very simple instruments like photoelectric colorimeter or semi-auto-analyzer, simple reagents and simple techniques are required and can be acquired at low costs.

In the present study, majority 62% had Stage 2 followed by 20% stage 1 and 18% stage 3. It was seen that HIE stage I was the most common followed by HIE stage II and finally HIE stage III which is similar to present study. All Babies with HIE stage I had recovered and had a good prognosis while those with Stage III had all expired. Choudhary L et al in their study mostly babies were of stage 2 category and his study proved positive correlation between the urinary UA/Cr ratio and the severity (grading) of HIE ($P < 0.001$). UUA/Cr ratios were significantly higher in infants with severe HIE (3.61 ± 0.61) when compared with infants with moderate HIE (2.95 ± 0.98 ; $P < 0.01$) and those with mild HIE ($2.64 \pm$

0.25 ; $P < 0.001$). The values of the UA/Cr ratios in the mild and moderate HIE groups were also statistically significant ($P < 0.01$). These patterns were also followed in present study but statistically non-significant. This may be possible due to small sample size.

Kumar et al. conducted a study on 110 neonates comprising 55 cases and 55 controls born in Rajendra Institute of Medical Sciences. Spot urine sample collected within first day of life. A cut-off urinary uric acid to creatinine (UA/UCR) ratio value of >1.14 was taken as the cut-off level. The urinary UA/UCR ratios were found to be higher in asphyxiated infants (2.58 ± 1.09) when compared with those in the controls (0.86 ± 0.17 which also is in favour of our study).

Thus the UUA/Cr allows rapid recognition of asphyxia and assessment of its severity and the potential for short term morbidity of death.

CONCLUSION

Currently diagnosis of perinatal insults relies on adequate documentation of general medicine and obstetrics factors and on radiological and laboratory assessments. But early identification of infants at highest risk for developing seizures to hypoxic ischemia is critical, so that therapeutic strategies can be facilitated. Many specific biomarkers are being investigated now a day to assess damage after perinatal asphyxia in neonates of which UUA/Cr is non-invasive, sensitive, early and cost effective. The most common perinatal danger component was MSAF (38%).

So we conclude that UUA/Cr concentration increase considerably after birth asphyxia, and the increase is associated with severity of HIE with a poorer outcome. Hence, UUA/Cr might have an important role in diagnosing and predicting the outcome of perinatal asphyxia. There exists still a need to study these parameters in the context of therapeutic hypothermia and how the parameters change over the period of treatment.

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Incidence, Prevalence and Mortality of HIV/AIDS across Different Levels of Human Development Index: A Global Perspective

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ABSTRACT

Background: HIV/AIDS has asserted its pandemic status by claiming more than 35 million lives so far. The disproportionate burden of HIV/AIDS across the globe in terms of mortality, incidence and prevalence rates intrigued researchers to examine and evaluate the degree and direction of a two-way association between the global HIV/AIDS epidemic and national development across different levels of HDI to formulate the policies. The present analysis is to concentrate directional influence of HDI on these rates.

Data and Method: Age-standardized HIV/AIDS mortality, prevalence, and incidence rates of 179 countries were extracted from Global Burden of Disease Study 2015. The human development index along with its 4 components were obtained from Human Development Report 2016. The association between each of the rates and HDI was judged by Spearman correlation, Linear and Quantile regression analysis, and the Kruskal-Wallis test.

Results: HIV/AIDS mortality, prevalence, and incidence rates were found to be inversely correlated with national HDI ($r = -0.707, -0.677, -0.557$ respectively; $P < .001$), as well as the 4 indicators of HDI. Countries in Low HDI group were found to experience higher burden of HIV/AIDS in terms of these rates than that of Medium, High, and Very high HDI countries.

Conclusions: Lower development status characterized by low HDI values was found to increase the burden of HIV/AIDS around the world. Higher levels of deprivation in terms of Health, Education, and Economy were not only found to affect the overall well-being but might just raise the severity of HIV/AIDS across the regions. Hence for HIV/AIDS control or eradication, development could be the key aspect; hence recommended that special attention should be paid to develop an enabling environment in the countries of lower HDI groups.

Keywords: HIV/AIDS, Mortality, Incidence, Prevalence, HDI, Quantile regression

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INTRODUCTION

Since the first reported case in the second half of twentieth century, Human Immunodeficiency Virus (HIV) leading to Acquired Immunodeficiency Syndrome (AIDS) had diversified prevalence, incidence and mortality rates across different regions had intensified

attention of WHO and a huge number of medical and social scientists. In few decades since first outbreak, it shaped to pandemic status by claiming more than 35 million lives so far. As per WHO recent published factsheets, nearly 1 million people died from HIV related causes during past 1 year and currently the number of people living with HIV has hit approximately to an alarming level (36.7 million) whereas another 1.8 million people reported to be newly infected in 2016 globally.¹ Out of an estimated 6000 new infections that occur globally each day, two out of three are in sub-Saharan Africa with young women continuing to bear a disproportionate burden.² Though between 2000 and 2016, the new cases of HIV infection fell by 39%, the incidence rate is still high among key populations and their partners.

In order to capture the variability in the spread of HIV/AIDS and to reassess the extent of the lethal threat it poses to the entire civilization and its development; prominent gaps were found to exist between developed, developing and least developed countries for incidence, prevalence and mortality in different age groups since the beginning of twenty-first century. Only, Sub-Saharan Africa countries accounted for almost two thirds of the global burden of new HIV infections. Through globalization of Antiretroviral Therapy (ART) and improved coverage of health facilities supported by National HIV programmes with better partners, it is expected that the wide gap in the incidence, prevalence and mortality related to HIV/AIDS between developed, developing and least developed countries should be narrowed. The reality, however, suggest that with the coexisting inequality and instability in different dimensions of lives across different regions as reflected by social, economic and health indicators, there would always be a considerable amount of differences in the levels and patterns of HIV/AIDS epidemic across nations.

Human Development Index which has been constructed to measure the average achievements in three major dimensions namely Health, Education and Standard of living is designed to capture the variability in people's lives and overall well-being. Countries and regions with relatively poor performance with respect to HDI can be characterized by the poorer access to education and health facilities, lack of infrastructure, prevalent security risks, poverty and persistent endemic diseases as compared to those countries and regions

which have made sustainable advancements to ensure human well-being. Persistent diseases and its high prevalence, incidence and mortality on the other hand impede development and hence reverse the social and economic gains that these countries are striving to attain.³ As we could see in the case of Sub-Saharan Africa, the high prevalence of HIV/AIDS in adult working age population was considered to be one of the leading arguments for that region being deprived of earning demographic dividend.⁴ In other words, it is a disease that particularly hits those who should be economically productive, and thus threatens not only health, but also the economic stability and potential of a country.⁵ So far, the studies associating HIV/AIDS and human development had been carried out to assess macro implications of the disease either in African continent or in some of the African countries with devastating history of HIV/AIDS on purely regional basis.⁶⁻⁸ One such study affirmed the need to look into the impact of HIV/AIDS on human development in Africa extending beyond health issues and it asserted that HIV/AIDS should and must be seen as a global development concern, affecting education and knowledge acquisition, income and social status, productivity and economic growth, and other direct and indirect components of human development such as gender equality and human rights.³

Through this paper we would like to shed some light on three different dimensional components of the current trajectory of HIV/AIDS in terms of incidence, prevalence and mortality rates across 179 countries and review the degree and direction to which HIV/AIDS epidemic is associated with human well-being that is measured by HDI and how the incidence, prevalence and mortality rates vary across these 179 countries as we classify them into 4 HDI groups.

OBJECTIVE

To present the overall variation of HIV/AIDS epidemic in terms of Incidence, Prevalence and Mortality rates for 179 countries and to provide quantitative evidence in support of the existing association between each of these rates with each component dimensions of HDI. Further, to propose dynamic models to predict the conditional mean and quantiles for Incidence, Prevalence and Mortality rates separately by taking HDI as predictor variable. And, finally, to depict the variability of the above rates across these 179 countries as well as across the 4 HDI groups (Very High, High, Medium and Low HDI groups).

DATA AND METHODOLOGY

Global HIV/AIDS epidemic

Mortality, prevalence and incidence rates of HIV/AIDS for 179 countries were extracted from Global Burden of Disease Study 2015.⁹

HDI

HDI is a composite index that measures the average achievements in three basic dimensions e.g. Life Expectancy Index (LEI), Education Index (EI) and Income Index (II) derived from Life Expectancy at Birth (LEB), Mean Years of Schooling (MYS), Expected Years of Schooling (EYS) and Gross National Income per capita (GNI_{pc}) and was obtained from Human Development Report 2016¹⁰ categorized as Very High (HDI \geq 0.800), High (0.800 > HDI \geq 0.700), Medium (0.700 > HDI \geq 0.550), and Low (HDI < 0.550) HDI groups.

STATISTICAL ANALYSIS

The median values and inter quartile ranges were calculated and Kolmogorov-Smirnov test for each variable under study were performed to check the normality¹¹ and at the rejection of null hypotheses, Spearman correlation coefficients were calculated separately between each of these rates and HDI and its 4 indicators in order to establish the association. Further,

Table 1: Medians, Interquartile ranges and Kolmogorov-Smirnov test results of global HIV/AIDS epidemiological parameters per 100,000 individuals

Global HIV/AIDS epidemic	n	Median	Interquartile Range	Kolmogorov- Smirnov test (P value)
Mortality	179	4.119	0.596-20.307	.000
Incidence	179	12.431	3.114-49.835	.000
Prevalence	179	133.99	35.056-696.023	.000

The median, interquartile range corresponding to the HIV/AIDS mortality, incidence and prevalence rates across these 4 HDI groups presented in table 2 indicated that all the three rates were increasing significantly as one move from high HDI to low HDI. The median mortality, incidence and prevalence rates were 0.375, 2.514 and 44.87 among countries of very high HDI while these were 52.126, 91.551 and 1232.03 among low HDI countries.

Table 2: HIV/AIDS mortality, incidence and prevalence rate across the categories of Human Development Index

HDI category	No. of countries	Mortality	Incidence	Prevalence
Very High	48	0.375 (0.208-1.301)	2.514 (1.21-3.93)	44.87 (19.24-101.91)
High	49	4.119 (1.23-8.95)	12.138 (3.994-23.75)	123.87 (31.426-335.24)
Medium	41	6.889 (2.342-33.701)	20.485 (7.20-81.23)	171.98 (66.70-1016.18)
Low	41	52.126 (20.924-115.198)	91.551 (36.297-252.601)	1232.03 (511.005-2914.98)

linear regression and proposed separate linear regression models performed to predict the conditional mean of each of the 3 dependent variables (HIV/AIDS mortality, prevalence, and incidence rates) considering HDI as the independent variable (HDI). In order to understand the average effect of HDI at different quantiles of each of the dependent variable's conditional distribution, quantile regression analyses were performed.¹²

Kruskal-Wallis test followed by pairwise comparisons were carried to examine whether the differences in HIV/AIDS mortality, prevalence and incidence rates across the 4 HDI groups were statistically varying.¹³ Statistical analyses were performed using SPSS 20 (IBM-SPSS Inc, Armonk, NY) and STATA (Stata Corp, College Station, Texas). P values < .05 were considered significant.

RESULTS

HIV/AIDS epidemic and national HDI

Each of the three rates e.g. mortality, prevalence, and incidence rates indicated (Kolmogorov-Smirnov test) non-normality of their distributions across the countries (P < .05). As indicated in table 1 of the listed countries 95% observed prevalence of HIV/AIDS were between 35.056 to 696.023 while annual incidence and mortality rates were between 3.114 to 49.835 and 0.596 to 20.307 respectively.

The pairwise comparisons between HDI categories revealed that HIV/AIDS related mortality and incidence rates differed significantly between each except between High and Medium HDI groups whereas prevalence do differ significantly between each of the categories of HDI except between Very High and High HDI as well as High and Medium groups.

Table 3: Spearman correlation coefficients between Human Development Index (HDI), its 4 indicators, and HIV/AIDS epidemiologic parameters

Variable	Mortality	Incidence	Prevalence
HDI	-0.707***	-0.677***	-0.557***
Life expectancy at Birth, y	-0.753***	-0.727***	-0.613***
Mean years of schooling	-0.617***	-0.594***	-0.485***
Expected years of schooling	-0.660***	-0.627***	-0.520***
Gross national income per capita, \$	-0.622***	-0.593***	-0.480***

The negative and highly significant value of correlation coefficients revealed that each of the 3 rates were inversely correlated with HDI as well as with each of its indicators.

Among the 4 indicators of HDI the association of each of the rates was highest with LE (r = -0.753 with mortality, -0.727 with incidence, and -0.613 with prevalence) and lowest with GNI (r = -0.622 with mortality, -0.593 with incidence, and -0.480 with prevalence). table 3, fig 1

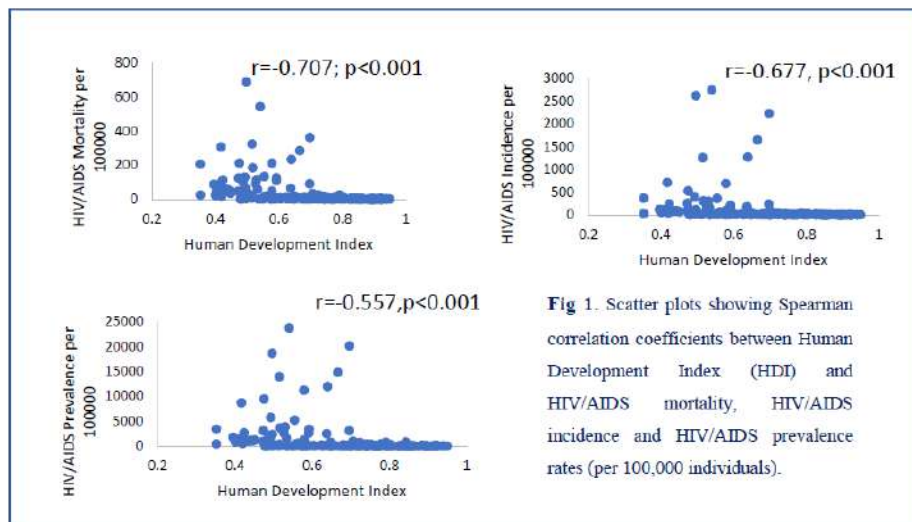


Fig 1. Scatter plots showing Spearman correlation coefficients between Human Development Index (HDI) and HIV/AIDS mortality, HIV/AIDS incidence and HIV/AIDS prevalence rates (per 100,000 individuals).

Table 4: Comparison of linear and quantile regression results using HIV/AIDS mortality, incidence and prevalence rate as dependent variables

Dependent Variable	Ordinary least squares coefficient estimate	Quantiles				
		0.10	0.25	0.50	0.75	0.90
Mortality	-222.547***	-2.091	-19.649***	-58.804***	-167.786***	-379.914*
Standard error	38.688	1.55	4.693	12.245	48.071	147.058
Incidence	-604.022***	-15.250***	-40.797***	-134.410***	-257.179**	-914.380
Standard error	175.527	3.866	9.204	23.971	92.377	699.14
Prevalence	-6613.414***	-37.813	-424.805**	-1736.044***	-3618.695**	-13231.43
Standard error	1571.27	31.960	135.366	324.393	1355.662	7665.4

From table 4, The results of Linear and Quantile regression analyses indicated that all the OLS coefficients were significant whereas the coefficients at .10 quantile corresponding to the conditional distribution of mortality and prevalence and at .90 quantile corresponding to the conditional distribution of incidence and prevalence were found to be insignificant. It was also seen that at .25, .5 and .75 quantiles, HDI had significant inverse effect on HIV/AIDS mortality (b=-19.649, -58.804, -167.786; P<.001), incidence (b=-40.797, -134.410, -257.179; P<.001 and P<.01)) and prevalence (b=-424.805, -1736.044, -3618.695; P<.001 and P<.01) whereas at .10 and .90 quantile, HDI had no significant effect on the conditional distribution of prevalence (b=-37.813, -13231.43; P<.05).

DISCUSSION

Current epidemiology of global HIV/AIDS in terms of mortality, prevalence, and incidence rates, it was transparent that significant disparity existed in the burden of HIV/AIDS across different levels of Human Development table-2. HIV/AIDS related mortality, prevalence, and incidence rates were found to be inversely correlated with national HDI and its 4 indicators (i.e. life expectancy at birth, mean years of schooling, expected years of schooling, and GNI per capita). The situation worsened in case of those countries which belong to the lower HDI group according to the existing classification; that comprises countries mostly of Sub-Saharan Africa and thus the disproportionate burden of HIV/AIDS in terms of mortality, incidence and prevalence became more severe with the lower level of overall well-being as characterized by lower levels of HDI values.

HIV/AIDS related burden and different dimensions of HDI are expecting to exert a 2-way force; on one hand, the burden of HIV/AIDS directly affects important health and demographic indicators such as mortality rates and life expectancy resulting to bring down the National HDI, whereas poverty, illiteracy and poor health facilities and infrastructure further aggravate the HIV/AIDS related mortality, incidence and prevalence rates. It was estimated that in the 7 most affected countries in Africa, life expectancy declined by 12.1 years by 1995-2000 and expected to decline further by 29.4 years by 2010-2015.³ Analysis of global inequality of life expectancy showed that 6 years of the difference in life expectancy between Africa and North America, the two extreme continents in terms of health and wealth, is due

to HIV/AIDS.¹⁴

The OLS regression asserted that the National HDI had significant inverse effect on each of the rates i.e. with increase in the National HDI values, the corresponding national rates on HIV/AIDS mortality, incidence and prevalence would decrease. The Quantile regression analyses revealed that HDI was significantly negatively associated with HIV/AIDS mortality, incidence and prevalence rates at different quantiles, though as we move from .10 quantile to .90 quantile, the average inverse effect of HDI at these quantile points corresponding to the conditional distribution of these 3 rates were found to grow stronger.

The 2-way interaction between education and HIV/AIDS has been extensively discussed.^{3,8,15} In the present study, it was found that years of schooling were reversely related to HIV/AIDS epidemic, hence needs to be enhanced especially in low- and medium-income countries being an essential component for human development. HIV/AIDS is one of the culprit reversing the trend toward the achievement of universal primary education in most African countries caused by death of AIDS parents resulting to economic status deterioration leading to increased number of children out of school (especially girls) that further impact on de-education of the future generation.^{3,15} Undoubtedly, education can make a significant contribution to the prevention of HIV transmission and is the most important vehicle to combat HIV/AIDS.¹⁶⁻¹⁷

Many of the researchers have described AIDS as a disease of poverty and continue to make the vicious circle with the loss of young wealth-producing adults and the high cost of caring for those with AIDS. More than 60% of people living with HIV inhabit the world's poorest region: sub-Saharan Africa.¹⁸ Even with the help of global organizations such as UNAIDS, a nation with low economic growth can hardly pay the cost of highly active antiretroviral therapy and prevention programs.¹⁹ Hence, the cyclical relationship is clear: poverty makes people more vulnerable to AIDS and AIDS generates poverty. This was verified in this study by the negative correlation between GNI per capita and HIV/AIDS mortality, prevalence, and incidences rates.

AIDS has been long considered as a disease at the core of a vicious circle, whereby the downstream effects of AIDS on socio-economic status and the upstream

effects of socioeconomic status upon the risk of acquiring HIV.¹⁸ The upstream effects were verified in our study with negative regression coefficients of HDI on HIV/AIDS mortality, prevalence, and incidence rates, which may be due to the effects of poor education and poverty on HIV/AIDS.

CONCLUSION

Higher levels of deprivation in terms of Health, Education, Economy responsible for HDI are to affect the overall well-being by accelerating the spread of HIV/AIDS. Hence in order to control the rates of transmission in less development regions, HIV/AIDS sustained effective method of prevention and control programs need to be intensified.

Ethical Clearance: Not required.

Conflict of Interest: None

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Study to Assess the Social and Economic Impact of Alcohol in a Peri-Urban Area of Tamil Nadu

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ABSTRACT

Introduction: Alcoholic beverages have been used in human societies since the beginning of recorded history. There is an exponential relationship between the amount of alcohol consumed and criminal behavior, including drunken driving and legal arrests. The cost associated with alcohol amounts to more than 1% of gross national product in high income and middle-income countries, with the costs of social harm constituting a major proportion in addition to health cost. **Methodology:** A community based cross sectional study was carried out using pretested questionnaire method to find out social and economic impact of alcohol in study population. Study population included all alcoholics aged between 18 and above who visited UHTC for other ailments & were willing to participate during the period and data analyses done with SPSS ver. 15.0. **Result:** Among 212 individuals, 37% alcoholics were involved in public commotion, rash driving, nearly 90% of them utilize their family income for alcohol consumption, 65% of them were in financial crisis and lost their job. On family income basis, the economic impact of excessive alcohol consumption is approximately 20-30 %.

Keywords: Alcohol, Impact, Social, Economic, Urban, Tamil Nadu.

INTRODUCTION

Alcoholic beverages have been used in human societies since the beginning of recorded history¹. The patterns of alcohol intake around the world are constantly evolving and alcohol is ubiquitous today. Increase in the average volume of drinking are predicted for the most populous regions of the world in South-east Asia including India¹. Cultural differences apparently influence the pattern of alcohol consumption⁴. In addition, alcohol is linked to categories of disease whose relative impact on the global burden is predicted to increase. The crucial need from a public health perspective, is for regular means of coordination whereby prevention of alcohol related problems is taken fully into account in policy decisions about alcohol control and regulation in market for alcoholic beverages.

Alcohol and tobacco are important products of global addictive demand and have experienced a rapid increase in per-capita consumption. The fastest growth has been in developing countries in the Asian subcontinent where the per capita pure alcohol consumption has been

increased by over 50 % between 1980 and 2000¹. Alcohol is casually related to more than 60 medical conditions. Overall, 3.5 % of global burden of disease is attributable to alcohol which accounts for as much death. Although the recorded alcohol per capita consumption has fallen since 1980 in most developed countries, it has risen steadily in developing countries so in India¹. The per capita consumption of alcohol by adults more than 15 years in India is increased by 106.7% between 1970-72 and 1994-96¹.

The pattern of drinking alcohol in India has changed from occasional and ritualistic use to social use. Today, the common purpose of drinking alcohol is to get drunk. Financial constraints among patients suffering from excessive alcohol use may hamper the ability to obtain the routine healthcare and further delay the diagnosis of alcoholic liver disease². Because of this, alcohol related problems are usually not detected until hepatic decompensation occurs. There is an exponential relationship between the amount of alcohol consumed and criminal behavior, including drunken driving and legal arrests¹.

Alcoholic beverages normally serve both the interest of public health and welfare, and simultaneously gain extra revenue for the government. Household expenditure studies in 1960s found families spending 3% - 45% of their income on alcohol³. Excessive alcohol consumption causes premature deaths (average of 79,000 deaths annually); increased disease and injury; property damage from fire and motor vehicle crashes; alcohol-related crime; and lost productivity⁴. The net effect of alcohol on health is detrimental, with estimated of 3.8% of all global deaths and 4.6% of global disability-adjusted life-years attributable to alcohol⁵. Disease burden is closely related to average volume of alcohol consumption, and, for every unit of exposure, is strongest in poor people and in those who are marginalized from the society. The cost associated with alcohol amount to more than 1% of gross national product in high income and middle-income countries, with the costs of social harm constituting a major proportion in addition to health cost⁵.

METHODOLOGY

A community based cross sectional study was carried out from March to August 2016 at Urban Health Centre Samayapuram, which is located in the Urban field practice area of CMCHRC, Trichy district in Tamil Nadu. The study was conducted after obtaining clearance from Institutional review board. Study population included all alcoholics aged between 18 and above who visited UHTC for other ailments & were willing to participate during the period. Interviews were anonymous and data remained confidential throughout the study. Each participant was informed about the purpose of the study and informed consent was obtained from each respondent. Data was collected using pre tested and semi structured questionnaire including, Alcohol Use Disorder Identification Test (AUDIT)⁶. The questionnaire was developed based on the information gathered from literature. The questionnaire was first prepared in English and explained to the study population in Tamil. Data was collected by personal interview method. The data from the questionnaires were entered and analysed in SPSS 15.0 Trial version.

RESULTS

Table 1: Sociodemographic profile of study population

Variables	Categories	No. of Subjects	Percentage (%)
Age in yrs.	< 20	22	10.4
	21- 40	156	73.5
	41- 60	23	10.8
	>60	7	3.3
	Total	212	100
Gender	Male	201	94.8
	Female	11	5.2
	Total	212	100
SES (Modified BG Prasad Classification)	Upper	14	6.6
	Upper Middle Class	17	8.2
	Middle Class	25	11.7
	Lower Middle Class	54	25.4
	Lower Class	102	48.1
	Total	212	100
Education	Illiterate	98	46.2
	Completed School	67	31.6
	Graduate/ Diploma	30	14.1
	Masters	17	8
	Total	212	100

Majority of the study population were in the age group of 21 to 40 (73.5%) years and were males (94.8%). Nearly three quarters of the study population belonged to lower class (48.1%) and lower middle class (25.4%). About half of the study population were illiterates (46.2%) Table 1.

Table 2: Alcohol consumption pattern of study population

Variables	Categories	No. of Subjects	Percentage (%)
Type of Alcohol Beverage	Beer	34	16.0
	Brandy	103	48.5
	Rum	56	26.4
	Whiskey	17	8.0
	Others	2	0.9
	Total	212	100
Frequency of Alcohol Consumption	Occasionally	5	2.3
	Monthly	57	26.8
	Weekends	112	52.8
	Daily	38	17.9
	Total	212	100
Quantity of Alcohol consumed	<2 drinks (< 60 ml)	55	25.9
	3-4 drinks (90 - 120 ml)	108	50.9
	5-9 drinks (150 - 270 ml)	43	20.2
	>10 drinks (>300 ml)	6	2.8
	Total	212	100

It was observed that nearly half of the study population consumed Brandy (48.5%), followed by Rum (26.4%). Majority admitted to consume alcohol only during the weekends (52.8%). About 17.9% of study population admitted to daily consumption of alcohol. Nearly half of the study population consumed on an average of 3 -4 drinks (90 – 120 ml) per sitting Table 2.

Table 3: Social Impact of Alcohol consumption

Variables	Categories	No. of Subjects	Percentage (%)
Daily Routine activities affected due to alcohol consumption	Never	39	18.3
	Rarely	68	32.0
	Monthly	77	36.3
	Weekly	23	10.8
	Daily	5	2.3
	Total	212	100
Got Injured in drunken state	Never	132	62.2
	Within this year	31	14.6
	Previous year	49	23.1
	Total	212	100
Conflicts with family members	Never	56	26.4
	Occasionally	102	48.1
	Frequently	54	25.4
	Total	212	100
Fight in public places	Never	76	34.4
	Occasionally	110	51.8
	Frequently	26	12.2
	Total	212	100
Driving Two wheelers while Drunk	Never	103	48.5
	Occasionally	89	41.9
	Frequently	20	9.4
	Total	212	100
Fined for Drink and Drive	Yes	61	28.7
	No	151	71.3
	Total	212	100
Changed Job due to alcoholism	Yes	70	33.1
	No	142	66.9
	Total	212	100
Consume Alcohol during working hours	Never	145	68.3
	Occasionally	47	22.1
	Frequently	20	9.4
	Total	212	100

Only around 2.3% of the study population admitted that their daily routine activities were affected due to alcohol consumption. Nearly 38% of the population had an injury during drunken state. Nearly three fourth of the study participant’s family were concerned about the drinking problem. Around 25% of the participants had frequent conflicts with the family members due to drinking. About 12% of the study population gave

history of having frequent fights in public places. One third (33%) of the study population were involved in road traffic accident. Nearly 10% of the study subjects admitted to driving while they were drunk. About 28% of the subjects gave a history of being fined for drunken driving. One third of the study subjects had a job change because of alcohol consumption. About 10% of the study subjects admitted to alcohol consumption during working hours. (table 3)

Table 4: Economic Impact of Alcohol consumption

Variables	Categories	No. of Subjects	Percentage (%)
Source of expenditure for Alcohol	Own	26	12.3
	Family member	156	73.5
	Friends	30	14.2
	Total	212	100
% of Family Income spent for Alcohol	< 20	61	28.7
	20 – 30	79	37.2
	30 – 40	48	22.6
	40 – 50	16	7.5
	>50	8	3.7
	Total	212	100
Family financial problems	Yes	139	65.5
	No	73	34.5
	Total	212	100
Medical Expenses due to Alcoholism (% of Total Income)	< 20	4	1.8
	20 – 30	104	49.1
	30 – 40	93	43.8
	40 – 50	9	4.2
	>50	2	0.9
	Total	212	100
Amount spent on Alcohol per month in INR	Less than 1000	78	36.8
	1000 – 2000	115	54.2
	More than 2000	19	9.0
	Total	212	100

The predominant source of expenditure for buying alcohol was from family members (73.5%). Nearly 11% of the study subjects spent more than 40% of their total family income on alcohol consumption. Majority of the study population admitted to have financial problems due to alcoholism. Nearly 5% of the study subjects spent more than 40% of their income on meeting the medical expenses related to alcoholism. About 9% of the study population spent over 2000 INR per month on alcohol consumption.(Table 4)

DISCUSSION

Age and gender distribution of alcohol users in the present study is similar to study conducted by Sujit D Rathod in Madhya Pradesh⁷. With regard to literacy status the findings of the present study are in contrast to the study conducted by Sujit D Rathod, who found nearly 60% of their study population had less than 11 years of schooling, whereas illiterates comprised of 28% compared to 46% in the present study.⁷ with regards to socio-economic status in the present study nearly 74% belonged to low socio-economic class which is similar to findings of study conducted by Sujit D Rathod⁷.

In the present study nearly 18% of study population admitted to daily consumption of alcohol, which is almost similar to the study conducted by A. pillai in Goa⁸ who found that about 29% of the subjects gave history of heavy episodic drinking per month.

In the present study, nearly 66% of alcoholics were in financial crisis which comparatively decreased from 85% in previous study. Each alcoholic spend nearly 20-30% of their income for medical expenses due to alcohol consumption, on the other hand in our reference study nearly 50-65% income were spend by alcoholics for medical expenses⁹. In previous study, only nearly 25% alcoholics were indulged in causing self-harm or harm to others, rash driving and failed to do their routine, in our study nearly 37% were involved in causing self-harm and harm to others, specifically 36% were failed to do routine and indulged in rash driving¹⁰.

In a study conducted by Prackash.C et.al, 32.8% of the study population consumed alcohol 6 days in a week on an average, in contrast in the present study more than half of the study population consumed alcohol during weekends¹¹. A study conducted in eastern India found that average expenditure among ALD patients on alcohol was Rs. 3800/month, in contrast in the present

study it was observed that around 9% of the population were spent > 2000 INR per month on alcohol¹². Eleven % lost their job, and 7 % sold immovable property, in the present study it was observed that 33% of the study population admitted to frequent job change because of alcoholism. Besides, 52 % had disturbed social and family life, 34 % abused their spouse, 20 % suffered accidents, and 37 % indulged in physical violence in contrast the present study showed that 74% of them had conflicts with family members & 64% had fights in public places because of alcoholism. It was observed that 33% of the study population had met with accidents following alcohol consumption¹².

CONCLUSION

Predominance of low socio-economic classes and low literacy levels as found in the present study is a matter of concern. Disruption of social life because of alcohol as found in the present study is another important issue that needs further attention. Evidence – based strategies for reducing excessive drinking should be implemented. Health awareness programs have to be effectively implemented to decrease social burden of alcohol.

Conflict of Interest- None declared

Source of Funding - Self

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Economics of Sustainability – A Theoretical Perspective

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ABSTRACT

Success of the human life relies on the sustainability of people's standard of living. Defining the term sustainability is a difficult task as it is complex in nature. This study is an attempt to project, new hypotheses to the term sustainability, by using natural and warranted growth rates. The unique concept of this research is to introduce a new concept called 'SNS Measurement' for Sustainability. This study also throws light on the link between the present and future generation in terms of sustainability in natural resources. Production is meaningful only when consumption is made and consumption without production leads to scarcity. Therefore the present theory initiates the concept of sustainability which involves in three aspects, firstly, the problems of distribution equity between inter and intra generations, secondly linkage of productions and production efficiency and finally, replacement of natural and artificial resources.

Keywords: Sustainability, Natural resources, SNS Measurement, Environment, Future.

INTRODUCTION

The concept of sustainability of sustainable growth is very complex, subjective and an abstract. Common men do not know what it may mean and what its implications might be. UNESCO document states that every generation should leave water, air and soil and other natural resources as pure and unpolluted to the future generation. It precisely states that each generation should leave un-diminished flora and fauna to the younger generation. Does it mean that present generation should not construct buildings, road and dams? Is it our moral obligation to preserve our flora and fauna to the future? Is it our sacrifice to the future generation. Is it compulsory to share the environment with the future? In fact it is an obligation to conduct ourselves in such a way to leave the undamaged environment to the future. It implies that we should not satisfy ourselves by impoverishing our successor. But we do not know the present optimum consumption that preserves an unpolluted environment to the future. Another point which relevant to this is that, we do not know the type of technology and consumption pattern and requirement of the future generation. No idea about the taste and preference of future generation. One thing, however, we must realize that we should not live at the expense of future well-being. Sustainability is a problem because each of us knows that we profit at the expense of the future⁵. In fact, we have free ride on each

other and we have free ride on the future. Environment is the base for our survival but it should not become the matter of survival for the future. It is like a legacy, one should preserve the future.

ISSUES IN SUSTAINABILITY

Sustainability is a matter of distributional equity between the present and the future. It is about sharing of well-being between present generation and future generation. It is a matter of promoting our welfare without affecting the well-being of the future generation. Sustainable development is a point at which the needs of the present generation are fulfilled without compromising the ability of future generation to meet their own needs⁶. Achievement of sustainability is equity between both within the generation and across the generation, i.e. intergenerational equity and intra generational equity. It is the optimum utilization of natural resources in the present and future. It is a matter of equity rather than efficiency according to Howarth and Norgaard.³

People, by and large, put more emphasis on equity between generation, rather than equity across a given generation, it does not mean that latter is not important. The World Commission on the Environment and Development (The Brundtland report) in 1987 stated that both intergenerational equity and intra generational

equity are important. Those who talk and raise the issue of sharing river and ground water, forget the share, they must leave to the future generation. Now, the intergeneration environmental disputes are in the limelight. However sustainability demands more attention on the equitable shares between the generations.

When we use up some resources which are replaceable whether it is mineral, animal or any other environmental amenity, then we should provide replacement for equal value. The substitute that we provide in exchange could be knowledge, could be green technology etc. If there is no replacement there will be environmental degradation. Therefore the environment needs public policy, because each of us knows the repercussion of environmental degradation and it is burning issue today.

The solutions require for the estimation of natural and manmade capital requirement for both present future generation. It is in postponement of current consumption to the future generation. The issue of sustainability may be more appropriate to the developed countries. Because they have reached the stage of high mass consumption and further exploitation is not necessary. Whereas in the case of developing countries, the basic needs are yet to be fulfilled. Therefore the present generation in the UDC can go further and employ the resource to overcome poverty and vast income inequality without damaging the environment. The paradox arises because if we concern about people who are currently poor, that will translate into an increase in current consumption not into an increase in investment. Therefore thinking about poor people today will be disadvantageous from the point of view sustainability.

It is a serious problem even in UDCs if the technology of the production process is not nature friendly. Here comes the importance of efficiency of production function and nature and pattern of consumption. However, natural capital can be exploited by man, but cannot be created by man. According to thermodynamic school, natural capital and manmade capital are in most of the cases complements rather than substitutes². They stated further that natural capital such as land, animals, aquatics, non-renewable and renewable energy and mineral stock are primary inputs and manmade capital and labourers are the agents of transformation. Sustainability intended are very high within the group and it is very low between the groups. Sustainability as a matter of distributional equity between the present and

the future; it becomes the issue of saving and investment. It is the choice between current consumption and future consumption. Then one has to find out the technology which reduces the wastage in the production process. Hence, the concept of sustainability involves the problems of distribution equity between inter and intra generations and productions and production efficiency and replacement of natural and artificial resources.

MEASURES OF SUSTAINABILITY

According to Hartwick-Solow, so long as the stock of capital did not decline overtime, non-declining consumption was possible. The stock of capital could be held constant by reinvesting from all non-renewable resources. Extraction in man-made capital, is built up for replacement. Man and natural capital are assumed to be perfect substitute under their model.

PEARCE-ATKINSON MEASURE OF SUSTAINABILITY

They have proposed an indicator of weak sustainability criterion viz., PAM. To them,

$$PAM = a - C_m/Y - C_n/Y$$

Where

a is Marginal Propensity to Save, C_m = Manmade capital and C_n = natural capital

The economy is sustainable if $PAM > 0$. The equation states that PAM will be positive if MPS exceeds the sum of depreciation on manmade and natural capital. According to David pearce¹ and Giles D Atkinson(1993), sustaibility estimation to countries like Czechoslovakia, Germany, Hungary, Japan, Netherland, Poland and the USA passed the weak test ($PAM > 0$). Mexico and the Philippines are classed as “Marginal” ($PAM = 0$) while Ethipia, Indonesia, Madagascar, Malawi and Nigeria are unsustainable ($PAM < 0$). Recently, Atkinson and Proops (1998) adopted the PAM measures to include imports and exports.

‘SNS MEASUREMENT’ OF SUSTAINABILITY

God has erected the universe and the environment. Natural capital such as land, water, atmosphere and minerals are gifts of nature. God has created nature along with the man kind. Man has to produce, the basic needs for his comfort. God has created land but man has to employ land to produce food grain cloth and

shelter. In the process of exploration and employment of natural resources, man has to be careful to leave the undamaged environment to the future generation. Optimum utilization of natural resources may leave due share to the future. Full employment equilibrium income of the economy indicates optimum utilization of natural resources. We cannot suffer today without employing the available resources for the sake of future generation. We cannot starve today for the sake of tomorrow's prosperity.

At the same time we cannot use the environmental resources by damaging it or going beyond her capacity. No one can go beyond the nature or conquer the nature. When we reach the peak there comes the down fall. That is life cycle and it is unavoidable law of life. Any economy is subjected to fluctuation. Therefore equality between demand and supply, saving and investment would indicated the economics of sustainability.

The economics of sustainability exist when $G = G_n = G_w$. That is the Actual growth rate = natural growth rate = Warranted growth rate. At this point the present societies fulfil its needs and reach the optimum point. Beyond this point there would not be sustainability. The points of equality between S and I is the optimum but unstable. That is $S=I$, the starting point of un- sustainability. Therefore investment must be less that saving. Sustainability is very high if $S=K$. If it becomes $S=k$ or $S=I$, it is the point of sustainability. This can be explained with the following equation. For sustainability according to

Therefore, for sustainability the growth rate of capital must be equal to the growth rate of income which satisfy the economic equilibrium too. What the researcher concludes is that the economic equilibrium itself indicates the sustainability of the economy. This also can be explained graphically.

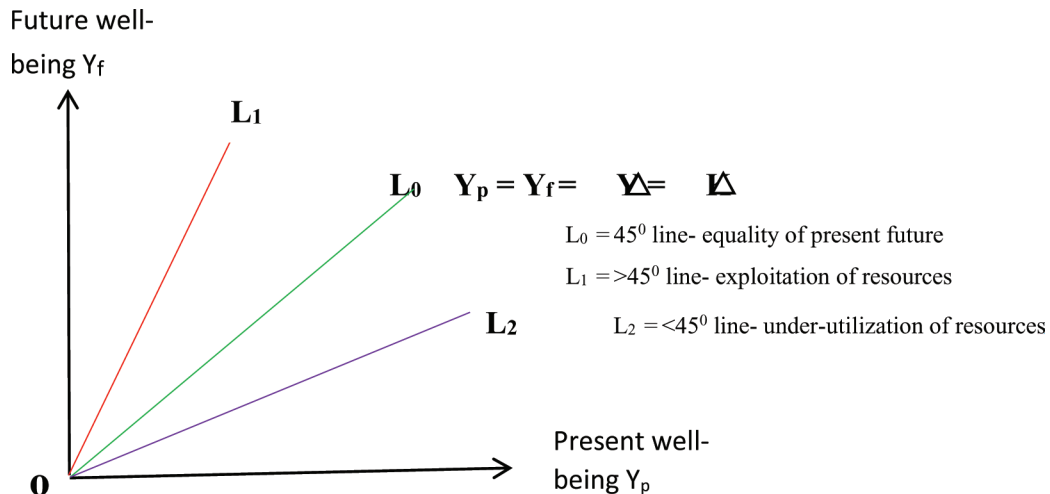


Figure 1. SNS Measurement

$$PAM = S/Y - K_m/Y - K_n/Y > 0 - 1.$$

Let $K_m/Y + K_n/Y = K/Y$ and rewrite equation 1

As $S/Y - K/Y > 0$ -2 (or)

$$S/Y > K/Y \quad -3$$

$$S > K \quad -4$$

Equation 4 indicates high level of sustainability. If $S=K$ then it is fairly sustainable. If we give incremental value to equation one, Then it can be rewritten as follows.

$$\Delta S / \Delta Y - \Delta K / \Delta Y > 0 \quad 5 - \text{or}$$

$$\Delta S / \Delta Y > \Delta K / \Delta Y \quad 6 - \text{or}$$

$$\Delta S > \Delta K \quad 7 - \text{or}$$

For high level of sustainability, the growth rate of saving must be be greater than the growth rate of capital. But the equality between the growth rate of income and growth rate of capital can explain both economy's equilibrium and sustainability.

Let $S/Y + C/Y = 1$ that is $APS + APC = 1$

Let $K_n/Y + K_m/Y = 1$ that is share of both natural and manmade capital in the total national income. Let $S/Y + C/Y = K_n/Y + K_m/Y$ [$K_n/Y + K_m/Y = K/Y$]⁸ That is $S+C = K$

By giving incremental value the above equation can be written as follows.

$\Delta S + \Delta C$
 At equilibrium point,
 $\Delta Y = \Delta S + \Delta C$. Since $\Delta K = \Delta S + \Delta C = \Delta Y$, hence $\Delta K = \Delta Y$ or $I = \Delta Y$

In figure 1, the present well-being is presented in the X axis and future well-being in the Y axis. OL straight line explains the equality between present and future generation. OL straight line (or) production function OL satisfies the sustainability norms. On the other hand,

OL_1 production function indicates over exploitation of natural resources and un-sustainability. Similarly, OL_2 production function explains the under-utilisation of natural resources by the present generation.

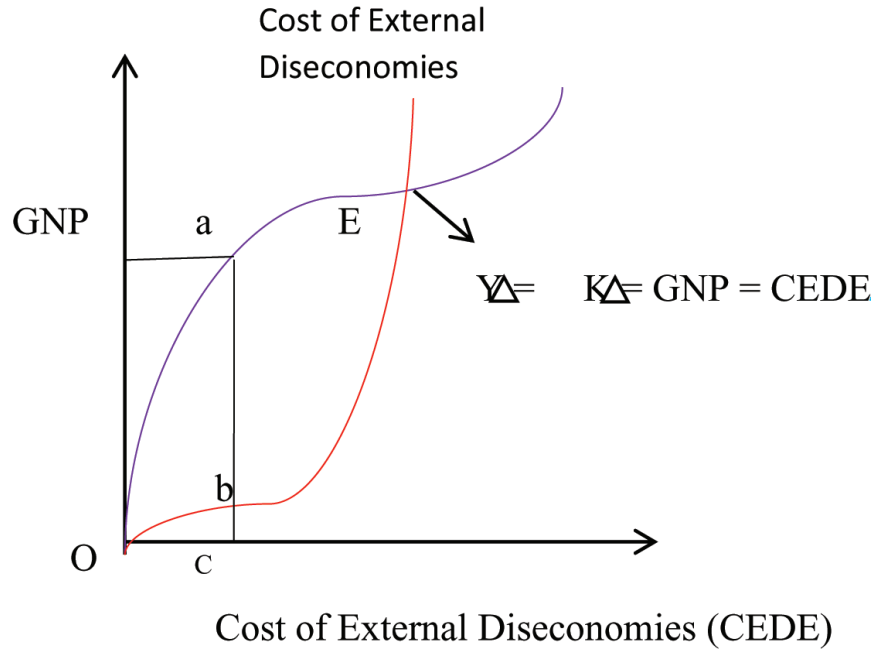


Figure 2. SNS Measurement

In figure 2, at point 'E' the rate of growth of income is equal to rate of growth of capital. After point 'E' there is no possibility for sustainable development. After this point the present generation ride on the future generation. At point 'a' GNP is greater than the cost of external diseconomies. That is $ab > bc$. Therefore the net economic welfare ($ac - bc > 0$) is positive enough to leave due share to the future. At the same time people in the present may live happily without suffering from external diseconomies such as air pollution, noise pollution, water pollution, etc.

CONCLUSION

The term sustainability is more abstract and subjective. Measurement of sustainability is possible if we able to estimate the value of manmade capital and natural capital. We also need the estimation of capital requirement for the present and future generation. But the measurement of capital requirement for the future as well as the present generation depends up on the level of technology of the present and future generation. Further, the capital requirement of the future, level of technology of the future and the total population in the future

cannot be estimated. However, the PAM measurement indicates that the economics of sustainability is possible in a point where MPS is greater that the capital output ratio. The SNS measurement of sustainability indicates that the sustainability is possible where growth rate of income is equal to the growth rate of capital. This is also possible to estimate if we able to estimate the cost of external diseconomies. As long as the cost of external diseconomies is less than the total income of the country, the sustainable development is possible.

In conclusion, it is to state that sustainability is not necessarily viewed as the matter of distribution between the present and future but it must be viewed as a matter of survival of the present⁴. Over exploitation, wastage of non-renewable resources and man's invasion against the nature will create unfavourable environment to the present generation. Man's attempt to conquer the nature is like one who is digging his own pit, because, man cannot conquer the nature. Man cannot understand the nature. One should understand that the deviation from the nature is deviation from happiness. Therefore we can only follow the law of nature. Let us see how the present generation can be protected from the environmental

degradation. How to stop the damage or stein we put on the environment. The act of protecting the present generation from the external dis economics will automatically help the future generation. Let us hope for the eco-friendly production function and consumption pattern. Let we conclude that the real and peaceful life can be lived just by following the nature not by understanding and conquering the nature.

Ethical Clearance: Completed. (Dept. level committee at VELS)

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Conflict of Interest: NIL

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Factors Affecting Neonatal Mortality and Morbidity - An Epidemiological Study

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ABSTRACTS

Background: Neonatal period is very much vulnerable to different problems leading to death. Neonatal morbidities are burden to the health system and claim the neonatal life. Sample registration system (SRS) statistical report 2013 says Odisha have very high NMRs around 35 or more per 1000 live births. This study aims at finding out the epidemiological causes affecting the neonatal morbidities and mortality.

Material and method: This is a retrospective observational study. Tenure of the study is one year from January 2014 to December 2014.

Result: Total number of 304 cases was observed. Percentage of deliveries requiring NICU admission-18.78%. Majority of cases admitted (58.8%) cases were within 24 hours of delivery. Out of which 61.8% cases were male. 51.3% cases were delivered by NVD. Highest number of mothers was within 25-30 years of age and was multipara. Neonatal jaundice and prematurity are the two important cause of morbidity (49.3%, 32.8% respectively). death rate was 2.96% while number of cases improved was 93.7%. 3.2 % cases had left the hospital against medical advice.

Conclusion: The neonatal morbidity and mortality is a reflection of the socio economical background of the mother. A holistic approach from proper antenatal care to delivery and a proper neonatal care can reduce not only the mortality but also the morbidities of the neonate.

Keywords: Low birth weight, Prematurity, NICU, Birth asphyxia, meconium aspiration

INTRODUCTION

Neonatal period is very much vulnerable to different problems leading to death. In developing countries 96% of the world's, approximate 5 million annual neonatal deaths occur. ¹ India contributes to one-fifth of global live births and more than a quarter of neonatal deaths. Nearly, 0.75 million neonates died in India in 2013, the highest for any country in the world. ² Sample

registration system (SRS) statistical report 2013 shows neonatal mortality rate(NMR) to be 28 per 1000 live births.³ In year 2000 the NMR was 44 per 1000 live births while it has declined to 28 per 1000 live births in 2013. But this rate of decline is less compared to rate of decline of infant mortality rate. The Millennium Development Goal-4(MDG 4) by year 2015 could not be achieved due to this slow decline in NMR. Neonatal morbidities are burden to the health system and claim the neonatal life. Bang *et al* (1995–1996) has studied a detail burden of common morbidities in rural community settings.⁴ According to Global, regional, and national causes of child mortality in 2000–13, with projections to inform post-2015 priorities: an updated systematic analysis. Lancet 2015, preterm birth complications and infections are the two major causes of neonatal deaths in

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India.⁵ Studies on the timing of neonatal deaths indicate that about three-fourths of total neonatal deaths occur in the first week of life.^{6,7,8}

According to High-Level Expert Group appointed by the Planning Commission of India, in a scenario of the health inequality and social inequality, the poorest and most disadvantaged have a higher risk for disease.⁹ Sample registration system (SRS) statistical report 2013 says Kerala and Tamil Nadu have low NMRs (<20 per 1000 live births) whereas Odisha, Madhya Pradesh and Uttar Pradesh have very high NMRs (35 or more per 1000 live births). The NMR in rural areas is 31 while that is 15 per 1000 live birth in urban areas. The discrepancy is more marked in Andhra Pradesh, Assam, Jharkhand and Kerala.³ There is no definite sex- differentiated NMR statistics available but studies shows females neonates are deprived of proper health care compared to male one.^{10,11} Maternal age and education has got direct influence on the neonatal mortality and morbidity. This is well evidenced by NMR statistics of Kerala. In India, 30% of neonates are borne with low birth weight¹² and more than 80% of total neonatal deaths occur among LBW/preterm neonates.¹³ Both neonatal sepsis and perinatal asphyxia contributes a huge towards NMR.¹⁴ The interventions in antenatal, during delivery and postnatal period influence a lot for prevention of neonatal mortality. UNICEF coverage evaluation survey in 2009 (CES 2009) shows only a quarter of pregnant ladies had full antenatal checkup, 73% of pregnant ladies had institutional deliveries and only one third of neonates were breastfed within 1hr of birth.¹⁵

Our study aims at deriving the factors affecting the neonatal morbidity and mortality in Orissa which is having high NMR.

METHODOLOGY

This retrospective observational study was conducted in the department of paediatrics, IMS and SUM hospital which is a teaching hospital in Orissa, India for a period of one year (Jan 2014 to Dec 2014). This is a teaching hospital having neonatal ICU (NICU) facility. This NICU is having 15 no of beds and only the neonates who are delivered in the same hospital are admitted here. All the NICU admissions strictly follow the admission criteria of the NICU protocol. This NICU has phototherapy unit, radiant warmer, high frequency ventilator, bubble continuous positive airway pressure,

ultrasonography having neonatal echocardiography, neuro sonogram facility, exchange transfusion facility. Radiological investigation facility like CT scan and MRI are also available in the hospital. The unit lack of the facility of inhale nitric oxide.

After Ethical clearance and due consent from the parents, in our study we have taken all the neonates admitted to the NICU during the period January 2014 to December 2014. The neonates who had undergone any surgery and all the referred cases and all the neonates who had left against medical advice were excluded from the study. The neonates admitted for observation and discharged within 24hrs were excluded from the study. The obstetric data and demographic data were retrieved from the labour room birth register.

Gestational age of the baby was calculated from the first day of last menstrual period (LMP) and in case of unknown LMP gestational age was calculated from the earliest ultrasonography. Babies borne before 37 completed weeks were considered as premature baby. Birth asphyxia was diagnosed as per American Academy of Paediatrics and American College of Obstetrics and Gynaecology (ACOG) guideline for hypoxic ischemic encephalopathy (HIE). Only culture positive (blood, CSF, urine, swab etc.) cases were considered under sepsis.

RESULT

In this retrospective observational study, 1618 deliveries were documented and among them 304 (58.88%) babies were admitted in the NICU. The incidence of NICU admission was 18.78%. Among 304 admitted NICU babies, 179 (58.88%) were admitted within 24 hour due to fulfilment of NICU admission criteria. Most of the NICU admitted babies were male babies (61.8%). It was also found that 58.8% mothers were from low socioeconomic backgrounds (Table 1).

Table 1: Demographic data of study population

Age (n=304)	No of cases	Percentage (%)
Less than 24hr	179	58.8
More than 24hr	125	41.1
Gender (n=304)		
Male	188	61.8

Cont... Table 1: Demographic data of study population

Female	116	38.1
Socioeconomic status(n=284)		
Low	167	58.8
Medium	99	34.8
High	18	6.3

Babies admitted to NICU, who were delivered by normal vaginal delivery accounts for 51.3%.(Table 2). Maximum number of (42.6%) of mothers belongs to age group 25-30 years (Table 3). It was revealed that, multiparous mother accounts for 49.2 cases and 38% cases were primipara (Table 4).

Table 2: Mode of delivery of NICU babies (n=304)

Mode	No of cases	Percentage (%)
Normal delivery	156	51.3
Instrumental delivery	13	4.2
Caesarean delivery	135	44.4

Table 3: Maternal age distribution, n=284 (less than 304 NICU babies as 16 cases are twin and 2cases are triplet)

Age	No of cases	Percentage (%)
15-20yrs	18	6.3
20-25yrs	99	34.8
25-30yrs	121	42.6
>30yrs	46	16.1

Table 4: Parity of the Mother, n=284

Parity	No of cases	Percentage%
Primipara	108	38
Multipara	140	49.2
Grand multipara	36	12.6

In our study 49.3% babies were within normal weight (> 2.5 kg) whereas 34.2% cases were extremely low birth weight (<1 kg) (Table 5). Most common morbidities in this study were neonatal jaundice (49.3%) and prematurity (32.8%) (Table 6). Coming to outcome to NICU admission babies an encouraging number of babies 285 cases (93.7%) were improved whereas death account for 2.9% but 10 cases (3.2%) could not

be followed up as they have left against medical advice (Table 7). Sepsis and birth asphyxia each attributes (33.3%) towards the cause of the death (Table 8).

Table 5: Birth weight of NICU babies

Weight in Kg	B	Percentage
<1Kg,ELBW	104	34.2
1-1.5Kg,VLBW	40	13.1
1.5-2.5Kg,LBW	10	3.2
>2.5Kg	150	49.3

Table 6: Diagnosis of NICU babies, n=304, but total more than n due to coexistent morbidities

Diagnosis	No of cases	Peren-tage %
Neonatal jaundice	150	49.3
Prematurity	100	32.8
Respiratory distress syndrome	84	27.6
Sepsis	66	21.7
Low birth weight	43	14.1
Birth asphyxia	31	10.1
Meconium aspiration	29	9.5
Necrotising enterocolitis	17	5.5
Congenital heart disease	9	2.9
Congenital malformation	5	1.6
Birth trauma	2	0.6
Intra cranial haemorrhage	4	1.3
Miscellaneous	3	0.9

Table 7: Outcome of neonatal admission, n=304

Outcome	No of cases	Percentage%
Improved	285	93.7
Death	9	2.9
Left against medical advice or referred	10	3.2

Table 8: Cause of death of NICU babies, n=9

Cause	No of cases	Percentages %
Sepsis	3	33.3
Birth asphyxia	3	33.3
Congenital diaphragmatic hernia	1	11.1
Meconium aspiration	1	11.1
Respiratory distress syndrome	1	11.1

DISCUSSION

In our study total number of NICU admission is 304 in number and total number of deliveries is 1618. Percentage of deliveries requiring NICU admission-18.78%. In a study by Wade Harrison Crude admission rate is 77.9 per 1000 livebirths in 2012.¹⁶ In the present study 58.8% neonates were admitted within 24 hours of delivery and 61.85% cases were male.

In a study by Walana W, the dominant sex was males 54.0% and the remaining were females 46.0%. Admissions were significantly common among neonates within the age group ≤ 2 days.¹⁷ 58.8% of parents belong to lower socioeconomic status in the present study which is similar to study by K suchita.¹⁸ In the maternal characteristic study K suchita found 52.76% mother were multiparous which is similar to our result. (49.2%). In the Majority of cases (42.6%) in this study, the maternal age is within 25 to 30 years of age which is accordance to studies by Wade Harrison.¹⁶

Coming to mode of delivery in this study maximum number of neonates was delivered by normal delivery (51.3%) followed by caesarean section 44.4%. 32.7% were delivered by caesarean section in the study by Wade Harrison. In our study 49.3% cases are more than 2.5 kg in weight while percentage of ELBW, VLBW, LBW babies are 34.2, 13.1, 3.2% (total 50.7%) respectively. Study by K Suchita shows 65.52% cases to be more than 2.5kg weight. While Shabbir Hussain et al¹⁹ has found 53.8% neonates were <2.5kg while 46.2% babies were >2.5kg in weight, which in accordance to our study.

Neonatal jaundice and the prematurity are the two important cause of morbidity in our study. Neonatal jaundice accounts for 49.3% of cases and prematurity

accounts for 32.8% of cases. In a study by Sridhar et al, the most common specific morbidity for admission was neonatal sepsis (28.8%) followed by RDS (23.85%) and hypoxic ischemic encephalopathy (17.72%).²⁰ While Gaucham et al. in Nepal reported, neonatal jaundice, sepsis and perinatal asphyxia as being commonest indication for admission to NICU.²¹ The number of deaths in this study is 9 cases and the number of cases who left the hospital against medical advice (LAMA) are 10. The death rate was 2.96% which means the number of death in 1000 live birth was approximately 30.

CONCLUSION

Neonatal jaundice and prematurity are the most common morbidity in our study, while birth asphyxia and sepsis are the two most common cause of mortality. All these causes of mortality and morbidity are clearly associated with maternal age, parity, socioeconomic status, birth weight of the neonate. The male preponderance may be due to the gender bias of the society. All these morbidities and mortalities can be prevented by proper antenatal care and intervention in right time. The number of death may not reflect the actual figure of the society as this is a hospital based study and we have not followed the LAMA cases. Further multi-centric trials are required.

Ethical Clearance: This study is approved from our institutional ethics committee.

Source of Funding: Self

Conflict of Interest: Nil

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Students' Perception and Attitude on Education Curriculum and System in an Indian Dental School

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ABSTRACT

Background: The continuous evaluation of the fundamental methodologies by feedback in teaching-learning will lead to better understanding of the profession eventually.

Objective: the objective of this study is to evaluate the students' perspective on dental education and attitude towards dental education and determine whether there is a need for a change in curriculum.

Materials and method: A total no. of 216 dental students were invited to participate in the online questionnaire survey, to assess their attitude and perspective towards the study topic. The data was statistically analyzed using SPSS version 20 and descriptive analysis was done.

Results: Students are in agreement with Problem Based Learning pattern and clinically oriented curriculum, with increased no. of clinical hours and wider range of pre-clinical exercises with audiovisual aids, including comprehensive patient care with more case discussions.

Conclusion: Students desire to have student centered active learning with teaching more clinically oriented using audio visual aids with comprehensive patient care training to help them in their future clinical practice.

Keywords: Education Curriculum, Students' Perception and Attitude, Teaching-learning, Problem Based Learning, Patient care

INTRODUCTION

Oral health is an important yet neglected health issue, especially in developing countries, like India. The onus of the same belongs to dental fraternity. The foundation of good oral health care lies in the motivation and training of dental students. Learning is soon shifting from being teacher centric to student centric.¹ Efficiency with which students learn directly affects their quality of work and finally patient satisfaction.² Dentistry is a profession in which both, theoretical knowledge and hand skills are of equal importance. Though a strong theoretical base is

important, it must be supplemented with equal or more practical training. Both together build a firm ground for good dental practice. Fundamental understanding of the subject during learning process leads to better applicability of the knowledge and skill in future. The continuous evaluation of the fundamental methodologies and basics in learning as well as teaching will lead to better outcome of the product and better understanding of the profession eventually. This will lead to better health care delivery to provide better service to the humanity. So, feedback from the students and the teachers at regular intervals depending on the changing scenario of the profession is very important for contemporary approach to upgrade the teaching learning program.

Hence, the purpose of this study was planned

The objectives were to evaluate students' perspective towards:

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Didactic theory classes by questionnaire method.

Pre-clinical, practical exercises by questionnaire method.

Clinical curriculum by questionnaire method.

METHODOLOGY

A total no. of 216, IV BDS dental students and interns were invited to participate in survey after obtaining ethical clearance. E-Questionnaires were distributed by sending a link to the participants containing 15 questions each to assess their attitude and perspective. The received responses were tabulated and statistically analyzed using SPSS version 20 and descriptive analysis was done.

RESULTS

Results of the questionnaire regarding theory classes are represented in figure 1. Approximately 58.3% of all participants agreed 9.3% strongly agreed that theory class content is applicable to cases treated in clinic. Many students (53.5%) agreed that time duration of individual theory classes are appropriate. Power point presentations and audio-visual aids were considered to be helpful by the participating students (56.3%). 66% of all participants strongly agreed that problem based learning will be beneficial. It was found that 64.2% of the dental students strongly agreed that the curriculum should be more practical oriented and less cumbersome.

RESULTS

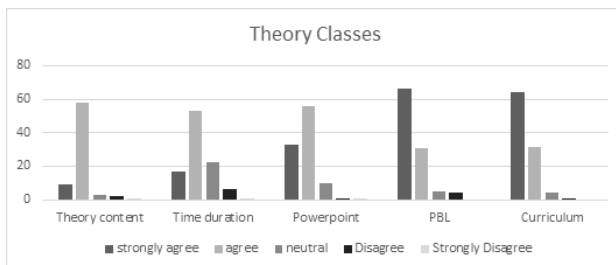


Figure 1: Students responses regarding lecture classes. Question 1 to 5

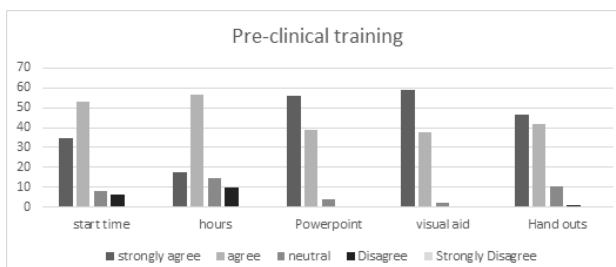


Figure 2: Students' responses regarding pre-clinical training.

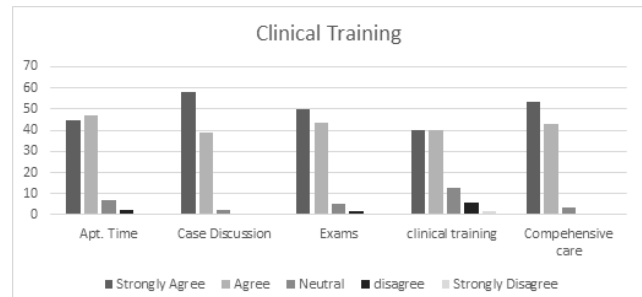


Figure 3: Students' responses regarding clinical training. Question 12-15 Question 6-11

Results of the questionnaire regarding pre-clinical training are represented in figure 2. 53.5% students agreed that second year is the correct time to start preclinical training. Although approximately 56.7% students agreed number of hours allotted to pre-clinical training is enough, 56.1% strongly agreed more procedures and techniques should be taught during preclinical training. Video demonstrations were considered helpful before the exercise by 59.1% of the students. Most students (46%) felt the need to receive demonstrative hand-outs before the preclinical exercise.

Results of the questionnaire regarding clinical training are represented in figure 3.

Third year seemed like an appropriate time to start treating patients by a large majority of students (91.7%). Majority students (57.7%) strongly agreed case discussion with faculty before treating the case is helpful. 50% strongly agreed student's clinical assessment during postings improves their competence. Approximately 40% agreed Clinical training equips to treat patients in our private practice after course completion. Moreover, a large majority 53% strongly agreed that comprehensive care training should be offered.

DISCUSSION

Students' view of education experience can also be an important source of information for curriculum assessment.⁶In our study, we have divided learning in dentistry into three different categories. The categories are: learning in theory classes, learning of basic skill in pre-clinical training, and learning during clinical hours providing patient care.

Regarding the lecture classes, according to present study, a majority of students agreed that even though the theory class contents are more than sufficient, the contents could have been more clinically oriented and less cumbersome (Figure 1). The current undergraduate

curriculum is more theory based and less skill based. It is heavily packed leaving very less time for students to acquire a deep understanding of the subject and clinical skills. Thus making it difficult to develop lifelong skills such as critical thinking, problem-solving and communication.⁷ There lies a necessity to integrate a need-based curriculum which is outcome based, involving the needs of students, the community, clinical practice and dental research.⁸

A majority of students agreed that time duration of the lecture classes was appropriate which is an average of forty-five minutes (Figure 1). This is in compliance with the recommend class time of forty-five minutes.⁹ Studies have proven that there is a lapse in attention after the initial 10-18 minutes and this is regardless of how compelling the lecture is thus the optimum length of lectures should be thirty minutes instead of sixty minutes.¹⁰ However, to comply with rules regarding hours dedicated to lectures and with limited time, pedagogical techniques and group discussions are recommended to overcome the short attention span of students.¹¹⁻¹⁴ Moreover, teachers have to follow recommendations by the dental council. This study recommends to modify the syllabus time to time to fulfil the needs of the future generation.

Majority of students felt the need for incorporating problem-based learning (PBL) in their dental school education (Figure 1). It helps students to relate themselves to clinical scenario because such a model of learning is an accurate reflection of real-life learning. Hence PBL is very suited to professional education programs like dentistry where it depends not only on knowledge but also on clinical applications.¹⁵ It also inculcates an attitude of constant learning which is a necessity in today's era of evidence-based learning.

Students preferred audio-visual aids in lectures in our study (Figure 1) which is in agreement with other studies since it helps them to learn more efficiently, organize their class notes and thus improve the students' performance.^{2,16-19} In contrary, Susskind found that though helpful, Powerpoint presentations (PPT) did not enhance the performance of students.²⁰ The reason for preferring PPT maybe perhaps due to most of our topics involve pictures of clinical and laboratory cases. Moreover, it not only saves time for the teacher during lecture hours but also able to create a picture of clinical procedures, which will have a long lasting impact in the mind of students.

The ultimate goal of the preclinical dental training is to prepare students to deliver the best possible care in the clinic by simulating the clinical conditions in laboratory. The students are then expected to build on that foundation during their clinical education and graduate, ready to enter practice.²¹ Based on the responses to the questionnaire, it was found that a majority of students consider the number of hours dedicated to preclinical training to be sufficient (Figure 2) and second year of dental school is an appropriate time for preclinical exercises both in operative dentistry and prosthodontics (Figure 2) and it also satisfies the syllabus suggested by Dental Council of India. A vast majority of students felt wider range of preclinical dental procedures and techniques (Figure 2) like preparations for ceramic crowns, veneers, and inlays should be taught which may improve the relevance of preclinical courses in similar dental school settings.^{21, 22}

In the present study, students find, video demonstrations of the preclinical procedures as well as handouts about the procedure, of great value (Figure 2). This is in agreement with previous studies which had received a positive response from students, when their school included audio-visual aids and educational handouts to their course structure.²² Visual aids help students' conceptualize better and gives them a clear understanding and handout will help them for future reference.

The degree of understanding clinical training and patient treatment is most critical and is the basis of students' professional career as a dentist. Majority of students agreed that the third year of their dental education was the appropriate time to start treating patients (Figure 3). Contrary to our study, in another study, dental students feel that they have lost out on time that could be spent on treating patients especially in the first half of dental school curriculum which curbs the experience of clinical learning.²³ Another study has pointed out that students are unable to judge the significance of their education until sometime after they graduate and have practiced dentistry on their own.²⁴ Hence it is better to increase the hours of clinical postings in nodule centres or in private clinics/ corporate clinics during undergraduate training may help to train the students for clinical practice.

Students have strongly agreed that discussing treatment plan and obtaining guidance from faculty

before treating a particular case is helpful to them (Figure 3). The skills and techniques that students learn in the clinical setting heavily depend on their interaction with faculty who also serve the role of a guide and mentor, where teaching, mentoring and patient treatment co-exist, in a pressing environment.^{25,26}

In our study, students found timely clinical assessments and tests are helpful (Figure 3) to get feedback from the faculty to improve themselves. Proper assessment drives and stimulates for deeper learning, but this cannot be generalized.^{27,28} When a well-planned assessment has a clear objective, provides feedback immediately to students, fulfills its rightful role and comprises an integral part of the educational process.²⁹

Dental education puts forth a unique challenge of preparing future health professionals. This involves teaching a multitude of skills that go beyond the content of periodic assessments and tests. A student's self-confidence is a significant concern in all phases of dental curriculum.³⁰ In this study, a significant percentage of students felt that their undergraduate dental education equips them well to work successfully in private practice (Figure 3). It is understood that undergraduates will not attain complete clinical excellence at the time of graduation. Nonetheless, there lies a responsibility with dental educators to equip students with the necessary self-assessment ability, clinical reasoning, initial self-confidence and preparedness for professional life and the ability to practice independent dentistry safely.²⁶

Students that participate in this study felt the need for comprehensive clinical training (Figure 3). This can be due to the fact that treatment provided in a comprehensive clinic setting mimics the setup of a private practice. It gives the students a chance to build strong bonds with the patients and see the effects of treatment delivered. Comprehensive clinical training environment has been known to offer a lot in an educational setting.²⁶ Schools offering comprehensive care approach to clinical education observed that it enhanced the students' clinical experience.³¹

CONCLUSION

Within the limitations, from the present study it can be concluded that:

1. Students prefer an educational environment that is based on active learning rather than passive

information delivery from faculty. Theory classes can be aimed at being more application oriented and presented using audio visual aids.

2. Pre-clinical training can include more clinically oriented procedures to enhance clinical performance in later years.
3. Students also felt that comprehensive care training would help in their future clinical practice.

This study provides an insight for curriculum planners. Teaching environment based on student's preferences will aid effective learning.

Ethical Clearance: By Institutional Ethics Committee MCOCS, Mangalore

Conflict of Interest: Nil

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Perception of Anganwadi Services in Urban ICDS Blocks in Kozhikode Corporation –A Cross -Sectional Study

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ABSTRACT

Introduction: Integrated Child Development Services is the largest national programme for the development of mothers and children in the world. The services are rendered through Anganwadi worker (AWW) at Anganwadi centre (AWC). An evaluation study is carried out to assess the perception of anganwadi services provided by the beneficiary mothers of 3 to 6 year old children in Urban ICDS blocks in Kozhikode Corporation

Method: A cross sectional descriptive study was carried out in 4 urban ICDS blocks in Kozhikode. Data was collected using pretested semi structured questionnaire and interviewing beneficiary mothers of 3 to 6 year old children .

Results: Out of 234 mothers interviewed, 221(94.4%) of mothers perceived that the children were getting supplementary nutrition regularly from anganwadi centres. A large majority 196(83.8%) of mothers were satisfied with the PSE activities conducted in AWC'S. A large proportion 207(88.5%) of mothers perceived that AWW's did not inform about the date, time, place of health checkup. A large proportion of mothers 158(67.5%) felt that AWW's did not offer any referral advice for the children during illness. About 129(55.1%) of mothers perceived that health education session were conducted occasionally in AWC's.

Conclusions: In conclusion according to mother's perception health checkup ,health education services and referral services were poor.

Key-words: *Supplementary nutrition, Preschool education, Health checkups, Referral services, Immunisation, Health education*

INTRODUCTION

Integrated Child Development Services described as India's gift to her children helps to achieve major national nutrition and health goals embodied in National policy for children (1974),National health policy(1983),National plan of action for children(1982),National nutrition

policy(1993)¹. ICDS was launched in 1975 with 33 projects. This programme is formulated to enhance the health, nutrition and learning opportunities of infants, young children and their mothers especially targeting for the poor and deprived. ICDS serves the target groups through network of anganwadis². The centre is run by local community based women called AWW who is supported by another women anganwadi helper in service delivery³. The specific services provided through programme are Supplementary nutrition programme, Preschool education, Immunisation, Health checkup, Referral services, and Nutrition and health education⁴. ICDS has expanded remarkably in its scope and coverage, and today it covers around 33.738 million

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children between three to six years of age, 39.871 million children between 6 months to three years, 18.047 million expectant and nursing mothers⁵. In Kerala, it covers around 4, 64249 children between three to six years of age and 4, 21540 children between 6 months to 3 years and 1, and 95927 pregnant and lactating mothers⁵.

To improve on the functioning of the anganwadis in urban areas, it is necessary to evaluate the services. Hence a study on perception of ICDS services of urban anganwadis is planned. This study brings in to focus certain bottlenecks and shortcomings in implementation of the programme in urban areas which can help in improving the services in the urban anganwadi centres. It helps us to improve health service delivery by producing information relevant to decision – making and assist planners and managers in making improved decision about programme and project. In this context this study was undertaken to assess package of services provided by the ICDS programme to 3 to 6 years children by assessing the perception of beneficiary mothers for uplifting the status of children.

METHOD

A community based cross sectional descriptive study was carried out in 4 urban ICDS blocks in Kozhikode Corporation. Keeping in view of prevalence of average and below average anganwadis in a study in Bangalore city by Vijayanthi et al in 2010 noted as 54%, a confidence level of 95%, absolute precision of 9.2%, a sample size of 117 anganwadi centres was calculated⁶. Using Simple random sampling method sample size of 117 anganwadi centres were selected from total 543 anganwadi centres in Urban Kozhikode Corporation. Data was collected over a period of one year from July 2012 to June 2013. Ethical clearance was obtained from institutional ethics committee and relevant permission from Social welfare department in Kerala. From each AWC 2 mothers – were selected by simple random sampling method. So 234 mothers of registered beneficiaries of 3 to 6 year old children were included to assess the perception regarding services provided by the Anganwadi centres. Using various tools for data collection which included pretested semi structured questionnaire and interviewing mothers of registered beneficiaries of 3 to 6 year old children. Data entered in MS excel and analysed using SPSS Software.

RESULTS

To assess the perception of mothers of beneficiary children, 2 mothers from 117 anganwadi centres were selected using simple random technique. Totally, 234 mothers were interviewed.

GENERAL CHARACTERISTICS

Out of 234 women, most number were educated up to high school 66(28.2%) and higher secondary 62(26.5%). 73(31.1%) educated up to lower and upper primary. There were 33(14.1%) educated up to graduate and above. In our study 129(55.1%) of mothers were from three generation families, 67(28.6%) were joint families and only 38(16.2%) were from nuclear families. Among 234 mothers 131(56%) were living in semipucca houses, 101(43.1%) in pucca houses. Only 2(0.9%) were staying in kutcha houses. Income was assessed using the APL//BPL cards, based on this large proportion of family of mothers 156(66.7%) were having APL card, rest of the families 78(33.3%) were having BPL card.

Table1. General characteristics of respondents

General characteristics	No.(n=234)	%
Literacy Level		
Primary	73	31.1%
High school	66	28.2
Higher secondary	62	26.5
Graduate & above	33	14.1
Family Type		
Nuclear	38	16.2
Joint	67	28.6
Three generation	129	55.1
Housing Type		
Kutcha	2	0.9
Semipucca	131	56.0
Pucca	101	43.1
Income Status		
APL	156	66.7
BPL	78	33.3

BASIC INFORMATION ON FUNCTIONING OF AWC

A large proportion 221(94.4%) of mother were of perception that AWC opens and works regularly. About 181(77.4%) of mothers reported that AWC’S were at a walk able distance from their residence. There were 53(22.6%) perceived that their residence was far off from the anganwadi’s. Mothers were enquired about the reasons for sending children to anganwadi’s. In this study it was observed that ,130 (55.6%) mothers reported education was a major priority for mothers for sending their children to AWC’s followed by supplementary nutrition 76(32.5%). About 28(12%) mothers reported that they send children to anganwadi’s for both food and education.

PERCEPTION REGARDING SERVICES PROVIDED IN ICDS CENTRES

In this study among 234 mothers, 221(94.4%) of mothers perceived that the children were getting supplementary nutrition regularly from anganwadi centres. Most of the mothers 169(72.2%) were of opinion that quality of supplementary nutrition was average and only 26(11.1%) perceived as good quality. About 39(16.7%) reported that food is of poor quality and they mentioned that sometimes spoiled food was given in anganwadi centres. Majority 144(61.5%) of mothers reported that AWW’s monitor the growth of child once in a month and 89(38.1 %) of mothers opined that growth monitoring was done once in 3 months or

occasionally

Most number 196(83.8%) of mothers were satisfied with the PSE activities conducted in AWC’S. There were 38(16.2%) of opinion that they were not satisfied with the PSE activities. A large proportion 170 (72.6%) of mothers perceived that PSE activities in the AWC helps in improving the psychological development of the child and 64(27.4%) of mothers informed that PSE activities does not improves the same.

The majority 182(77.8%) of mothers reported that AWW’s informs mothers on date, time and place of immunisation sessions and rest 52(22.2%) of mothers were reported that AWW’s did not inform them on immunisation sessions. There were 129 (55.1%) of mothers were perceived that health education session were conducted only occasionally in AWC’S and 67(28.6%) of mothers were of opinion that health education session were conducted monthly or 3 monthly in AWC’s.

A large proportion 207(88.5%) of mothers opined that AWW’s did not inform them about the date, time, place of health check up .In our study 142(60.7%) of mothers reported that AWW’s counselled them during sickness of children and 92(39.3%) of mothers perceived that there was no counselling. A large proportion 220(94%) of mothers opined that they did not receive medicines from AWW’s. Most number of mothers 158(67.5%) felt that there was no referral from AWW’S.

Table 2: Perception of mothers regarding services of AWC’S

Services of AWC’s	Proportion of respondents who said “YES”- No.(n=234)	%
SUPPLEMENTARY NUTRITION PROGRAMME		
Regularity in Getting SNP	221	94.4
PRE SCHOOL EDUCATION		
PSE activities-Satisfaction	196	83.8
PSE improves psychological development	170	72.6
IMMUNISATION		
AWW informs immunisation	182	77.8
HEALTH CHECKUP		
AWW’S informs on health check up	27	11.5
Counselling during sickness	142	60.7
Received medicines	14	6.0
REFERRAL SERVICES		
Referred children	76	32.5

DISCUSSION

A study by Manoj Kumar tripathy etal(Orissa 2011) observed that 94% of mothers perceived that AWC'S opens and works regularly and 55.5% of mothers are of opinion that AWC's were walkable distance from their residence⁷. Pandey etal (Lucknow 2013) reported that 33.8% of respondents perceived that the purpose of enrolment at AWC's of their children was learning⁸.

NCAER (2001) revealed that 42 % of households reported good supplementary nutrition in anganwadi's⁹. Manoj Kumar tripathy etal in his study mentioned that 73.5% of mothers reported that supplementary food is acceptable to the children⁷. Jose bobhan (Kerala 2006) noted that 75.5% of mothers reported regular supplementary feeding in AWC's¹⁰. According to Pratichi child report (West Bengal -2009),50% of mothers reported low quality of food in anganwadi¹¹.

About 46% of mothers reported no weighing of children in anganwadi's according to (Pratichi report West Bengal -2009)¹¹. NCAER (2001) showed that, 62.1% of mothers reported growth monitoring in anganwadi⁹. Manoj Kumar tripathy etal observed that 88.5% of mothers reported growth monitoring in anganwadis⁷.

According to NCAER (2001) , 93.3% of mother reported that anganwadi's provided preschool education⁹. In the Pratichi child report (West Bengal -2009), 28% of mothers reported no PSE in anganwadi's¹¹. Manoj kumar tripathy etal(Orissa 2011) reported that 55% of mothers reported play mode learning in centres and the same study also mentioned that only 27% of mothers are of opinion that preschool educational activities aid in psychological growth of children⁷. Nibharani etal (Assam 2001) reported that only 26.67% of mothers satisfied with nonformal preschool education provided by anganwadi's¹². According to NCAER (2001) 74.8% of the households reported regular healthcheckup by anganwadi⁹. Ram prabhakar (Kolkata 2012) 77.8% of respondents reported that AWW had never counselled regarding health issues¹³.

CONCLUSION

In conclusion according to mother's perception health checkup, health education and referral services were poor. There is a need for effective coordination between the health functionaries and the anganwadi workers in health checkups and referral services, nutrition and health education and referral services.

Conflict of Interest- Nil

Source of Funding – Nil

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Prevalence and Factors Associated with Depression among the Students of a Medical College in Kerala

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ABSTRACT

Introduction: Depression has a higher prevalence among medical students compared to general population. This could lead to deteriorating academic performance, errors in patient care and even suicides. There are hardly few studies conducted in this part of the country to assess the prevalence of depression among medical students and also the factors associated with it. Also, there are no studies which have used the new version of the Beck's Depression inventory (BDI-II). Hence in this background the present study was undertaken

Methodology: This was a cross-sectional study done at DM Wayanad Institute of Medical Sciences, Wayanad District, Kerala, between October 2017 and January 2018. All the undergraduate medical students of the college were the study subjects. Data was collected using a predesigned and pretested self-administered questionnaire (Beck's Depression Inventory II). Completed responses were obtained from a total 720 students.

Results: 68.5% were found to have no depression and 31.5% depression. 15.1%, 9.3% and 7.1% were found to have mild, moderate and severe depression respectively. Prevalence of depression was *more* among males compared to females, unmarried subjects compared to married, Part I-Final Phase students compared to other phases, NRI quota students compared to other quotas, Muslims compared to other religions, urban origin students compared to rural and those with a history of major life event, chronic illness, feeling of loneliness, backlog in academics, consumption of alcohol and tobacco compared to those without. However only **place of origin, h/o major life event, feeling of loneliness, backlog in academics and h/o consumption of tobacco and alcohol were found to have statistically significant association with depression.**

Conclusion: The prevalence of depression in our study was lower compared to other studies. Urban origin, h/o major life event, feeling of loneliness, backlog in academics and h/o consumption of tobacco and alcohol were found to be associated with presence of depression

Keywords: Depression, students, medical college, Kerala, Beck's Depression inventory II

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INTRODUCTION

Depression is a mental disorder characterized by loss of interest and pleasure (anhedonia), decreased energy (anergy), feelings of guilt or low self-worth, disturbed sleep and/or appetite, and poor concentration.¹ It is a significant contributor to the global burden of disease and affects people in all countries across the

world with a global prevalence of depressive episode of 3.2%. Depressive disorders often start at a young age and often are recurrent throughout life. For these reasons, depression is the leading cause of disability worldwide in terms of total years lost due to disability. The demand for curbing depression and other mental health conditions is thus on the rise globally.²

Worldwide, it has been demonstrated that 25–90% of medical students are stressed, and stress is an important determinant of depression leading to a higher prevalence of depression among medical students than general population.^{3–6} Several factors may account for this fact. These include daily life stressors and stressors specific to the tedious learning environment.⁷ The potential negative effects of emotional distress on medical students include impairment of functioning in classroom and clinical practice, stress-induced disorders and deteriorating performance. In medical doctors, it has been demonstrated that depression affects patient care leading to increased prescription error.⁸ Depression is also associated with higher suicide rates and this may be reason for higher suicide rate in medical professionals than the general population.⁹ This is especially true in female medical professionals.¹⁰ Students in extreme stress or depression need serious attention, otherwise inability to cope successfully with the enormous stress of education may lead to a cascade of consequences at both personal and professional levels.¹¹

To prevent depressive symptoms among medical students, decreased self-esteem, self-perceived medical errors and thus improve on the quality of care given to patients, factors associated with depression in medical training should be identified and appropriately tackled.¹² There are hardly few studies conducted in this part of the country to assess the prevalence of depression among medical students and also the factors associated with it. Also, there are no studies which have used the new version of the Beck's Depression inventory (BDI-II). BDI-II was developed for the assessment of symptoms corresponding to criteria for diagnosing depressive disorders listed in Diagnostic and Statistical Manual of Mental Disorders; Fourth Edition (DSM-IV, 1994).¹³ In this background, the present study was undertaken to find out the prevalence of depression among medical students and also the factors associated with it using the new version of the Beck's Depression inventory (BDI-II).

MATERIALS AND METHOD

This was a cross-sectional study done at DM Wayanad Institute of Medical Sciences, Wayanad District, Kerala, between October 2017 and January 2018. All the undergraduate medical students of the college (i.e., phase I to phase III, part II) willing to participate in the study were the study subjects. After obtaining approval from the college administration, the students were approached individually in their hostel rooms and briefed about the purpose of the study. Participation in the study was voluntary. Oral informed consent was obtained from the subjects and data was collected using a predesigned and pretested self-administered questionnaire, the first part of which had questions pertaining to basic socio demographic details and possible factors contributing to depression and the second part Beck's Depression Inventory II. The Beck Depression Inventory–Second Edition (BDI-II) is a 21-item self-report instrument developed by Aaron Beck (1996) for measuring the severity of depression among adults and adolescents aged 13 years and older. The composition of items has been carefully constructed which are related to depressive symptomatology such as hopelessness, irritability, guilt feelings, fatigue, lack of interest in sex, loss of pleasure, and also feelings of suicide thoughts/wishes etc. Each item in BDI-II is assigned a score 0 to 3. Thus, the total score of each participant ranges from 0 to 43. The interpretation of final scores is as follows; 0-13 → no depression, 14-19 → mild depression, 20-28 → moderate depression and 29-63 → severe depression.¹³ Completed responses were obtained from a total 720 students. The respondents were asked not to mention their names for maintaining anonymity and also to encourage participation and elicit truthful response. Data were kept confidential.

Data were entered in MS Excel and analyzed using Statistical Package for Social Sciences v21.0. Descriptive statistics such as mean and percentage and also inferential statistics like Chi-square test to find out association were used.

RESULTS

The total number of subjects were 720 of which 263(36.5%) were males and 457(63.5%) females. 23(3.2%) were married and 696(96.7%) were unmarried. 173(24%), 270(37.5%), 148(20.6%), 129(17.9%) were from Phase I, Phase II, Phase III part I and Phase III,

Part II respectively. The mean age of the subjects was 21.03 \pm 1.55 years.

Out of the total 720, 493(68.5%) were found to have no depression, 227(31.5%) were found to have depression. 109(15.1%), 67(9.3%) and 51(7.1%) were found to have mild, moderate and severe depression respectively (graph 1). Prevalence of mild depression was more among females, whereas moderate and severe depression was more among males (graph 2). Prevalence of mild and moderate depression was highest among management quota students, whereas severe depression was highest among NRI quota students (graph 3). Prevalence of mild depression was highest among Phase II students, moderate depression among Phase I students and severe depression among Phase III, Part I students (graph 4). Prevalence of mild depression was highest among Muslims, moderate depression among Hindus, and severe depression among Christians (graph 5). Prevalence of mild and severe depression was higher among unmarried students whereas moderate depression was higher among married students (graph 6). Prevalence of mild depression was higher among

rural students whereas moderate and severe depression were higher among urban students (graph 7).

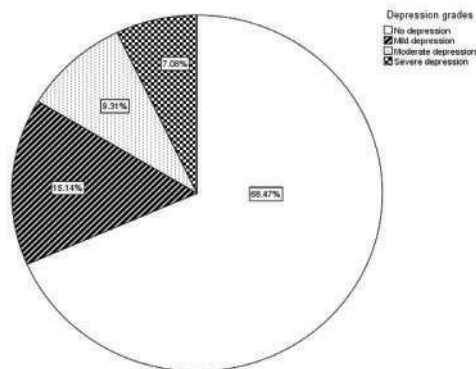
It was observed that the prevalence of depression was more among males compared to females, unmarried subjects compared to married, Part I-Final Phase students compared to other phases, NRI quota students compared to other quotas, Muslims compared to other religions, urban origin students compared to rural and those with a history of major life event (loss of a close family member or friend, road traffic accident, break up, hospitalisation for major illness etc., in the last 3 years), chronic illness (sickle cell disease, asthma, diabetes, hypertension etc.) feeling of loneliness (due to living away from home/ parents/siblings/friends), backlog in academics, consumption of alcohol (> once a week) and tobacco (at least once daily) compared to those without. However only place of origin, h/o major life event, feeling of loneliness, backlog in academics and h/o consumption of tobacco and alcohol were found to have statistically significant association with depression (table I).

Table I: Factors associated with depression among medical students.

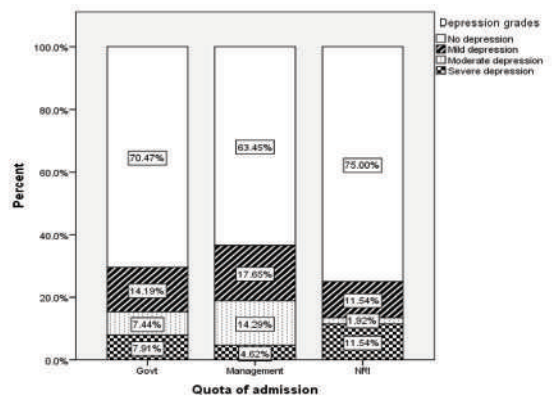
Variables		Depression present	Depression absent	Total	P value
Sex	Male	90(34.2)	173(65.8)	263(100)	0.24
	Female	137(30)	320(70)	457(100)	
Marital status	Married	7(30.4)	16(69.6)	23(100)	0.91
	Unmarried	220(31.6)	477(68.4)	697(100)	
Phase of MBBS	I	60(34.7)	113(65.3)	173(100)	0.56
	II	83(30.7)	187(69.3)	270(100)	
	Part I, Final Phase	107(72.3)	41(27.7)	148(100)	
	Part II, Final Phase	86(66.7)	43(33.3)	129(100)	
Quota of admission	Govt	127(29.5)	303(70.5)	430(100)	0.1
	Management	87(36.6)	151(63.4)	238(100)	
	NRI	39(75)	13(25)	52(100)	
Religion	Hindu	102(30.4)	234(69.6)	336(100)	0.76
	Muslim	87(66.8)	175(33.2)	262(100)	
	Christian	38(31.1)	84(68.9)	122(100)	

Cont... Table I: Factors associated with depression

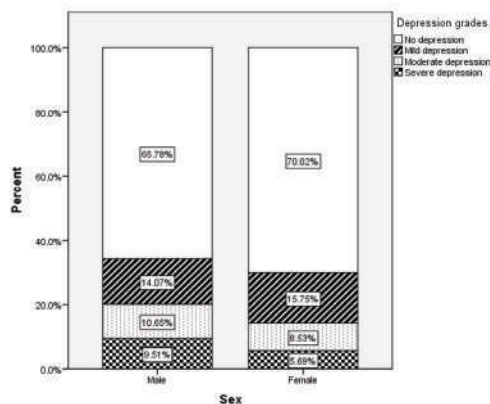
Place of origin	Rural	118(28.3)	299(71.7)	417(100)	0.03
	Urban	109(36)	194(64)	303(100)	
H/o major life event	Present	107(57.2)	143(42.8)	250(100)	<0.01
	Absent	120(25.5)	350(74.5)	470(100)	
H/o Chronic illness	Present	14(37.8)	23(62.2)	37(100)	0.40
	Absent	213(31.2)	470(68.8)	683(100)	
Feeling of Loneliness due to living away from home/ parents/siblings/ friends	Present	88(44)	112(56)	200(100)	<0.01
	Absent	139(26.7)	381(73.3)	520(100)	
Backlog in academics	Present	64(41)	92(59)	156(100)	<0.01
	Absent	163(28.9)	401(71.1)	564(100)	
H/o consumption of Alcohol	Present	8(61.5)	5(38.5)	13(100)	0.019
	Absent	219(31)	488(69)	707(100)	
H/o consumption of Tobacco	Present	18(45.5)	15(54.5)	33(100)	<0.01
	Absent	209(30.4)	478(69.6)	687(100)	



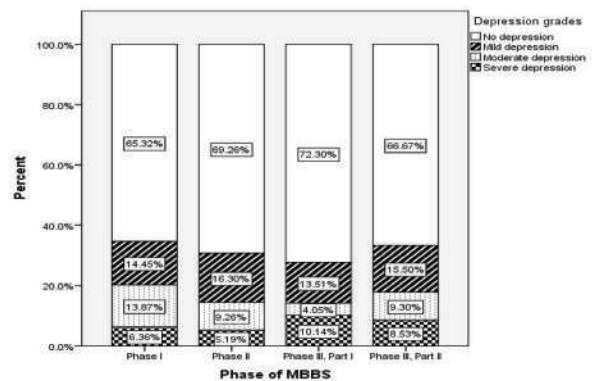
Graph 1: Distribution of different grades of depression among the study subjects



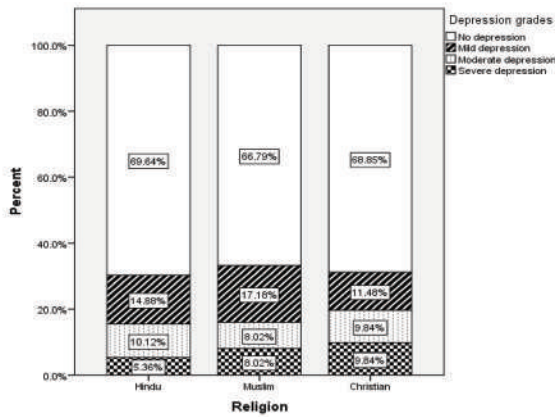
Graph 3: Stacked bar graph comparing grades of depression between different quotas of admission



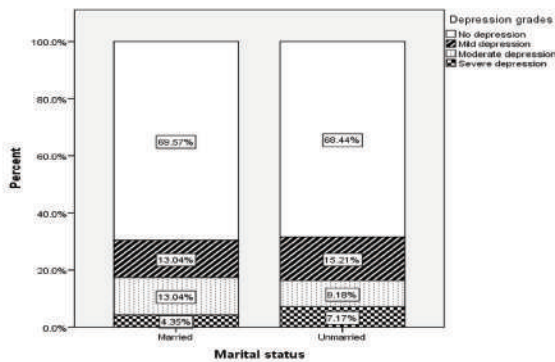
Graph 2: Stacked bar graph comparing grades of depression between sexes



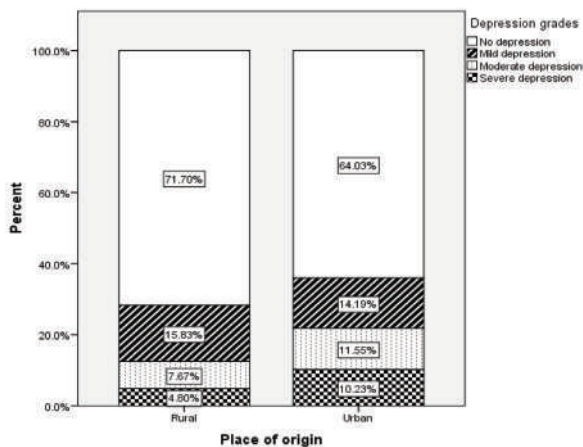
Graph 4: Stacked bar graph comparing grades of depression between students of different phases of MBBS



Graph 5: Stacked bar graph comparing grades of depression between students of different religions



Graph 6: Stacked bar graph comparing grades of depression between married and unmarried students



Graph 7: Stacked bar graph comparing grades of depression between rural and urban students

DISCUSSION

The prevalence of depression in our study was 31.5%. However, few other studies have reported a higher prevalence i.e., 58% and 44.4%. The differences could be due to the different questionnaires used (PHQ-9 in the former and older version of BDI in the latter) and the differences in the sociodemographic characteristics of the subjects. 15.1%, 9.3% and 7.1% subjects were

found to have mild, moderate and severe depression respectively. Rawat et al., and Agrawal et al. have reported it as 43%, 12% and 3% and 44.42%, 27.12 and 0.98% respectively. The differences could be due to the reasons mentioned above.^{14,15}

It was observed that the prevalence of depression was more among males compared to females, unmarried subjects compared to married, Part I-Final Phase students compared to other phases. Agrawal et al. have also reported the prevalence to be more among unmarried subjects compared to married. However, Agrawal et al., and Rawat et al., have reported the prevalence to be more among females compared to males and Phase II students and Phase I students respectively which is in contrast to our study.^{14,15}

In the current study place of origin, h/o major life event, feeling of loneliness, backlog in academics and h/o consumption of tobacco and alcohol were found to have statistically significant association with depression whereas sex, marital status, Phase of MBBS and h/o chronic illness were not found to have statistically significant association. Ngasa et al., have noted that the presence of a chronic disease, major life events, gender and being a student at the clinical level were found to have statistically significant association with depression whereas h/o consumption of alcohol was not found to have statistically significant association. These differences could be due to differences in the questionnaires used (Ngasa et al., have used PHQ-9 questionnaire) and also sociocultural differences between the subjects in the two studies.¹⁶ Agrawal et al., have noted that gender, year of study and marital status were found to have statistically significant association with depression.¹⁴

The limitations of the study were that the study subjects were from a single college. Hence the findings cannot be generalized to the medical students' community of the country or world.

CONCLUSION

The prevalence of depression in our study was lower compared to other studies. Urban origin, h/o major life event, feeling of loneliness, backlog in academics and h/o consumption of tobacco (at least once daily) and alcohol (> once a week) were found to be associated with presence of depression.

Conflict of Interest: None Declared

Source of Funding: Nil

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Platelet-Rich Fibrin as Palatal Bandage: A Case Report

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ABSTRACT

Introduction: PRF [Plasma-rich fibrin] consists of numerous growth factors and platelet cytokines that promote faster wound healing. The use of PRF bandage on donor site in FGGs [free gingival graft procedures] can significantly reduce morbidity and accelerate healing. The aim of the presented case report is to document the contribution of PRF in the healing of FGG donor site.

Method and Material: PRF was prepared and compacted as a dressing on the palatal wound. Post-operative follow-up was done every week for 1 month.

Results and Discussion: It was observed that wound healing was superior and accelerated compared to conventional FGG. Complete wound healing was observed in 2 weeks. The patient reported minimal pain during first 2 days post-operatively.

Conclusion: Owing to the promising results delivered, a PRF palatal bandage is an efficacious method to safeguard the raw wound engendered as a result of FGG remarkably alleviating discomfort afflicted patients.

Keywords: FGG, PRF, Donor site

INTRODUCTION

FGG is a widely used procedure for the augmentation of keratinized tissues in the oral mucosa.^[1] The root coverage provided by FGGs is similar to that of regenerative procedures and pedicle grafts however; FGGs offer superior gingival thickness which in turn helps in preventing recurrence of recession.^[1] The graft is usually harvested from the palatal mucosa in the premolar-molar region.^[2,3] Being autogenous, the clinical outcome is far better than that of synthetic or allogenic grafts.^[3] The primary disadvantage of this technique is the inevitable formation of two surgical sites and morbidity of the donor site. The palatal wound heals in 2-4 weeks by secondary intention relatively causing more pain and discomfort to the patient than connective

tissue grafts^[1,3]

To overcome this, the use of a bio-active material consisting of growth factors may be considered for accelerating healing of the donor site.^[4] Platelet-rich fibrin, a second generation platelet concentrate stimulates angiogenesis, guided epithelial cell migration, development of an effective neovascularization resulting in accelerated tissue cicatrization, faster wound coverage and tissue remodeling.^[4, 5] Moreover, fibrin and fibrin degradation products provide immunity by stimulating the migration of neutrophils and permitting their adhesion to endothelium and fibrinogen by increasing the membrane's expression of CD 11c/CD18 receptors^[5]

This case report describes the clinical outcome of PRF used as a palatal bandage and the significant reduction in post-operative pain and inflammation, consequently reducing the donor site morbidity. An attempt has been made to relate and compare the palatal wound healing where FGG was done and wound closure was achieved with a non-eugenol pack.

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CASE REPORT

A systemically healthy male patient, aged 28 years was referred to the Department of Periodontology, Manipal college of dental sciences was evaluated for this case. Root coverage was indicated for lower left central incisor 31[Photoplate1]. 1 week ahead of surgery, the patient was advised for the following investigations-bleeding time, clotting time, hemoglobin count and platelet count, all of which were found to be within the normal range.

Surgical technique:

Prior to preparation, vitals of the patient were checked and found to be normal. Intra-oral asepsis was attained with 0.2% chlorhexidine digluconate solution and local anesthesia was administered. The receptor bed was prepared [Photoplate1] and a sterile template was used for measuring the dimensions of the graft, required for coverage.

Donor site:

A split-thickness graft of the required dimensions was harvested by conventional scalpel technique from the palatal keratinized mucosa in the region around the premolars and the first molar. The bleeding was controlled by digital pressure. A sample of 10ml venous blood was collected from the antecubital vein, without any anti-coagulant and was immediately subjected to centrifugation at 3000rpm for 10 minutes as described by Choukronet.al.⁵ A layer of fibrin formed in the tube between a layer of erythrocytes at the bottom and plasma poor plasma [PPP] at the top. Being a good hemostatic agent PPP was separated from the centrifuged blood using syringe and was applied on the palatal wound using gauze to control bleeding. The PRF was then emptied onto sterile gauze [Photoplate2] and squeezed to form a PRF membrane, which was resized to that of the palatal wound [Photoplate2]. The PRF was secured in place and the wound was closed by matrix suturing with 5-0, braided silk suture and placing a non-eugenol pack. Retention of the periodontal pack and protection of the donor site was aided by a sterile acrylic stent.

Recipient site:

The FGG obtained was placed at the prepared recipient bed and sutured using 5-0, braided silk suture. [Photoplate1] A non-eugenol pack was placed over it. The patient was prescribed analgesics for 3days and

chlorhexidine mouthwash for 2 weeks and recalled for suture removal after 1week and follow up was scheduled at intervals of 1week for 1month.

Clinical outcome

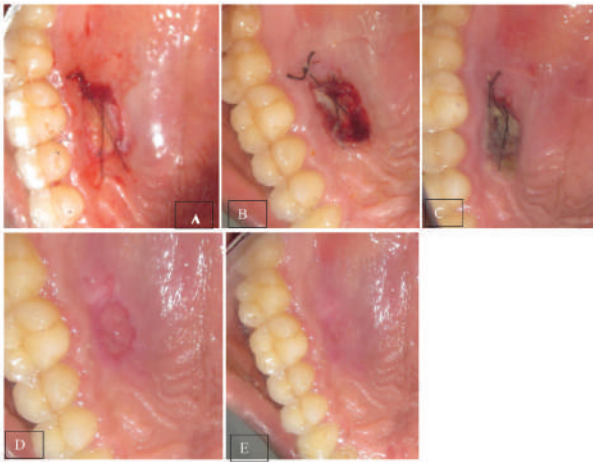
The patient was questioned if he faced any pain or discomfort at the donor site. According to the patient, discomfort was minimal, especially for first 2 days post-operatively. Palatal wound was then examined which revealed that the periodontal pack was intact and the palatal sutures were secure. After 10 days, the sutures were removed and the wound was further scrutinized. An uneventful superior healing was observed at the donor site that was visibly appreciable [Photoplate3.]. The wound had diminished in size and the margins showed no signs of inflammation, merging with normal tissues. Complete wound healing was observed in 2 weeks.



Photoplate1 Pre operative and Immediate Post Operative photographs of recipient and donor site



Photoplate 2. Preparation of Platelet-rich Fibrin and Donor Site Covered With PRF Membrane



Photoplate 3. From Clockwise Direction, Donor Site: A) On The Day Of Surgery, B) Second Day Post-operatively C) Fourth Day Post-operatively D) 10th Day Post-operatively E) one month operatively

DISCUSSION

Free gingival grafts have been extensively used since their introduction by Bjorn in 1963.^[6] The fate of the graft is largely dependent on the survival of the connective tissue at the recipient site.^[7] Usually, sloughing of the epithelium is observed and sometimes, the graft, though healthy, is bulbous, and can be demarcated from the normal tissue.^[7] Complete healing in FGGs is delayed and occurs by secondary intention, thus the graft is morphologically distinguishable from adjacent tissues for months.^[3, 7] Moreover, donor site pain and morbidity was much longer and greater, making it less preferable for root coverage procedures.^[3]

The use of PRF as palatal bandage was first advocated by Aravindaksha et al.^[2] as an efficacious approach to protect the raw wound area of palatal donor site to reduce healing time and patient discomfort. PRF is known to improve body's natural defense mechanism and promote healing and regeneration of tissues. Being strictly autologous, it is advantageous over the conventional PRP as it eliminates the need for biochemical handling of blood.^[8] Additionally, preparation of PRF is inexpensive and eliminates the risks related to toxinogenous [bovine] derived thrombin.^[4] However, the preparation of PRF is technique sensitive as it involves immediate collection of blood and centrifugation, prior to initiation of clotting cascade.

The triad of angiogenesis, immunity and formation of epithelial cover are substantiated by PRF.^[5] PRF comprises of fibrin that binds to several growth factors like, fibroblast growth factor, platelet derived growth

factor, vascular endothelial growth factor and angiopoietin which play an important role in initial angiogenesis. The molecular structure of fibrin serves as an optimal matrix that supports proliferation of fibroblasts and endothelial cells, allowing rapid angiogenesis.^[5] PRF is considered to be an immune organizing node, owing to its rich content in cytokines that possess chemotactic properties and facilitate neovascularization.^[9] These cytokines are gradually released from the PRF during fibrin matrix remodeling that favors wound healing.^[9] Rasmuset et al.^[10] postulated that the fibrin matrix promotes synthesis of Type I collagen and protects endogenous fibrogenic factors from proteolytic degradation, forming a physiologic architecture conducive to wound healing.

In the present case, excellent healing was achieved within 14 days. The graft was pink, firm and merged with the surrounding tissues. Signs of inflammation or infection were not seen. The reason for accelerated and superior degree of healing may be attributed to the use of PRF as a palatal bandage.

CONCLUSION

PRF as an adjuvant has succeeded in mitigating post-operative pain and morbidity of the donor site. Using it as a bio-active dressing is time-saving and cost-effective. From a clinical standpoint, PRF promotes all the imperative parameters associated with wound healing and further implications of this novel technique in periodontal surgeries need to be elucidated.

Ethical Clearance- Ethical committee approval was taken prior to the publication from institutional ethical and research committee Manipal College of Dental Sciences, Mangalore, Manipal College of Higher education.(MAHE)

Source of Funding- Self.

Conflict of Interest – Nil

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The Exemplar of Employment Epoch in India with HRD Perspective

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ABSTRACT

The term human resource means the total sum of competencies in the society. The development of an economy depends on all competencies of Human resources. In present day context, the human resource development gains importance as it shapes development strategies of nations in global context. The hotplate of recent economy issue is the employment factor and in turn manpower development of the respective country. The developed countries are free from the problem of unemployment but suffering from, disguised unemployment and underemployment. The current study focuses on market mechanisms, by employing new strategies in the present academic system through matching education and training to augment the need for human resources. The basic objective of present study to induce the Tamilnadu government intensify efforts so as to increase public as well as private investment and spending on key Social Services, such as Education system, Social welfare measures, Proper Nutrition, sufficient irrigation facility, Adequate and clean sanitation Public health and Family Welfare etc., Chapter one provides basic idea about the Human resource development and Employment. Chapter two displays the methodology of the study. Chapter three lists the review of literature. Chapter four describes the share of employment in all three sectors and corresponding industrial break up with projection of the share of employment in developed countries. Chapter six describes the same for developing countries. The last chapter concludes with the findings and suggestions.

Keywords: HRD, Employment, Economic Development, Labour, Sectors

INTRODUCTION

The human resources has crossed its territory of significance from personnel department to Administrative level and policy framework. The performance of production intended to verbal evolution of human resource development. Human beings are an asset who must be hired, satisfied, developed, and retained in current scenario. In long run, like financial assets and materials assets, even human assets also be maintained and replaced based the demand of the commercial world. In the line of organization human resources attains the higher grade as it sustain the feasibility of business policy in the reality. The human resources development are not restricted with the formal approaches such as class room training, hands on courses or preplanned training programme, but also extended to informal way by means conversation, coaching by manager, project proposal and presentation. Healthy organizations are adopting

both formal and informal bases for the development of human resource development. The dictionary meaning of human resources, 'the people, staff or person who operates and maintains the organization which is contrasted from other assets like physical, financial, monetary and material assets'. Human Resource is a process implemented in an organization which deals with the people and issues related to people such as reward, appointment, recompense, routine management, and training. The growth of human resources in the recent past has witness the level of reaps and bounds of development of business practices and it becomes integral part of the organization.

METHODOLOGY

Hypothesis

Human resource development influences the mental and physical conditions of the employee.

Human resource development improves labour working days.

OBJECTIVES OF STUDY

To analyze the role of human resources development in growth of Indian economy.

To prove the HRD meant for the right person is in the right place at the right time.

To construct a framework for employees to improve personal and technical skills, knowledge, and abilities.

REVIEW OF LITERATURE

According to India Labour and Employment report 2014¹, the structure of the labour market, patterns of employment growth, and labour-market institutions play an important role in shaping development patterns and outcomes. However, there is a lack of analytical documentation on these issues.

Amitabh Kundu and P.C. Mohanan² According to them, the trends and pattern of economic growth does not guarantee that the growth of job opportunities will be equal to that of the working age population or higher than that, after wiping out the backlog of unemployment.

T.S Pabola and Partha Pratim Sahu³, According to them, a major proportion of workers in non-agriculture economic activities work in informal sector where they suffer from a large quality deficit in employment, in terms of low productivity, low earnings, poor conditions of work and lack of social protection.

IMA report⁴ has analyzed and prepared a report on the India employment Report, the employment during 2015-16. In this report, they compared the employment with talent scenario in India. During the this period nearly 462.5 million people above the age of 14 years were employed, and it is more than 9 million, a decade ago. It is unfortunate that nearly 18 million were searching for jobs. The number of people has increased by about 91 million between 1999-00 and 2015-16. However, both number of people employed and their share in the total population have decreased steadily in the last four years. Between 1999-00 and 2015-16, about 1.5 times more people were employed in the urban areas than in rural areas. The urban workforce increased at a much faster rate 3.3 percent CAGR compared to 0.8 percent of rural work force. The rate of rural employment declined

from 3.5 times urban employment in 2004-05 to 2.4 times in 2015-16.

Sona Mitra⁵ According to her, proportional employment generation has not been achieved along with incremental output growth rate and secondly employment opportunities have negative growth with the traditional labour intensive industries.

HRD and Management Development

The strength of human resource development depends on the management and leadership development process which is flexible and continuous, linking an individual's development to the goals of the task available in the organization. The correlation between the level of employment and economic activity, witness a positive response from the worldwide statistics. Table 1 depicts the share of employment from the primary, secondary and tertiary sector with respect to economic activity, extracted from world development Indicators for the year 2011 to developed countries.

Table 1: Share of Employment by Economic Activity (%) year 2011

Country	Agriculture	Industry	Service
UK	1.5	23.5	75.0
USA	2.0	22.0	76.0
France	1.5	23.5	75.0
Japan	5.0	29.0	65.0
Germany	2.5	31.0	66.0
Italy	5.5	29.5	65.0
Australia	4.5	20.0	75.5

Source: World Development Indicators (WDI): 2011⁶

The above table indicates, the elasticity of employment in the developed countries significantly differs across the sectors. As a matter of fact, there is no provision for further employment irrespective of output. Except pure agriculture, the scope for the employment is almost zero and the value of elasticity in service sector ranges from 0.3 to 0.5. However, there is a space for the overall employment level, for the agro based industries and core manufacturing industries for service sector in

large base. From our projections, it is seen that even if the service sector grows at more than 10 per cent, its share in employment by 2013 will still be only 29 percent rising from the level of 23 per cent in 1999-2000.

Table 2: Employment Projections (at % growth rate)

	1999-2000	2004-05	Projected Elasticity	Growth Rate	Employment Growth rate	2017
Agriculture	237.56	240.32	0.10	4.00	0.40	252.11
Mining& quarrying	2.27	2.24	0.00	4.70	0.00	2.24
Manufacturing	48.01	51.79	0.22	10.50	2.31	68.11
Electricity, Gas and water supply	1.28	1.29	0.00	8.30	0.00	1.29
Construction	17.62	21.10	0.60	8.50	5.10	38.32
Trade, hotels& restaurant	37.32	45.76	0.50	9.20	4.60	78.49
Transport, Storage and communication	14.69	18.78	0.40	10.50	4.20	30.76
Financing, insurance, real estates and business services	5.05	5.90	0.50	11.00	5.50	11.21
Community, social and personal services	33.20	35.95	0.30	7.60	2.28	47.11
Total Employment	397.00	423.13	0.22	8.00	1.76	529.64
Labour Force (1.5%)	406.05	437.43				522.99
Labour Force (1.8%)	406.05	443.93				549.90
Unemployment rate (1.8%)	2.23					3.68

Source: Planning Commission: 2016

From table 2, it is evident that fast-tracking growth is dominant in all economic activities to expanding employment opportunities. The need of the hour arises to support and enhance both demand and supply sides of the human resources in order to achieve new heights of employment. On the demand side the most compelling force is evident for growth in the employment. The estimates are projecting a sustained growth of 8.5 per cent per annum, by 2015, and unemployment will be totally eliminated. The macroeconomic policy framework may facilitate accelerated growth in the economy. Secondly, demand side strategy envisioned with specific policies

for selective sectors aimed at the growth of labour intensive industries like apparel industry, leather industry and textile industry. This must be managed in such a way that there is no compromise with efficiency. The supply side interventions should be in capacity building and enhancing the skill endowment of the labour force.

The following table portrays the share of employment by economic activity for the South East Asian countries for the year 2011.

Table: 3 Share of Employment by Economic Activity (%) Year 2011

Country	Agriculture	Industry	Service
China	49.8	23.5	26.7
Indonesia	55.5	14.0	31.0
Thailand	49.0	18.5	32.5
Philippines	35.0	15.0	50.0
Malaysia	17.5	31.5	51.0
Korea Rep.	10.5	26.5	55.5
Pakistan	58.5	14.5	27.0
India	57.0	21.0	22.0

Sources: World Development Indicators (WDI): 2011

It is acknowledged from Table 3 that discussion of the employment situation or an employment strategy will not be complete without a reference to the social safety nets for workers. The organized sector of the society represents the social secured sector which are lacking in the developed countries like India.

Table 4: Rate of Growth of Population, Labour Force and Employment: 2011

Time intervals	Population growth (% per annum)	Labour force (% per annum)	Employment Growth (% per annum)	Gross Domestic Product growth (% per annum)
1972-73 - 1977-78	2.27	2.94	2.73	4.70
1977-78 to 1983	2.19	2.04	2.17	4.05
1983 to 1987-88	2.14	1.74	1.54	4.23
1987-88 to 1993-94	2.10	2.29	2.43	5.85
(1983 to 1993-94)	(2.12)	(2.05)	(2.04)	(5.20)
1993-94 to 1999-2000	1.93	1.03	0.98	6.63
1999-2000 to 2010-2011	1.21	1.73	1.27	5.21

Source: Report of Task force Employment Opportunities, Planning Commission:⁷

The essence of the study is to compare the employment with the economic activity for which the growth rate of population, labour force and employment are compared with the Gross Domestic Product with their growth rate. Surprisingly there is a positive linkage between employment and the GDP, and also other Economic indicators.

CONCLUSION

From the current study, it can be reviewed that employment opportunity are to be generated through the effective human resource management. Unless and

otherwise, it is difficult to enhance the production policy and other industrial policy. The main suggestion of the study is the rural industrialization through available human resource the backward, semi-urban and remote areas. The labour intensive industries are encouraged to implement the human resource policy in order to create more employment opportunities. The may pave way for equality in the developmental activities as well as utilization of available human resources in optimum way.

Ethical Clearance: completed. (Dept. level committee at VELs)

Source of Funding: Self

Conflict of Interest: NIL

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Effectiveness of Structured Teaching Programme on Knowledge of Kangaroo Mother Care among Mothers

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ABSTRACT

Objective : The objective of the study was to find out the efficacy of structured teaching programme (STP) of Kangaroo Mother Care (KMC) among mothers in AIMS, Kochi. **Materials and method:** A quantitative approach with quasi experimental pretest – posttest design and convenience sampling technique was used in this study. Study was conducted on 100 antenatal mothers (50 experimental and 50 control group) attending gynecologic OPD, AIMS, Kochi, Kerala. The tools used for the study was Knowledge Questionnaire on KMC with 13 items related to demographic data and 17 items related to KMC. **Result :** The present study reveals that out of 50 subjects of experimental group, the mean pretest knowledge score is 7.4 and the mean posttest knowledge score is 10.5 after the implementation of Structured Teaching Programme (STP). The control group, mean pretest knowledge score is 8.2 and the mean posttest knowledge score is 6.9. There is high level of significance in the knowledge score of the subjects between the experimental and control group at ($t(98) = 2.62, p < 0.000$). The pretest and post test knowledge score was greater in primigravida mothers than multi gravida mothers. A statistically significant association was observed for educational level and knowledge score ($f = 17.56, p < 0.05$), prior information and knowledge score ($f = 8.369, p < 0.05$). **Conclusion:** Based on the study findings the STP was significantly effective to improve the knowledge level of mothers regarding the KMC. Majority of the mothers (35 (68%)) had inadequate knowledge regarding KMC before the implementation of the STP and after the implementation 37 (74%) attained adequate knowledge.

Keywords : Structured Teaching Programme, Kangaroo Mother Care, Knowledge, Mothers

INTRODUCTION

Kangaroo care seeks to provide restored closeness of the newborn with family members by placing the infant in direct skin-to-skin contact with them. This ensures physiological and psychological warmth and bonding. The parent's stable body temperature is more smoothly than an incubator, and allows for readily accessible breast feeding when the mother holds the baby this way. While this model of infant care is substantially different from the typical western neonatal intensive care unit. It is estimated more than 200 neonatal intensive care units

practice kangaroo care today. One recent survey found that 82% of neonatal intensive care units use kangaroo care in the States today¹.

Caring low birth weight baby is a great challenge for the neonatal care unit and the family. Number of low birth weight baby is still far beyond the expected target in our country. The cost of the quality management of these babies is increasing day by day. KMC is low cost approach for the care of low birth weight baby. This method of care was introduced and popularized by Dr. Edger Roy, Dr. Martinez and Dr. Charpak in late 1970's².

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Sivapriya S, Subash J, Kamala S. (2008) conducted a quasi experimental study to assess the knowledge of mothers of preterm babies regarding kangaroo mother care and to evaluate the effectiveness of structured teaching programme on kangaroo care among the mothers of preterm babies. A total of 35 mothers were

selected for the study. Findings of the study revealed that, the pre-test knowledge of the Kangaroo Care was Nil. After the structured teaching programme post test knowledge of the mother regarding Kangaroo Care was increased. 6 (17.10%) mothers had inadequate knowledge on Kangaroo Care, 25 (71.4%) mothers had moderately adequate knowledge and 4 (11.5%) mothers had adequate knowledge on Kangaroo Care. Kangaroo Mother Care is a simple low cost and highly effective intervention for low birth weight babies. And also teaching programmes can improve the knowledge of mothers on Kangaroo Care. So, educational programme on Kangaroo Care can be provided to Mothers, which in turn will improve the preterm and low birth care ^[3].

Preterm birth is now the leading cause of under-five child deaths worldwide with one million direct deaths plus approximately another million where preterm is a risk factor for neonatal deaths due to other causes. There is strong evidence that kangaroo mother care (KMC) reduces mortality among babies with birth weight <2000 g (mostly preterm). KMC involves continuous skin-to-skin contact, breastfeeding support, and promotion of early hospital discharge with follow-up. The World Health Organization has endorsed KMC for stabilised newborns in health facilities in both high-income and low-income countries ^[4]. The study will initiate key steps in the development, implementation and expansion of sustainable, facility-based KMC services in the institution and thereby in all developing countries.

AIMS AND OBJECTIVES

The aim of the study was to find out the efficacy of structured teaching programme of KMC among mothers in AIMS, Kochi

- 1) Identify the pretest and post test knowledge score on KMC among mothers' of experimental group
- 2) Evaluate pretest and posttest level of knowledge score among mothers' control group
- 3) Compare the post test level of knowledge score among primi and multipara mothers'
- 4) Find the association between the selected demographic variables and knowledge level on KMC among mothers'

HYPOTHESIS

H1: There will be significant difference in the

posttest knowledge score after the administration of the STP the experimental group.

H2: There is significant association between the post test knowledge score and the selected demographic variables .

VARIABLE

Independent Variable : STP regarding KMC

Dependent Variable : Knowledge of mothers'

MATERIALS AND METHOD

The study was conducted on 100 antenatal mothers and the research approach is quantitative and research design used was quasi experimental pretest–posttest. The researcher explained the purpose of study and obtained an informed consent and the tool was administered and the data was obtained from the mothers. The tools used for the study was Knowledge Questionnaire on KMC with 13 items related to demographic data and 17 items related to KMC. Each mother took nearly 20 minutes to take fill the questionnaire. The data obtained was analyzed using inferential and descriptive statistics i.e independent and paired' t' test. and Chi square .

DATA COLLECTION INSTRUMENTS

Tool 1: Knowledge Questionnaire on KMC.

Part I Demographic Performa

The semi structured questionnaire was with 13 items related to demographic data-age , marital status ,education ,occupation area of residence, ,number of delivery , number of children, birth weight ,mode of delivery ,number of pregnancy, prior information, prior practice of KMC

Part II Knowledge questionnaire

17 items related to KMC with four options out of which one answer is the most appropriate which is graded as one and the wrong answer with zero.

RESULTS AND DISCUSSION

Section 1 : Socio demographic characteristics of subjects

Table 1 : Distribution of subjects based on demographic variables. n = 100

Sl no.	Sample characteristics	Frequency (f)	Percentage (%)
1	Age in years		
	18-25	49	49 %
	26-32	46	46 %
	33-40	5	5 %
	Above 40	-	-
2	Education		
	Primary school	15	15 %
	Secondary school	27	27 %
	Graduate	46	46 %
	Postgraduate/above	12	12 %
3	Occupation		
	Homemaker	62	62 %
	Government employee	6	6 %
	Private employee	32	32 %
	Business	-	-

Table 1 depicts most of the mothers 49(49%) falls in the age group between 18-25 ,46(46%) of the mothers were graduates ,62(62%) of the mothers were homemakers ,59(59%) of the mothers were primi gravida and 66(66%) of the mothers did not have any prior information about KMC .

NY PRIOR INFORMATION

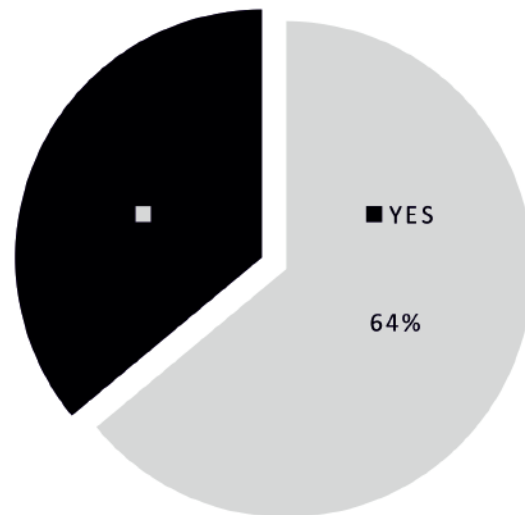


Figure 2: Distribution of subjects according to any prior information

Data presented in figure 2 shows the frequency and percentage of mothers according to any prior information on KMC . Among 100 mothers 64 (64%) of the mothers have no information on KMC and 36(36%) are having informations on KMC .

Section II: Analysis of pre & post test knowledge score of the mothers

Table II – Distribution of samples according to pre –test knowledge score of experimental group

n = 50

Pre test score experimental group		
Level of knowledge	Frequency (f)	Percentage (%)
Adequate knowledge ≥ 13	0	0 %
Moderate knowledge 9-12	16	32 %
Inadequate knowledge ≤ 8	34	68 %

The data presented on table 2 shows that out of 50 mothers 16(32%) of mothers have moderate knowledge, 34(68%) has inadequate knowledge before the implementation of STP on KMC

n = 100

GRAVIDA

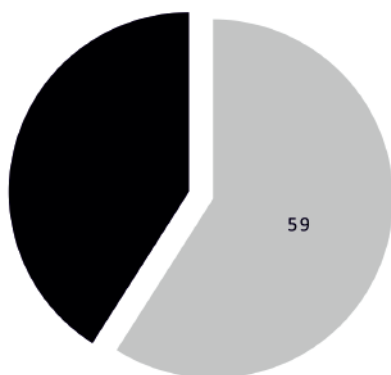


Figure 1: Distribution of subjects according to gravida

Data presented in figure 1 shows that out of 100 mothers 59(59%) of the mothers are primi gravida and 41(41%) are multigravida.

Table III – Distribution of samples according to post –test knowledge score of experimental group

n=50

Post test score experimental group		
Level of knowledge	Frequency (f)	Percentage (%)
Adequate knowledge ≥ 13	6	12 %
Moderate knowledge 9-12	37	74 %
Inadequate knowledge ≤ 8	7	14 %

The data presented on table III shows that out of 50 samples 6(12%) samples have gained adequate knowledge ,37(74%) of sample has attained gained moderate knowledge and 7(14%) have inadequate knowledge after the implementation of STP.

Section III: Comparison the pre test and post test level of knowledge score of experimental and control group

Table IV – Distribution of samples according to mean ,standard deviation ,mean difference and ‘t’ value of the experimental group n = 50

	Knowledge		mean difference	t-value	df	level of significance
	Mean	SD				
EXPERIMENTAL GROUP						
Pre test	7.40	1.714	.115	11.964	49	.000
Post test	10.50	1.854	.123			

$(t (49) = 3.269, p(.000))$

The data presented in table IV shows that there is a significant difference in the knowledge score of the subjects within the group after the intervention.

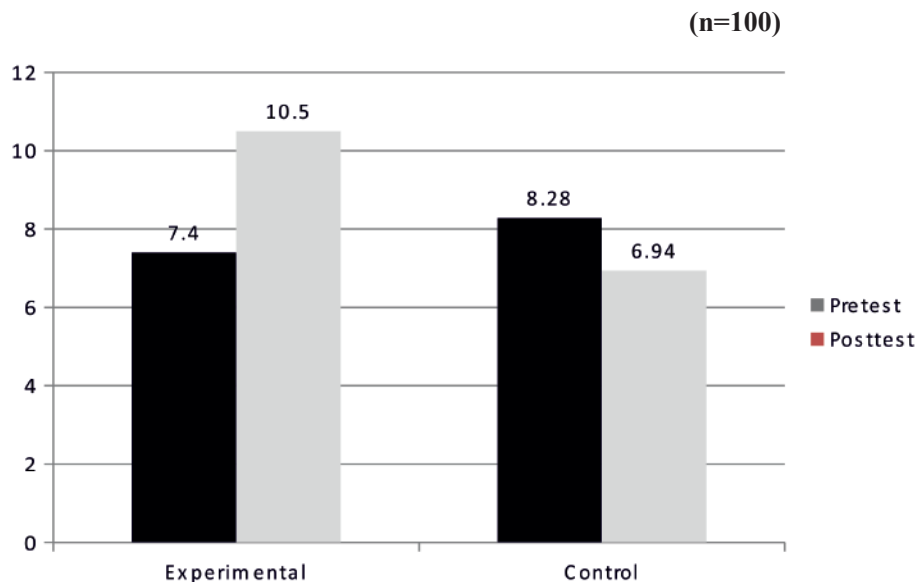


Figure 3: The mean pre test and post test knowledge scores

Figure 3 indicate that the mean knowledge score of the experimental group pre test is 7.4 and the mean post test score is 10.5 after the implementation of the intervention and the mean knowledge score of the control group pre test is 8.2 and the post test is 6.

Table V – Comparison of posttest between the experimental and control group

n= 100

	Knowledge		mean difference	t-value	df	level of significance
	Mean	SD				
EXPERIMENTAL GROUP Post test	10.50	1.854	0.123	8.369	98	.000
CONTROL GROUP Post test	6.94	2.368	0.73			

(t (98) =2.62 ,p<0.000)

The data presented in table V shows that there is high level of significance in the knowledge score of the subjects between the experimental and control group.

Section IV- Association between knowledge level of subjects and selected demographic variables

Table VI – Association between education and pretest knowledge score

n= 100

Variable	Level of Knowledge			df	χ^2	p-value
<i>Education</i>	inadequate	moderate	adequate	6	17.536	0.008
Graduate	28	21	0			
Postgraduate	3	8	1			
Primary school	13	2	0			
Secondary school	18	9	0			

Table VI reveals that there is significant association between education and level of education at (χ^2 -17.536,p<0.05)

DISCUSSION

Out of 50 samples of experimental group 16(32%) of the sample had moderate knowledge,34(68%) had inadequate knowledge , before the administration of STP.

Out of 50 samples of experimental group 37 (74%) of the sample gained moderate knowledge,7(14%) are still having inadequate knowledge and 6 (12%) samples are having adequate knowledge after the administration of STP.

The mean pre test knowledge score is 7.40 and post test knowledge score is 10.50of the experimental group. And the mean pre test knowledge score is 8.28 and post test knowledge score is 6.94 of the control

group. Statistical analysis of data shows mean post test knowledge score was 10.50 which is higher than the mean pre test knowledge score was 7.40. There is 3.1 mean increase in the knowledge .

There is high level of significance in the knowledge score of the subjects between the experimental and control group at (t (98) =2.62 ,p<0.000).

Sivapriya S, Subash J, Kamala S. (2008) conducted a quasi experimental study to assess the knowledge of mothers of preterm babies regarding kangaroo mother care and to evaluate the effectiveness of structured teaching programme on kangaroo care among the mothers of preterm babies. After the structured teaching programme post test knowledge of the mother regarding Kangaroo Care was increased. 6 (17.10%) mothers had

inadequate knowledge on Kangaroo Care, 25 (71.4%) mothers had moderately adequate knowledge and 4 (11.5%) mothers had adequate knowledge on Kangaroo Care.^[3]

The findings of the present study correlates with the findings of the supportive study . Hence STP can be considered as an important teaching method to impart knowledge

CONCLUSION

KMC is a powerful, easy method to use and to promote the health and wellbeing of low birth weight babies. KMC helps in maintaining temperature of infant; facilitates breast feeding; improves growth; reduces infection; and improves mother-infant bonding.^[4] Many Mothers in India does not know how to practice KMC on their low birth weight babies and hence they do not practice also. So, to know the current knowledge and attitude of mothers regarding KMC and to improve their knowledge and practice some research studies are needed to carried on with teaching programmes on mothers of low birth weight babies. In turns it also helps the nursing personnel to improve their communication skills.^[5]

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Ethical Clearence: Obtained from Research committee of Amrita College of Nursing and Institutional

Ethics Committee of Amrita Institute of Medical Sciences, Kochi.

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Indoor Air Pollution an Ignored Public Health Issue: Study to Find the Awareness and Practices Regarding Indoor Air Pollution in a Rural Setting Near Chennai

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ABSTRACT

Background: Indoor air pollution (IAP) refers to chemical, biological and physical contamination of indoor air. It is of great concern owing to the range of ill effects it has on health. Rural India still relies on biomass fuels for cooking inspite of availability of cleaner fuels.

Objective: To assess the knowledge, and practices regarding indoor air pollution and its health hazards among rural women in Kuthambakkam village in Tamilnadu.

Methodology: A cross sectional descriptive study was conducted among rural women from 150 households in Kuthambakam village in Tamilnadu. Personal interviews were conducted at their houses using a structured questionnaire. Data obtained was analyzed using SPSS version 21.

Results: The mean age of the study participants was 38.5 years. Majority of the women were married (90.7%) or widowed (2.6%). 13.3% were illiterates. Overcrowding was found to be present in 46% households. Kitchen was not separate in 42.7% houses. Majority households used LPG (70%) as source of cooking fuel followed by wood (18%), kerosene (11.3%) and cow dung (0.7%). 4% of the houses did not have any windows in the kitchen while in remaining houses windows (64.7%) were the common mode of exhaust for smoke. The practice of burning mosquito coils and incense sticks was seen in 37.3% and 46% households respectively. The study found that 16 (38%) men smoked inside their houses. 57% women were not aware that indoor air pollution is hazardous to their health and well being.

Conclusion: Indoor air pollution is a looming threat often ignored by people. It is imperative to make people aware of indoor air pollution and its deleterious effects on human health.

Keywords: Biomass fuel, Health, Ignorance, Indoor air pollution

INTRODUCTION

Indoor air pollution (IAP) refers to chemical, biological and physical contamination of indoor air.¹It is of great concern owing to the range of ill effects it has

on health. Globally, IAP from use of solid fuel accounts for more than 1.6 million deaths and 39 million DALYs every year.² Approximately, three billion people in the world, use biomass such as crop residues, dung, straw, wood, kerosene and coal as their primary source of energy for cooking and heating. In the South East Asia region, 78% households rely on solid fuel for cooking. IAP was estimated to cause 374000 deaths in children below 5 years & 185000 deaths among adults. India is the main victim and IAP is estimated to be responsible for between 4% to 6% of the national burden of disease.² A majority of these households are located in poor rural

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communities and burn such solid fuels in inefficient devices, often in kitchens that are poorly ventilated, resulting in very high exposures to multiple toxic products of incomplete combustion.³

According to WHO, a pollutant released indoors is 1000 times more likely to reach the lung than that released outdoors. Biomass smoke contains harmful pollutants like suspended particulate matter, nitrogen dioxide (NO₂), carbon monoxide, sulphur dioxide (SO₂), formaldehyde and carcinogens. Indoor smoking of tobacco also contributes to IAP. Studies both in India and other countries have confirmed that exposure to biomass fuels has a significant association to chronic respiratory symptoms such as chronic cough, chronic phlegm and chronic respiratory diseases such as chronic bronchitis, asthma, corpulmonale and respiratory failure.²⁻⁵

According to the Census of India (2011), many households still rely on firewood fuel for cooking and approximately 20% rely on other forms of biomass fuels. In rural areas, approximately 80-90% of households are dependent on biomass for cooking. In contrast to cleaner fuels, kerosene and LPG were accounted for 19% and 48%, respectively.⁶ Poverty, inaccessibility to improved cooking fuel, and lack of awareness about harms of biomass emissions are among the major factors that drive their widespread use.⁷ In India, out of 0.2 billion people using fuel for cooking; 49% use firewood; 8.9% cow dung cake; 1.5% coal, lignite, or charcoal; 2.9% kerosene; 28.6% liquefied petroleum gas (LPG); 0.1% electricity; 0.4% biogas; and 0.5% any other means.⁸

A person's exposure to indoor air pollution is determined by the concentration of pollutants in the indoor environment and by the amount of time spent in this environment. Stove features (the presence of chimney or flue that routes smoke to the outside), the location of the stove and kitchen, as well as ventilation practices have a major impact on indoor air pollution. In most societies women are in charge of cooking and they spend between 3 and 7 hours per day near the stove preparing food.² It is estimated that an average woman in India may be subjected to 60,000 hours of exposure to smoke due to combustion of biomass fuels in her life time.⁵ Being the most vulnerable group, the present study was conducted among rural women in Kuthambakkam village in Tamilnadu.

OBJECTIVE

To assess the knowledge, and practices regarding indoor air pollution and its health hazards among rural women in Kuthambakkam village in Tamilnadu.

METHODOLOGY

It was a cross sectional descriptive study conducted between January - February 2016 in Kuthambakkam village, the rural field practice area of Saveetha Medical College and Hospital, Thandalam. Permission was obtained from the Institutional Ethics Committee prior to the conduct of study.

According to NFHS 4, 73% of households use clean fuel for cooking in India. Based on this prevalence and taking relative precision as 10% of prevalence, at 95% confidence level the sample size was calculated as 142. So for the present study it was decided to survey 150 households. Kuthambakkam village is located 30 Km away from Chennai and has a population of 5047 people and 1277 households.⁶ The required number of households was selected using simple random sampling method. In each of these household, women aged 18 years and above were interviewed. Informed consent was obtained after explaining the purpose of the study. Those women who were not willing to participate in the study were excluded. Personalized interviews were conducted at their houses using a structured questionnaire.

Data obtained was analyzed using SPSS version 21. Descriptive statistics were calculated. Results were expressed in the form of simple proportions, mean and standard deviation.

RESULTS

The study was conducted among women from 150 households in Kuthambakkam village. The mean age of the study participants was 38.5±12.1 years (min:18 years & max:73 years). Their age distribution is depicted in Table 1.

Majority of the women were married or widowed (90.7% & 2.6% respectively) while the rest were unmarried. Only 13.3% were illiterates (Table 1).

Majority 70.7% women were residing in nuclear families. The total family income per month of these households ranged from Rs 500 – 80,000 (mean: Rs 8910 ± 7902). Under-five children were present in 64 families

(42.6%) and geriatric people in 33 families (22%).

It was found that more than half (58.6%) of the houses were semipucca followed by pucca houses (28.7%) and only 12.7% of houses were kutcha. Majority houses had cemented floor (63.3%), 14.7% had mud floor and rest were either tiled/ marble. Majority (55%) of the houses had only 2 rooms and 10% had only single room. Overcrowding was assessed using person per room criteria and was found to be present in 46% households.

Kitchen was not separate in 42.7% houses. Majority households used LPG (70%) as source of cooking fuel followed by wood (18%), kerosene (11.3%) and cow dung (0.7%). It was found that 4% of the houses did not have even windows in the kitchen while in remaining houses windows (64.7%) were the common mode of exhaust for smoke followed by exhaust fan (29.3%) and chimney (2%). When questioned if they keep the windows and doors open at the time of cooking, only 68% replied in affirmative. (Table 2)

The practice of burning mosquito coils and incense sticks was seen in 37.3% and 46% households respectively. The study found that men in the family smoked in 42 (28%) of households, of which 16 (38%) smoked inside their houses (Table 3). 13 (31%) were regular smokers, 19 (45.2%) smoked occasionally and 10 (23.8%) smoked rarely.

45% women were aware of potential sources of indoor air pollution. 43% women were aware that indoor air pollution is hazardous to their health and well being. 9% women reported respiratory illness in their family members.

Table 1: Distribution of women according to their age, marital status and education status (N= 150)

Age group	Frequency	Percentage%
18-30	44	29.3
31-40	52	34.7
41-50	28	18.7
51-60	18	12.0
61-70	8	5.3

Cont... Table 1

Marital Status		
Unmarried	10	6.7
Married	136	90.6
Widowed	4	2.7
Education Status		
Illiterate	20	13.3
Literate	130	86.7

Table 2: Distribution of houses according to physical environmental characteristics (N=150)

Type of house	Frequency	Percentage
Kucha	19	12.7
Pucca	43	28.7
Semi pucca	88	58.6
Type of floor		
Mud	22	14.7
Cement	95	63.3
Tile	29	19.3
Marble	4	2.7
Number of rooms		
1	15	10.0
2	83	55.3
3	27	18.0
4	14	9.3
5	9	6.0
6	1	0.7
7	1	0.7
Ventilation		
Adequate	93	62.0
Not adequate	57	38.0
Type of cooking fuel		
LPG	105	70.0
Kerosene	17	11.3
Wood	27	18.0
Cowdung	1	0.7
Smoke outlet		
No windows present	6	4.0
Windows	97	64.7
Exhaust fan	44	29.3
Chimney	3	2.0
Kitchen		
Separate	86	57.3
Not separate	64	42.7
Windows and doors kept open during cooking		
Yes	102	68.0
No	48	32.0

Table 3: Distribution of Houses according to personal habits leading to Indoor air pollution

	Frequency	Percentage
Burning coils (N=150)		
Yes	56	37.3
No	94	62.7
Burning incense inside the house (N= 150)		
Yes	69	46.0
No	81	54.0
Smoking inside the house (N=42)		
Yes	16	38.0
No	26	62.0

DISCUSSION

In the present study almost one third of the houses did not use clean fuel for cooking (18% wood, 11.3% kerosene and 0.7% cow dung). According to National Sample Survey (NSS) 2010, carried out by Government of India, biomass fuel remains a widely used energy source in rural India where nearly 80% of households use them as the primary cooking fuel. In contrast, the majority of urban households use liquefied petroleum gas (LPG) as the primary cooking fuel; however, about 19% of urban households also use biomass fuel for cooking purposes.⁹ The use of LPG, which is known to result in the lowest pollution levels within households, remains a nonfeasible proposition for bulk of India's population as a result of prices, limited supply, and access.³

Poverty, inaccessibility to improved cooking fuel, and lack of awareness about harms of biomass emissions are among the major factors that drive their widespread use.^{9,10} The knowledge regarding association of indoor air pollution with health and disease was very poor in the present study as only 45% women had knowledge that indoor air pollution is a potential health hazard. Burning biomass fuels can have adverse effects on health because of its incomplete products of combustion which includes suspended particulate matter, carbon monoxide, poly aromatic hydrocarbons, poly organic matter, formaldehyde, etc.. The combustion of coal in particular results in production of oxides of sulfur, arsenic, and fluorine which can have deleterious effect on ones' health when inhaled for a prolonged duration of time.¹¹

In India, an estimated 400,000 deaths from acute

lower respiratory infection (ALRI) in children younger than five and 34,000 deaths from chronic obstructive pulmonary disease (COPD) in women are attributed annually to household solid fuel use, making this the third leading risk factor amongst all risk factors contributing to the national burden of disease and exceeding the burden attributable to outdoor air pollution^{12,13}. Some of the earliest human evidence linking indoor air pollution from biomass combustion with respiratory health came from studies carried out in Nepal and India in the mid-1980s.^{14, 15}

Health hazards due to biomass fuels could be reduced to even more than 50% by using smokeless chulas (improved cooking stoves) with proper exhaust chimneys.¹⁶ Studies have demonstrated that improved cook stoves reduce considerably the smoke, either by having a far better combustion or by having an excess of air or with a combination of both, the health impacts of smoke from open fires inside dwellings can be reduced using such improved cook stoves, changes to the environment (e.g. use of a chimney), and changes to user behavior (e.g. drying fuel wood before use, using a lid during cooking).¹⁷ In the present study, windows (64.7%) were the common mode of exhaust for smoke followed by exhaust fan (29.3%) and chimney (2%). 4% of the households didn't even have proper windows for the escape of smoke.

Apart from using biomass fuel, other habits like burning of incense sticks and mosquito coils in the household also leads to indoor air pollution.^{18,19} In the present study more than one third of the houses had a practice of burning mosquito coils inside the house and almost half of the women burnt incense sticks in the house.

According to WHO passive smoking or the second hand smoke is a serious form of Indoor air pollution.²⁰ In the present study 38% of the men who were smokers were smoking inside the house adding up to the risk of diseases to the inmates of the house.

CONCLUSION

Choice of cooking fuel depends on the socio-economic status of the people however; the choice of inhaling indoor air pollutants is not dependent on the socio-economic status alone. Indoor air pollution is a looming threat to the health of people and is an often ignored public health issue. Hence, it becomes imperative that people should be made aware of possible

indoor air pollutants like bio mass fuel, passive smoking, incense sticks, mosquito coils etc and its deleterious effect on ones' health by conducting regular Information Education & Counseling (IEC) activities among the people. Improved cooking stoves or subsidized LPG should be made accessible to all the people irrespective of their socioeconomic status.

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Conflicts of Interests: Nil

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Factors Influencing Semen Analysis in Case of Infertility

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ABSTRACT

Background / Objectives: In recent years, infertility in men has increased, which may be associated with their advancing age, habits like tobacco use, alcoholism and occupation. Semen parameters might be sensitive markers for these influencing factors.

Materials and Method: This study was conducted in all patients referred to Pathology department for semen analysis from Obstetrics and Gynaecology department in KVG Medical College and Hospital, Sullia from July 2011 to August 2013. 50 cases were included in this study. Information was collected as per the proforma by questionnaire from the patients about their occupation, smoking habits, tobacco chewing and alcohol intake. Semen examination was done as per WHO standard protocol procedures. Patients were classified into tobacco consumers, alcoholics and combined smokers & alcoholics. All these cases were again grouped according to age and occupation .

Results: Semen parameters like volume, motility, count, density and morphologically normal spermatozoa were comparatively reduced in tobacco users & combined alcoholics & tobacco users. Variation of semen quality with respect to age was not significant.

Conclusion: The influence of advancing age and occupation like drivers (radiant heat), and agriculture (gonadotoxic pesticides and fertilizers) could probably be considered as additive factors for oligozoospermia.

Keywords: age, alcohol, occupation, semen parameters, tobacco use.

INTRODUCTION

Parenthood is considered one of the most important life achievements in the Indian society. The importance of surgery to the psychological wellbeing of the couple can also be gauged from the fact that the overwhelming majority of patients seeking vasectomy reversal in India do so not because they have remarried or want additional children but because they have lost an only child. This compares with 2.6% patients in U.S. who seek a vasectomy reversal for this reason.^[1]

Infertility is defined as the failure to achieve a pregnancy within one year of regular (atleast 3 times per month) unprotected intercourse. It effects approximately 15% of sexually active couples ; a causative male factor is present in approximately 40% of cases. Oxidative stress also contributes to defective spermatogenesis and poor quality of sperm associated with idiopathic male factor infertility. Infertility is regarded as male factor when an alteration in sperm concentration or motility or morphology is present in atleast one sample of two sperm analysis, which comply with WHO 1999 guidelines, collected between one to four weeks apart.^[2]

The causes of male infertility fall into one of three categories : pretesticular, testicular and post-testicular .^[3]

Detection of male fertility problems relies heavily on the assessment of conventional parameters, namely sperm concentration, motility, morphology, viability,

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volume and Ph.^[4]

Rapid developments have occurred in the management of couple infertility due to a male factor. These have stimulated renewed interest in semen analysis, which has become more correct, more reliable and more informative.^[5]

Semen analysis is the initial and most essential step of the infertility evaluation, which also includes a physical exam, hormonal evaluation, sperm function testing, and genetic analysis. ^[6] In practice, however, because of a lack of standardization, a wide variation in results among laboratories, and an apparent need for increased quality control.^[7]

Previous estimates of infertility help-seeking were based on data from women. Men report a percentage seeking help that appears to be somewhat lower than reported by women. About 1 in 5 of those seeking help reported male-related infertility conditions.^[8]

Basic semen analysis is used to evaluate the male partners of couples with infertility. Conventional techniques for the evaluation of semen have been standardized by the World Health Organization (WHO) ^[9].

MATERIALS AND METHOD

Detailed history of age, occupation, tobacco use, smoking and alcohol intake was taken as per the proforma by questionnaire and detailed physical examination including genital examination was done. Semen samples were collected from all patients by masturbation after 2-5 days of sexual abstinence in wide mouthed polypropylene bottle and these semen samples were processed and analyzed by single qualified person.

I. MACROSCOPIC EXAMINATION

1). Liquefaction : Normal semen sample liquefies within 30 minutes at room temperature. Occasionally, samples may not liquefy, in which case additional treatment like, mechanical mixing or enzyme digestion may be necessary.

2). Color : Semen sample is examined immediately after liquefaction or within 1hour of ejaculation. Normally, semen is homogenous grey opalescent and may appear less opaque if sperm concentration is low. Red brown when mixed with blood or yellow in patients

with jaundice or taking vitamins.

3). Volume : of ejaculate is measured using graduated cylinder.

4). Viscosity : is measured by gentle aspiration into wide bore 5ml pipette and then allowing the semen to drop by gravity and observing the length of the thread. A normal sample leaves the pipette as small drops. In cases of abnormal viscosity, the drop will form thread more than 2cm long. Alternatively, the viscosity may be evaluated by introducing a glass rod into sample and observing the length of the thread that forms on withdrawal of the rod.

5).pH : is measured by using pH paper by evenly spreading one drop of semen onto the pH paper and after 30 seconds, the color change is compared with the calibration strip.

II. MICROSCOPIC EXAMINATION

A) Fixed volume 10µl semen is taken on to a clean glass slide with micropipette and covered with a 22mm×22mm coverslip. After stabilizing for 1minute, wet preparation is examined under light microscopy to note :

i) Motility : Select the fields atleast 5mm from the edge of the coverslip.

- Atleast 5 microscopic fields are assessed to classify 200 spermatozoa.
- Motility is graded as:-
 - a) Rapid progressive motility
 - b) Slow progressive motility
 - c) Non motile forms
 - d) Dead forms

ii) Preliminary estimation of sperm concentration : Scanning the wet mount and estimating the number of spermatozoa per high power field will help to estimate sperm count roughly, which is used to decide the dilution factor for determining sperm concentration by hemocytometry.

B) Assessment of sperm concentration :- The concentration of spermatozoa should be determined using hemocytometer method on two separate preparations of

semen sample, one on each side of counting chamber. The dilution is determined from preliminary estimation of sperm concentration.

Constituents of semen diluting fluid:

Sodium bicarbonate 5gm

Formalin (neutral) 1ml

Distilled water 99ml

Procedure

- Automatic pipettes or WBC pipettes are used for making dilutions.
- Charge the improved Neubauer hemocytometer with 10µl of thoroughly mixed diluted sample. Later, allow to stabilize for about 5 minutes in a humid chamber to prevent drying.
- Spermatozoa in the RBC chamber are counted.
- Sperm count per ml = N/conversion factor x10x6 N= number of sperms in RBC chamber.

C). Assessment of sperm morphology:

- Preparation of smears by feathering technique as peripheral blood smear preparation.
- Air dry the smear. Later fix in equal parts of 95% ethanol & ether for 5-15minutes.
- Stain with Leishman stain or stain in aqueous basic fuchsin for 5 minutes.

* Examine the slide under oil immersion, all normal & abnormal spermatozoa are assessed and scored. Atleast 200 spermatozoa are counted and scored.

D). Calculation of Leukocytes : Leukocytes in millions per ml= w×c/100 W- no.of leukocytes per 100 sperms counted

C- sperm count

E). Calculation of immature germ cell: Immature germ cell in millions per ml = N×C/100

N-number of immature germ cells per 100 sperms counted. C- Sperm Count.

RESULTS

AGE:

The mean age of the patients was 25.54. The distribution of semen quality among age groups is shown in Table 1 .

TABLE-1: Distribution of semen quality among age groups:-

Semen Quality	Age Groups (in years)				
	21-25	26-30	31-35	36-40	41-45
nz	2	6	4	-	1
atz	7	3	3	-	2
oz	14	10	8	3	1
atz	6	3	2	-	1
tz	-	-	-	-	-
otz	-	-	-	-	-
oz					

nz- Normozoospermia, oz- Oligozoospermia, atz- Asthenoteratozoospermia, tz- Teratozoospermia

13/50 cases were normozoospermic. The remaining 37 cases were classified into oligozoospermic and asthenozoospermic. All these cases were again stratified according to age (21-25, 26-30, 31-35, 36-40, 41-45) and occupation (sedentary, business, drivers & agriculture) for statistical analysis.

Control Group :

These cases constituted 26% of 50 cases (13/50).

The mean values of controls are shown in table 2. Mean age was 31.3yrs

TABLE-2 Mean values of Controls

Parameters	Values
n	13
Age in years	31.3
Volume (ml)	2.57
Liquefaction Time (min)	28.84
Sperm Count	69.24
Total Motility	58.07
a%	36.53
Morphologically normal sperms (%)	78.84
Morphologically abnormal sperms (%)	21.15
WBC ($10^6/ml$)	5.76

Normal controls are stratified according to age group

Table No. 3 : Stratification of normal control according to age group

Parameters	21-25	26-30	31-35	36-40	41-45
n	2	5	4	-	2
Volume	2.25	2.4	1.25	-	3.5
Liquefaction time	37.5	24	30	-	30
Sperm count	81.4	69.34	62.12	-	71.1
Total motility	60	58	61.2	-	50
a%	45	37	40	-	20
Morphologically normal sperms	82.5	83	70	-	82.5
Morphologically abnormal sperms	17.5	17	30	-	17.5
WBC Cells	3	7.2	5.2	-	8

Stratification of normal control according to age group

Maximum no. of cases belong to age group 26-30 (n=5). Semen volume was Highest in age group 41-45 years. Liquefaction time was highest in age group 21-25 years. The sperm count was highest in the youngest age group (21-25 years). But not much difference was there in between other age groups. The progressive motility was least in the oldest age group (41-45 years) and not

much difference in other age groups. Rapid progressive motility was least in 41-45 years. The percentage of normal sperms was least in age group 31-35 years (70%) whereas other age groups did not show much variation. Abnormal sperms was highest in age group 31 – 35 years. WBC cells were highest in age group 26 – 30 years. No significant change in pH was observed between age groups.

Table No. 4 : Distribution of control groups according to their occupation

Parameters	Agriculture	Sedentary	Business	Drivers
n	2	5	4	2
Volume	2	2.7	1.25	3.5
Liquefaction Time	35	33	23.75	22.5
Sperm Count	61	74.68	68.7	65
Total Motility	72.5	54	57.5	55
a%	50	31	37.5	35
Normal sperms	70	83	77.5	80
Abnormal sperms	30	17	22.5	20
WBC	3.5	6	8	3

The maximum were sedentary workers. The drivers had the maximum semen volume.

The liquefaction time was highest among agriculturalists and least in drivers. Sperm

Count was maximum in sedentary group and least in agriculture.

The motility was least in drivers and maximum in agriculture. The rapid progressive motility was least in sedentary.

The percentage of normal sperms was highest in sedentary groups and least in agriculture. The percentage of WBC cells was highest in business group and least in drivers.

DISCUSSION

In this study 50 cases were studied excluding the patients with history of genitourinary tract infection, systemic illness, tuberculosis, cryptorchidism, mumps, testicular injury, obstructive azoospermia and diabetes mellitus.

EFFECT OF AGE ON SEMEN QUALITY

In this study, 13 cases belonged to the control group. The mean age in this group was 31.3 years. The semen quality was satisfactory. The mean sperm count was 69.24 million/ml. The total motility was 58.07% whereas rapid progressive motility was 36.53%. The morphologically normal sperm percentage was 78.84%.

Also, in this study, out of 50 cases, the sperm count was highest in the youngest age group but not much significant difference in other age groups. The rapid progressive motility was least in 41-45 years age group. The percentage of normal sperms was least in age group 31-35 years(70%).

In a study conducted by Kidd SA, Eskenazi B, Wyrobek AJ, it was found that increase in male age is associated with a decline in semen volume, sperm motility, and sperm morphology.^[10]

The findings of this present study was also supported by another study done by Liliane FS, Joao BA, Claudia GP, Ana LM, Fabiana CM et al which demonstrated a morphological evaluation by MSOME with increased age.^[11]

Table No. 5: Comparison of effect of age on quality by various workers

STUDY	YEAR	SPERM COUNT	TOTAL MOTILITY	RAPID PROGRESSIVE MOTILITY	ABNORMAL FORMS
Kidd SA et al ^[10]	2002	Decreased	Decreased	Decreased	Increased
Liliane FS et al ^[11]	2006	Decreased	Decreased	Decreased	Increased
Present Study	2013	Decreased	Decreased	Decreased	Increased

EFFECT OF OCCUPATION ON SEMEN QUALITY:

The patients were divided into agriculture, drivers, sedentary and business group. In the control group, the maximum were sedentary workers. The liquefaction time was highest among agriculturalists. The sperm count was maximum in sedentary group and least in agriculture.

The percentage of normal sperms was highest in sedentary group and least in agriculture.

Outside the control group, the maximum number of

oligozoospermic cases belonged to agriculture followed by drivers and least in sedentary.

Asthenozoospermic cases also were maximum in agriculture category followed by drivers.

Mukhopadhyay D et al in 2006 concluded that occupational stress can have deleterious effect on semen parameters. He noticed a decline in sperm count, total motility and increase in abnormal forms.^[12]

Johrami R et al also found similar findings in 2013 and concluded that radiant heat and exposure to pesticides leads to adverse affect on semen quality.^[13]

OCCUPATION

Table No. 6: Comparison of effect of occupation on semen quality by various workers

STUDY	YEAR	SPERM COUNT	TOTAL MOTILITY	RAPID PROGRESSIVE MOTILITY	ABNORMAL FORMS
Johrami R et al ^[13]	2013	Decreased	Decreased	Decreased	Increased
Mukhopadhyay D et al ^[12]	2006	Decreased	Decreased	Decreased	Increased
Present study	2013	Decreased	Decreased	Decreased	Increased

In control group the mean sperm count, total motility, rapid progressive motility and morphologically normal spermatozoa were 69.24 million/ml, 58.07%, 36.53% and 78.84% respectively. Among the control group, maximum were sedentary workers. The drivers had the maximum semen volume. The motility was least in drivers. The percentage of normal sperms was highest

in sedentary groups and least in agriculture. It is evident from the results of the present study that- Semen quality is declining in the past few decades.

Age alone did not alter the semen quality significantly but act as a minor risk factor.

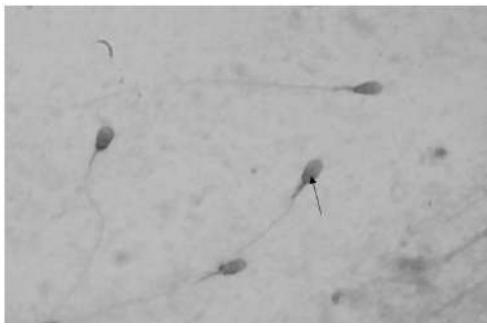


Fig. 1: Photomicrograph of Normal Spermatozoa

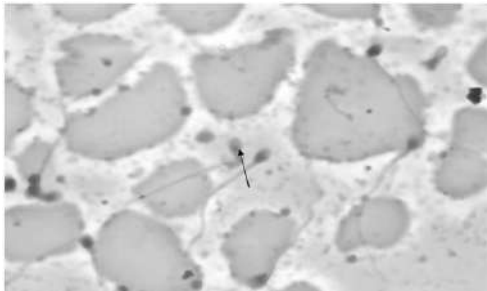


Fig. 2: Photomicrograph of spermatozoa with bent midpiece

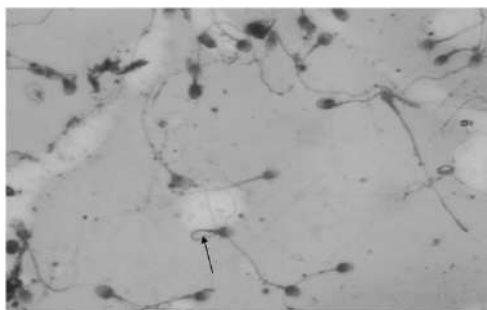


Fig. 3: Photomicrograph of spermatozoa with bent tail

The influence of advancing age and occupations like Agriculture (specially use of gonadotoxic pesticides and fertilizers) and Drivers (radiant heat) can be considered as hazards and additive factors for reduced semen quality.

Therefore, it can be concluded that in concordance with other researches that semen quality is declining and there is a role of multi factorial etiology in male infertility.

Conflict of Interest- None

Source of Funding - Self

Ethical Clearance- Prior Approval Taken

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Awareness of Undergraduate Students Regarding Blood Donation among Non-Medical Colleges in Selected Setting

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ABSTRACT

Background: Blood is life sustaining fluid and is valuable and donating blood can save the life of individuals. The South East Asia's estimated blood requirement is about 16 million units per year, but it collects just about 9.4 million units annually, leaving a gap of 6 million units. (World health organization¹. **Objective:** of the study to determine the awareness level of non- medical undergraduate students regarding blood donation using questionnaire on awareness regarding blood donation **Method:** A descriptive survey was conducted among 104 non-medical undergraduate students who were studying at selected setting. Random sampling technique was adopted for selection of the colleges and Multi stage (Proportionate and random) sampling technique for selection of the sample and Tools used were demographic proforma and tool for assessment of level of awareness regarding blood donation, data was obtained by self-administered questionnaire. **Results:** Majority 79(75.9%) of the sample had moderate level of awareness regarding blood donation and around 24 (23.7%) of the sample had high level awareness regarding blood donation. **Conclusion:** With help of organizing various awareness programmes we can improve the awareness which will make the students to participate actively in voluntarily donating the blood.

Keywords: Awareness, blood donation, non-medical undergraduate students.

BACKGROUND

Blood can save millions of life, and young people are the hope and future of a safe blood supply in the world. The South East Asia's estimated blood requirement is about 16 million units per year, but it collects just about 9.4 million units annually, leaving a gap of 6 million units¹. India with its huge population of over 1 billion is lagging behind in blood collection. India has 2760 blood banks that can collect 9 million units of blood annually, but collects only 7 million. Human blood is an essential element of human life with no substitute. The theme of World Health Day in 2000 was "Blood saves Life². Safe blood starts with me." Nowadays, blood transfusion is still one of the main components of care and treatment

to patients with serious conditions such as trauma, major surgeries, chemotherapy, and patients in need of long-term therapies.

However, problems regarding a permanent shortage of blood are observed in blood services all over the world. The only source of blood is blood donation recruitment of voluntary, non-remunerated blood donors poses major challenges to transfusion services throughout the world. Increase in the level of awareness and development of a positive attitude towards blood donation is the top most priority of all national blood transfusion centers. The first step for attaining this goal is to perform comprehensive studies about awareness and attitude of the population towards blood donation to gauge the present situation, beliefs and both positive and negative attitudes of the population towards blood donation.

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OBJECTIVE

To determine the awareness level of non- medical undergraduate students regarding blood donation using

questionnaire on awareness regarding blood donation.

METHOD

A descriptive survey was conducted among 104 non-medical undergraduate students who were studying at selected colleges like College of Journalism and Mass Communication, College of Agriculture Sciences, College of Architecture and College of Law & Legal Studies under Teerthanker Mahaveer University. Random sampling technique was adopted for selection of the colleges and Multi stage (Proportionate and random) sampling technique for selection of the sample and The following criteria were set for the sample selection - of both male and female who enrolled and studying in selected setting, who are willing to participate in the study and who are studying in non-medical colleges of selected setting

Tools used were demographic proforma and tool for assessment of level of awareness regarding blood donation, data was obtained by self-administered questionnaire.

RESULTS

Obtained data was analyzed based on objectives of the study by using SPSS 16.0 version. Out of 104 sample majority (43.5%) of them were in the age majority (60.5%) of the sample were above 20 year age and remaining (39.4%) are below 20 year of age. Most of sample belonged to male gender (56.6%) and majority of the sample were belongs to Hindu religion (73%), most (33.65%) of the sample fathers were graduates and even most (33.6%) of the sample mothers were also graduates, majority of the sample (85.5%) were didn't donate blood ever before, around 34.6% sample and their families underwent for blood transfusion.

Table-1 Frequency and percentage sample on the basis of level of awareness (n = 104)

S.No	Level of awareness regarding blood donation	f	%
1	Low level of awareness	1	0.9
2	Moderate level of awareness	79	75.9
3	High level of awareness	24	23.07

The data presented in table 1 revealed that majority (75.9%) of the sample were at moderate level of awareness regarding blood donation, only 0.9% of them at low level of awareness regarding blood donation.

DISCUSSION

Most 63(60.5%) of the sample were in the age of 20 years and above 20, majority 60 (56.6%) of them were male, most 76 (73%) of the sample belong to the Hindu Religion. Majority of the subjects fathers 33(31.7%) were with post graduate and above educational qualification and majority of subjects mothers 35 (33.6%) were graduated, around 89 (85.5%) of the sample were never donated blood before.

Around 59 (56.7%) had never received donated blood for themselves or for their family member and about 68 (65.3%) sample had never underwent for blood transfusion. Majority 79(75.9%) of the sample had moderate level of awareness regarding blood donation and around 24 (23.7%) of the sample had high level awareness regarding blood donation.

The presented study was supported by a study conducted among 288 (Male- 162, Female-126) subjects of age group 18- 60 at rural Puducherry The results shows that majority (79.5%) subjects were aware blood can be donated. Around 17.5% of subjects had past history of blood donation. Most 55% of the subjects donated blood to their relatives.³

The present study supported by a study conducted among health science students at South India. The result found that the majority (60%) of subjects have high level of awareness and only (20.7%) subjects have low level of awareness.⁴

CONCLUSION

The present study concluded that non-medical undergraduate students were have the some awareness regarding blood donation and. Some of the subjects didn't donate the blood. With help of organizing various awareness programmes we can improve the awareness which will make the students to participate actively in voluntarily donating the blood.

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Surveillance of Elderly Patients with Hypertension in Eastern India: Our Experience

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ABSTRACT

Background: It is unknown to what extent General Practitioners (GPs) manage hypertension (HT) differently in older patients, as compared to younger age groups. The purpose of our study was to know the incidence of hypertension in older patients as compare to younger age groups.

Method: In this retrospective observational study the data of hypertension patients attending at MKCG medical college and IMS and SUM Hospital were documented and analyzed. The study population consisted of all patients aged 60 years or older with at least one blood pressure (BP) measurement during the inclusion period, without pre-existent HT, diabetes mellitus (DM) or atherosclerotic cardiovascular disease at time of study start.

Results: We included 19,500 patients from 159 GP's practices of whom 1,181 (6.1 %) were newly diagnosed with HT. Corrected for age-adjusted SBP, older patients were less likely to be diagnosed with HT (odds ratio per year age increase 0.98, $p < 0.001$). Corrected for age-adjusted SBP, no significant effect of age on the probability of treatment in newly diagnosed HT patients was observed ($p = 0.82$).

Conclusions: This study showed that GPs are less inclined to diagnose HT with increasing patient age, but do not withhold treatment when they diagnose HT in older patients.

Keywords: Hypertension, Aged 80 and over, Age factors, Electronic health records, General practice

INTRODUCTION

Evidence on the effectiveness of treatment of hypertension (HT) in patients of 80 years and older is conflicting^[1-4]. Traditionally older patients were ignored in Dutch guidelines as patients up to 65 years old were treated according to their risk estimate of atherosclerotic cardio-vascular disease, for which blood pressure (BP) was one of the criteria^[5]. For older patients however, the general practitioner (GP) had to rely on his/her clinical judgment, which varied widely as to when it was appro-

priate to start treatment^[6]. In 2008 the Hypertension in the Very Elderly Trial (HYVET)^[1] indicated that treatment of HT in patients of 80 years and older was beneficial on mortality from stroke and overall mortality. There is evidence that high BP is not associated with a higher risk of death in the frail^[3], but further analysis of the HYVET study showed that both frail and fitter patients appeared to gain from antihypertensive treatment^[5]. In 2012 the Dutch cardiovascular risk management guidelines^[7] set systolic blood pressure (SBP) target values below 150–160 mmHg in older patients. Similarly, guidelines of the British National Institute for Health and Care Excellence (NICE), the European Society of Hypertension (ESH) and the European Society of Cardiology (ESC) recommended SBP target values below 150 mmHg in patients over 80 years old^[8,9]. However, there is evidence

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that compliance to these revised guidelines is incomplete^[10], particularly in older patients^[11, 12] and a recent review suggested that indeed, each patient's individual clinical condition may need to be taken into account for optimal HT treatment^[13]. In practice, other than patient-related barriers, e.g. doctor or system related barriers, whether they are appropriate or inappropriate, may play a role in incomplete guideline compliance. In light of the conflicting evidence and lack of information whether GPs manage HT differently in older patients, we wanted to investigate how HT is diagnosed and treated in this age group, as compared to younger patients.

METHOD

In this retrospective observational study the data of hypertension patients attending at MKCG medical college and IMS and SUM Hospital were documented and analyzed. The study population consisted of all patients aged 60 years or older with at least one blood pressure (BP) measurement during the inclusion period, without pre-existent HT, diabetes mellitus (DM) or atherosclerotic cardiovascular disease at time of study start. All the data were analyzed by SPSS 20 software and documented.

RESULTS

Our cohort consisted of 19,500 patients aged 60+ with at least one BP measurement and without a diagnosis of HT, DM or arterial cardiovascular disease or antihypertensive medication prior to the first BP measurement. The source population comprised of 131,545 patients aged 60 years or older. Sixty one percent were 60–69 years old, 28.2 % were 70–79 years old and 10.8 % were 80 years or older. The percentages of women in these age groups were 55.7, 57.9 and 64.0 % respectively. Table 1 shows SBP values, by age group and gender. Outcomes Percentages of patients with diagnosis of hypertension, by age and systolic blood pressure shows the percentages of patients with a new diagnosis of HT for each age- and SBP-group with 95 % confidence intervals. The corresponding numbers are reported in Table 2. Of those patients with a BP between 160 and 179 mmHg and aged 60–69 years, 18.2 % (16.5–20.0) had a new diagnosis of HT within 1 month. For patients of 70–79 years and 80 years and older within the same BP group these percentages were 12.1 % (10.2–14.2) and 7.1 % (5.0–9.9) respectively. The p-value for trends between age groups was significant in all three

BP groups between 140 and 200 mmHg, indicating that, within these SBP groups, older patients are less likely to be diagnosed as hypertensive than younger patients. Effect of systolic blood pressure Z-scores, age and gender on new diagnosis of hypertension The outcomes of the logistic regression analysis with newly diagnosed HT as outcome were as follows. The unadjusted odds ratio (OR) for the SBP Z-score was 4.30 (95 % CI 4.01 – 4.61; $p < 0.001$). Adjusted for age, the OR for the SBP Z-score was 4.35 (4.05–4.67; $p < 0.001$). This adjusted OR of 4.35 for SBP Z-score means that the odds of new diagnosis of HT is multiplied by 4.35 when the SBP increases by one standard deviation. Adjusted for SBP Z-score, age had a significant effect on the probability of diagnosis of HT (OR 0.98 per year age increase, 95 % CI 0.97–0.99, $p > 0.001$). We found no significant interaction between age and SBP Z-score in our model. Gender had no significant contribution to the model.

This model permits calculating the probability of a new diagnosis of HT on basis of a given SBP Z value and age. For example: a 60-year-old male patient with a SBP Z-score +1 (165 mmHg) has a predicted probability of a new diagnosis of 15.9 % (95 % CI: 14.5–17.3 %). The probability for an 80-year-old with the same SBP Z-score (170 mmHg), is only 11.2 % (95 % CI: 10.1–12.5 %). These findings are illustrated in which shows the predicted probabilities of a new HT diagnosis, in relation to SBP and age. Percentages of patients with treatment of hypertension, by age and systolic blood pressure We calculated the percentages of patients that received antihypertensive treatment within 4 months after being diagnosed as having HT. In the group with an SBP of 140–159 mmHg for instance, 45.3 % (37.2–53.6) of the 60–69 years old patients and 50.0 % (18.8–81.8) of the 80 years and older patients were treated; and in the group with an SBP of 160–179 mmHg, 69.9 % (64.7–74.6) of the 60–69 years old patients and 50.0 % (33.2–66.8) of the 80 years and older patients were treated. For details on all age groups please see Table 3. None of the p-values for age-related trends were significant. Effect of systolic blood pressure Z-scores, age and gender on treatment after diagnosis of hypertension For the outcome treatment, the OR for the SBP Z-score was 2.96 (95 % CI: 2.45–3.57). Age and gender had no significant contribution to the model. (OR for age 1.00, 95 % CI: 0.98–1.02, $p = 0.82$).

Table: 1 Systolic Blood Pressure by gender and age mean SBP with standard deviation; percentages above 140 mmHg and 160 mmHg

Age	N	Gender	SBP (mmHg) Mean	SD	SBP>140 mmHg	SBP> 160 mmHg
60-69	5270	Male	142	19.9	55.8%	20.7%
	6619	Female	141	20.7	53.8%	20.8%
70-79	2316	Male	145	20.8	63.1%	26.4%
	3182	Female	146	21.2	65.1%	28.3%
80+	761	Male	146	21.6	64.5%	27.9%
	1352	Female	149	22.2	71.1%	32.0%

Table 2: New diagnosis of hypertension within one month after inclusion

SBP (mmHg)	Age (years)	N	New diagnosis (%)	P for trend
<=130	60-69	5385	0.5 (0.3-0.7)	0.61
	70-79	1965	0.6 (0.3-1.1)	
	80+	661	0.2 (0.0-0.9)	
140-159	60-69	4029	3.4 (2.9-4.0)	<0.001
	70-79	2019	2.5 (1.9-3.2)	
	80+	807	0.7 (0.3-1.6)	
160-179	60-69	1829	18.2 (16.5-20.0)	<0.001
	70-79	1028	12.1 (10.2-14.2)	
	80+	424	7.1 (5.0-9.9)	
180-199	60-69	504	34.9 (30.9-39.2)	0.002
	70-79	392	30.9 (26.5-35.6)	
	80+	156	21.2 (15.5-28.2)	
200+	60-69	142	48.6 (40.5 – 56.7)	
	70-79	94	39.4 (30.1-49.5)	
	80+	65	41.5 (30.4-53.7)	

Table: 3 Treatment within four months after inclusion in diagnosed hypertension patients

SBP (mmHg)	Age (years)	N	Anthypertensive treatment (%)	P for trend
<=130	60-69	26	30.8 (16.5-50.0)	0.70
	70-79	12	33.3 (13.8-60.9)	
	80+	1	0.0 (0.0-79.3)	
140-159	60-69	137	45.3 (37.2-53.6)	0.70
	70-79	50	48.0 (44.8-62.5)	
	80+	6	50.0 (18.8-81.8)	
160-179	60-69	332	69.9 (64.7-74.6)	0.15
	70-79	124	71.0 (62.4-78.2)	
	80+	30	50.0 (33.2-66.8)	
180-199	60-69	176	86.9 (81.2-91.1)	
	70-79	121	81.8 (74.0-87.7)	
	80+	33	81.8 (65.6-91.4)	
200+	60-69	69	95.7 (88.0-98.5)	
	70-79	37	97.3 (86.2-99.5)	
	80+	27	88.9 (71.9-96.1)	

DISCUSSION

The study included a large and, because we excluded patients with diabetes, existing HT and other cardiovascular conditions, homogenous cohort. Moreover, the data were collected during the normal practice of GPs, and reflect how they manage HT in daily care. We have no reason to assume that GPs participating in IPCI differ in their HT management from their non-participating colleagues; therefore, the conclusions may be generalized to the Dutch population. In the study we only studied recorded BP measurements and diagnoses. Especially diagnoses by medical specialists may not all be recorded by the GP. Therefore, registration bias is possible. All patients in our study have an immortal time of two years, which may introduce age related bias, as older patients have a shorter life expectancy and hence are less likely to be

included in the cohort. Moreover, in general, diagnosis of HT is based on more than one measurement, which is not accounted for in our study. This may further explain why the percentages with a diagnosis of HT are rather low. A further limitation may be that this study does not permit any insight into the reason why older patients are less likely to be diagnosed as having HT. For our study we excluded patients with comorbidities such as DM and pre-existing cardiovascular disease. On the one hand this reduces the generalizability of the results. On the other hand, excluding patients with these co-morbidities eliminates these co-morbidities as potential confounders because, according to international guidelines, these patients should have strict BP control. By excluding these patients, it was easier to study the impact of age and BP on the outcomes. A strength of this study is that, by using reference SBP values we could control for the

natural increase of BP by age. As reference BP data for the older Dutch population were not readily available, we used data from the Eastern India population, which may be a limitation. In our cohort, mean BPs in all age strata were slightly lower than the used reference values [16]. This may be explained by the fact that we excluded patients already diagnosed with HT. Comparison with existing literature Although previous studies compared HT management in older to younger age groups [11, 12], to our knowledge, this is the first study to take age-specific SBP levels into account. The proportions of patients with a new diagnosis of HT were rather low and this seems in accordance with existing literature about guideline adherence [10]. However, our follow up period of one month does not allow conclusions about guideline adherence as some patients may receive the diagnosis of HT later on. Although we demonstrate that older patients are less likely to receive a diagnosis of HT, our data do not provide any insight why these patients are less likely to be diagnosed. A possible explanation may be the clinical condition, especially frailty in older patients as an important reason to refrain from treatment of HT [3, 9]. Other barriers to guideline compliance in older people are outside the scope of this study.

CONCLUSIONS

This study showed that GPs are less inclined to diagnose HT with increasing age, but do not withhold treatment when they diagnose HT in older patients. Increasing life expectancy will lead to larger numbers of older patients, yet the optimal management of HT in this age group has not been elucidated. In this respect there are indications that BP target values will depend on features, such as frailty, in older patients. More research, especially in the form of trials, will be needed to determine to diagnose HT in older patients are correct.

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Medical Devices Access in Asian Countries: Sustainable Growth Trajectory in India

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ABSTRACT

Technologically advanced solutions for treatment of diseases, scientific rigor & research has seen tremendous growth in therapeutic usage of medical devices ^[1]. The role of 'Make in India' initiative becomes of utmost importance as a driving force for technological advancement of medical devices industry ^[2]. However, challenges exist & need to be addressed in providing affordable healthcare by producing medical devices that are cost competitive and effective to increased access ^[2]. Asian Countries like Japan, China and South Korea are foremost in the Medical devices sector ^[3].

This paper probes the sustainability of 'Make in India' policy with the growth trajectory of Asian countries in medical devices discusses; ways of overcoming challenges through regulations, policies and other stakeholders contribution.

Keywords- Medical device, Make in India, Growth trajectory, Sustainable model.

INTRODUCTION

Advanced technological solution has seen tremendous potential in therapeutic usage of medical devices ^[1]. Medical devices play a significant role in screening, diagnosing and treating patients as well as in restoring patients to normal lives. ^[2]. Globally, the medical device industry witnesses impressive growth and plays a vital role in the healthcare ecosystem reaching USD 520 billion by 2020 ^[2].

Since the last few decades, the Indian healthcare industry has seen improved growth scale with a greater need to better the quality of healthcare and provide affordable healthcare solutions as a result of which the medical device industry has also grown considerably. The compound annual growth rate (CAGR) of Indian medical device industry is around 15% of health **care as compared to CAGR of 4-6% of healthcare in other countries**. Even though there is improved access and affordability of healthcare services, India faces high level of dependency on imports of medical devices ^[1].

Although Asian countries like Japan, China and South Korea are foremost in the Medical devices sector there is a sufficient opportunity in medical devices

manufacturing and development of industries in India ^[2].

The Government of India's 'Make in India' initiative presents a platform for the medical device industries to revisit the operating model, identify key aspects for sustainability and explore possibilities for creating a transformative change in the medical devices sector. The role of 'Make in India' initiative has become the game-changer for technological advancement in the medical devices industry ^[3].

It therefore becomes necessary to probe the sustainability of 'Make in India' policy with the growth trajectory of Asian countries in medical devices and devise methods of overcoming challenges through regulations, policies and other stakeholder contribution.

GROWTH TRAJECTORY OF MEDICAL DEVICE MARKET IN ASIAN COUNTRIES

China - a leader in the Asian Market.

China's medical device market ranks second in the world. The driving force behind the growing market of medical devices in China is the increase in income and expanding population. By 2050, China will have 1.4

billion population above 60 years thereby increasing the demand of medical devices for these Chinese ageing baby boomers. A tremendous gap between urban and rural healthcare system in China exists, as well as between various types of hospital care. There is an inflow of huge number of population towards well-resourced and prominent healthcare centers in urban areas, due to poor health care systems in rural areas [5].

Chinese medical device market value is estimated around USD 11 billion in 2015. Chinese government needs to bridge the gap between quality healthcare and promote domestic manufacturing [5], as a result of which healthcare expenses is estimated to grow at 5.2% of the GDP in the next few years [6].

Market Challenges in China

Chinese government must revise and relook at the basic laws of foreign investment to ease investor influx and prevent the Medical Device sector growth trajectory from getting foiled by a robust regulatory framework. Infrastructure for small scale healthcare industries should be developed at grass root level, equitable access should be provided for basic healthcare services and Public Healthcare reforms must be implemented [5].

Developmental factors of China's Medical Device Market

China consists of state specific incentives, cheaper access to land and training subsidies to develop medical devices manufacturing base [1]. It will also facilitate establishment of electronic medical record system linked directly through medical devices thereby enabling smooth sharing and storage of patient's data especially in the remote areas, relieving overcrowding in the hospitals and shortening wait lists [5].

About 70% of advanced medical devices in China are exported from the European, American and Japanese markets that are in great demand in the hospitals especially in the private and tertiary care hospitals [7]. China possesses highly competitive and fragmented medical devices market [7]. One-third of China's med-tech market consists of medical equipment like x-ray, ultrasound and other imaging equipment [5].

Opportunities in China

With increase in per capita incomes, China's consumers are demanding more sophisticated

and reliable medical devices. Ageing population, affordability to healthcare products and growing health care needs are the key growth drivers in China's medical device industries.

Restructuring and privatization of hospitals is the predominant motive in healthcare delivery in China. Doctors are rated according to the number of patients they treat as well as the research output they produce which is linked with the performance appraisals, salary and career advancement. A well-orchestrated coordination is provided for the physician-patient interaction through the use of digital solutions like mobile, social network, web, wireless devices, and physician portals [5].

Japanese invasion in the Medical Devices industry

Japan ranks third largest medical device market, having more ageing population driving the medical device manufacturing companies. Manufacturers have to follow Japanese Pharmaceutical Affairs Law to develop and market their products [4].

The Japanese medical devices market was approximately USD 32.5 billion in 2012, primarily dependent on import of sophisticated medical equipment with a whopping import size of approximately USD 7.4 billion from U.S.A. According to the American Medical Devices and Diagnostics Manufacturers' Association (AMDD), a trade association with Japanese operations enabled approval of 58% of "new medical devices" in Japan during the last 7-year period [4]. A 2.5% CAGR in Japan's medical device manufacturing is estimated by Espicom Business Intelligence from year 2013 to 2018 year [5].

Market Challenge in Japan

Factors affecting the degree of penetration in Japan's Market are the local competition, regulatory norms to be overcome, language and social factors, type of product, its quality & serviceability and commercial practices. Other factors affecting market entry in Japan includes level of competition between domestic manufactures and international players, import authorization necessities, restricted or banned imports, provisional entrance of goods, certifications, principles & classification requirements [5].

Market Opportunities in Japan

Japan's aging population and continuous demand

for advanced medical devices is the key determinant of vertical growth of Japan's medical device market. Domestic medical device production in Japan includes: diagnostic imaging tools; therapeutic and surgical kits; monitoring systems, home therapeutic equipment, dialyzers, and endoscopes. Some of the world's leading companies like Nipro, Toshiba Medical Systems, Hitachi Medico and Nihon Kodan are some of the highest performing Japanese Medical Devices Companies. Most major U.S. and foreign medical device firms have an office in Japan or at least a Japanese official [5].

South Korean medical devices growth landscape

Korean medical devices market is third largest in Asia continent. In Korea, healthcare market is focused in five major cities of Seoul, Pusan, Daegu, Daejeon and Kwangju. These cities contain about 60% of Korea's hospital beds [8]. About 49.8 million are growing older thereby providing a good opportunity for medical device market headway [9]. The medical device market is estimated to be around USD 3.9 billion dollars and growing at an average rate of 13.5 % [10].

Opportunities in Korea

The Korean government aims to increase the medical device exports to achieve USD 12.5 billion growth by 2020 making a 3.8% contribution in the global markets. Korea presents unique opportunities for medical device companies due to a population of 49.8 million people who are growing older and whose average income is on the rise. Currently costly medical devices like digital X-ray, MRI, CT and ultrasound diagnostic systems are manufactured locally and are marketed in more than 50 countries in and around the world including USA and European nations [11]. Due to sophisticated technology and more features, Korean medical devices are in higher demand in the global market.

Challenges in Korea

Korea promotes electronics and medical engineering courses in its colleges and graduation schools. This has enabled them to possess huge number of technical experts spear heading the electro-medical equipment industry [11].

There has been a steep rise in the number of hospitals and medical equipment in Korea thereby creating huge number of local manufacturers. Highly sophisticated and reliable medical products of the Korean domestic

manufacturers have made them worthy competitors in the overseas market landscape. The Korean domestic equipment industries perform continuous market monitoring in overseas as well as local markets [11].

Regulatory aspects of the growing Korean Medical Devices industry

Introduction of electronic filing system for medical devices and ease in tracing of the Medical Device- Korea Food & Drug Administration (KFDA) Commissioner has the right to track medical devices that possess critical risk for the human health are some regulatory parameters laid by the Korean government. Manufacturers in Korea recall medical devices that cause incurable serious adverse side effects or death [9].

INDIAN MEDICAL DEVICE ECOSYSTEM

Regulatory measures and medical device manufacturing policy decisions create a conducive atmosphere for large- scale manufacturing of products.

Challenges in the Indian Scenario

Indian medical devices industry follows outdated regulatory standards, which needs amendments and improvements. Indian manufactured products are substandard and give poor compliance, causing the Indian markets to have high level of dependency on medical devices exports. The Indian manufactured medical products are highly taxed and expensive with a lack of motivation from government to promote manufacturing. Poor tax incentives policy to encourage home grown manufacturing, inadequate funding policy from the government to sponsor innovation and lack of expertise in manufacturing high end quality medical products are the major challenges for the Indian Medical Devices industry [12].

Support from Indian Healthcare industry

The Indian medical industries must align themselves with the 'Make in India' initiative of the Indian government. Other stakeholders like healthcare providers and health insurers should also contribute and play their part in the Make in India plan and leverage Government policies and regulate the changes. Design and development of medical products with total customer satisfaction will lead to high quality creation, provide attractive solutions and generate cost effective innovations [13].

Backing from other sectors enabling growth of Medical devices

Indian insurance sector must provide wider coverage to both diagnostics and screening products. Local production will be enhanced by increasing the insurance over indigenously manufactured devices. Industry – academia interface must be enhanced to foster research, consultancy, entrepreneurship and innovation in medical devices industry. Associative work between industry and academia will enable exchange of ideas, facilitate partnerships, fragmentize and regulate the manufacturing process^[13].

Table 1: GDP and Population size between the four giants of Medical devices countries^[14].

Sr. No.	Countries	Public healthcare expenditure as a % of GDP	Population size
1	India	1.407	1.31 billion
2	China	3.09	1.37 billion
3	Japan	8.55	126.96 million
4	South Korea	3.98	50.62 million

STRATEGIES AND SUSTAINABLE GROWTH MODEL FOR INDIA FROM ASIAN COUNTRIES

State specific incentives can be started similar to China to develop a medical devices manufacturing base that includes economical production of high gain medical devices. Provision of cheaper access to land and training subsidies will greatly motivate new entrants in the medical devices manufacturing sector. Use of high tech & sophisticated technologies like telemedicine and the use of digital solutions like wireless devices and physician portals will enhance the quality of healthcare delivery system. The medical devices market should be well structured and organized. It should promote research and innovation in the medical devices manufacturing sector.

India must aim for having world-class manufacturing facilities similar to that in Japan. India should promote generation of technical expertise in electro-medical equipment manufacturing similar to Korea to manufacture highly refined and reliable medical products.

SUSTAINABLE GROWTH MODEL FOR INDIAN MEDICAL DEVICES INDUSTRY

Amendments in policy and strategic implementation of regulatory mechanism can bring about tremendous opportunities for the MNCs and local companies in India. The changes in the regulatory design will attract more investment and bring technological upgradation in the medical devices industries. Technological collaborations between MNCs and domestic associates can leverage their product's reach in the market and domestic manufacturers can explore contract-manufacturing setting up international standards of infrastructure, enabling India to become a global center for medical devices manufacturing in the world^[15].

Financial measures must be taken to develop and nurture the emerging medical device-manufacturing ecosystem to attract investors. Provision of Duty credits on import of raw materials for medical device manufacturing and a favorable government policy to introduce concession on VAT for imported equipment will act as an enabling environment for Medical devices growth in India.

Superior segment manufacturing and incentivizing of low to medium technology products will create a conducive environment for large-scale medical device manufacturing. Low and medium technology products that can be incentivized may include disposables, consumables, certain imaging equipment, implants, stents, some categories of laboratory diagnostics equipment and innovative eHealth based solutions^[12].

Indian Government should promote and make policies that are conducive to a macro - economic environment for medical device manufacturing. The Indian government through Make in India initiative must achieve 100% foreign direct investment for Greenfield and brownfield entries. Low and middle level companies should be partnered with giants in medical device manufacturing firms and supported well to manufacture efficient and reliable medical devices and flourish in the market^[16].

Strong bonding between the customer and the seller should be established to have good sales and marketing. Apart from sales and marketing, installation, servicing and maintenance of the medical devices should be

done efficiently and regularized well. Accuracy and efficacy of screening and diagnosis should be improved. Portable diagnostic devices should be manufactured on a larger scale to meet the demands of homecare and remote locations. Advanced sophisticated assistive and rehabilitation devices that would reduce the healing time and restore patients to healthy state should be produced by Indian manufacturers. Homecare screening devices for early detection of diseases should be produced on a larger scale^[12].

CONCLUSION

The traditional US and western European markets are under regulatory scrutiny and pricing pressure providing the Asian markets an opportunity to leverage accessibility in medical devices. The Indian medical devices market is fourth in Asia after Japan, China & South Korea^[2]. Best practices in these countries in terms of access to health care services, fast track approach, tax holidays, can be adopted by India and design a holistic ecosystem for medical devices for sustainable growth.

Leveraging 'Make in India' initiative for medical devices and incorporating best practices of the Asian giants in medical devices will provide local innovation and make India a global center for medical device manufacturing.

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HIV Risk among Labor Migrants: An in-Depth Study of the Literature

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ABSTRACT

Background: This study aimed to identify multilevel strategies associated with HIV risk among labor migrants.

Method: An extensive literature review from the global data base such as PubMed, google scholar and EBSCO were searched by using key words in various combination such as AIDS, HIV, migration, mobility, migrants and labor migrants.

Results: The review of the present study revealed that the HIV risk among labor migrants was associated with multilevel determinants. These are of socio-demographic variables, components of knowledge factor, life style and sexual practices. The socio-demographic determinants associated with HIV risk were: age, education, income per month, marital status, pre-and extra marital sex, and cultural norms. The determinants of knowledge factor frequently associated with HIV risk were: awareness towards HIV/AIDS, perspective and perception towards HIV/AIDS and limited condom use. The determinants of lifestyle component most often linked to HIV risk were: history of migration, exposure to pornography and peer influence. Sexual practices frequently related to elevated HIV risk were: sex with commercial sex workers, sex with casual unpaid partners and men having sex with men.

Conclusion: The result findings across labor migration necessitates the need for multilevel intervention strategies. Also, additional research is required to inform the policy maker and administrator towards development, implementation and evaluation of multilevel intervention that overlaid the prior methodological limitation and build new tailored interventions.

Keywords: HIV, AIDS, HIV risk, migration, labor migration, migration factors

BACKGROUND

The 2017 UNAIDS data estimated that in 2016, 36.7 million people were living with HIV and 1.8 million people were newly infected with HIV¹. With the continuous growth of the epidemic, migrants are considered a high risk to HIV infections². The World Migration Report 2018 estimated around 244 million

international migrants in the world and they remitted around USD 429 billion in 2016 in low-and middle-income countries³. There has been a move from individual HIV risk behaviour to multilevel as caused by cultural, social, political and economic determinants. For example, HIV scholars have pointed that understanding of HIV risk through ecological models⁴ and social vulnerability⁵. Such approaches have helped researchers in understanding HIV risk among labour migrants. Labour migrants are particularly stayed away from their families and spouses and engaged in markets, mines and fields. They are forced to do dangerous and demanding jobs for low wages, living with unfavourable environments and have limited access to health care. They face limited social network support, forced to adapt

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foreign culture, customs and cultures. These factors may impact to increase HIV risk among labor migrants as well as other vulnerable populations.

It has not been fully understood the HIV transmission pathways in labor migrants, but the burgeoning literature both in social and health science examining various issues of migrant's population^{6,7,8}. Until now, HIV risk among labour migrants has not been thoroughly studied. Therefore, this study tries to look with a multidisciplinary approach⁹ for potential determinants that could be used to formulate multilevel interventions for communities, institutions, families, couples and individual. This comprehensive review identified four categories of evidence based multilevel determinants that represents the association between HIV risk and labor migration. These were: (1) socio-demographic; (2) knowledge; (3) life style; (4) sexual practices. It also represents gaps and limitations in previous studies and offer recommendations for future research.

SEARCH METHOD

The relevant English data base such as PubMed, EBSCO and google scholar were examined for articles by using key words in various combination: AIDS, HIV, migration, mobility, migrants and labor migrants. All reviewed articles reference section was also studied to find additional articles. The author acknowledges that despite of extensive literature search some of the pertinent articles might have been omitted, especially to those labor migrants who occasionally represented by particular occupations (e.g. seafarers, truck drivers). About 116 research papers were included in this study.

Inclusion and exclusion criteria

The labor migrants in this study, defined as: individuals who leave their native place (home location) and move for a short period (temporarily) to a different location (both in-side and out-side of country) to engage in salaried activity with the intention of returning to their native place again. Thus, only articles that directly linking with labor migration and HIV/AIDS were included. The permanent immigrants were excluded from the study as they do not have intention to return back to their native home location. Further, asylum and refugees were excluded in the study though they act as a forced migration and may associated with distinct risk but may not likely to come back their home location. The articles published between 1989 to 2017 and written

in English language were included in the study.

Multilevel determinants

While reviewing the literature from various data base, a comprehensive list of multilevel determinants gathered that are linked to HIV risk were established and categorized into the four groups: (1) socio-demographic; (2) knowledge; (3) life style; (4) sexual practices.

RESULTS

Socio-demographic determinants

Young people are centre of HIV/AIDS epidemic and are disproportionately affected by it¹⁰. Every day, approximately 3000 new HIV infections occur among young people, aged between 15-24 and this population account for more than one-third of all new HIV infections¹¹. A study conducted in China, based on the nationwide 1% population sampling survey in 1995, it was found that 86% of labor migrants were between 15 and 65 years of age and 75% were between 15 and 34 years of age¹².

Limited studies found that age at sexual initiation associated with HIV risk for labor migrants. Previous studies in China, Nepal, Kenya and South Africa demonstrated that an association between early age at sexual initiation and multiple sex partners^{13,14,15,16}. Unprotected sexual intercourse within last three months and frequent cigarette smoking were more prevalent among young labor migrants than with elder migrants¹³. Similarly, another study among Mexican labor migrants in the US showed that migrants from the youngest age group (18-29 years old) particularly have elevated risk behaviours such as sex with a commercial sex worker, sex while under the influence of alcohol or drugs and sex with a male partner¹⁷. A research carried out by Population Council in four high HIV prevalence states of India on migration/mobility patterns among male workers and their links with HIV risk found that almost 70% of male labours are young between 18 to 29 years, more than half of a young labours are married and resides away from their wives because of work. Further reports suggest that nearly 31% have intercourse with either sex workers or non-spousal unpaid female partners in source places in past 2 years¹⁸. Also, labor migrants with only primary education and higher incomes were more likely to engage risky behaviour¹⁹. Further, a study of migrants in Shanghai, 12% of migrants were educated to high

school or college level, 48% to secondary school level, and 28% to primary school level, with remaining 9.1% of migrants being illiterate or semi-illiterate²⁰. Marital status has also been found to be a significant predictor of vulnerability to HIV/AIDS among migrant workers. A study conducted in Myanmar showed that respondents, who were single, divorced or separated, visited sex workers more frequently than married labor migrants¹⁹. Another study in China showed that being married was associated significantly with increased HIV risk behaviors²¹. Also, an ethnographic study on migration and HIV transmission have conducted in Northern Karnataka have found that nearly 35% of married labor migrant men were involved in extramarital sex whereas around 40% of unmarried men were engaged with premarital sex²².

In-depth investigation has also revealed that socio-cultural environment played a crucial role in men's sexual behaviour. Various factors that affect men's sexual behaviour include community norms and practices^{23,24} gender roles and inequalities^{23,25} stigma and discrimination^{23,26} and low education status²⁷. Research in different settings argues that those who ignore social, cultural norms and gender inequality experiences different types of sexual interactions such as types of sexual relationship (non-spousal/premarital/transactional), the frequency and opportunities for sexual contact and condom use^{22,26,28,29}. Further, rigid traditional gender norms allow men greater freedom for sex, more mobility and opportunity for engaging with multiple sexual partnerships³⁰.

Knowledge factor determinants

Most studies have documented lack of knowledge about HIV/AIDS among labor migrants that closely linked with HIV-related risk behaviours. Most migrant workers had inadequate HIV/AIDS knowledge despite health education campaigns. For example, in Russia, male labor migrants from Eastern Europe and Central Asia were asked eight-item assessment of HIV/AIDS knowledge. These migrants, on average, scored only 3.6 items correctly³¹. Further, 45% of migrants felt that oral contraceptive and IUDs could prevent HIV infections. A study among Mexican migrant laborers' on knowledge about HIV transmission showed that the migrants had higher knowledge on major modes of transmission, whereas there was misconception that HIV contracting through AIDS testing, public restrooms and mosquito

bites³². Some migrants believed that AIDS is a diseases of drug addicts and homosexuals and personal appearance could tell whether person is infected with HIV or not. Also, Burmese labor migrants in Thailand were given a knowledge assessment on HIV prevention, transmission and associated risk factors, the total score was 36, 41 and 82% respectively³³. Male participants scored higher than female migrants in all scales and the level of HIV/AIDS knowledge increased with addition of each year education level. Further, some literatures documented that labor migrants had low knowledge on HIV. For example, one study in China showed that only 37% of labor migrants had knowledge that condom usage could prevent HIV transmission and 38% knew that antibiotics use could not prevent HIV infection¹³.

Limited condom use is associated with high HIV risk among labor migrants. It is mainly associated with difficulty in obtaining condom, health beliefs, various cultural norms and practices and impaired judgements. A study in South Africa stated that the migrant mine workers reported of using very limited condom despite of free supplies^{34,35}. In Moscow, the tajik labor migrants reported of engaging unprotected sex due to various reasons: they did not carry condom when they were drunk, using condom during sex decrease sexual pleasure and obstacles in getting condoms due to unidentified status in the city³⁶. The Mexican labor migrants in the USA reported that the lack of knowledge prevails them to know accurate use of condom. About less than fifty percent of these migrant men had always protected sex with occasional partners, whereas about a third had unprotected sex³².

Life style determinants

It is widely believed that environment of an individual brings profound influence to his/her behaviour. For example, when an agricultural worker (farmer) migrated to an urban life style which is greatly different from rural environment, we cannot be guaranteed that his/her sexual behaviour was changed/affected by the current living life style. Therefore, it is important to understand the potential predictors that affect HIV risk due to migration. These factors may include migration history (total duration living in the city after migration, place of initiation and continuation of sex work etc) exposure to pornography, peer influence and other socio-demographic characteristics coupled with knowledge, attitude and perception which has been explored in other

literatures^{37,38,39}.

Migration History

Migrant worker's frequency of a visit to their families in native country has a significant association with HIV-related risk behaviour. Labor migrants, who lived away from their native land for prolonged periods tend to have increased HIV-related risk behaviours. A comparative cross-sectional study carried out in three rural communities of West Africa found an association between higher mobility and increased HIV-related risk behaviours. Furthermore, condom use was found least, where mobility was greatest⁴⁰. The few studies conducted among male labor migrants in China demonstrated that sexually transmitted diseases (STDs) were significantly associated with the high frequency of visiting home⁴¹.

Peer influence and Pornography exposure

Studies documented that peer influence occupies an important role increasing the likelihood of risky sexual behaviour leading to HIV risk among labor migrants. A study in Shanghai, China reported that, the respondents who had peers engaging in sex with a non-regular sex partner were 4.4 times more likely to be involved in risk behaviour than were those who did not engage⁴². Another study in Metema district, northeast Ethiopia documented that seasonal migrant worker's social environment such as peer influence can lead to HIV risk⁴³.

Past research from developed countries suggested that exposure to pornography is associated with increased acceptance of premarital and extramarital sex including paid sex^{44,45,46,47,48}. A recent research in United States among adults has shown that individuals who had visited sexually explicit websites were twice more likely to have multiple sexual partners than their counterparts⁴⁴. Another study which looked into different aspects of pornography exposure historically from 1973-2010 also found a positive association with multiple sexual partners and paid sex⁴⁷.

Sexual practices determinants

Evidence suggests that male labor migrants are more likely to engage HIV risk than non-migrants. For instance, women with a migrant husband are twice more prone to HIV positive than a non-migrant husband⁴⁹. A study of labour migrants in Moscow reported a majority of migrants having unprotected sex with commercial sex workers³⁶. In Durham, North Carolina, a study

conducted among Hispanic migrants, 22% respondents stated that they had visit sex workers in the previous year. These migrants reported, on average, about 6.7 sex worker visits per year⁵⁰. A study in Tajik migrant workers in Moscow reported that all participants did not use condom while sex with commercial sex workers³⁶.

Studies have demonstrated that casual unpaid partner (such as relatives, neighbours and friends) influences the HIV risk among migrants at place of origin. A study conducted in Azamgarh and Prakasam districts in India reported that in Prakasam district, the migrant workers were engaged sex with a casual unpaid partner more than the Azamgarh district⁵¹. Having multiple sexual partner are associated with risky HIV behaviour. Long time away from their regular partner/spouse and lack of social control at home environments, labor migrants often engaged sex with multiple sexual female partners at destination areas. About less than one third percent (30%) of Eastern European and Central Asian migrant workers in Russia were stated engaging sex with multiple sexual female partners in last 3 months³¹. Comparing with Nepali migrant workers who travelled to India with non-migrants, the study showed that around 49% of migrants were reported having multiple female partners in last five years whereas it was only 25% for the non-migrants during the same period⁵². The recent labor migrants of rural Tanzania who had more than two partners in last 12 months was 24% whereas for non-migrants it was only 11%⁵³.

Men having sex with men also cause increased risky sexual behaviour. A study among Mexican labor migrants in New York city, USA stated that four male migrants ever had sex with men out of total 50 male migrants⁵⁴. In another study among Latino labor migrants those who seek day labour jobs in the USA, the study concluded that 38% of male migrants solicited for sex by a male partner, while only 9% of those engaging sex with the solicitor⁵³. Further, another study in California among Mexican labor migrants, about 37% of migrants had reported sex with male in last three months⁵⁵. The study concluded that these male migrants had averaged 11 sexual partners in last 2 months in comparison with non- men sex with men.

DISCUSSION

The review of the present study was revealed that the HIV risk most frequently related to multilevel

determinants at different levels of socio-demographic variables, components of knowledge factor, life style and sexual practices. The socio-demographic determinants related to HIV risk were: age, education, income per month, marital status, pre-and extra marital sex and cultural norms. The determinants of knowledge factor frequently associated with HIV risk were: awareness towards the HIV/AIDS, perspective and perception towards HIV/AIDS, and limited condom use. The determinants of lifestyle component most often associated with HIV risk were: history of migration, exposure to pornography and peer influence. Sexual practices were most often related to HIV risk were sex with commercial sex workers, sex with casual unpaid partners and men having sex with men.

To understand how migrant labor differ in prone to HIV risk from other susceptible communities, additional exploration is required in the development, execution, and evaluation of multilevel interventions. The review findings represent a couple of specific ways in which the present body of knowledge is inadequate because of methodological confinements of various current studies and offer solutions towards its improvement. One, sometimes there is occasion where a lack of consistency in how investigators perceived labor migration from various sorts of migration. This could be improved through by adopting rigorous systematic approach on criteria and definition made for labor migration.

Two, with respect to gender, HIV risks among female migrant labors are more, is also less studied. Hence, the risk of HIV in female migrant labor ought to be investigated. For instance, Lin⁵⁶ stated that HIV risks were higher in female migrants because of intoxication and Deonar stated that HIV risk among women were higher because of less self-efficacy⁵⁵. Other studies have been reported that some female migrant labor engaged in transactional sex or commercial sex work in order to survive^{57,58}.

Three, most of the studies used sample qualitative data, non-probabilistic samples or independent variables with narrow range, and many of these studies do not intend to assess the strength of risk factors through a systematic phenomenon. Research designs could be more rigorous to achieve possible cross study comparisons that could overcome the constraints of mobility and undocumented status of labor migrants. There is a more need and key attention to document the HIV prevalence data through

a wide variety of systematic phenomenon such as probabilistic sampling, subgroups of migrants within the specified samples, independent variables/factors with broader range, and collection of more biological samples. Furthermore, to investigate the whole migration process, longitudinal studies are needed that could encompass the sites of source, transit, destination and return⁵⁹.

Four, mixed method approach with proper quantification and statistical analysis could be helpful in assisting in better and comprehensive understanding of the multilevel determinants of HIV/AIDS and labor migration⁶⁰. Also, qualitative and ethnographic study may add better understanding in sociocultural and policy context. Future studies should be focused on implementation challenges in research like: how best to communicate with migrant labors through digital technology and how to deal with the problems of policymakers, implementers and community leaders. The later emphasize on community participation that could lead the development and implementation of community based research activities⁶¹.

Five, lack of investigation on protective factors have been found among labor migrants for HIV risk infection. Several studies^{62,63,64} have been reported that labor migrants had high HIV risky behaviours, but their condom use is more and they are likely to be tested for HIV infection. But the protective factors are more broadly perceived across four categories of determinants. Kissingers study revealed that in a social organization such as church related group was linked with fewer female sex workers visit and condom use found consistent in Latino labor migrations of New Orleans⁶⁵. Whereas Saggruti study revealed that the migrants who lives with their wives had lesser risky sexual behaviour in Mumbai, India⁶⁶. Wide variety of approaches should need to study and focus on protective factors that consider strengths and resources of an approach^{67,68} focused on individual, group, family, socio-cultural norms, values, beliefs which are corelated with protective behaviours of HIV and preventive intervention strategies.

In conclusion, there are new concerns such as migration and HIV/AIDS to be studied, which includes HIV testing attitudes amongst the migrants⁶⁹, HIV positive status due to migration⁷⁰, and delays in testing of HIV/AIDS in migrants⁷¹. Further, other issues among labor migrants and their families such as barriers and access to ART treatment, adherence and prevention of

HIV from mother to child transmission to be studied.

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Study of Hypertension in Elderly Patients of Both Sexes in Western Rajasthan Population

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ABSTRACT

45 elderly male and 45 elderly female patient aged between 60-75 years suffering with Hypertension were studied their associated diseases were Diabetes Millitus 7(15.5%) in males 9(20%) in females. Obesity 4(8.8%) in males 5(11.1%) in females CVD 5(11.1%) in males 4(8.8%) in females stroke 7(15.5%) in males 5(11.1%) in female. Renal insufficiency was 5(11.1%) in males and 4(8.8%) in females. CCF was 3(6.6%) in males 4(8.8%) in females physical inactiveness 4(8.8%) males 5(11.1%) in females Alcoholic 5(11.1%) in males 2(4.4%) in females Tobacco chewers. 3(6.6%) in males 4(8.8%) in females Dementia 2(4.4%) in males 3(6.6%) in females patients. The recorded BP in elderly patients of both sexes were classified as Grade I (mild) SBP – 140 – 159 DBP (90-99 Hgmm) were 14(31.1%) males 12(26.6%) in females patients Grade II moderate SBP (mm Hg) (160-179) DBP (Hgmm) (100-109) 10(22.2%) were males, 11(24.4%) were female patients. Grade III (severe) SBP (mmHg) >80 and DBP(MMHG) > 100. 21(46.6%) were males and 22(48.8%) were females. Isolated systolic BP SBP - 140 DBP <90 17 (37.1) in males 18 (40%) female Patients. Causes of secondary HTN in females were Cushing syndrome 9(2%) in males 12(26.6%) in females coarctation of aorta 2(4.4%) in males, 1(2.2%) in females Reno vascular stenosis 5(11.1%) in males 3(6.6%) in females, Endocrine disorders 4(8.8%) in males 9(20%) in females obstructive sleep apnea 10(22.2%) in males, 8(17.5%) in females, Drugs 7(15.5%) in males and females chronic kidney diseases 5(11.1%), in Males, 3(6.6%) in females Pheochromocytoma 3(6.6%) in males, 2(4.4%) in females. This study of HTN in elderly patients with different clinical manifestation will certainly help the physician to treat such patients efficiently as HTN is an important risk factor for CVS morbidity and mortality.

Keywords- HTN – Hypertension ; SBP - Systolic Blood pressure, DBP = Diastolic Blood pressure. ; ISH = Isolated systolic Hypertension CVD = cardiovascular disease.

INTRODUCTION

Based on the average reading 140 mm Hg systolic or greater and/ or 90mm Hg diastolic or greater or receiving anti hypertension medications for those above sixty years In clouding elderly male and females are hypertensive patients⁽¹⁾ Hypertension in geriatric population is typically characterized by high systolic BP

(SBP) in the setting of normal or even decreased diastolic BP Both elevated SBP and elevated pulse pressure are related to an age related increase in the arterial stiffness. No single factor accounts for this age related increase in SBP Although many factors like arterial stiffness, hypertrophy and loss of contractility of vascular smooth muscle cells, fibrosis, collagen deposition, fragmentation of elastic lamina, calcification. Decreased baroreceptor sensitivity increased sympathetic nervous system activity. Increased Alfa- adrenergic receptor was responsiveness. Endothelial dysfunction, decreased nitric oxide production, Sodium sensitivity, decreased ability to excrete sodium load. Low plasma rennin activity. Insulin resistance, central adiposity are the factor to increase the blood pressure in geriatric population⁽²⁾ It is

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observed that, majority of old patients in whom isolated systolic Hypertension develops have not had an elevated diastolic pressure before⁽³⁾ Hypertension in the elderly patient represents a management dilemma to cardio vascular specialist and other practitioners. Furthermore wide adaptations of drug strategies targeting subgroups of Hypertensive patients with specific risk conditions to lower blood pressure (BP) beyond traditional goals, difficult questions arise about how aggressive elderly patients should be treated. Is HTN in the elderly an emergency state or not ?. Does BP control lower the risk associated with cardio vascular and death of geriatric Population ?. Hence attempt was made to rule out the various diseases associated with HTN in elderly patients of both sexes. So that physician can treat the cause of HTN along with regulating the elevated BP which can reduce the morbidity and mortality of elderly patients suffering with HTN.

MATERIAL AND METHOD

45 elderly males and 45 elderly females aged between 60-75 years due to illiteracy approximate age was noted. The elderly patients who were regularly visiting to medicine department of Bangar Govt. Hospital Pali – 306401, (Rajasthan) had a complaint of Hypertension were selected for study. These patients were middle socio - economic status. These patients were examined with their cause of HTN and associated diseases. Biochemical and pathological test were also carried out to confirm their diseases. Moreover, ECG was also done to rollout CVD. The individual patients of both sexes were studied, noted and treated accordingly. The duration of this study was about four years.

OBSERVATION AND RESULTS

Table -1. Study of causes of HTN in both elderly sexes of western Rajasthan – DM 7(15.5) in males 9(20%) in females. Obesity was 4(8.8%) in males 5(11.1%) in females CVD 5(11.1%) in males 4(8.8) in females. Stroke was 7(15.5%) in males 5(11.1%) in females Renal insufficiency 5(11.1%) in males 4(8.8%) in females. CCF 3(6.6%) in males, 4(8.8%) in females. Physically inactive was 4(8.8%) in males 5(11.1%) in females Alcoholic 5(11.1%) in males 2(4.4%) in females. Tobacco – chewers 3(6.6%) in males 4(8.8%) Dementia 2(4.4%) in males 3(6.6%) in females

Table – 2. Classification of record of BP in both sexes of western Rajasthan population – Grade – I (Mild) SBP (mmHg) 140-159 DBP (Hg mm) 90-99.14(31%) in males, 12 26.6% in females. Grade II (Moderate) SBP(mmhg). 160-179, DBP(mmhg) 100-10-, (22.21 in males, 11(24.4%) in females. Grade III SBP (mm Hg) > 80 DBP (mm Hg) > 100 21(46.6%) in males 22(48.8%) in females isolated systolic BP SBP > 140 DBP<90 in females 17(37.7%) in males, 18(40%) in females

Table – 3 Study of patients with secondary HTN in both elderly sexes of western Rajasthan Cushing syndrome 9(20%) in males 12(26.6%) in females. Coarctation of aorta 2(4.4%) in males 1(2.2%) in females Reno vascular stenosis 5(11.1%) 3(6.6%) in females Endocrine disorders, 4(8.8) in males 9(20.%) in females obstructive sleep apnea 10(22.2%) in males 8(17.5%) in females. Drugs (NSAID), Alcohol 7(15.5%) in males and females. Chronic kidney disease was 5(11.1%) in males 3(6.6%) in females. Pheochromocytoma was 3(6.6%) in males 2(4.4%) in females

Table – 1: Study of causes of HTN in both sexes of western Rajasthan (Males : 45 ; Females : 45)

Sl no	Particular causes	No of male patient	Percentage	No of Female patient	Percentage
1	D.M	7	15.5	9	20
2	Obesity	4	8.8	5	11.1
3	CVD	5	11.1	4	8.8
4	Stroke	7	15.5	5	11.1
5	Renal insufficiently	5	11.1	4	8.8
6	CCF	3	6.6	4	8.8
7	Physical inactive	4	8.8	5	11.1
8	Alcoholic	5	11.1	2	4.4
9	Tobacco chewers	3	6.6	4	8.8
10	Dementia	2	4.4	3	6.6

Table – 2: Classification of record of Blood pressure in both sexes of western Rajasthan

(Males : 45 ; Females : 45)

Sl no	Particulars	No of male patient	Percentage	Female	Percentage
1	Grade – I (mild/SBP (mmHg)- DBP (mmHg) 140-159 -90-99`	7	15.5	8	17.7
2	Grade II (moderate SBP (MMHG)- DBP(mmHg) 160-179 100-109	9	20	9	20
3	Grade – III (severe) SBP (mmHg)- DBP (mmHg) 7180 >100	12	26.6	10	22.2
4	Isolated systolic HTN SBP > 140. DBP<90	17	37.7	18	40

Table – 3: Causes of secondary hypertension in elderly patients of both sexes of western Rajasthan

(Males : 45 ; Females : 45)

Sl no	Particular causes	No of male patient	Percentage	No of Female Patients	Percentage
1	Cushing syndrome	9	20	12	26.6
2	Coarctation of Aorta	2	4.4	1	2.2
3	Reno Vascular stenosis	5	11.1	3	6.6
4	Endocrine disorders	4	8.8	9	20
5	Obstructive sleep apnea	4	22.2	8	17.5
6	Drugs (NSAID, Alcohol)	7	15.5	7	15.5
7	Chronic kidney diseases	5	11.1	3	6.6
8	Pheochromocytoma	3	6.6	2	4.4

DISCUSSION

In the present study of HTN in elderly patients of both sexes in western Rajasthan population The patients of HTN associated with several diseases like DM 7(15.5%) in males 9(20%) in females. Obesity was 4(8.8%) in females, CVD 5(11.1%) in males 4(8.8%) in females. Stroke was 7(15.5%) in males, 5(11.1%) in females Renal insufficiency 5(11.1%) in males 4(8.8%) in females CCF 3(6.6%) in males 4(8.8%) in females. Physical inactive was 4(8.8%) in males 5(11.1%) in females Alcoholic 5(11.1%) in males 2(4.4%) in females Tobacco chewers 3(6.6%) in males 4(8.8%) in females Dementia 2(4.4%) in males 3(6.6%) in females (table 1). These findings were more or less in agreement with previous studies. ⁽⁴⁾⁽⁵⁾⁽⁶⁾. The BP was recorded and classified into four groups Grade – I (mild) SBP (mmHg) (140-159) DBP (mmHg) 90-99 7(15.5%) males 8(17.7%) females. Grade II (moderate) (SBP (mmHg))

160-179 DBP (mmHg) 100-109) 9(20%) in males and females. Grade-III (severe) was SBP (mmHg) > 180, DBP (mmHg) > 100. 2 (26.6%) observed in males, 10(22.2%) in females. Grade IV isolated systolic SBP (mmHg) > 140 DBP (mmHg) <90 17(37.7%) in males 18(40%) in females (table No 2). Cause of secondary HTN is the elderly patients were Cushing syndrome 9(20%) in males 12(26.6%) in females. coarctation of aorta 2(4.4%) in males 1(2.2%) in females. Reno vascular stenosis 5(11.1%) in males, 3(6.6%) in females endocrine disorders 4(8.8%) in males, 9(20%) in female. Obstructive sleep apnea were 10(22.2%) in males, 8(17.5%) in females. Drugs (NSAID Alcohol) 7(15.5%) in males and 7(15.5%) in females were observed equally. Chronic kidney disease was 5(11.1%) in males, 3(6.6%) in females. Pheochromocytoma 3(6.6%) in males 2(4.4%) in females these findings were more are less in agreement with previous studies. ⁽⁷⁾⁽⁸⁾

It was also observed that major reduction in DBP (<65 mmHg) might be associated with ischemic Cardiopathy. Lowering DBP might jeopardize appropriate blood flow in the brain, heart and kidney during the diastole. However, low DBP was not responsible for an increase in the mortality⁽⁹⁾ Essential HTN is the most common cause of HTN but Secondary HTN is more prevalent in elderly patients than younger subjects. Renal vascular HTN is common in older people and should be treated with multi drug therapy because renal insufficiency is of unknown cause⁽¹⁰⁾ moreover ISH in the elderly patients was more difficult to control because of large artery stiffness and major changes in the arterial wall aortic calcification Hence the traditional drugs of anti HTN largely produce vasodilatation rather than decrease arterial stiffness⁽¹¹⁾ hence increased risk of CVD in elderly secondary to increased arterial stiffness an epiphenomenon related to an underlying chronic debilitating illness and or cardiac dysfunction and anti HTN therapy induced lowering of DBP which leads to myocardial ischemia and increased risk for on acute coronary events. High grade stenosis of coronary arteries, increased risk of Myocardial infarction with anti HTN therapy – induced decreased in BP may well occur. Furthermore, one cannot make any distinction between those cardio vascular events that are naturally occurring vs those that are treatment induced indeed frail elderly person (admitted) may have DBP < 60 mm Hg and SBP< 120mmHg in association with reduced survival and often without abnormal left ventricular function or anti hypertensive drug therapy

Apart from anti hypertensive therapy life style modifications including weight loss, physical exercise, low salt diet, should be recommended for patients with hypertensive

SUMMARY AND CONCLUSION

the study of hypertension in elderly patients of both sexes is quite useful to the physician and cardiologist because isolated systolic HTN is a peculiar BP in elderly patients, the approach to HTN in geriatric population should be no different than that of other geriatric syndromes HTN in older people represents a heterogeneous process and should be approached on an individual, case – by case basis, but this study needs further patho-physiological, Histo-pathological, genetic study because remedy and prevention of thickness of blood vessels, exact mechanism of systolic and diastolic movements of heart is still unclear

This research work is approved by ethical committee of Govt. Bangar Hospital Pali- 306401. (Rajasthan)

No **Conflict of Interest**

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Practices Regarding Biomedical Waste Management among Health Care Workers of Tertiary Care Hospitals of Meerut, U.P.

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ABSTRACT

Background: The term “biomedical waste” has been defined as “any waste which is generated during diagnosis, treatment or immunization of human beings or animals, or in the research activities pertaining to or in the production or testing of biologicals and includes categories as mentioned in schedule I of the Government of India’s Biomedical Waste (Management and Handling) Rules 1998”.

Objectives: To assess the practices related to Bio-Medical Waste Management

Material & Method: The present cross sectional study was conducted from march 2016 to February 2017 among healthcare workers of tertiary care hospitals of Meerut city. Simple random sampling was used. The written consent was taken. Data was analysed using SPSS version 19 and Pearson’s Chi square test was applied.

Results: The healthcare workers segregate BMW according to different categories and they were doing this at the point of generation (87.6% and 88.5% respectively). 88.5% HCWs did not dispose all kind of waste into garbage waste. Majority (89.2%) were following color coding for disposal of BMW. Correct practice related to disposal of Normal Waste was observed in 89.2% of HCWs. Most of the HCWs were correctly disposing category 1,6,7 and 8 of BMW (97.1%, 89.2%, 88.5% and 97.1% respectively) whereas Category 2,3,4,9 and 10 were disposed correctly by nearly three-fourth of the HCWs (72.3%, 73.9%, 72.3%, 78.0% and 78.0% respectively).

Conclusion: Practices regarding Bio-Medical Waste was also found to be satisfactory in all the Health Care Workers but lower for IV class workers.

Keywords: *Biomedical waste management, hospital, healthcare workers.*

INTRODUCTION

Nature has made everything for a defined purpose. ‘Anything which is not intended for further use is termed as waste’. In the scientific and industrial era, turnover of the products is very high. With increasing need of Health Care in fast changing society, the role of hospitals/nursing homes comes to the forefront. Hospital is a residential establishment which provides short term and long term medical care consisting of observational, diagnostic, therapeutic and rehabilitative services for a person suffering or suspected to be suffering from disease or injury and for parturient.¹

The term “biomedical waste” has been defined as “any waste which is generated during diagnosis, treatment or immunization of human beings or animals, or in the research activities pertaining to or in the production or testing of biologicals and includes categories as mentioned in schedule I of the Government of India’s Biomedical Waste (Management and Handling) Rules 1998”.²

The inadequate and inappropriate practice of handling of healthcare waste may have serious health consequences and a significant impact on the health of health care personnel, to waste workers, patients, to

general public and environment as well.³

MATERIAL & METHOD

The present cross sectional study was done among healthcare workers with the objective to assess their practice regarding biomedical waste management. The study was conducted from March 2016 to February 2017. Ethical approval for the study was taken from institutional ethical committee of Subharti Medical College, SVSU, Meerut. Simple random sampling was used for selection of hospitals. Out of the two tertiary care hospitals in the city one was selected randomly and from the list of 150 bedded hospital in the city one was selected randomly. After that list of all the health care workers (nursing staff, OT technician, lab technician and fourth class) were procured from respective hospitals. Two visits were made in both the hospitals. Health care workers who were present on these two visits and give consent were included in the study. Each category of Health Care Worker were attended separately and two visits for each category was made for collection of data. Prior permission was taken from the concerned authority and arrangement was made to gather the workers at pre-decided date, time and place. Those who were left due to duty etc were attended on second visit. The purpose and objectives of the study was explained to the Health Care Workers prior to data collection and they were assured about the confidentiality of the responder. Data was collected on predesigned pretested semi structured questionnaire which included details of socio-demographic variables like age, sex, education, designation and other details about knowledge of Health Care Workers regarding Biomedical Waste Management. Before filling the questionnaire, each question was explained to the Health Care Workers so that they could understand the questionnaire completely and could answer properly. Single observer demonstrated the questionnaire to all workers. Completion of questionnaire was assured at the time of collection. Data was coded, entered and analysed using SPSS version 19 and suitable test was applied.

FINDINGS

Table No.-1 DISTRIBUTION OF STUDY POPULATION ACCORDING TO THEIR PRACTICE RELATED TO SEGREGATION OF BIOMEDICAL WASTE

	Freq	%
Segregate BMW According To Different Categories		
YES	275	87.6
NO	39	12.4
Segregation Of BMW At The Point Of Generation		
YES	278	88.5
NO	36	11.5
Total	314	100

According to this table majority of the healthcare workers segregate BMW according to different categories and they were doing this at the point of generation (87.6% and 88.5% respectively).

Table No.-2 DISTRIBUTION OF STUDY POPULATION ACCORDING TO THEIR PRACTICE RELATED TO DISPOSAL OF WASTE

	Freq	%
Do You Dispose All Kinds Of Waste Into Garbage Waste		
YES	36	11.5
NO	278	88.5
Do You Follow Color Coding For Disposal Of Normal Waste From The Hospital		
YES	280	89.2
NO	34	10.9
Following Color Coding For BMW Disposal		
YES	280	89.2
NO	34	10.8
Total	314	100

This table shows that 88.5% HCWs did not dispose all kind of waste into garbage waste. Majority (89.2%) were following color coding for disposal of BMW. Correct practice related to disposal of Normal Waste was observed in 89.2% of HCWs.

Table No.-3 DISTRIBUTION OF STUDY POPULATION ACCORDING TO THEIR PRACTICE RELATED TO DISPOSAL OF BMW ACCORDING TO COLOR CODE

	Freq	%
CATEGORY 1		
CORRECT	305	97.1
INCORRECT	9	2.9
CATEGORY 2		
CORRECT	227	72.3
INCORRECT	87	27.7
CATEGORY 3		
CORRECT	232	73.9
INCORRECT	82	26.1
CATEGORY 4		
CORRECT	227	72.3
INCORRECT	87	27.7
CATEGORY 5		
CORRECT	261	83.1
INCORRECT	53	16.9
CATEGORY 6		
CORRECT	280	89.2
INCORRECT	34	10.8
CATEGORY 7		
CORRECT	278	88.5
INCORRECT	36	11.6
CATEGORY 8		
CORRECT	305	97.1
INCORRECT	9	2.9
CATEGORY 9		
CORRECT	245	78
INCORRECT	69	22
CATEGORY 10		
CORRECT	245	78
INCORRECT	69	22
Total	314	100

According to this table most of the HCWs were correctly disposing category 1,6,7 and 8 of BMW (97.1, 89.2, 88.5 and 97.1% respectively) whereas Category 2,3,4,9 and 10 were disposed correctly by nearly three-fourth of the HCWs (72.3%, 73.9%, 72.3%, 78.0% and 78.0% respectively).

SEGREGATE BMW ACCORDING TO DIFFERENT CATEGORIES

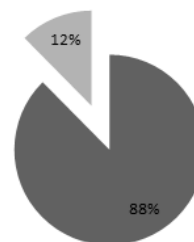


FIGURE 1. DISTRIBUTION OF HCWs ACCORDING TO THEIR PRACTICE RELATED TO SEGREGATION OF BMW ACCORDING TO DIFFERENT CATEGORIES

SEGREGATION OF BMW AT THE POINT OF GENERATION

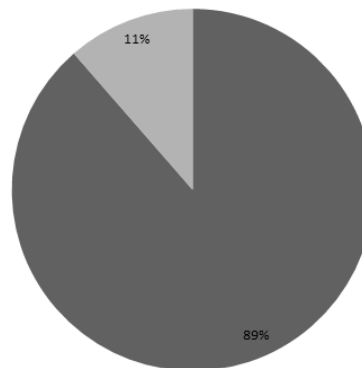


FIGURE 1a. DISTRIBUTION OF HCWs ACCORDING TO THEIR PRACTICE RELATED TO SEGREGATION OF BMW ACCORDING TO DIFFERENT CATEGORIES

FIGURE 2. DISTRIBUTION OF HCWs ACCORDING TO THEIR PRACTICE RELATED TO DISPOSAL OF WASTE

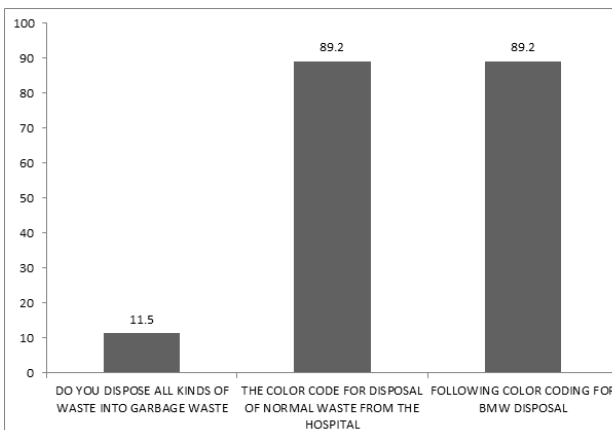


FIGURE 3. DISTRIBUTION OF HCWs ACCORDING TO THEIR PRACTICE RELATED TO DISPOSAL OF BMW ACCORDING TO COLOR CODE

DISCUSSION

In our study the practice of segregation of BMW according to different categories was 97.3% in Nursing Staff and 96.2% in Lab Technician, while it was 100.0% in OT Technician and 28.9% of IV class workers whereas Sehgal et al (2015)⁴ reported in their study that the practice of segregation of BMW according to different categories was 100.0% in Nursing Staff, Lab Technician and IV class workers. Sanjeev R et al (2014)⁵ reported in their study that the practice of segregation of BMW according to different categories was 68.6% in HCWs.

In the present study 88.5% HCWs said No for the practice of disposal of all kinds of waste into general garbage among HCWs whereas Sanjeev R et al (2014)⁵ reported in their study that the practice of disposal of all kinds of waste into general garbage among HCWs said No was 81.8%.

In the present study almost all the Nursing Staff (99.1%) and most of the Non Nursing Staff (92.1%) had correct practice of category 1. The difference was found to be statistically significant. Majority of the Nursing Staff (89.8, 88.9, 85.3 and 84.9% respectively) had correct practice related to category 5,6,9 and 10 whereas nearly two-third of the Non Nursing Staff (66.3, 65.2, 59.6 and 60.7% respectively) correctly dispose BMW according to color code. The difference was found to be statistically significant. Three-fourth of the Nursing Staff (77.3%) and nearly two-third of Non Nursing Staff (59.6, 65.2, 59.6 and 65.2%) had correctly dispose category 2, 3,4 and 8. The difference was found to be statistically significant. Incorrect practice related to category 2,3,4,5,8,9 and 10 was found to be more among class IV HCW (73.4, 62.2, 73.4, 64.4, 62.2 and 73.3% respectively).

CONCLUSION

The present cross-sectional study was conducted among health care workers of tertiary care hospitals

of Meerut city with the objectives to assess practice regarding Biomedical waste Management. Practices regarding Bio-Medical Waste was found to be satisfactory in all the Health Care Workers except for IV class workers.

Conflict of Interest: There is no conflict of Interest in my study.

Source of Funding: Self

Ethical Clearance: Ethical clearance was taken from the ethical committee of Subharti Medical College.

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Study of Determinants of Renewal of Health Insurance Policies

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ABSTRACT

Introduction- Health insurance in India is still at a naïve stage. Out of pocket (OOP) expenditure is still the most predominant mechanism for funding healthcare. Studies have shown that there exists a close relationship between the health conditions of the people and the economic growth of the country in which they live. In such scenario, there is a dire need to study determinants of renewal of health insurance policy.

Method – A descriptive study was carried out to understand factors affecting renewal of health Insurance policy in Pune City. Questionnaire was circulated to 200 individuals who were covered under voluntary health insurance. Further, this population was studied for two variables a) those who have renewed their health insurance policy at least once and b) who did not renew the policy and discontinued after one year. Further determinants of renewal were compared within both the groups. In addition, respondents were identified from both the groups who have availed benefit of health insurance policy through cashless hospitalisation or reimbursement. The claim settlement process was studied through 5-point Likert scale.

Results- Age, income, percentage spending on healthcare as well as total expenses affects the renewal decisions. Younger individuals have shown to be more customary in paying the premium and renewing the policy & willing to renew health insurance policy. The group who have renewed health insurance have also rated tax savings component higher

Conclusion -The study suggests need of product innovation to suit everyone's needs. The products offered should focus upon long term benefits and tax savings components to sustain customers for a longer duration. The results also suggest improving the claim settlement process as customer satisfaction is significant factor in influencing the renewal decision of policyholder.

Keywords – Health insurance, Renewal, claim settlement

INTRODUCTION

Even after the liberalisation of insurance sector in 1986 penetration of health insurance in India is still at a naïve stage. Approximately 12 percent of the population is covered under some form of insurance. With the central and state government, aiming towards universal health coverage and through the launch of

schemes like Ayushman Bharat, insurance sector is certainly progressing towards better days.

The public health spending in India is equal to 1% of GDP, the out of pocket (OOP) being the pre dominant mechanism for financing healthcare in the country. The penetration of health insurance is remarkably low as compared to that in other developing economies in the world.¹

The World Bank in a 2012 report says that the healthcare expenditure was one of the major cause of poverty in India.² Nearly 65 % of the India's poor get into debt and 3% fall below poverty line each year because healthcare related expenses. In such scenario, Health insurance is the only viable option to make healthcare

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available and accessible.¹

One of the most ambitious goals was to achieve universal healthcare by 2020. This goal was aiming at covering maximum population under health insurance and significantly reducing out of pocket expenditure.^{2,3} It is observed that nearly 40% of hospitalised patients sell assets or borrow money to afford treatment and an average of 24% fall further down the poverty trap in this process. One of the reasons for lack of a proper health-seeking behaviour within the poor community is the expensive medical treatment especially at private hospitals and the poor facilities available at public health centres.^{3,4}

Studies have shown that there exists a close relationship between the health conditions of the people and the economic growth of the country in which they live.⁵ As government continues to take efforts in this step, the insurance companies which are the major players in the market should aim at increasing demands of health insurance.^{5,6}

Health insurance is the need of the hour and the consumers are willing to purchase insurance if the they pursue product is beneficial.⁷⁻⁹ Several studies have listed the most prevalent variables: gender, marital status, Religion/ethnicity, education, income level, age, geographical mobility, and family size. The studies pertaining to demand and supply of health insurance in India are scarce as compared to the developed countries so are the studies pertaining to renewal of health insurance. It is considered that factors which affect the purchase decision will also influence the renewal of health insurance policy.⁸

Health insurance policies like any other product is affected by consumers purchase decision. Repeat buying of the same product in health insurance is considered as renewal. The classical five stage consumer decision process model introduced by Philip Kotler which gave a generalized view of the purchase decision, still remains valid as a basic approach to consumer purchase decision process and may be applied to health insurance purchase.

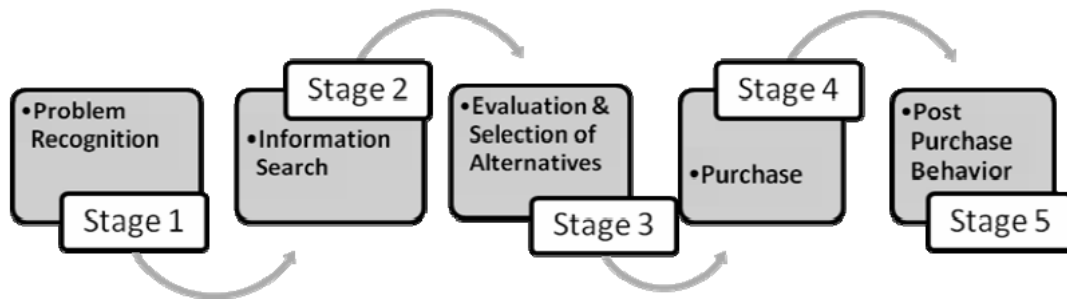


Fig. 1 The Five Stage Buying Decision Process

(Image source- Principles of Marketing, 14th edition, Philip Kotler)

Consumer choice is one of the essential preconditions for regulated competition in health care. Health insurance in higher income educated group adopts five stage decision process. Thus it is considered that the determinants of purchase and renewal of health insurance are common.¹⁰

Studies carried out in various parts of India as well as globally have shown that the major contributing factors to the health insurance are the age, gender, income marital status and occupation. On the supply side of health insurance, the determinants are important, as it is the basis for improvement in their processes like ease

of reimbursement and other administrative processes.¹¹

Health insurance is voluntary and the consumer may take it if found beneficial. This is the main challenges of the companies to attract to something without which also one can survive. Health insurance policy are annual and typically renewed after one year. It is only recently some private

General insurance companies have started selling two-year health insurance plans. Health insurance providers are generally reluctant to offer long-term health insurance policies.¹²⁻¹⁴

However, some amount of customers get attracted towards the policy considering the tax saving component the penetration is still very low. On the other hand, there

are many challenges for an insurance company to have long-term products. One reason is the impulsiveness of medical costs in future. Healthcare delivery is affected by changing technology, evolving equipment's and procedures. Apart from this healthcare cost is also affected by governmental rules and fiscal policies. On the other hand, least efforts are taken to understand the demography, epidemiology and prevalence of medical conditions in population so that the appropriate pricing of the policy can be derived. In such scenario, there is a need to study determinants of health insurance policy renewal.¹⁵

Aim- The study aims to bring out determinants of renewal of health Insurance policy

Objectives of the Study

To study the factors influencing renewal of health insurance policies in Pune City.

To assess customer satisfaction among those who have availed the benefits of health insurance.

METHODOLOGY

A descriptive study was carried out to understand factors affecting renewal of health Insurance policy. Data was collected through a questionnaire from individuals enrolled in voluntary health insurance policies in Pune City. The questionnaire was circulated to 200 individuals out of which 130 responded and filled

the complete questionnaire. Questionnaire included data on different socio-economic variables like age, income, gender, education & occupation. Other important parameters on which information was gathered included healthcare expenditure and hospitalisation & claims if any during the insured period.

The inclusion criteria were limited to individuals enrolled in voluntary health insurance at least once in three years. Further, this population was studied for two variables a) those who have renewed their health insurance policy at least once and b) who did not renew the policy and discontinued after one year. Further determinants of renewal were compared within both the groups.

In addition, respondents were identified from both the groups who have availed benefit of health insurance policy through cashless hospitalisation or reimbursement. The claim settlement process was studied through 5-point Likert scale. The parameters studied included claim settlement process, transparency, hospital care, documentation and accurate communication and overall experience with payer and provider.

Data Analysis and Results

The total sample size included in the study was 130. Out of 130 respondents 59 had renewed their health insurance policy whereas 71 did not renew it. This clearly indicates that non-renewal of health insurance is more.

Table 1- Descriptive statistics of policyholders renewing and not renewing health insurance

Parameter	N=59 Renewed health insurance policy	Mean	N=71 Did not renew health insurance policy	Mean
Total monthly income	58		71	
More than 1 lakh	N=22	57510	N=17	45226
40,000 to 1,00,000	N=18		N=34	
Up to 40,000	N=38		N=27	
Annual healthcare expenditure	59	49092	71	40982
Age	59	40.23	71	42.31
Percentage spending on health annually	59	18.22	71	15.23

Cont.... Table 1- Descriptive statistics of policyholders renewing and not renewing health insurance

Average Premium paid	59	11,452	71	11,300
	Number of policies renewed	Claim filed	Number of policies did not renewed	Claim filed
Claim filed due to hospitalization	59	N=22	71	N=23

Table1 shows the distinct characteristics of both the groups. It is evident that those respondents who have renewed health insurance policy have higher income as compared to those who haven't renewed. This suggest that higher income enables one to pay the premium on a regular basis and be more sustainable towards health insurance. The similar observations were seen with total monthly expenditure and percentage spending on health, which was higher in the group who have renewed health insurance. The mean age of the respondents was found to be lower in the group who have renewed health

insurance. This suggests that younger respondents have shown more continuity and regularity. Younger individuals in the renewed group also said that the tax saving components is also an important deciding factor in insurance purchase and renewal.

Also, renewal of health insurance was found to be significantly affected by Healthcare expenses. The percentage spending on health was more than the non renewed group.

Experience with claim settlement process

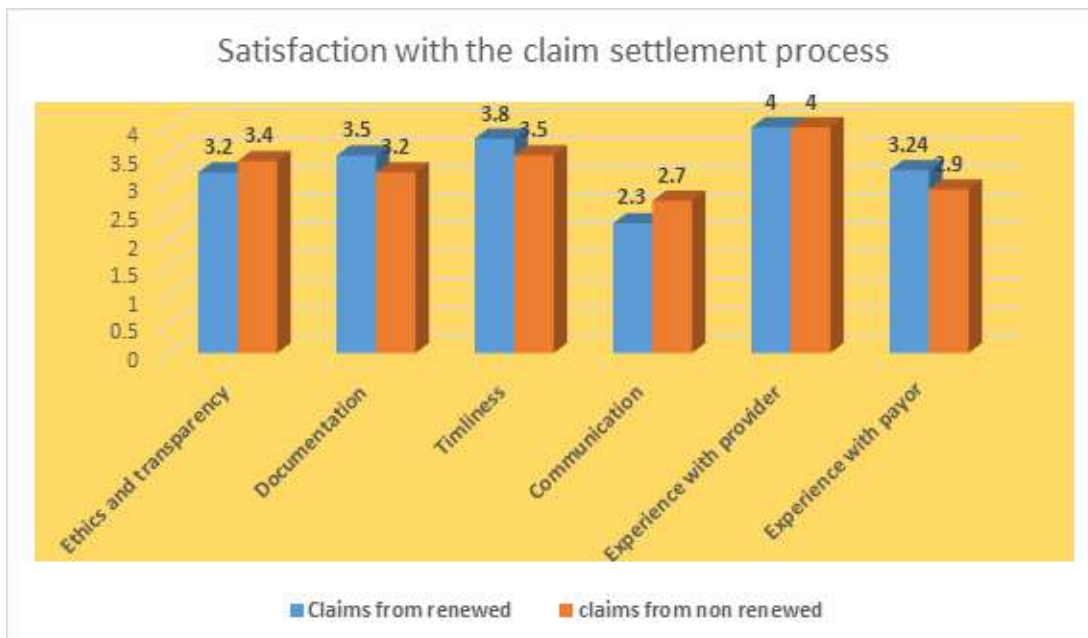


Fig 2 –Satisfaction levels with respect to health insurance policy

Total 71 respondents did not renew their health insurance policy after one year.23 of them faced were hospitalised and could avail the benefit of the policy. Number of claims filed from the group who

have renewed Health insurance were 22.and from the non-renewed were 23.The experience related to claim settlement process was also studied in both the groups.

The results have been summarised in Fig 2.

From the Total 130 respondents 59 respondents renewed their health insurance policy. Out of these 59 respondents 22 were hospitalised and could availed the benefit of the policy. Those hospitalised were further enquired about the claim settlement process and associated factors. The questions included information on ethics and transparency, documentation, timeliness of process, communication, experience with payer and providers.

DISCUSSION

The study aims to identify factors affecting continued enrolment in health insurance policy through renewal of the policy in Pune City. The variables included in the study attempted to examine the determinants of renewal of health insurance policy. In the study younger age, higher income and high healthcare expenditure were found to be significant determinants of continuation of the policy. The experience about the quality of care, experience of payer and provider also affects renewal. The findings can be correlated to the marketing studies, where the researchers have found that if the customer is satisfied there is higher probability of repeat purchase of the product. We also found that if the customer's satisfaction level from insurer is high and his experience from insurer was good then probability of renewing the policy was high.

These experiences positively influence renewal of health insurance policy.

Age, income, percentage spending on healthcare as well as total expenses also affect the renewal decisions. Younger individuals have shown to be more customary in paying the premium and renewing the policy. And are ready to renew health insurance policy. The group who have renewed health insurance have also rated tax savings component higher. This means that this is also one of the attracting factors in continuing the policy. This attracts for product innovations with better tax saving components along with coverage and premiums. Out of the total 71 respondents of non renewed group, 23 had availed the benefit of hospitalisation but this even this benefit could not result into continuation of the policy for the next year. This suggests that mere hospitalisation expenses are not enough to retain the policy holders.

In both the groups, there was no significant difference in the average amount of premium paid. However the income varied in both the groups. This suggests that for better continuity of the policies products needs to be designed to suit every ones economic status.

From both the groups majority of respondents who have files claims have rated claim settlement process as average. The process is considered a cumbersome one with loads of documentation. The suggests that process needs to be more transparent and customer friendly.

CONCLUSION

Health insurance policies are not long-term policies and they are required to be renewed each

year. Understanding the factors that affect the demand and renewal decisions of continuing in health insurance programme is vital for future growth and development of this sector. The important determinants in terms of renewal of health insurance policies observed in the study were younger age, higher income and higher medical expenses.

The study also aims at product innovation with long- term benefits and tax savings components to sustain customers for a longer duration. Insurance companies need to develop and market the product and choose target customers in a policyholder in the manner to ensure long-term continuity. The results also suggest improving the claim settlement process as customer satisfaction is significant factor in influencing the renewal decision of policyholder. This should encourage insurance companies to provide a good experience to the customer during the period of the policy.

Source of Funding- Nil

Conflict of Interest- None

Ethical Clearance – IEC of Symbiosis International (Deemed University)

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Phytochemical Analysis and Antifungal Activity of *Ganoderma lucidum*

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ABSTRACT

Ganoderma lucidum has been used for several decades for both treatment strategy and health promotion. The manifestation of new infections, drug resistant, high costs of synthetic drugs and their side effects has led to an increase in the use of traditional medicine globally. Hence an endeavor has been made in this study to examine the antifungal activity of both ethanol and methanol extracts of *G. lucidum*. The phytochemical screening was done to reveal the bioactive constituents of *G. lucidum*. The phytochemical screening of *G. lucidum* revealed that the extracts contain bioactive compounds such as carbohydrates, glycosides, triterpenoids and phenolic compounds. The both extracts of *G. lucidum* were then subjected for the Minimum Inhibitory Concentration (MIC) determination with the help of micro-dilution bioassay. Various pathogenic organisms were selected against which the antifungal activity of the extracts were determined. The result of the antifungal activity showed that the methanolic extract of *G. lucidum* showed the strongest antifungal activity among the two extracts against the fungal strains.

Keywords: *Ganoderma lucidum*, Antifungal activity, Minimum Inhibitory Concentration.

INTRODUCTION

Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources; many of these isolations were based on the uses of the agents in traditional medicine¹. The herbal medicines serve the health needs of about 80% of the world's population, especially for millions of people in the vast rural areas of developing countries; more than 65% of the global population uses medicinal plants as a primary health care modality².

Plants have been a major focus of investigations for novel biologically active compounds³. However, filamentous fungi have been the producers of some of the

most powerful secondary metabolites which have been developed into therapeutic agents⁴. In view of this, the searches for new anti-microbial agents from medicinal plants are even more urgent in the countries like India where infectious diseases of fungal origin are not only widespread, but the causative agents are also developing an increasing resistance against many of the commonly used antibiotics⁵.

There is a constant search for new antibiotics because the existing drugs have unwanted toxicity and their inappropriate and indiscriminate use have led to an increase in antibiotic-resistant strains⁶. Numerous investigations have proved that medicinal plants as well as microorganisms contain diverse classes of bioactive compounds such as Tannins, Alkaloids, Flavonoids, Terpenoids, Phenols, etc⁷. The main aim of this current study was to detect the various bioactive components present in *G. lucidum* and also determine the antifungal

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activity to prove its use as a safe and potent antifungal agent.

MATERIALS AND METHOD

Preparation of extracts

The fruiting bodies of *G. lucidum* were obtained from MKV Organics, Puducherry. The extraction method of with certain modifications was used⁸. The dried fruiting bodies were grinded to a fine powder using a domestic blender. For preparing the extracts, methanol and ethanol were used as solvents to obtain the pharmacologically active compounds from the mushroom⁹⁻¹¹.

For every 1 gram of powder, 50 ml of solvent was used and was subjected to extraction using a Soxhlet extraction apparatus. After the completion of extraction, the supernatant was filtered through Whatman #1 filter paper. All solvent extracted fractions were evaporated to dryness to obtain residues. The extracts were stored at 4°C in air tight containers for further investigations¹².

Phytochemical screening

The different qualitative chemical tests can be performed for establishing a profile of given extract for its chemical composition. The extracts were then subjected to qualitative chemical tests for various phytoconstituents like Alkaloids, Flavonoids, Carbohydrates, Reducing sugars, Tannins and Phenolic compounds, Cardiac glycosides, Terpenoids, Anthraquinones, Saponins, Volatile oils and Steroids¹³⁻¹⁵.

Detection of alkaloids

a) Mayer's Test

To a few ml of extract, one drop of Mayer's reagents was added by the side of the test tube. A white creamy precipitate indicated the test as positive.

Preparation of Mayer's Reagent

Mercuric chloride (1.358g) was dissolved in 60 ml of water and KI (5.0 g) was dissolved in 10 ml of water. The two solutions were mixed and made up to 100 ml with water.

b) Wagner's Test

To a few ml of extract, few drops of Wagner's reagent were added by the side of the test tube. A reddish brown precipitate confirmed the test as positive.

Preparation of Wagner's Reagent

Iodine (1.27 g) and KI (2 g) were dissolved in 5 ml of water and made up to 100 ml with distilled water.

Detection of Carbohydrates

a) Molisch's test

To 2 ml of extract, two drops of alcoholic solution of α -naphthol was added, the mixture was shaken well and 1 ml of conc. H_2SO_4 was added slowly along the sides of the test tube and allowed to stand. A violet ring indicated the presence of carbohydrates.

b) Benedict's Test

To 0.5 ml of extract, 1 ml of Benedict's reagent was added. The mixture was heated on a boiling water bath for 2 mins. A characteristic coloured precipitate indicated the presence of sugar.

Benedict's Reagent

Sodium citrate (173g) and Na_2CO_3 (100g) were dissolved in 800 ml of distilled water and boiled to make it clear. $CuSO_4$ (17.3g) dissolved in 100 ml distilled water was added to it.

Test for Glycosides

a) Legal's test

To the extract, few drops of 10% NaOH were added to make it alkaline. Sodium nitroprusside was added to the solution. Presence of blue colouration indicated the presence of glycosides in the extract.

b) Keller-Killiani test (for cardiac glycosides)

To 2 ml of extract, 2 ml glacial acetic acid is added, followed by one drop of 5% $FeCl_3$. Conc. H_2SO_4 is added from the side of the test tube. Reddish brown ring appears at the junction of the two liquid layers indicating the presence of cardiac glycosides.

Detection of Proteins and Amino Acids

a) Millon's Test

To 2 ml extract, few drops of Millon's reagent were added. A white precipitate indicated the presence of proteins.

b) Biuret Test

An aliquot of 2 ml of extract was heated with 1 drop of 2 % CuSO₄ solution. To this 1 ml of ethanol (95%) was added, followed by excess of KOH Pellets. Pink colour in the ethanolic layers indicated the presence of proteins.

Detection of Flavonoids

a) Shinoda test (Magnesium Hydrochloride reduction test)

To the test Solution, few fragments of Magnesium ribbon were added and concentrated HCl was added drop wise, pink scarlet, crimson red or occasionally green to blue color appears after few minutes.

b) Alkaline reagent test

To the test solution few drops of sodium hydroxide solution was added; formation of an intense yellow color, which turned to Colourless on addition of few drops of dil. acid, indicated the presence of flavonoids.

Detection of Phytosterols

a) Libermann Burchard's Test

To the extract, 3 ml of acetic anhydride was added and mixed. To this one drop of concentrated H₂SO₄ were added slowly along the sides of the test tube. An array of colour change showed the presence of phytosterols.

Test for Triterpenoids and Steroids

a) Libermann Burchard's Test

Extract was treated with few drops of acetic anhydride, boiled and cooled. Conc. H₂SO₄ was added from the sides of the test tube, showed a brown ring at the junction of two layers and the upper layer turning green showed the presence of Steroids and formation of deep red colour indicated the presence of triterpenoids.

b) Salkowski test

Extract was treated with few drops of conc. H₂SO₄, shaken well and allowed to stand for some time; red color at the lower layer indicated the presence of Steroids and formation of yellow colored lower layer indicated the presence of Triterpenoids.

Detection of Phenolic Compounds and Tannins

a) Ferric Chloride Test

To the extract, few drops of neutral 5% ferric chloride

solution were added. A dark green colour indicated the presence of phenolic compounds.

b) Lead Acetate Test

To the extract, 3 ml of 10% lead acetate solution was added. A bulky white precipitate indicated the presence of phenolic compounds.

Fungal Test strains used

A total of five fungal species were tested. *Candida albicans* (ATCC-10231), *Aspergillus niger* (ATCC-6275), *Aspergillus flavus* (ATCC-204304), *Aspergillus fumigatus* (ATCC-16907) and *Cryptococcus neoformans* (ATCC-208821).

Culture media and inoculum preparation

The isolates were grown on Sabouraud dextrose agar (Himedia) for 48 h at 35°C. The inoculum preparation followed the directions of document M27-A of the NCCLS¹⁶. Thus, the optical density (OD) of a 0.5 McFarland standard at 530 nm was measured five times on different days. Therefore, a suspension of each of the yeasts in sterile distilled water was adjusted in Bausch & Lomb spectrophotometer to that OD₅₃₀ range.

Minimum Inhibitory Concentration (MIC)

The MIC was determined as the lowest concentration of the extract which inhibited the growth of the tested fungi. A broth micro-dilution bioassay in 96-well micro titer polystyrene plates was used to determine MIC. The method of was followed with modifications¹⁷. The wells of each column (1-12) were filled with 50 µl of sterilized RPMI broth (except the first well of each column). 100 µl of the extracts (methanol and ethanol) having a concentration of 10 µg/ml was added to the first well of columns 4-12. Serial two fold dilutions were made of the 10 µg/ml extract with the broth in the 07 consecutive wells of the columns. The concentration of the extracts ranged from 10 to 0.0625 µg/ml. Next, 50 µl of the fungal inoculum were added to each well so that the final volume of each well was 150 µl. The first & second column of the plate served as the positive and negative control. The plates were covered and then incubated at 37°C for 24h. After 24-48 hrs, 40 µl of 0.2 mg/ml iodinitrotetrazolium chloride was added to each well and the plates were further incubated at 37°C for 30 min. Fungal growth in the wells was indicated by development of red-pink color, while growth inhibition was indicated

by no change in the colour of cell suspensions. The MIC of each extract is defined as the lowest concentration inhibiting the growth of the fungi and was recorded.

RESULTS AND DISCUSSION

Qualitative phytochemical screening

The phytochemical screening of *G. lucidum* revealed

that the extracts contain Carbohydrates, Glycosides, Triterpenoids and Phenolic compounds. Methanol and ethanol extracts were found to extract the maximum active components being solvents that have low polarity. This result was in accordance to the previously reported literature¹⁸ and is represented in Table-1.

Table.1 Qualitative phytochemical analysis of

Ganoderma lucidum from two organic solvents

S. No	Phytochemical	Test	Observation	
			Methanol	Ethanol
1	Alkaloids	Mayer's test	-	-
		Wagner's test	-	-
2	Carbohydrates	Molisch's test	+	+
		Benedict's test	+	-
3	Glycosides	Legal's test	+	+
		Keller-Killiani test	+	+
4	Proteins and Amino acids	Millon's test	-	-
		Biuret test	-	-
5	Flavonoids	Shinoda test (Magnesium Hydrochloride reduction test)	-	-
		Alkaline reagent test	+	-
6	Phytosterols	Libermann - Burchard's test	-	-
7	Phenolic Compounds and Tannins	Ferric Chloride test	+	+
		Lead Acetate test	+	-
8	Triterpenoids and Steroids	Libermann - Burchard's test	+	+
		Salkowski test	+	+

Determination of Minimum Inhibitory Concentration (MIC)

The MIC values of the extracts against the tested strains are represented in Table-2. The MIC value of the extracts ranged from in descending (10 µg/ml, 05 µg/ml, 2.5 µg/ml, 1.25 µg/ml and 0.625 µg/ml).

The MIC of the methanol extract was found to be 0.625 µg/ml against *Candida albicans*, for ethanol extract was found to be 1.25 µg/ml against *Candida albicans*. *Candida albicans* and *Aspergillus fumigatus* were found to be the most susceptible fungal strains as the two extracts inhibited their growth.

For *Aspergillus flavus* and *Cryptococcus neoformans* the ethanol extract was found to be the most effective, whereas for *Aspergillus fumigatus*, both extracts were equally found to be effective, for *Aspergillus niger* only the methanol extract was found to be effective. The antifungal activity of the methanolic extract against *Candida albicans* and *Aspergillus fumigatus* is of great importance as they are emerging pathogens¹⁹.

Table. 2 Minimum inhibitory concentration (MIC) ($\mu\text{g/ml}$) values of the extracts against the tested organisms

Minimum Inhibitory Concentration ($\mu\text{g/ml}$)		
Organisms (n=360)	Methanol	Ethanol
Candida albicans (162)	0.625	1.25
Aspergillus flavus (32)	ND	2.5
Aspergillus fumigates (86)	2.5	2.5
Aspergillus niger (56)	1.25	ND
Cryptococcus neoformans (24)	ND	1.25

Antifungal activity

This study justifies the claimed uses of *G. lucidum* in the traditional system of medicine and its bioactive components to treat various infectious diseases caused by the microbes²⁰.

The presence of antimicrobial substances in the higher plants and filamentous fungi is well established. Hence the antifungal activity of *G. lucidum* is described in this study²¹.

Candida albicans, *Aspergillus flavus*, *Aspergillus fumigates*, *Aspergillus niger* and *Cryptococcus neoformans* were found to be inhibited by the both extracts of *G. lucidum*. The presence of important phytoconstituents like Carbohydrates, Glycosides, Triterpenoids, Phenolic compounds and tannins could be responsible for the antifungal properties²². However, thorough research needs to be done in order to recognize the phytoconstituents responsible for the antifungal activity before being used for the development of any drugs.

CONCLUSION

The results obtained from this work showed that extracts of *G. lucidum* medicinal mushroom screened exhibit antifungal effects present more in methanolic extract than ethanol extracts against the fungal strains. This study also supports the traditional usage of the studied plants and suggests that *G. lucidum* extracts possess compounds with antifungal properties that can be used as antifungal agents in new drugs for the therapy of infectious diseases caused by pathogens.

Conflict of Interest: No.

Source of Funding: Self.

Ethical Clearance: Obtained.

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Pattern of Cutaneous Manifestations among HIV Patients of a Tertiary Care Teaching Hospital

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ABSTRACT

Introduction: The most recent data from UNAIDS, about 35 million people are living with HIV infection worldwide. Cutaneous disorders occur more frequently as HIV infection advances and immune function deteriorates; however, they are common and of various types throughout the course of HIV disease. Taking cutaneous disorders into consideration for case management is essential to improve quality of life for HIV-infected patients. **Materials and method:** The current record based study was conducted at the tertiary care teaching hospital of Kasturba medical College, Mangalore. The records of all the HIV positive patients who visited dermatology clinic, were retrieved from the record section of the hospital. The information pertaining to the demographic characteristics, mode of transmission of HIV and cutaneous manifestations were obtained from the case records.. Data was entered and analyzed using SPSS

Results: About half (n=67, 51.5%) the patients were in the age group of 26-35 years, and one quarter (n=30, 23.1%) were between 36 and 45 years old. About 86.9% (n=113) of patients acquired HIV through the sexual exposure. **Conclusion:** Oropharyngeal candidiasis was the most common dermatological manifestations observed among the participants in the current study

Keywords: HIV, Mangalore, cutaneous manifestations

BACKGROUND

HIV infection/ AIDS is a global pandemic, the hallmark of which is a profound immunodeficiency, which results from a progressive quantitative and qualitative deficiency of helper T cells. ^[1] According to the most recent data from UNAIDS, about 35 million people are living with HIV infection worldwide. ^[2] Estimates from NACO (National AIDS control organization) the national adult HIV prevalence in India is approximately 0.36 percent, amounting to between 2 and 3.1 million people. More men are HIV positive than women. Nationally, the

prevalence rate for adult females is 0.29 percent, while for males it is 0.43 percent. Prevalence is also high in the age group of 15-49 years (88.7 percent of all infections). ^[3] Aberrant immune activation and inflammation in HIV infected individuals contribute considerably to the increased incidence of chronic conditions like cancer, neurocognitive dysfunction, diabetes, kidney, liver and cardiovascular disease ^[1]

Cutaneous disorders occur more frequently as HIV infection advances and immune function deteriorates; however, they are common and of various types throughout the course of HIV disease. Taking cutaneous disorders into consideration for case management is essential to improve quality of life for HIV-infected patients. ^[4] Skin disorders are common manifestations of human immunodeficiency virus (HIV) disease: they affect between 80% and 95% of HIV-infected patients according to the literature, ^[5-9] occurring at any time in

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the course of infection. It is commonly seen that skin is the first and only organ affected during the course of the disease. [10,11]

Cutaneous disorders during HIV infection are numerous and [7,8] can vary from the macular rash seen in acute seroconversion syndrome to end-stage Kaposi Sarcoma. [1] The more common non-neoplastic manifestations are seborrheic dermatitis (seen in up to 50% of patients with HIV), folliculitis (~20% of patients with HIV) and shingles (seen in 10-20% of patients). [1] Some have drawn attention because their onset defines some of the Centers for Disease Control and Prevention (CDC) acquired immunodeficiency syndrome (AIDS) clinical categories, eg, oral candidiasis, zoster, herpes simplex, oral hairy leukoplakia, and Kaposi sarcoma, but most have been documented solely in case reports. In the context of HIV infection, cutaneous disorders can present with particular clinical manifestations: unusual anatomical sites, increased severity, treatment failure, and unusual clinical appearance. These lesions are often the first manifestations of symptomatic HIV disease. Clinicians need to be aware of these diagnoses and the order of their appearance since correct interpretation is essential for counseling patients about the progression of their illness and for initiating appropriate therapy. [5] Hence, this study was undertaken to find out the various cutaneous manifestations among HIV patients and also to list out the other opportunistic infections in HIV patients with cutaneous manifestations.

MATERIALS AND METHOD

Ethical clearance was obtained from the Institutional Ethics Committee (IEC) of Kasturba Medical College, Mangalore (MAHE) before starting the study. The current record based study was conducted at the tertiary care teaching hospital of Kasturba medical College, Mangalore. The records of all the HIV positive patients who visited dermatology clinic, were retrieved from the record section of the hospital after obtaining the permission from the Medical Superintendent. The information pertaining to the demographic characteristics, mode of transmission of HIV and cutaneous manifestations were obtained from the case records. Medical case records were scrutinized for the completeness; and incomplete records were excluded from the study. Data was entered and analyzed using SPSS (Statistical Package for Social Sciences) Version 11.5. Results were expressed by using proportions, mean and standard deviation.

RESULTS

Table 1: Baseline characteristics of study population (n=130)

Baseline characteristics	Number	Percentage
Age group (Years)		
≤ 25	25	19.2
26-35	67	51.5
36-45	30	23.1
>45	08	06.2
Gender		
Male	86	66.2
Female	44	33.8
Marital status		
Single	40	30.8
Married	90	69.2

A total of 130 patients with HIV attended the dermatology clinic during the study period. The demographic features of the patients are given in Table 1. About half (n=67, 51.5%) the patients were in the age group of 26-35 years, and one quarter (n=30, 23.1%) were between 36 and 45 years old. Two-thirds (n= 86, 66.2%) of the patients were male. 30 patients (23.1%) were employed in hotels and 33 (25.4%) of them were housewives.

Table 2: Distribution of study population according to mode of transmission of HIV (n=130)

Mode of transmission	Number	Percentage
Heterosexual	110	84.6
Homosexual	003	02.3
Blood transfusion	002	01.5
Mother to child	001	00.8
Unknown	014	10.8

The distribution of study participants by route of transmission is given in Table 2. About 86.9% (n=113) of patients acquired HIV through the sexual exposure, among which 110 were through heterosexual exposure while 3 were through homosexual exposure.

Table 3: Cutaneous manifestations of HIV infected patients (n=108)

Cutaneous manifestation	Number	Percentage
Candidiasis	39	36.3
Viral infections	23	21.3
Bacterial infections	09	08.4
Scabies	08	07.5
Pigmentation	07	06.4
Ichthyosis	07	06.4
Dermatophytoses	05	04.6
Pruritus	04	03.7
Seborrheic Dermatitis	03	02.7
Xerosis	03	02.7

Table 3 gives the cutaneous manifestations of HIV. About one-third (n=39, 36.3%) of the patients had candidiasis, while 23 patients (21.3%) had viral infections like herpes zoster and herpes simplex.

DISCUSSION

This was a retrospective study done by studying the case records of 130 HIV infected patients attending the tertiary care hospital. Out of 130 HIV patients with cutaneous manifestations 86 (66.2%) were males and 44 (33.8%) were females. Majority of the patients (n=97, 74.6%) belonged to the age group of 26-45 years. The age differences in the occurrence of the disease between the sexes could be attributed to early marriages in females and early detection, either due to pregnancy or because their spouse tested positive. Studies done by Spira et al [4] and Singh et al [12] also show high male prevalence. The National Commission on Macroeconomic and Health India report reveals that in high prevalence area like Karnataka, Andhra Pradesh, Maharashtra and Tamil Nadu males had higher prevalence 12.9 compared to females 4.4. [13] as reflected in our study.

Housewives formed 25% of the study group, hotel workers 23%, drivers 8% and manual laborers 7%. Occupations such as fishermen, farmers, masons etc formed 34% of the study group. The statistics points to a low socioeconomic status, similar to a study done in eastern India in which 80% of study participants

belonged to lower socioeconomic strata with income less than Rs.1500 per month. [12] This points to a low level of education and awareness, which is reflected by the increased number of cases seen in this group. Further, it also points to poor nutrition, which in itself can hasten the progression of the disease.

More than four fifth of cases gave history of heterosexual exposure as mode of acquisition of infection while 3 patients gave history of homosexual mode of infection. This is congruent with another study done in India in which majority (94%) of cases were transmitted through heterosexual contacts, however a study done by Powers reported that in only 34% of cases the mode of transmission of infection was by heterosexual route. [14] Study by Spira reported 35% transmission of infection by homosexual route, which is much higher than our study. [4]

Oropharyngeal candidiasis was the commonest mucocutaneous manifestation accounting for 39 (36.3%) cases followed by viral infections such as herpes zoster, herpes simplex and molluscum contagiosum in 23 (21.3%) patients. Other cutaneous manifestations were scabies ,pigmentation , ichthyosis , dermatophytosis and less commonly xerosis and seborrheic dermatitis. The pattern obtained was similar to other studies. [15-17] However, these findings are very different from another study done in India with a similar sample size (n=137), which found seborrheic dermatitis to be the most common manifestation (74%), while oral candidiasis was seen in only 17.5% of patients. Further, pigmentation and xerosis were more prevalent, 47% and 52.5% respectively, as compared to our study. [12] Pruritus is a common complaint in the HIV-infected patient. [18] The overall predominance of skin disorders in homosexual and bisexual men compared with the other HIV transmission groups, even after exclusion of Kaposi sarcoma, may be explained by the fact that these patients usually report more easily their discomfort than the others. Moreover, some skin disorders, such as condyloma or molluscum contagiosum, are known to be caused by sexually transmitted agents.

CONCLUSION

As evident from present study HIV mainly affected the working age group of the society predominantly through sexual route. Oropharyngeal candidiasis was the most common dermatological manifestations observed

among the participants in the current study.

Ethical Clearance- Taken from Institutional Ethics committee

Source of Funding- None

Conflict of Interest - Nil

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To Study the Knowledge and Association between Self Medication and Education among People Residing in Hilly Area

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ABSTRACT

Background: Self-medication can be both beneficial and harmful for Hilly Area people where universal access to health care is yet to be achieved. This area is having various disease drug resistant region and also very much vulnerable to harms of self-medication. *Objectives:* Therefore, this study was initiated to determine the knowledge of self-medication and also found to be association between education and self medication practices in hilly population. *Material and Methods:* The study was a community-based cross-sectional study carried out at Kalgaon PHC of Patan Taluka. A total of 487 heads of family were selected by randomization. *Result:* In spite of all these conditions commonly practiced self medication in hilly area for fever, headache, etc. In this study fever and headache as reported by 64.7% and 61.0% followed by Abdominal Pain 54.2%, Cough (55.9%), and Diarrhea 43.9%. Although among population 63.7% respondents had correct knowledge regarding dose, 64.9% about duration, 9.7% about contraindication, 0.6% regarding expiry date. *Conclusion:* Higher percentages of self-medication practices were seen among all the population. This study helps the respondents had better knowledge of dose, duration, indication as compared to its contraindication and its adverse effects.

Keywords: Self-medication, Knowledge, Health education, Hilly Area, Cross Sectional Study

INTRODUCTION

Self-care has been characterized as the basic level of health care in all societies from the ancient time. This urge of self-care might have been a driving force motivating for self-medication.

The World Health Organization has been promoting the practice of self-medication due to inadequacy in implementing health care delivery system, particularly in remote and rural areas.

OTC (over the counter) drugs are intended for self-medication and are of established efficacy and safety, their inappropriate use due to lack of knowledge of their side effects and interactions could have serious insinuation, especially in special population groups like children, elderly, pregnant and lactating mothers¹.

Antimicrobial resistance is a current problem worldwide particularly in developing countries where antibiotics are often available without a prescription².

Aim:- To study prevalence of practice of self-medication among people residing in hilly area.

Objectives:-

To study status of knowledge regarding Self Medication among people residing in hilly area.

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To study the association between self - medication and education of the study population.

MATERIAL AND METHOD

Background to the study area:-

The present study was carried in remote and hilly areas of Patan Talukain Satara District. Out of 13 P.H.C.s in Patan Taluka,Kalgaon P.H.C. was selected randomly and out of 5 sub centres, Kachni was also selected randomly covering population of 2754 in 551 households.Kachni is 27 km. from KrishnaInstitute of Medical Sciences “Deemed To Be University” , Karad.

Study design:-

The study was conducted as a community-based cross-sectional survey in an attempt to assess the practices towards self-medication among the residents of hilly area of Patan Taluka using a self-administered questionnaire.

Study Population:-

The study population comprised of heads of families residents at sub centre Kachni selected randomly from the five sub centres in jurisdiction of Kalgaon PHC in the patan taluka. The inclusion criterion for the selection of participants was that they had to be permanent residents of the local and were to be above 18 years of age.

Sample size:-

The desired sample size for the study was determined using the formula

Assuming 50% of families (head of families) were using self medication.

$$\text{i.e. } p = 50\% \text{ (users)}$$

$$q = 50\% \text{ (non users)}$$

$$L = \text{allowable error}$$

Minimum families (head of families) to be studied is

$$n = 4pq/L^2$$

$$n = 4 \times 50 \times 50/5^2$$

$$n = 400$$

Sampling Technique

Out of 13 PHC in Patan Taluka, Kalgaon PHC was selected randomly and out of 5 sub centre,Kachni also selected randomly by lottery method.With the minimum sample size known, a total of 487 heads of family were selected, randomly and were enumerated and the number of participants from each was selected by sampling fraction.

Survey Instrument

This study instrument was an anonymous, self-administered, questionnaire based-survey, carried out from November 2013 to June 2014. A self developed questionnaire which was tested for validity and reliability and modified accordingly consisting of mainly closed-ended questions was used for data collection. The information on the questionnaires included social demographic variables such as age, gender, income,occupation and level of education. In addition to questions on demographic information, the questionnaire also included questions on knowledge of self-medication, involvement in self-medication practices, frequency of self-medication, sources of drugs used, and reasons for self-prescribing.

Data Analysis:

Following completion of data collection, it was reviewed, organized and entered into a micro computer running the Statistical Package of Social Science (SPSS version.) software for windows Vista and Epidemiological Information Software (Epi Info 3.5.3) to validate and analyze the entries. The results are based upon the data obtained from residents. The prevalence of self-medication was reported as percentages. The survey was descriptive and data was summarized as rates and ratios.

Ethical Considerations:

The study was approved by the Department of Community medicine, and Ethical committee of Krishna Institute of Medical Sciences Deemed University Karad. And a letter of consent was obtained from the medical officer of PHC Kalgaon. Participants were properly informed by the interviewer on the nature of study, its confidentiality, importance to the society and procedures for completing the questionnaire, and informed consent was obtained in all cases. **Funding:**

Project is funded by Krishna Institute of Medical

Sciences “Deemed To Be University”, Karad.

Limitations:

This study was largely constrained by time which prevented the use of a larger sample size. Another limitation of this study was the reliance on self-reported data about self-medication from the respondents coupled with inability to ascertain drugs used, and their dosages. The inability to establish the occurrence of side effects

following drug use could also have limited the study.

Observations and Results:

A total of 487 study subjects were included in the study and the data was collected by structured interview among the heads of family from hilly area.(aged above 18 years).

Socio-demographic characteristics:-

Table 1: Socio-demographic characteristics of the respondents

Sr. No.	Demographic variables	Frequency	%	
	Age	Upto 30yrs	22	4.5
		31-40yrs	109	22.4
		41-50yrs	175	35.9
		51-60yrs	147	30.2
		61-70yrs	34	7.0
	Mean age	46.82		
Std. Deviation	9.640			
	Gender	Male	384	78.9
		Female	103	21.1
	Occupation	Farmer	234	48.0
		Labour	253	52.0
	Education	Illiterate	274	56.3
		Primary – I (1dt to 4th)	83	17.0
		Primary – II (5th to 7th)	81	16.6
		SSC	45	9.2
		HSC	3	.6
		Graduate	1	.2
	Income Group	Rs. 1786-2976 (SEC-III)	3	.6
		Rs. 893-1785 (SEC-IV)	25	5.1
		<= Rs. 893 (SEC-V)	459	94.3
	Family Type	Nuclear	360	73.9
		Joint	127	26.1

Table 2: Association between Self-medication practices and education of the respondents.

Sr. No.	Education	Self-Medication		Total	Pearson Chi-Square	
		Yes	No		Value	P- Value
	Illiterate	212	62	274	47.367	0.000*
	Primary	49	34	83		
	Primary	37	44	81		
	SSC	21	24	45		
	HSC	0	3	3		
	Graduate	0	1	1		

*Significant when p<0.05

RESULT

As depicted in above table literacy status was significantly associated with practice of self medication which was more in illiterates.

Table No. 3 Conditions commonly practiced for self-medication by the respondents

Sr. No.	Common conditions	Self medication	
		Yes	No
	Fever	315(64.7%)	4(.8%)
	Headache	297 (61.0%)	22(4.5%)
	Malaise	181(37.2%)	138(28.3%)
	Abdominal Pain	264(54.2%)	55(11.3%)
	Cough	272(55.9%)	47(9.7%)
	Cold	29(6.0%)	290(59.5%)
	Vomiting	77(15.8%)	242(49.7%)
8.	Diarrhoea	214(43.9%)	105(21.6%)
9.	Weakness	43(8.8%)	276(56.7%)
10.	Other Symptoms	15(3.1%)	304(62.4%)

RESULT

The above table shows that commonest 10 frequently reported conditions for seeking self-medication included fever and headache as reported by 315 (64.7%)

and 297(61.0%) followed by Abdominal Pain (264 respondents) (54.2%), Cough(272 respondents) (55.9%), Diarrhoea (214 respondents) (43.9%) respectively.

Table 4: Knowledge about medications among respondents.

Sr. No.	Knowledge	Self medication		Pearson Chi-Square	
		Yes	No	Value	P value
1	Dose	310 (63.7%)	9 (1.8%)	483.066 ^a	.000*
2	Duration	316 (64.9%)	3 (.6%)	482.589 ^a	.000*
3	Indication	316 (64.9%)	3 (.6%)	482.589 ^a	.000*
4	Contra indications	47 (9.7%)	272 (55.9%)	482.669 ^a	.000*
5	Expiry Date	3 (0.6%)	316 (64.9%)	484.050 ^a	.000*
6	Adverse Effect	19 (3.9%)	300 (61.6%)	480.804 ^a	.000*

**Significant when p<0.05*

This table shows that the knowledge about medications among respondents where 63.7% respondents having correct knowledge regarding dose, 64.9% about duration, 9.7% regarding contraindication, 0.6 regarding expiry date, & 3.9% regarding Adverse Effect respectively and the maximum population 55.9%, 64.9% and 61.6% still significantly lack appropriate knowledge about contra indication, Expiry Date and Adverse Effect respectively.

DISCUSSION

Majority of the respondents 384 (78.9%) were male and 103 (21.1%) were female (table No1). Meaning that more men were compounded in the research than women, may be due to the nature of jobs men entail in that may not give them the time to relax and participate in other activities. This result matches with the study done by Mohamed saleem T.K 2011³ where majority male respondents were found compared to females.

This study showed higher prevalence among the age group between 41 to 50 years which was similar findings (35.9%) seen in the study conducted by Afolabi (2008) Banerjee; Bhadury & other (2012)⁴, Patil S.B & other⁵; Santosh Kumar; Binjawadgi; Kanakhi (2014), Stein & other^{4,5,6}.

Another study conducted in Mexico⁷ revealed that females practiced more self medication (61.9%) than

males did (38.1%) and identified women as fundamental element in the consumption of drugs and employment of self medication. Studies conducted in Spain showed that Self-medication is more prevalent among women, persons who live alone, and persons who live in large cities. Inappropriate or unsafe use should be properly addressed and managed⁷.

The study done by Nitin kumar, Stein et al. showed prevalence more in the female (82.2%) & (55.5%) respectively which contradicts to our study.

Overall educational status was found less though educated individuals seems to take physicians advice. In the present study majority of the respondents had not attended even primary school education 274 (56.3%) followed by 83 (17.0%) had achieved primary level 1 education, and only 81 (16.6%) had attained primary level 2 education and only 45 (9.2%) had secondary school. This shows the high number of primary school drop outs and attendance level as well as a reduce illiteracy and increased drop out level which is stipulated by a reduced. Respondents who attended primary level and a further reduction in secondary school attendance. This study however contradicts a study done by Azeem AK et al. 2011 in USA where majority of the respondents had completed was attending secondary education.

Various studies on the relationship between educational status and attitude towards self-medication

commonly found that differences in educational levels may be responsible for the finding that more young and middle-class patients regard medication as not always being essential for every illness and concluded that the difference between social classes is statistically significant⁸.

World-wide, consumers commonly reach for self-care products to help them solve their common health problems which include fever, body pains, indigestion, diarrhoea, vomiting, cough, and upper respiratory tract infections^{9,10}.

Self medication with drugs is an economical choice of treatment for common self limiting illnesses all over the world.¹¹ Certain studies^{12, 13, 14} amongst different populations reveal that the population had a fairly good knowledge on the advantages of self medication, as they correctly perceived it as time-saving and economical, doing away with the need to go to a doctor for minor illness and providing quick, easy and convenient relief¹⁵.

The relationship between educational status and attitude towards self-medication commonly found that differences in educational levels may be responsible for the finding that more young and middle-class patients regard medication as not always being essential for every illness and concluded that the difference between social classes is statistically significant⁷³.

The study showed a positive correlation between the education level of the respondents and the tendency to obtain medications from the hospital/pharmacies. The prevalence among the illiterates was 7.5%, 30.6% in those who had primary education, 42.2% in those with secondary and 62.5% in those who had post-secondary school education. In contrast, there was a negative correlation between the education level of the respondents and the tendency to obtain medications from patent medicine stores and local hawkers.

SUMMARY & CONCLUSION

This was a community based cross sectional study conducted in hilly area of Patan Taluka of a sub centre kachni under PHC Kalgaon from Nov. 2013 to Dec.2014 among 487 heads of families as a study subjects.

Among the 487 respondents 319(65.5%) were using self medication. Out of which 41-50 yrs. of age group

which was an economically productive age group was practicing more (35.5).

Comparatively all respondents who were practicing self medication were illiterates (77.37%) belonged to nuclear family.

The respondents had better knowledge about dose, duration and Indication as compared to its contraindication and adverse effect. This study intention to continue this practice in the future and recommend to others should be an alarming wake up call to all the doctors, health care providers, pharmacists and policy makers of Government of India.

Conflicts of Interest: Author declared that no conflicts of interest.

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Low-level Laser Therapy in the Management of Diabetic Sensorimotor Polyneuropathy

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Abstract

Background & Objective: Diabetes Mellitus is one of the most common progressive and disabling diseases. Population affected with Diabetes may experience numbness or insensitivity to pain and temperature, a tingling, burning or prickling sensation, sharp pains or cramps, extreme sensitivity to even a light touch, loss of balance and coordination. Low-Level laser therapy (LLLT) has been advocated for the treatment of chronic pain disorders. This therapy has been suggested for relief of symptoms of pain, inflammation and utilized in wound healing & nerve regeneration. With this evidence Laser has been advocated in this study. The aim of this study is to evaluate the effectiveness of Low-Level Laser Therapy for relieving the symptoms of Diabetic Sensorimotor Polyneuropathy. **Methodology:** This randomized controlled trial was conducted in a private Medical College Hospital, Chennai. The materials required for conducting the study includes Tuning Fork, Reflex Hammer, 10gm Semmes Weinstein monofilaments, Goggles and a Ga As LASER unit. The study was conducted among 40 subjects satisfying selection criteria in the age group of 40-60 years and was randomly assigned in to control(Group-A) or experimental group(Group-B) and was assessed for degree of neuropathy and pain using Toronto clinical neuropathy score and Numerical Pain Rating Scale (NPRS) respectively. Participants in the respective groups are treated for five weeks with 4 joules for 4 days in a week. **Results:** Within-group analyses showed a significant difference in both outcome measures with $p < 0.05$. The pre-test mean in Group-A was 9.80 and post-test mean value of Toronto Clinical Neuropathy Score is 8.25 and in the Group-B the pretest mean was 10.10 and post-test mean was 6.30 this shows that Toronto Clinical Neuropathy Score in group B were comparatively significantly less than group A, $P < 0.05$. The Post Test mean value of Numerical Pain Rating Scale in group A is 5.15 and in the group, B is 3.90 compared to their pre-test values of 6.25(Group-A) and 6.30(Group-B) respectively. The Numerical Pain Rating Scale analysis in Group B were comparatively significant than Group A, which indicates a significant difference between groups with $p < 0.05$. **Conclusion:** This study concludes that Low-Level Laser Therapy is more effective in patients with Diabetic sensorimotor Polyneuropathy in reducing Pain and relieving symptoms.

Keywords: Diabetic Sensorimotor Polyneuropathy, Low-Level Laser Therapy

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INTRODUCTION

Diabetes is one among the most progressive and disabling disease. Recently 150 million people were with diabetes all over the world and in the year 2025, their number is expected to increase to 300 million (WHO)

[1]. Diabetic sensorimotor polyneuropathy is 27.6% prevalent among those with diabetes [2]. It was also noted that 13% of persons with glucose tolerance impairment had polyneuropathy, which suggests that neuropathy can also be developed due to the pre-diabetic state caused by impaired glucose tolerance [3]. In another population-based study conducted among diabetic cohorts, it was recorded that 25-30% had peripheral neuropathy graded to be either moderate or severe. [4]

Distal symmetrical neuropathy is also termed as sensorimotor neuropathy and is one of the most common types of diabetic neuropathy. The affected individual develops pain which may be worst at night, impaired or loss of sensation, disturbance in balance and coordination. The symptoms may be predominant in the distal part of the leg and hands which may progress later proximally. The Lower limb is likely to be affected first than the upper limb. Diabetic Peripheral neuropathy can also produce hyperalgesia. Chronic painful neuropathy symptoms may affect the individual's quality of life and can be a factor to induce stress, anxiety, depression and reduced mobility. [5] Sensorimotor neuropathy or distal symmetrical neuropathy is often termed based on their clinical appearance as a stocking-glove neuropathy and in this case, distal long nerves are affected first and later progress proximally [6].

Painful symptoms of Diabetic neuropathy is often resilient to medications. Analgesics and various other drugs are recommended to manage symptoms of pain, such as phenothiazine's, anticonvulsants, and tricyclic antidepressants, which might induce numerous adverse effects. Low-level laser therapy (LLLT), is a form of physiotherapy practice which is widely used for tissue healing, pain, and inflammation, and this therapy is classified in the group of "Other physical therapies in the management of diabetic peripheral neuropathy" [7].

Symptoms associated with early pathophysiological stages of Diabetic Sensorimotor Polyneuropathy can be measured using the Toronto Clinical Neuropathy Score because of its content validity and of construct validity towards nerve conduction velocity measures [8, 9]. The Toronto Clinical Neuropathy Score has been used widely in clinical trials because of its reliability, user-friendliness, and acceptability by patients and also essential for its ability to identify the intensity of clinical stages associated with Diabetic Sensorimotor Polyneuropathy and its progression [10].

The objective of the study is to find out the effectiveness of low-level laser therapy in the management of distal symmetrical diabetic neuropathy.

METHOD

The study was conducted in the Physiotherapy Out Patient Department of a private medical college teaching Hospital at Chennai. The study was approved by the Institutional Human Ethical Committee of the University. The participants were selected randomly and assigned to the groups based on a block randomization procedure. The materials required for conducting the study includes Tuning Fork, Reflex Hammer, 10gm Semmes Weinstein monofilaments, Goggles, and a LASER therapy unit. The Population who satisfy the selection criteria attending the outpatient department of the study centre were included in the study. They were grouped into two, one as control N=20 (Group-A) and the other as intervention group N=20 (Group-B). The selection criteria include Participants with known type2 diabetes mellitus with more than 10 years duration aged between 40-60 years, presenting with diabetic neuropathy symptoms based on the Toronto Clinical Neuropathy Score [11]. Population presenting with gangrene, unstable medical conditions (e.g., malignancy, active/untreated thyroid disease), and other neurologic problems that might interfere with the assessment of neuropathy, Metallic implants, Chronic Alcohol or illicit drug abuse were excluded from the study [12].

All participants were explained about the procedure and informed consent was obtained. The outcome measures used were Toronto clinical neuropathy score to measure the degree of neuropathy [6, 7] and Numerical Pain Rating Scale (NPRS) to measure pain [13]. Both outcome measures were tested by a clinical physiotherapist blinded to group allotment before and after an intervention.

Intervention:

The control group-A did not receive any Physiotherapy intervention, they received only standard drug routine as prescribed by the physician to alleviate the symptoms associated with Diabetic neuropathy. The interventional group-B received LLLT along with the standardized medications to alleviate the symptoms associated with Diabetic neuropathy. All the participants of the group-B were explained about the nature of the

treatment and need to wear goggles throughout the treatment to obviate any risk of accidental application of laser beam into the eye was informed. Laser apparatus is positioned and goggles were given to the patient. The patient is made to lie down in a comfortable position. Treatment area was cleaned with alcohol to remove any material that might absorb or reflect the radiation. The following parameters were used with laser source by a Gallium Arsenide: wavelength of 904 nm, the maximum power of 25 W, a pulse duration of 100 ns and frequency of 1,000 Hz. The treatment was for 4days/week for 5 weeks with an energy dose of 4 joules ^[14] for 60 sec. at each point. The therapy was applied by positioning the diode applicator with 1 cm² diameter and at four

located points along the sciatic nerve in each lower extremity. The Laser was kept in contact with the tissues and the beam was applied at right angles on treatment areas. Single point or spotting method of application was applied. Laser was spotted around the neck of the fibula just below the head of the fibula for common peroneal nerve, for deep peroneal nerve Laser was spotted between extensor hallucis longus and extensor digitorum longus, for posterior tibial nerve Laser was spotted just behind and distal to the medial malleolus, for superficial peroneal and Laser was spotted over lateral aspect of the Achilles tendon across the lateral malleolus and medial malleolus to the medial aspect of the Achilles tendon. The device is switched off before removing the applicator from the skin ^{[12], [15]}.

Clinical findings and Results:

Table -1:Pre-test & Post-test values comparison between Groups –A (Control group)

Group A		Mean	Standard deviation	t value	Significance
Toronto Clinical Neuropathy Scores	Pre-test	9.80	1.54	7.33	<0.05
	Post-test	8.25	1.21		
Numerical Pain Rating Scale	Pre-test	6.25	1.01	5.39	<0.05
	Post-test	5.15	0.81		

Table- 2: Pre-test & Post-test values comparison between Groups –B (Interventional group)

Group B		Mean	Standard deviation	t value	Significance
Toronto Clinical Neuropathy Scores	Pre test	10.10	1.51	15.67	<0.05
	Post test	6.30	1.59		
Numerical Pain Rating Scale	Pre test	6.30	0.86	7.05	<0.05
	Post test	3.90	1.25		

The student t-test is used for statistical analysis. From statistical analysis, the quantitative data revealed a statistically significant difference between the Group A & Group B, and also within the group. The post-test mean value of Toronto Clinical Neuropathy Score in Group A is 8.25 and in the Group, B is 6.30 this shows that Toronto Clinical Neuropathy Score in Group B

was comparatively significant than group A, P<0.05. The Post Test mean value of Numerical Pain Rating Scale in Group, A is 5.15 and in the Group, B is 3.90. This pain outcome results also proves that the mean score of Numerical Pain Rating Scale in Group B was comparatively significant than Group A, P<0.05.

Table- 3: Post-test values comparison between Groups A & B

The post-test measure of mean and standard deviation for Toronto Clinical Neuropathy Score, Numerical Pain Rating Scale in Group A and Group B in respect with 't' value (student 't' test)

Parameter	Post Test Values				't' test	Significance
	Group A		Group B			
	Mean	Standard deviation	Mean	Standard deviation		
Toronto Clinical Neuropathy Score	8.25	1.21	6.30	1.59	5.86	<0.05
Numerical Pain Rating Scale	5.15	0.81	3.90	1.25	3.74	<0.05

Statistical Analysis of Toronto Clinical Neuropathy Score and Numerical Pain Rating Scale post-test scores analyzed with unpaired t-test showed significant difference between Group A and Group B. The analyzed data reveals that the interventional group(A) had better recovery in pain and symptoms compared to control group(B).

DISCUSSION

The study results showed significant improvement with LLLT with 4 joules of irradiation, no significant adverse effects were reported in any of the groups. Therefore, LLLT could be offered safely to patients with diabetic neuropathy.

The Toronto clinical neuropathy scale and numerical rating scale was followed as outcome measures to analyze the alleviation of symptoms associated with distal symmetrical sensorimotor neuropathy. The outcome of the study proved a significant decline in symptoms and pain associated with diabetic neuropathy in all the participants.

Despite various pharmacological treatment approaches to manage the symptoms associated with diabetic neuropathy is available, the safety of long-term advocacy of drugs without side effects is arguable. Moreover, physical measures of treatment for this condition has a dearth in literature support and there is a lacuna in physiotherapy intervention for managing diabetic neuropathy. In this study, LLLT with a dosage of 4j/cm² was taken and studied for its significance in the selected population based on its proven neuro-regenerative effects.

Further multidimensional studies would be very beneficial since diabetes induced peripheral neuropathy is a condition involving multiple symptom which may affect autonomic function, sensation and motor function and future studies may direct towards functional outcome through this modality.

Anders et al. underwent study on Neuro regenerative and Neuroprotective effects of low-level laser and concluded that there is massive axonal sprouting and increase in various molecules such as growth associated protein – 43 (GAP- 43), calcitonin gene-related (CGRP) and transforming growth factors beta1. They concluded that laser irradiation activates the proliferation of the Schwann cells which will help in process of nerve regeneration.^[16]

Various other studies have also reported the effect of Laser irradiation in diabetic neuropathy and the physiological association related to its pathological changes provides evidence of laser irradiation facilitating collagen synthesis, altering DNA synthesis, and improving the function of degenerated neuron and also by facilitating ATP synthesis, improving serotonin and endorphins, promotion of anti-inflammatory mechanisms by reducing prostaglandin synthesis. This process of cellular alterations may also help tissue in improving local circulation, by reducing inflammation which in turn reduces pain^{[17], [18], [19]}

Peric et al^[11], and Zinman et al^[12] from their study results concluded that LLLT does not produce significant improvement in symptoms and pain associated with Diabetic polyneuropathy. In contrary this study

established a significant effect of LLLT on relieving symptoms and decreasing pain on distal symmetric polyneuropathy. In a study done by Enwemeka et al. reported that laser therapy was highly effective for tissue repair and pain relief^[20].

Morshedi et al. demonstrated that the low-level laser therapy is an effective mean of treatment for pain and inflammation to a target tissue without any adverse effects if the criteria of therapeutic parameters are followed appropriately^[21]. Similarly our study also did not show any adverse reactions to laser therapy. Considering the absence of any significant adverse event with LLLT, Further studies are needed to investigate the effect of LLLT on Distal Symmetric Polyneuropathy of varied sternness. One of the significant limitation of our study was small sample size and follow up. Upon further follow-up studies, LLLT can be a recommendable choice of modality in treating Distal Symmetric Polyneuropathy of diverse severity. Although this study demonstrated a significant improvement in pain and symptoms associated with diabetic neuropathy with low-level laser therapy, the observed trend warrants further investigation. The exact mechanism related to the progression of the condition is still debatable.

CONCLUSION

Results of the present study recommend Low-Level Laser Therapy as an effective treatment procedure for Diabetic sensorimotor Polyneuropathy in reducing Pain and relieving symptoms.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Obtained

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Expression of miR-21 and its Target Gene Bcl-2 in Oral Squamous Cell Carcinoma

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ABSTRACT

Cancer is the word that is scaring the humanity. With the increase in the consumption of tobacco and related products the incidence of Oral cancer is increasing globally. Late diagnosis, invasion and metastasis are factors that contribute to poor prognosis of oral cancer. Early diagnostic markers and targeted therapy are the need of the hour to reduce the morbidity and mortality caused owing to oral cancer. MicroRNAs are emerging biomarkers for both diagnosis and prognosis of various human cancers. The present study aimed at quantification of microRNA21 (miR-21) and expression of Bcl-2 in oral squamous cell carcinoma (OSCC) and their paired normal tissues. miR-21 was significantly upregulated in OSCC compared to its paired normals ($p < 0.00$). Increased expression of Bcl-2 was noted in miR-21 upregulated cases of oral squamous cell carcinoma. The expression of miR-21 was associated with tobacco use (smoking) and nodal metastasis. Our results suggest that miR-21 is upregulated in the OSCC and controls apoptosis by upregulating Bcl-2 gene thereby playing a major role in disease progression.

Keywords: MicroRNA, Oral cancer, Apoptosis, miR-21, qRT-PCR

INTRODUCTION

Oral cancer is a major health burden; ranking the third most common cancer in the Indian subcontinent, accounting for 30% of the global incidence of new cases per annum¹. Oral carcinoma includes the carcinomas of lip, oral cavity and oropharynx of which the oral squamous cell carcinoma(OSCC) accounts for 90% of cases². The highest risk factors of the disease include tobacco; in both smoking and smokeless forms, betel quid, areca nut and alcohol^{3,4}. Early diagnosis is still challenging in developing countries due to lack of awareness. Even with combined treatment modalities,

the five-year survival rate has remained less than 50% which can be attributed to the late diagnosis, disease spread and lack of molecular markers for early diagnosis and targeted therapies⁵.

MicroRNAs are small group of non-coding RNAs that possess the ability to regulate gene expression post transcriptionally. Though microRNAs do not code for proteins they control protein synthesis by pairing with the target mRNAs and affect the translation process. They simultaneously control hundreds of genes with their partial complementarity thereby influencing vital physiological processes from cell division to apoptosis^{6,7}. A wide range of studies have shown deregulation of microRNAs in cancer and their expression signatures are associated with tumor type, grade and clinical outcomes⁸. Located on chromosome 17q 23.2 MicroRNA 21 is a widely studied oncogenic RNA which targets various downstream regulators like Fas-L, PTEN, PDCD4, AKT, TPM1, BCL2, MMPS ETC that involve in carcinogenesis and its upregulation has been

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demonstrated in hematologic and solid malignancies. Furthermore, miR-21 resists anticancer drug therapy in pancreas, colon, lung and bladder cancer⁹. Having acquired the above knowledge, we evaluated the expression of miR-21 and its target gene Bcl-2 in OSCC with a motive to evolve a clinical biomarker for oral cancer.

MATERIALS AND METHOD

Patient and tissue Samples

The study was approved by the Institutional ethical committee [IEC-N1/12/MAR/27/10] before the commencement of sample collection. Twenty-five Tumor samples and paired normal tissue were collected from the patients during surgical removal of the lesion with prior informed consent. Tissues were immersed in RNAlater (Sigma Aldrich) and stored in -40°C until further PCR analysis. Remaining lesion was fixed in formalin and routinely processed and embedded in paraffin wax blocks for IHC staining. The clinic-pathological data was obtained from the medical records department. (Table 1)

Quantitative Reverse Transcription PCR

The tissues were homogenized with 1ml of trizol (Invitrogen) and the total RNA extracted was quantified using Nano Drop 2000 Spectrophotometer (ThermoScientific). cDNA was synthesized from 1µg of total RNA using stem loop RT primers with primescript RT kit (Takara Bio Inc-Japan). The PCR amplification was performed using the Applied Biosystems 7500 Real-Time PCR Detection System according to the manufacturer's instructions. Primers for mir21 was 5'-UAGCUUAUCAGACUGAUGUUGA-3'. U6(snRNA) was used as reference gene for normalization. Results were expressed as mean and standard deviation. Standard curves were generated and the relative amount of miR-21 was normalized to U6 snRNA. We analyzed the expression levels of miR-21 in Oral cancer tissues relative to non-tumor controls using the 2- $\Delta\Delta C_t$ method (Livak method). When the fold value was >1, there was an increased expression of miR-21 in the cancer tissues compared to their non-tumorous counterparts.

Immunohistochemistry

The tissue sections were deparaffinized in xylene and dehydration in a series of absolute alcohol each for 5 min. Peroxide block (Biogenex life sciences Pvt Ltd)

was used to block endogenous peroxide and antigen was retrieved using pressure cooker. The Sections were incubated with rabbit monoclonal antiBcl-2 primary antibody (clone-100) (Biogenex life sciences Pvt Ltd) for 45 mins at 25°C followed by secondary antibody for 30 minutes. Subsequently the sections were washed, stained with DAB chromogen, counterstained with Harris hematoxylin, dried and mounted with DPX. Tonsil tissue sections were used as positive control. An internal negative control was used to validate the staining.

In the Bcl2 positive cells the antibody stained the cytoplasm brown against a blue background. The staining was scored as 0 (negative staining), 1+ (mild), 2+ (moderate) and 3+(intense). The slides were scored by two pathologist and H (Histo) score was calculated for all the sections¹⁰.

Statistical Analysis

All the statistical analysis was performed using SPSS software version 17.0. The values were represented as mean and standard deviation. Correlation between miR-21 expression and the clinic-pathological features was analyzed using chi-square test. The interobserver variation was calculated with Cohen's kappa coefficient. Kruskal-Wallis Test was performed to calculate the fold change in microRNA expression. A p-value less than 0.05 was considered statistically significant.

RESULTS

Expression of miR-21 in OSCC patient

Only 23/25 samples were quantified by PCR analysis. 2 samples did not work even after multiple trials. The study results showed a significant upregulation ($p < 0.00$) of miR-21 in OSCC tissues relative to its adjacent normal samples. With a relatively stable expression of miR-21 in the paired normal tissue, a mean fold change of 17.39 was noted in its expression in the OSCC samples ($p < 0.000$). (Figure 1)

Immunohistochemistry

Bcl-2 expression was higher in tumor tissues compared to normal ($p < 0.02$). About 92.3% of miR-21 upregulated cases showed a positive expression for Bcl-2 with a highly significant miR-21/ Bcl-2 ratio ($p < 0.000$). Though 40% of normal tissues were positive for Bcl2 only the basal cells of the epithelium showed the expression of the protein. (Figure 2) The interobserver

variation or the measurement of agreement (kappa score- 0.828 & 0.940) between the observes was statistically analyzed and was highly significant (p < 0.000)

Association of mirR-21 and Bcl-2 expression and clinical features:

We also analyzed the association between miR-21 and Bcl-2 expression with the clinico-pathological parameters. The mean age of the samples was 55.16 years with 19 males and 6 females. A significant upregulation of miR-21 was noted among men (76.5%) compared to women (p < 0.001) and miR-21 expression was strongly associated with smoking (p < 0.001). Though it was not statistically significant it was observed that patients with moderately differently OSCC(MDOSCC) exhibited higher expression of miR-21(77.8%) compared to other grades of tumor. upregulation of miR-21 was noted in tumors with nodal metastasis (p < 0.007). Expression of Bcl-2 was higher in men (73.7%) (p < 0.01) and smokers (91.7%) (p < 0.002) and increased significantly with increasing grade of nodal metastasis (p < 0.006). There was no correlation between the age, tumor site, tumor size and tumor grade with the Bcl-2 expression. (Table2)

Table 1. Clinicopathologic characteristics in Oral SCC patients (N= 25)

Characteristics	N(%)
Age in years	55.16 (mean)
< =40	3
41- 60	12
>60	10
Gender	

Cont.. Table 1.

Male	19(76)
Female	6 (24)
Location	
Buccal mucosa	12(48)
Tongue	7(28)
Lip	2(8)
Alveolus	3(12)
Floor of mouth	1(4)
Smoking	
Positive	12(48)
Negative	13(52)
Tumor size	
T1	12(48)
T2	11(44)
T3	0(0)
T4	2(8)
Nodal status	
N	7(28)
N1	12(48)
N2	6(24)
Tumor grade	
WDOSCC	14(56)
MDOSCC	9(36)
PDOSCC	2(8)

Abbreviations: WDOSCC- Well differentiated squamous cell carcinoma, MDOSCC- Moderately differentiated squamous cell carcinoma, PDOSCC- Poorly differentiated squamous cell carcinoma.

Table 2 : Clinicopathologic comparison of miR-21 and Bcl-2 expression in OSCC

Characteristics	N=23	miR-21			P-value	N=25	Bcl-2		P-value
		Upregulated	Downregulated	Equal			Positive	Negative	
Age in years					0.816			0.517	
< = 40	3	1(33.3%)	1(33.3%)	1(33.3%)		3	1(33.3%)		2(66.7%)
41 - 60	11	7(63.6%)	3(27.3%)	1(9.1%)		12	7(58.3%)		5(41.7%)
> 60	9	5(55.6%)	3(33.3%)	1(11.1%)		10	7(70%)	3(30%)	
Gender					0.001*			0.01*	
Male	17	13(76.4)	4(23.6)	0(0%)		19	14(73.7%)		5(26.3%)
Female	6	0(0%)	3(50%)	3(50%)		6	1(16.7%)		5(83.3%)

Cont... Table 2 : Clinicopathologic comparison of miR-21 and Bcl-2 expression in OSCC

Location									
Buccal mucosa	11	7(63.6%)	2(18.2%)	2(18.2%)	0.367	12	9(75%)	3(25%)	0.222
Tongue	6	4(66.7%)	1(16.7%)	1(16.7%)		7	4(57.1%)	3(42.9%)	
Lip	2	0(0%)	2(100%)	0(0%)		2	0(0%)	2(100%)	
Alveolus	3	1(33.3%)	2(66.7%)	0(0%)		3	1(33.3%)	2(66.7%)	
Floor of mouth	1	1(100%)	0(0%)	0(0%)		1	1(100%)	0(0%)	
Smoking									
Positive	10	10(100%)	0(0%)	0(0%)	0.001*	12	11(91.7%)	1(8.3%)	0.002*
Negative	13	3(23.1%)	7(53.8%)	3(23.1%)		13	4(30.8%)	9(69.2%)	
Tumor size									
T1	11	3(27.35)	5(45.5%)	3(27.35)	0.79	12	5(41.7%)	7(58.3%)	0.153
T2	10	8(80%)	2(20%)	0(0%)		11	8(72.7%)	3(27.3%)	
T4	2	2(100%)	0(0%)	0(0%)		2	2(100%)	0(0%)	
Nodal status									
N0	7	0(0%)	5(71.4%)	2(28.6%)	0.007*	7	1(14.3%)	6(85.7%)	0.006*
N1	11	8(72.7%)	2(18.2%)	1(9.1%)		12	8(66.7%)	4(33.3%)	
N2	5	5(100%)	0(0%)	0(0%)		6	6	0(0%)	
Tumor grade									
WDOSCC	12	4(33.3%)	5(41.7%)	3(25.0%)	0.159	14	7(50%)	7(50%)	0.353
MDOSCC	9	7(77.8%)	2(22.2%)	0(0%)		9	6(66.7%)	3(33.3%)	
PDOSCC	2	2(100%)	0(0%)	0(0%)		2	2(100%)	0(0%)	

* 23/25 cases only worked for PCR analysis. p values were calculated by Pearson chi square test and are charted out in the table. P value < 0.05 is considered statistically significant.

Fold change - miR-21

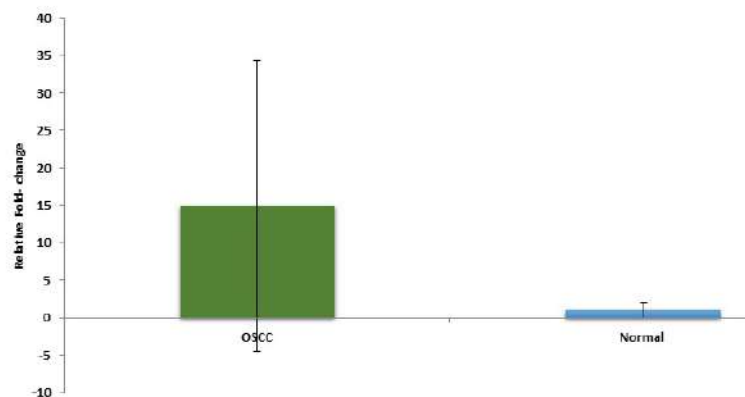


Figure1: RT-qPCR of miR-21 expression depicting Fold change of miR-21 in OSCC compared to its adjacent normal tissues

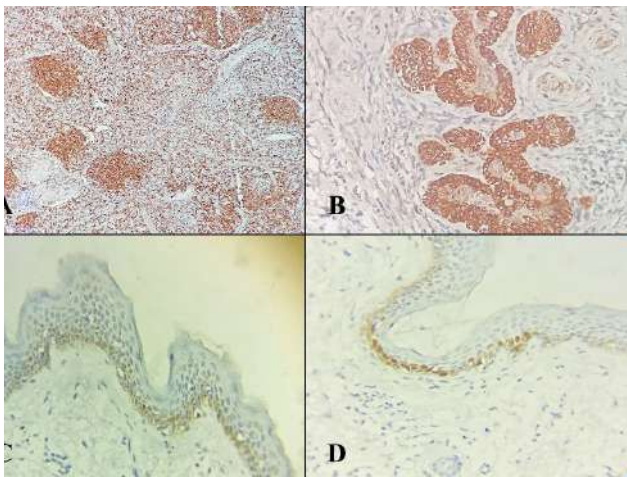


Figure 2: (A) Section showing Positive staining of Bcl-2 in tonsil tissue (positive control) (10XVIEW: IHC), (B) Intense staining of Bcl-2 in dysplastic islands of OSCC. (C & D) Mild and moderate staining of Bcl-2 in the basal cell of the Normal oral epithelium (20XVIEW: IHC)

DISCUSSION

MicroRNAs are novel gene regulators that play major role in development and physiology¹¹. Studies have shown that miR-21 is significantly upregulated in head and neck cancers and is associated with disease progression and patient survival¹². In this study we analyzed the expression of miR-21 in OSCC and found that it is significantly overexpressed in tumors compared to its paired normal proving a possible role played in the initiation of the disease. A similar study conducted on laryngeal SCC published results which demonstrated a significantly higher expression of miR-21 in cancer tissues than the normal tissue which was consistent with our data¹³. miR-21 was 17.39 fold elevated in OSCC than its paired normal in our study. This value is intermediate between 8.29-fold and 37.89-fold elevation in early and advance tongue SCC as reported by Li et al¹⁴.

Current Study results showed that 100% of the smokers had a higher miR-21 expression when compared to the patients who did not smoke. Smoking tobacco is one of the major risk factors for OSCC and recent study by Zhang et al has demonstrated a nicotine induced upregulation of miR-21 in esophageal cell line by targeting the EMT transforming growth factor beta (TGF- β)¹⁵. Thus it can be hypothesized that upregulation of miR-21 could be one of the process by which tobacco initiates oral carcinogenesis. In addition to tumor initiation, miR-21 plays a vital role in cancer cell migration, invasion and lymph node metastasis¹⁶. Our study showed that patients with lymph node metastasis exhibited higher expression of miR-21 suggesting that

miR-21 is related to cancer progression as demonstrated by Li et al in tongue Squamous cell carcinoma. Over-expression of miR-21 promoted proliferation, migration, and invasion of colorectal cancer cells which could be the justification for increased lymph node metastasis in miR-21 upregulated cases of our study¹⁷. In relation to the grade of the tumor and microRNA expression, it was found that the miR-21 expression was higher in MDOSCC and PDOSCC whereas WDOSCC cases showed comparatively low expression of miR-21. This kind of expression pattern suggests the role of miR-21 in the progression of the disease and eventually poor prognosis.

Evasion of apoptosis aids in cancer cell survival. Upregulation of miR-21 is indirectly involved in apoptosis by regulating the genes that are responsible for these processes in a variety of tumors¹⁸. Knockdown of miR-21 in glioblastoma cells triggered an increase in apoptotic cell death, suggesting that miR-21 acts as an anti-apoptotic factor¹⁹. Bcl-2 is a gene that codes for a specific protein that inhibits apoptosis. Our results showed an increased expression of Bcl-2 (60%) in OSCC compared to the paired normal tissue (48%). About 90% of the miR-21 upregulated cases showed positive expression for Bcl-2 which proves an association between the genes. MicroRNA 21 upregulation increased the expression of Bcl-2 and miR-21 knockdown induced apoptotic cell death in lung Squamous cell carcinoma cells²⁰. Inhibition of miR-21 resulted in significantly lower levels of Bcl-2 protein in human gastric and pancreatic adenocarcinoma cells^{21,22}. Our study proves that Bcl2 is a direct target for miR-21. These data suggest that miR-21 exerts a potential role in oral carcinogenesis

CONCLUSION

In conclusion, miR-21 promotes oncogenesis and is overexpressed in oral squamous cell carcinoma tissues compared to their adjacent normal tissue. Increased expression of anti-apoptotic gene Bcl-2 is noted in miR-21 upregulated cancer tissues suggesting its possible role in evading apoptosis thereby favoring cancer progression. Higher lymph node metastasis in miR-21 positive cases addresses the role of this microRNA in tumor invasion and metastasis. Therefore, miR-21 can be considered as important clinical biomarkers for OSCC and their implications in targeted therapies is a new avenue for Oral cancer research.

Conflict of interest – None

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Ethical Clearance – Ethical clearance was obtained from the IEC.

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Consumer Trust in E-Commerce Transaction in Delhi

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ABSTRACT

Online Shopping in India is an emerging trend for marketers for promoting their merchandise in a wide geographical area using the Internet. India acquired 283.8 million Internet users by 2017. India is now the third largest Internet user after the U.S. and China. Lack of trust is the biggest obstacle to the success of online shopping. The present study focused upon the relationship of trust antecedents with consumer trust and consumer trust with online shopping activities with the help of cross-sectional survey conducted in Delhi. Structural equation modeling (SEM) was used to achieve the results of this research. The results revealed that knowledge and privacy protection did not have a significant relationship with consumer trust. The results revealed that security protection, perceived risk, and perceived benefits are very important antecedents for building trust among the consumers towards online shopping. Consumer trust was found to have a significant relationship with online shopping activities. Finally, some useful implications have been offered for the marketers at the end.

Keywords: Online shopping, privacy, security, risk, and online trust.

INTRODUCTION

Online shopping has become very popular for the consumers. This is the new and innovative pattern of shopping. It is not only provides a wide range of products to the consumers, but it also offers a huge market and business opportunities. In the past 05 years, there has been rapid expansion of the Internet and huge growth of Internet users.

Review of Literature

(1) Internet in India: The Internet performs an imperative role in enhancing the level of convenience and novelty. The application of the Internet is boosted significantly due to the speed and level of comfort. It has gained importance as a way of marketing and promotion. It provides a common platform of business transactions for sellers and buyers (Joshi & Achuthan, 2016)¹. This has given a new dimension to marketing. India gained 290 .8 million Internet users by 2017. India is now the third largest Internet user after the U.S. and China.

(2) Online Shopping: Online shopping is a form of electronic commerce in which a customer buys a products or service by using the Internet instead of going to a traditional brick and mortar store. E-web store,

e-shop, Internet shop, online stores are the alternative names of online shopping (Padmanabh, Jeevanda, & Jose, 2016) ²

Online shopping becomes popular during the Internet boom in 1999-2000. Amazon.com is the first online bookstore. It was founded by Jeff Bezos and created a history by becoming the first bookstore with presence only on the Internet. In India, online transactions are only 8%; whereas, internationally, it is 18%. Hence, there is a lot of potential for the growth of online shopping; 8 million Indians are shopped online in 2018 (Chellappa, R.K. & Pavlou, P.A, 2012)³

OBJECTIVES OF THE STUDY

To examine the relationship between knowledge, privacy protection, security, protection, and trust in online shopping.

To ascertain the relationship between perceived risk, perceived benefits, and trust in online shopping.

To examine the influence of consumer trust on online shopping activities.

To develop and validate a comprehensive model on

consumer trust in online shopping activities

Hypothesis of the Study:

H1: Knowledge is positively associated with consumer trust in online shopping.

H2: Privacy protection is positively associated with consumer trust in online shopping.

H3: Security protection is positively associated with consumer trust in online shopping.

H4: Perceived risk has a significant relationship with consumer trust in online shopping.

H5: Perceived benefits have a significant relationship with consumer trust in online shopping.

H6: Consumer trust in online shopping is positively associated with online shopping activities.

Research Methodology and Data Collection

To test the theoretical framework, we examined the influence of trust on online shopping activities. The research participants were online shoppers of Delhi. The research study follows the descriptive research design. A thorough literature review has been done on online shopping in order to identify the antecedents of consumer trust in online shopping. A sample of 300 respondents participated in the study. A well structured and undisguised questionnaire was used for primary data collection. The respondents were requested to assign ratings on a 5-point likert scale from 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree. A total of 400 responses were received. After eliminating incomplete and inappropriate responses, a total of 300 usable responses were included in the sample

Table 1. Discriminant Validity

Constructs	Knowledge	Privacy Protection	Security Protection	Perceived Risk	Perceived Benefits	Consumer Trust	Online Shopping Activities
Knowledge	0.80	0.071	0.297	0.194	0.061	0.244	0.036
Privacy Protection		0.56	0.154	0.244	0.037	0.089	0.187
Security Protection			0.70	0.532	0.129	0.272	0.329
Perceived Risk				0.65	0.298	0.266	0.251
Perceived Benefits					0.84	0.228	0.074
Consumer Trust						0.92	0.089
Online Shopping Activities							0.89

for construction validation and hypotheses testing.

Reliabilities and Validation: This study measures the seven constructs including knowledge, privacy protection, security protection, perceived risk, perceived benefits, consumer trust, and online shopping activities.

Reliability: Cronbach's alpha value was calculated in order to measure the reliability of these constructs. The Cronbach's alpha of knowledge, privacy protection, security protection, perceived risk, perceived benefits, consumer trust, and online shopping activities are 0.793, 0.789, 0.883, 0.874, 0.938, 0.899, and 0.929, respectively. The construct reliabilities are all within the accepted range, exceeding 0.70.

Content Validity: To ensure content validity, a thorough review of the literature on the subject of the study was conducted. The questionnaire was also pilot tested by expert's review, after which necessary changes were made to improve both content and clarity of the questionnaire.

Construct Validity: Construct validity was examined by assessing convergent validity and discriminant validity. Convergent validity is considered acceptable when all item loadings are greater than 0.50. The cumulative percentage of variance explained by each factor was greater than 63% for all constructs.

Discriminant Validity: The average variance extracted (AVE) can also be used to evaluate discriminant validity. Discriminant validity is checked by examining whether the correlations between the variables are lower than square root of the average variance extracted. All square roots of each AVE value are greater than the off diagonal elements as indicated in the Table 1. It indicates discriminant validity among variables.

Data Analysis and Results

To test the proposed research model, and for the data analysis of both the measurement model and structural model, we used structural equation modeling (SEM). AMOS analyzes structural equation models, including measurement and structural models with multi item variables.

(1) Demographic Profile of the Respondents:

The profile of the respondents is shown in the Table 2. A judgmental sample of 300 respondents was surveyed and their demographics comprised of the following:

Gender Wise: Male respondents: 166 (55%) and female respondents: 134 (45%). Mean is 1.45 and the standard deviation is 0.498.

Age Group Wise: 17-25 years: 64 respondents (21%); 26-35 years: 113 respondents (38%); 36-45 years: 77 respondents (26%); and 45 & above years: 46 respondents (15%). The mean is 2.35 and standard deviation is 0.982.

Occupation Wise: Employees: 95 respondents (32%); Business owners: 111 respondents (37%); Students: 43 respondents (14%); and other occupations: 51 respondents (17%). The mean is 2.17 and the standard deviation is 1.056.

Income Wise (in INR): Below 4 lakhs: 94 respondents (32%); 4-8 lakhs: 91 respondents (30%); 8-12 lakhs: 75 respondents (25%); and 12 lakhs & above category: 40 respondents (13%). The mean is 2.2 and the standard deviation is 1.029. The demographic profile of the respondents is summarized in the Table 2.

Table 2. Demographic Profile of the Respondents.

Categories	Sub categories	Frequency	% age	Mean	Standard Deviation
Gender	Male	166	55	1.45	0.498
	Female	134	45		
	Total	300	100		
Age	17-25 yrs	64	21	2.35	0.982
	26-35 yrs	113	38		
	36-45 yrs	77	26		
	45 & above	46	15		
	Total	300	100		
Occupation	Employee	95	32	2.17	1.056
	Business owner	111	37		
	Student	43	14		
	Other	51	17		
	Total	300	100		
Income	Below 4 lac	94	32	2.2	1.029
	4-8 lac	91	30		
	8-12 lac	75	25		
	12 & above	40	13		
	Total	300	100		

(2) Structural Equation Modeling (SEM):

The study developed a theoretical model to study the influence of consumer trust on online shopping activities in Delhi. To confirm whether the following constructs: Knowledge, privacy protection, security protection, perceived risk, and perceived benefits measure consumer trust and consumer trust measures online shopping activities or not, confirmatory factor analysis was used. Confirmatory factor analysis (CFA) was conducted by using AMOS Statistical Software Package version 18. The method adopted in CFA was maximum likelihood extraction to estimate the CFA model. Various goodness-of-fit measures can be produced by CFA by which a model can be evaluated. CFA is the base of measurement modeling in SEM.

(i) Measurement Model:

The present model examines the various relationships among the measures of constructs including: knowledge, privacy protection, security protection, perceived risk, perceived benefits, trust, and online shopping activities. The value of chi square, degree of freedom, Normed chi square, and other model fit indices including: RMR (root mean residual), GFI (goodness of fit index), AGFI (adjusted goodness of fit index), CFI (comparative fit index), and RMSEA (root mean square error of approximation) are calculated.

The values of RMR, GFI, CFI, and RMSEA are

close to the threshold level. The value of RMR (0.057) is close to 0. The values of GFI (0.755), CFI (0.820), and RMSEA (0.104) reach the cut off criterion. The Normed chi square value is close to the threshold level, but is not satisfactory, and the p-value (0.000) shows the significance. These model fit indices are very important to be taken into consideration because based on these model fit indices values, we were able to ascertain whether the model is fit or not. These values can be improved. Therefore, it leads to another modification of the measurement model.

Further validation of the measurement model was done with the following constructs: Knowledge, privacy protection, security protection, perceived risk, perceived benefits, consumer trust, and online shopping activities. One item of knowledge (K2) has low regression weight less than 0.5. This item is deleted from the model. All the remaining items have regression weight less than 0.5. This item is deleted from the model. All the remaining items have regression weight more than 0.5, so there is need to delete only one item.

The Table 3 shows the values of RMR, GFI, AGFI, RMSEA, and Normed chi-square that are essential to check the model fit. There are different cut off criteria for each value. The model comprising the measurement items shows adequate fit – RMR (0.058) close to 0, CFI (0.823), and RMSEA (0.107).

Table 3. Fit indices of Multiple Group CFA Analysis for the Measurement Model

GOF Index/Absolute Measure	Measurement Model 1	Measurement Model 2
χ^2 (chi-square)	1396.835	1338.394
Degree of Freedom	329	303
Probability	0.000	0.000
GFI	0.755	0.755
RMSEA	0.104	0.107
RMR	0.057	0.058
Normed chi-square (χ^2/df)	4.24	4.41
Incremental fit Measures/CFI	0.820	0.823
Parsimony Measures/AGFI	0.698	0.694

There are small changes that occur in the values because only one item was deleted from the model; otherwise, all the values reached the cut off criteria and are significant at p-value. Next was to evaluate the psychometric properties of the model in terms of reliability, convergent validity, and discriminant validity. The AVE value is 0.5, which meets the cut-off criterion.

(ii) Structural Model: Once the validity of the measurement model has been done, then we moved to ascertain the validity of the structural model. Structural theory explains the transition from the measurement model to the structural model in a series of relationships among constructs.

The structural model examines the specifying relationship of the constructs and the nature of each relationship. The relationship between the different variables is represented by a two-headed arrow, but in the structural model, it shows a dependence relationship and a single headed arrow represents it. After employing structural equation modeling (SEM), we need to confirm

the relationship between knowledge, security protection, privacy protection, perceived risk, and perceived benefits with consumer trust.

The preliminary analysis of the structural model was tested upon with the final items of the measurement model II. Knowledge, privacy protection, security protection, perceived risk, and perceived benefits are in a relationship with each other. This is shown by covariances between them. This leads to consumer trust and consumer trust further leads to online shopping activities. The model was tested like this for achieving different model fit indices.

Table 4. Fit indices of Multiple Group CFA Analysis for the Measurement Model

GOF Index/Absolute Measures	Measurement Model 1	Measurement Model 2
χ^2 (Chi-square)	1484.083	819.938
Degree of Freedom	309	215
Probability	0.00*	0.000*
GFI	0.738	0.825
RMSEA	0.113	0.097
RMR	0.106	0.085
Normed chi-square(χ^2/df)	4.8	3.6
Incremental fit Measures/CFI	0.799	0.859
Parsimony Measures/AGFI	0.680	0.694

*5% Level of Significance

The Table 4 shows the parameters, which are considered in declaring the overall model, fit. The values of the parameters are close to the threshold levels. The values of chi square, degree of freedom, Normed chi-square, and other model fit indices including: goodness of fit index (GFI), adjusted goodness of fit index (AGFI), root mean residual (RMR), comparative fit index (CFI), and root mean square error of approximation (RMSEA) are examined. It can be seen from the Table 4 that the values of RMR, GFI, and RMSEA are close to the threshold level and the p-value (0.000) shows significance at the 5% level.

However, the other fit indices could not close enough to conclude the fitness of the model. Hence, the above values can be modified to re-specify the above

model. Where RMR is close to 0, RMSEA is less than 1, and the Normed chi-square value should be near to 3, but the Normed chi square value is 3.6, which is very close to the threshold level, and which is significant at p-value (0.000). All other model fit indices are also very close to the threshold level and thus, they represent a moderate fit and are significant. The factors loading along with reliability are very high for all the constructs.

DISCUSSION

This study proposed six hypotheses. The H1, H2, and H3 hypotheses help to achieve the first objective of the study, that is, to examine the relationship between knowledge, privacy protection, security protections, and consumer trust in online shopping. H1 helps to examine the relationship between knowledge and trust in online

shopping; H2 helps to examine the relationship between privacy protection and trust in online shopping; and H3 helps to examine the relationship between security protection and trust in online shopping. The results reveal that H1 is rejected, which implies that knowledge is not positively associated with trust in online shopping. Next, H3 is accepted, which implies that security protection is positively associated with trust in online shopping.

The hypotheses H4 and H5 helps us to achieve the second objective, that is, to examine the relationship between perceived risk, perceived benefits, and trust in online shopping. The hypothesis H4 supports that perceived risk has a significant relationship with consumer trust in online shopping. Hypothesis H5 supports that perceived benefits have a significant relationship with trust in online shopping.

The last and the sixth hypothesis, H6 helps us to achieve the third objective, that is, to examine the relationship of consumer trust with online shopping activities. The results of this study show that trust is positively associated with online shopping activities. The last objective to examine the influence of consumer trust on online shopping activities is fulfilled by the R-square value.

CONCLUSION

The results reveal that knowledge and privacy protection are not positively associated with consumer trust. It means there is no effect of knowledge and privacy protections on the consumers' trust. Security protection is positively associated with trust with intention to increase online shopping Activities; perceived risk has a significant relationship with consumer trust in online shopping; perceived benefits are also found to have a significant relationship with trust in online shopping; and consumer trust is positively associated with online shopping activities. Thus, the model and results have many important implications for merchants who wish to build their online businesses by increasing consumer trust.

Managerial Implications

Online vendors can distribute free samples or free subscription for the online shoppers to test their products or services.

The research findings provide data to the marketers about the importance of perceived risk in online shopping.

Security protection is importance to build consumer trust in online shopping.

Managing online customer reviews and feedback are another way to build trust among the customers.

After sales services to the customers can lead to the formation of a magical relationship with customers.

Conflict of Interest: Authors declare no conflict of interest.

Source of Funding: Self

Ethical Clearance: I testify that my article submitted has not published elsewhere and I actively involved in substantive completion of paper.

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Knowledge and Awareness of Handling Methyl Methacrylate Monomer among Undergraduate Dental Students

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ABSTRACT

Objective: Methyl methacrylate (MMA) monomer is one of the most widely used chemical in the dental laboratory and handled frequently by dental students. This study was done to assess the knowledge, awareness and handling practices of MMA among the undergraduate dental students of the Faculty of Dentistry, Melaka Manipal Medical College and Manipal College of Dental Sciences, Manipal of Manipal Academy of Higher Education, Manipal.

Methodology: The study sample comprised of 273 dental students. A validated questionnaire with questions pertaining to the knowledge about MMA, facilities of the lab where MMA is handled, personal protective aid to be used while manipulating MMA and any history of allergic experience was distributed among the students. Frequency of response to individual question in the questionnaire was analysed.

Results: 81.2% of the students who participated in the study were aware of the allergic potential of MMA and 89.8% were aware of its highly inflammable nature however, 92.7% were not aware of its neurotoxicity. 64% of the participants were aware of the ventilation system in the lab. 60.4% were aware of the proper storage method and 30.7% of proper disposal technique. More than half of the subjects used safety goggles (62.6%) and gloves (53.4%); but less than half of them used lab coat (21.9%) and mask (29.6%) while handling MMA and 71% of them changed the gloves every day.

Conclusion: Most of the students were aware of the facilities available in their laboratory, protective equipment required while handling and proper storage method of MMA. However, dental students need to enhance their knowledge of Methyl Methacrylate (MMA) in terms of its route of exposure, local and systemic side effects and proper disposal methods.

Keywords: Methyl methacrylate, MMA, protective equipment, dental laboratory,

INTRODUCTION

Acrylic resin is used for a variety of applications in dental laboratories. Its major use is in the fabrication of complete or partial dentures. Acrylic resin is

supplied in a variety of forms, such as powder: liquid, gels, and sheets. The powder-liquid system of methyl methacrylate (MMA) is the most common form used in dental laboratories¹. The liquid monomer is a clear, colourless, and flammable chemical and has strong odour described as acrid or pungent². MMA has been reported as a lung, skin, and eye irritant³, and causes mild axonal degeneration of digital nerves when handled with bare hands before polymerization⁴. In animal studies, after chronic oral exposure to high concentrations of MMA monomer systemic effects, including damage to the central nervous system and liver have been noted⁵. In the

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dental laboratory setup, the primary route of exposure of MMA is inhalation⁶.

The toxicity of MMA has been largely studied. However, not many studies have been conducted to assess the knowledge and awareness of handling Methyl methacrylate monomer among dental students. The aim of this study was to thus to assess the awareness and handling practices of acrylic resin among dental students of Melaka Manipal Medical College and Manipal College of Dental Sciences, Manipal.

MATERIAL AND METHOD

A descriptive cross-sectional study was conducted

with the help of a validated questionnaire among the undergraduate dental students of Melaka Manipal Medical College and Manipal College of Dental Sciences, Manipal. The study was conducted among 273 dental students. Institutional ethical committee clearance was obtained for the same. An informed consent was taken from the students involved in the study. A validated questionnaire was prepared with questions pertaining to the knowledge of MMA, facilities of the lab where MMA is handled, personal protective aid to be used during the manipulation of MMA and any history of allergic experience which was then distributed among the students. Frequency of response to individual questions in the questionnaire was analysed.

FINDINGS (RESULTS & DISCUSSION):

Results:

Demography:

Among the 273 participants 76.2% (no=208) were female and 23.8% (no=65) were male.

Table 1 : Knowledge and awareness of handling Methyl methacrylate monomer

Questions pertaining to Methyl methacrylate (MMA)	Percentage of participants who gave the right response (n= 273)
Inflammable nature of MMA	89.8
Primary route of exposure (Inhalation)	55
Maximum threshold level in air (100 ppm)	48.3
Half-life of MMA in blood (10-15 hours)	52.01
Allergic nature of MMA	81.2
Neurotoxicity	7.3
Penetrates latex gloves	50.1
Storage method of MMA	64.4
Proper disposal method	37.3
Trimming of acrylic prosthesis releases monomer vapor	68.8
Presence of fire extinguisher in the lab	67.3
Presence of first aid kit in the lab	59.3
Presence of eye wash station	67.3

Knowledge on MMA (Table 1):

89.8% (no=245) of the study group were aware of its highly inflammable nature. 45% of them did not have any prior knowledge of its primary route of exposure. The accepted maximum threshold level for MMA is 100 ppm and 48.3% (no=132) of them were aware of the

same. 52.01% (n=142) participants had prior knowledge of the half-life of MMA in blood which is about 10-15 hours.

81.2% (no=222) were aware of the allergic nature of

MMA however, 92.7% (no=253) were not aware of its neurotoxicity. Majority of the participants were aware of the proper storage methods which is in a tightly closed 64.4% (no=176) amber coloured bottle 60.4% (no=165). 37.3% (no=102) aware of proper disposal method which is atomizing in a combustion chamber. 68.8% of the participants knew that monomers vapours are released during trimming of acrylic prosthesis.

Awareness of the facilities in the laboratory (Table 1):

Dental labs have windows for ventilation, but about 46% (no=126) of the participants were aware of the same.

All the dental labs have emergency facilities in the form of Fire extinguisher, First aid kit and eye wash station. 67.3 (no=184) were aware of the presence of Fire extinguisher, 59.3 (no=162) were aware of the presence of First aid kit and 67.3 (no=184) aware of the eye wash station inside the lab.

Use of personal protective aids (Table 2):

Safety goggles, Mask, Gloves and Laboratory coat are the protective aids that can be used while handling MMA. 62.6% of the total participants used safety goggles, 53.4% of them used gloves, 21.9% used lab coat and 29.6% used masks while handling MMA.

Among the personal protective equipment, 71% of them changed their gloves every day, 6.9 % once a week, 4.76% once a month and 15.3% changed it at a frequency other than the ones mentioned above. Masks were changed by 68.8% of the participants on a daily basis.

Table 2: Use of personal protective aids among dental students

Protective aids	Participants (%age)
Goggles	62.6
Gloves	53.4
Mouth masks	29.6
Lab coat	21.9

History of allergic reaction:

A small percentage of the participants (16.11%) experienced allergic reaction like irritation and skin

rashes. None of the participants had experienced any systemic effect.

DISCUSSION

Methyl Methacrylate monomer is highly inflammable and has to be handled carefully. The laboratories where MMA is handled should be equipped with appropriate fire and safety measures. In the present study, majority of the participants were aware of the fact that MMA monomer is highly inflammable in nature. The dental students should be sensitized regarding the basic fire safety procedures such as operating a fire extinguisher. Emergency contact numbers should be displayed in the right area and fire evacuation drills should be regularly conducted in order to tackle a fire in laboratory.

Safety goggles, Mouth mask, Gloves and Laboratory coat are the basic protective aids that can be used while handling MMA⁷. Approximately half the students were using safety goggles and mouth mask, but only one fourth of them were using lab coat and latex gloves. Since the primary route of exposure of MMA is inhalation, followed by direct skin contact, dental students should be advised to wear mouth masks and Polyvinyl alcohol gloves or butyl rubber gloves while handling MMA. Latex gloves are not advisable for use as monomer can penetrate it. Allergic reaction such as irritation and skin rashes were experienced by a very small proportion of the participants of this study. The use of personal protective equipment can help avoid the occurrence of allergic reactions by protection from exposure.

MMA monomer should be stored in tightly closed amber colour bottles to avoid unwanted polymerization and three fourth of the subjects knew this fact⁸. Accepted maximum threshold level for MMA in air is 100 ppm⁷ and thus is mandatory to have proper ventilation to reduce the level of MMA in the laboratory.

MMA can cause local effects such as skin rashes to severe systemic effect like neuro- toxicity. Thus, students should take measures to reduce the exposure to MMA by using personal protective aids and work in a well-ventilated setup. In this study majority of the participants were aware of the local allergic nature of MMA but not aware of its neurotoxicity.

In case of exposure to MMA the first aid procedures include the following:

If inhaled, move person into fresh air; In case of skin contact, wash off with soap and plenty of water. In case of eye contact, flush eyes with water as a precaution; If swallowed, Do NOT induce vomiting. Nothing should be administered orally to an unconscious person. Rinse mouth with water and consult a physician⁹.

In case of spillage appropriate personal protective equipment should be used and the material that has spilt over should be absorbed onto sand or vermiculite; any source of ignition must be removed from the proximity of the spill. The absorbed material must be scooped and collected in a plastic bag which is further placed into another plastic bag for double protection later to be delivered to the next chemical waste pick-up. The disposal is by atomizing in a combustion chamber⁸. One third of the participants of this study were aware of the above-mentioned procedure.

Dental labs should be well ventilated with windows and exhaust fans, vacuum suction and fume hood. The dental labs must possess emergency facilities such as the fire extinguisher, first aid kit and running water supply. One third of the students using the dental laboratory were not aware of the same.

CONCLUSION

Most of the students were aware of the facilities available in their laboratory, protective equipment required while handling and proper storage method of MMA. However, dental students need to enhance their knowledge of Methyl Methacrylate (MMA) in terms of its route of exposure, local and systemic side effects and proper disposal methods so that any incident of spillage or exposure can be handled appropriately.

In an attempt to increase the awareness and enhance the knowledge of handling methyl methacrylate among the participants an interactive session was conducted. The session comprised of briefing the students about the properties of MMA pertaining to storage, its inflammable nature and first aid measures in case of spillage and exposure with emphasis on the use of personal protective equipment while handling MMA. A bookmark containing the highlights of the session was also distributed among the participants for future reference and reinforcement.

Conflict of Interest – None

Source of Funding- Self funded

Ethical Clearance – Ethical Clearance was obtained from the Institutional ethical committee

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A Study on Effects of Serum Calcium Levels in Relation to Ankle Joint Instability - A Case Control Study

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ABSTRACT

1/4th of what we eat keeps us healthy and 3/4th of what we eat , keeps the doctors wealthy is the recent highlighted quote. With developing lifestyles and its proportionate increase in stress levels leads to so many diseases. This study is focussed on the serum calcium levels as a risk factor in individuals who have recurrent ankle sprains. The serum calcium levels of 80 individuals (Male - 47, female 33) who had recurrent ankle sprains were taken as Cases and 80 volunteers were taken as the control group (1:1)who were age and sex matched with that of the cases. Chi square value was found to be 5.48 (P <0.05) which means there was an association between serum calcium level and ankle joint instability and odds Ratio value was found to be 2.22 (95 % C.I:1.07-4.60). This interpretation concludes that there is a higher likelihood of ankle joint instability associated with serum calcium deficiency. Among the 80 subjects of group I , 34 had low serum calcium levels and they were put into a follow up study and the values of the serum calcium levels were measured again. On comparison of Serum calcium mean levels in the pretest and post test among 34 patients, The mean level in the pretest was 7.59 mg/dl as compared to 8.95 in the post test. The difference in the mean levels (1.36) was statistically significant (P<0.001) ,and the recurrence rate of ankle sprain also reduced.

Keywords : Serum calcium levels, Joint instability, calcium supplements.

INTRODUCTION

Calcium accounts for 1 to 2 percent of adult human body weight. Over 99 percent of total body calcium is found in teeth and bones. With aging, fractional absorption gradually declines. Research has shown that adequate calcium intake can reduce the risk of fractures, osteoporosis, and diabetes in some populations. Dietary requirements for Ca are determined by the needs for bone development and maintenance, which vary throughout the life stage, with greater needs during the periods of rapid growth in childhood and adolescence, during pregnancy and lactation, and in later life¹⁷. Calcium (Ca²⁺) release from intracellular stores

controls numerous cellular processes, including cardiac and skeletal muscle contraction, synaptic transmission and metabolism¹⁸. Many studies have shown that an increased phosphorus (P) intake may have negative effects on the skeleton, whereas calcium (Ca) intake may have a protective effect on it. As there may be an optimal balance between the 2 in relation to bone health, interest has been focused on the dietary Ca:P ratio (Virpi Kemi May 2017) Thyroid gland with its parafollicular cells secreting calcitonin has an effect over calcium metabolism. Calcitonin is involved in helping to regulate levels of calcium and phosphate in the blood, opposing the action of parathyroid hormone. This means that it acts to reduce calcium levels in the blood. Thyroid hormones profoundly alters bone turnover by a direct action on the bone cells and by influencing calcium compartment sizes as well as flow to and from these compartments. Considering all the above factors, we can see that, the word sprain/joint instability is not a MERE word these days , but has a complexed meaning of all the above said

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factors or much more influencing its occurrence and recurrence.

Aim : The aim of this present study is to find the effects of serum calcium levels on ankle joint instability

Objective : The serum calcium levels of the individuals who have recurrent ankle sprains are measured and interpreted to check if there is any significant role of calcium in determining the bone stability.

Hypothesis:

- Low serum calcium levels have considerable effect on bone instability

- Low serum calcium levels can affect bone strength and can cause recurrent ankle sprains

- Normal serum calcium levels can considerably help in reducing the chances and frequency of recurrence of ankle sprains.

MATERIALS AND METHOD

A designed prospective study was done at the Nathan Super speciality hospital , Salem, Tamilnadu , India. With the estimated odds ratio, a total of 160 patients were selected (March 2017- May 2018)by random sampling technique. They were divided into two groups. Group I who visited the hospital with the history recurrent ankle sprains (minimum 2sprains/month), group II who did not have ankle sprains, but visited the hospital for other complaints. The individuals were explained the importance of the study , the importance of calcium levels and all the potential risk factors were explained to them. The entire study was explained to the

individuals in the local language. Approximately 2ml of blood sample was obtained after getting the consent form duly signed by the individuals of both the groups. The individuals of both the groups were age and sex matched.

Inclusion criteria :Group I

Patients with recurrent ankle sprain

Age group between 25-45 years

Exclusion criteria (For both the Groups)

Pregnant women

Any congenital diseases influencing the thyroid levels

Any surgery involving the lower extremities

Individuals who are already in thyroid and calcium supplements

Any metal implants

Any fracture in the lower extremities.

who are not willing to be a participant

Limitations of the study:

Limited only to patients with recurrent ankle sprain, and age group of 25-35 years.

RESULTS

The normal human serum calcium level is found to be in the range of 8.2-10.5mg/dl ^{1,2} The results were tabulated for each group and the statistical analysis was done with the help of SPSS software.

Table I- The mean values, standard deviation, minimum and maximum values of serum calcium levels of Male and Female subjects of group I

Serum calcium levels (8.2-10.5mg/dl)	Normal	Minimum	Maximum	Mean	Std. Deviation
Male	47	7	13	9.67	1.563
Female	33	7	11	8.33	1.217

Table II- The mean values, standard deviation, minimum and maximum values of serum calcium levels of Male and Female subjects of group II

Control - Group II					
Serum calcium levels	N	Minimum	Maximum	Mean	Std. Deviation
Male	47	6.6	12.0	9.238	1.1528
Female	33	6.6	12.1	9.109	1.2360

Table III- Showing association between Serum calcium level and ankle joint instability

Serum calcium deficiency	Ankle joint instability		Total
	Yes	No	
Yes	34	20	54
No	46	60	106
Total	80	80	160

Chi square results were found to be 5.48 (P <0.05) and Odds Ratio was found to be 2.22 (95 % C.I:1.07-4.60) at 95% confidence interval.

In group I, 34 subjects had low serum calcium levels. With informed consent, the needed calcium supplements were given to them. A follow up study was done for a period of three months and again the blood samples were collected and checked for the serum calcium levels. The results were tabulated as below.

Table IV Comparison of Serum calcium levels among the patients before and after the medication

Variables	Test	Mean	SE	Mean difference	SE (Mean difference)	Paired 't'	P value
Serum calcium	Pre test	7.59	0.08	1.36	0.12	11.06	<0.001
	Post test	8.95	0.07				

DISCUSSION

Calcium is an important component of the skeletal mass of the human body, seen almost 99% in bones and 1% in the teeth. Calcium constitutes of 1% of total body weight. It is also an essential nutrient required for nerve conduction, muscle contraction, hormone and enzyme secretion, and blood clotting. Adequate calcium intake is essential for normal growth and development of the skeleton and teeth and for adequate bone mineralization^{14,15}. The values of serum calcium level may vary with various parameters like socioeconomic status³, gender differences⁹, hormonal factors etc. In

adulthood, low calcium intake has been associated with increased risk for osteoporosis, bone fractures, and falls^{6,7,8}

The risk of spraining an ankle depends on both intrinsic factors (hind foot alignment, ligament laxity, muscular force, neuromuscular control and so on) and extrinsic factors (shoes worn, type and intensity of sport, warm up and so on).^{12,13}

Coming to the group II, 14 of the subjects had low serum calcium levels, but did not show any signs of ankle joint instability. These subjects in group II may

also fall under the risk of joint instability. The values of Chi square= 5.48 (P <0.05) means that there is an association between serum calcium level and ankle joint instability. Odds Ratio =2.22 (95 % C.I:1.07-4.60). This interpretation shows a higher likelihood of ankle joint instability significantly associated with serum calcium deficiency.

There have been numerous trials and meta-analyses of calcium supplementation for fracture reduction, and associations with risk of myocardial infarction have been suggested in recent years¹⁰. In the current study, among 80 subjects of group I, 34 subjects showed low calcium levels. They were put into a follow up study for three months with needed changes in lifestyle, calcium supplements. After a period of three months, blood sample was taken again for the 34 individuals and tested for the serum calcium levels. The mean serum calcium level in the pretest was 7.59 mg/dl as compared to 8.95mg/dl in the post test. The difference in the mean levels (1.36) was statistically significant (P<0.001). There was a significant increase in the level of serum calcium and this showed that the intervention was effective. Also the frequency of spraining the ankle was reduced among the subjects.

CONCLUSION

The ankle joint also forms the main weight bearing area of the body next to the knee joint. It needs lots of factors to stabilize its proper functioning¹³. The current study shows calcium as one of the potential risk factor in recurrence of ankle sprain/ ankle instability. It also shows that there is significant increase in serum calcium levels post medication and decrease in the frequency of ankle sprains. Calcium, vitamin D are important mutual factors in strengthening the skeletal mass^{11,16}. Calcium with its role in muscular control, when checked for its normal levels periodically, can help in avoiding risk of spraining a muscle, stabilisation of joint compartment and also in muscle strengthening. Orthopaedicians should have a vision on these parameters along with other treatment procedures.

Conflict of Interest - There was no conflict of interest during the period of study

Source of Funding - None - declared

Informed Consent Form - The research was conducted after obtaining informed consent form for the

respective subjects who took part in the research (both for group I and group II)

Ethical Clearance : Declared clear and approved by the Research Department, Saveetha University (Feb 2017)

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Impact of Service Quality on Customer Satisfaction Special Reference to Retail Outlets in Tamil Nadu

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ABSTRACT

Retail store profitability is dependent on the conversion rate of footfalls. One of the critical aspects that consumers use to make a buy, or no buy decision is the service quality offered by the store they choose to visit. This research provides insight into relationship between demographics of consumers, specifically age group, gender, marital status, and income group. The findings of the research suggest that the top priority of consumers seems to be: Loyalty Cards, Equipment/Fixtures, Timely Home Delivery, Merchandise quality, Packaging/ labeling, Error free transactions, and Error free home delivery. Further reliability and Policy have a greater impact on consumer satisfaction. Gender and Age do not seem to impact perceived or expected quality of services at retail outlets

Keywords: service quality, SERVQUAL, RSQS, Retail, hierarchical measurement, expectation, perception

INTRODUCTION

Retailing in India has metamorphosed from an industry dominated by traditional stores to an industry that now has a mix of traditional and modern format stores. Consumers choose among these different types based on the kind of purchases, namely durables, non-durables, and white goods. They also discriminate among the stores based on purchase volume and total spend. Consumer expectations of service quality differ between traditional and modern formats, for example consumers do not expect electronic modes of payment when they visit a traditional store, whereas they expect electronic payment facility when they shop at modern stores. Similarly, consumers do not expect ambience in a traditional store but when they visit a modern format store they do expect the ambience to be good

(Air conditioning for example). Given this differences in expectations service quality becomes an important aspect of modern retail outlets.

Modern retailing has expanded quickly in the last two decades and competition has intensified in industry. It has been reported in the newspapers and magazines that modern retailers are running huge debts in order to keep themselves afloat. Many retail giants have expressed that the cost of operations is big chunk of their total cost. Operations cost includes supply chain management cost, real estate cost, and human resources cost. All these have direct linkage with the four major elements of service quality, namely, tangibles, reliability, responsiveness, and store policies. These four elements can be further divided into 18 measurement items as shown in the table below:

Table 1 : Service Quality Measurement Items

S. No.	RSQ Dimension	RSQ sub Dimension	Perception item
1	Physical aspects	Appearance	P1: This store has modern looking equipment and fixtures
2	Physical aspects	Appearance	P2: The physical facilities at this store are visually appealing

Cont... Table 1 : Service Quality Measurement Items

3	Physical aspects	Appearance	P3: Materials associated with this store’s service are visually appealing
4	Physical aspects	Appearance	P4: This store has clean, attractive, and convenient public areas
5	Physical aspects	Convenience	P5: The layout at this store makes it easy for customers to find what they need
6	Physical aspects	Convenience	P6: The Layout at this store makes easy for customers to move around in the store
7	Reliability	Promises	P7: When this store promises to do something by a certain time it will do so
8	Reliability	Promises	P8: This store provides services at the time it promises to do so
9	Reliability	Doing it right	P9: This store performs the service right the first time
10	Reliability	Doing it right	P10: In this store merchandize are available when the customer wants it
11	Reliability	Doing it right	P11: This store insists on error free sales transaction and records
12	personal interaction	Inspiring confidence	P12: Employees in this store have the knowledge to answer customers questions
13	personal interaction	Inspiring confidence	P13: The behavior of employees in this store instills confidence in customers
14	personal interaction	Inspiring confidence	P14: Customers feel safe in their transaction with this store
15	personal interaction	Courteous/helpfulness	P15: Employees in this store give prompt service to customers
16	personal interaction	Courteous/helpfulness	P16: Employees in this store tell customers when exactly services will be performed
17	personal interaction	Courteous/helpfulness	P17: Employees in this store are never too busy to respond to customer’s request
18	personal interaction	Courteous/helpfulness	P18: This store gives customer individual attention

Source: Researcher’s Compilation

Given this linkage to the operations costs, it is pertinent that retailers focus on these in order to extract maximum mileage for their investment. This translates into providing superior service quality. Excelling on all the areas of service quality could be a vision but seldom achievable. Hence the best option for retailers is to match the expectation of the consumers in the areas of service quality that matter most to them. Differently said retailers need to identify service quality aspects that

consumers use to differentiate between stores. In order to facilitate this process this research attempts to identify the store attributes that are used by consumers to choose shops for fulfilling their wants.

Literature

Economic activities performed to fulfil needs of one party to another are called services. Commonly services are time bound and result in satisfying some needs of the recipients. Services comprise financial

exchange, expense of resources such as time, and effort. Customers' expectations from service providers include value from goods, labor, specialized skills, amenities, networks, and arrangements. While service encounters result in fulfilment of customer expectation but do not involve change of ownership of physical components involved. The essential feature of services is the ubiquity of intangible elements and the absence of ownership exchange.

Services quality is measured as a gap between customers' expectation and what is actually provided by the services provider. Services are an essential component of many businesses and retail business is no exception. services play a major role in retail ecosystem towards customer satisfaction and loyalty. While quality of goods can be measured easily based on the performance of the goods and their attributes, the same is not true for services due its intangible nature. Further, the fact that expectations vary from one customer to another, the situation becomes even more complex. In view of the supremacy of intangible components, services quality measurement includes subjective and objective methods. Hence service quality measurement is an indirect measurement of customer satisfaction. Subjective methods of measuring service quality are critical incident method, SERVQUAL, and Relevance method. SERVEQUAL or a modified version of it is most widespread method used by researchers. Objective elements of service quality can be divided into primary processes and secondary processes. In the primary process, service encounters of customers are observed. In the secondary, countable factors such as numbers of customer complaints or numbers of goods returned are evaluated to make inferences about service quality.

Numerous models have been developed to measure customer perception of service quality. Most of these models employ direct interaction between customers and the personnel of the service providers. As per Lewis and Booms¹ (1993) "service quality is a measure of how well the service delivered matches customer expectations". Conceptually service quality is defined as the over-all conclusion or outlook relating to the excellence or superiority of the service² (Parasuram et al., 1988). It encompasses the evaluation of customer expectation against customer perception of actual service performance³ (Parasuram et al., 1985, 1988). They have developed a measurable scale termed SERVQUAL, in which, five dimensions namely –

Tangibles, Reliability, responsiveness, Assurance, and Empathy. The SERVQUAL instrument has been widely recognized and applied to various service settings such as health care, large retail chains, banks and restaurants. However, the generalizability of the dimensions of SERVQUAL across different service industries has been questioned. Further, the two-battery tool to measure expectation and perception has been viewed as inapt in terms of scale reliability and questionnaire length⁴ (Carman, 1990). Although SERVQUAL has been empirically tested in a number of studies involving pure service such as banking, credit card service, etc. it has not been successfully adapted to and validated in a retail store environment⁵ (Dabholkar et al., 1996) they reason that a measure of retail service quality must capture additional dimensions. As a result of numerous focus groups experiments, they have developed the RSQS (Retail Service Quality Scale) that includes the 4 dimensions namely – Physical Aspects; Reliability; Personal Interaction; problem solving; and Policy. They believe that their scale is able to serve as a analytic tool for retailers to determine which service areas need improvement so that store managers can deploy resources for improving those specific features of service quality.

Service quality has been found to be an important predictor of consumer behavior such as repeat purchase intentions, likelihood of recommendation, switching, and complaining⁶ (Bittner, 1990). Woodside et al., 1989 Significant association between service quality and repeat purchase behavior has been observed⁵. Dabholkar et al. (1996) similarly significant relationship between service quality and the likelihood of recommending and repeat purchase has also been observed⁵. Therefore, the objective of the study is to study the impact of service quality on customer satisfaction for retail shop customers in Tamil Nadu. The following are the sub-objectives of the study:

To find if customer satisfaction is independent of gender

To find if the customer satisfaction is independent of Age group to which the respondents belong

To find out the elements of retail service quality that are most relevant to the cusom

Though there is a absence of harmony on the service quality measurement concept, academicians do agree to it being multidimensional in nature and

involvement of higher order ideas^{7, 5, 4, 3, 8} (Brad and Cronin, 2001; Dabholkar et al., 1996; Carman, 1990; Parashuraman et al., 1988; Gronroos, 1984). Brady and Cronin's (2001). Findings of research on service quality suggest that customers' perceptions are a multidimensional hierarchical construct consisting of customers' overall perception of service quality, the primary dimension and the sub-dimensions. The sub dimensions are considered as first order factors of service quality construct and the primary dimensions are considered as second order factors of the service quality construct. The hierarchical approach has been adopted by many marketing academics for measuring the service quality in various service contexts such as agribusiness⁹ (Gunderson, Gray, and Akridge, 2009), airport¹⁰ services (Fodness and Murray, 2007), education¹¹ (Clemes, Gan, and Kao, 2007), electronic services¹² (Fassnacht and Koese, 2006). However, no study could be found in the literature which construes service quality in retail outlets as a hierarchical construct.

Retail Service Quality Scale (RSQS)

The retail Service Quality scale was developed by Pratibha A. Dabholkar, Dayle I. Thorpe, Joseph O. Rentz in 1996 to measure the services provided by retail outlets. The RSQS25 uses a hierarchical structure to evince customers' perceptions as well as expectations. This allows the determination of gap between the two and hence the need for improvement can be assessed. Additionally, the scale is divided into primary and secondary and sub-dimensions. The scale can be used either to study only the secondary and sub-dimension or can be used to study the overall measurement of service quality. The RSQS has the following dimension and sub-dimensions in an hierarchical fashion:

1. Physical Aspects
2. Appearance
3. Convenience
4. Reliability
5. Promises
6. Doing it right
7. Personal Interaction
8. Inspiring confidence
9. Courteous/helpful
10. Policy

Physical aspects – includes functional elements like layout, comfort and privacy and also aesthetic elements such as the architecture, color, materials and style of the store.

Reliability – a combination of keeping promises and performing services right.

Personal interaction – the service personnel being courteous, helpful, inspiring confidence and trust in customers.

Problem-solving – the handling of returns and exchanges as well as complaints.

General Policy – a set of strategies, procedures and guiding principles which the store operates

METHODOLOGY

Mall encounter method was used to run the survey using RSQS along with some demographic variables. The sample size was 750 customers who visited and completed their shopping in a modern format retail store. SPSS package was used to run a correlation analysis to discern if there are any relationship between demographics, store attributes and customer satisfaction. The results indicate a strong correlation between tangible aspects of store and customer satisfaction. It seems that tangible attributes of stores are of paramount importance to customer while choosing a store.

Exploratory factor analysis was run on the gap between expectation and perception averages along with demographics, which resulted in the extraction of 4 components consisting of Age and Marital Status as first component, Income and Average Score of Tangibles as second component, Store policy and Reliability as third component, Gender and Responsiveness as fourth component.

Further a categorical regression was run to estimate an equation relating the RSQS elements, demographics and customer satisfaction. All variables except marital status were found to be significant at an alpha of 0.05

RESULTS AND DISCUSSION

Since the variables in RSQS are measured on a 5point scale a categorical regression was deemed appropriate. The relevant tables from SPSS output are given below. The regression is highly significant with an R square of 0.65 indicating sufficiently high predictive power.

Table 2: Regression Coefficients for Customer Satisfaction Vs Gaps and Demographics

RSQS Elements	Standardized Coefficients	df	F	Sig.
Equipment/Fixtures	0.231	4	16.413	0
Layout	0.141	4	7.55	0
Aisle space	0.109	4	3.636	0.007
Packaging/ labeling	0.181	4	11.283	0
Ambience	0.112	4	3.16	0.015
Merchandise quality	0.183	4	10.71	0
Parking Space	0.136	4	6.382	0
Billing time	0.165	3	11.236	0
Error free transactions	0.18	2	12.206	0
Merchandise availability	0.159	3	11.644	0
Timely Home Delivery	0.218	3	16.128	0
Error free home delivery	0.179	3	12.235	0
Returns/ Exchanges	0.116	1	5.458	0.02
Complaint Handling	0.116	3	4.904	0.003
Operating hours	0.096	2	3.111	0.047
Accepts CC/DC	0.121	2	5.854	0.003
Loyalty Cards	0.24	3	18.657	0
Source: Researcher's Computations				
Dependent Variable: overall satisfaction				

Since all the coefficients are positive and significant it is clear that an increase in the perception about RSQS elements leads to greater customer satisfaction. The top priority of consumers seems to be: Loyalty Cards, Equipment/Fixtures, Timely Home Delivery, Merchandise quality, Packaging/ labeling, Error free transactions, and Error free home delivery

The Categorical regression output for gaps between Expectation and Perception reveals that all the

coefficients are negative indicating that an increase in gap leads to decrease in customer satisfaction. From the coefficients table it is observed that the regression coefficients for all the variables except Gender and Age are significant. Further reliability and Policy seem to have a greater impact on consumer satisfaction. Since Gender and Age are not significant it can be construed that consumer satisfaction is independent of gender and age as far as service quality is concerned.

Table 3: ANOVA for Customer Satisfaction Vs Gaps and Demographics

	Sum of Squares	df	Mean Square	F	Sig.
Regression	63.073	14	4.505	5.664	0
Residual	186.927	235	0.795		
Total	250	249			
Source: Researcher's Computations					
Dependent Variable: Customer satisfaction string					
Predictors: Gender Age Marital Status Tangibles reliability personal interaction policy					

Table 4: Regression Coefficients for Customer Satisfaction Vs Gaps and Demographics				
Variables	Standardized Coefficients	df	F	Sig.
Gender	0.069	1	1.898	0.17
Age	0.063	3	1.794	0.149
Marital status	0.128	1	4.087	0.044
Tangibles	-0.208	2	4.255	0.015
reliability	-0.223	3	18.696	0
personal interaction	-0.174	2	3.872	0.022
policy	-0.243	2	24.099	0
Source: Researcher's Computations				
Dependent Variable: Customer satisfaction string				

CONCLUSION

The research findings confirm that services at retail outlets are important in general and specifically Physical aspects of the store along with, Timely Home Delivery, Merchandise quality, Packaging/ labeling, and Error free transactions are important for the consumers and they seem to use these for making a selection of stores for their purchases. Further reliability and Policy have a greater impact on consumer satisfaction. In view of this it is suggested that retailers focus on creating an environment inside the store that will provide a satisfying experience for the consumers. Retailers should not focus on a few aspects of service delivery, they should manage the total shopping experience of consumers.

Ethical Clearance- Not applicable

Source of Funding- Self

Conflict of Interest: Nil

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In Vitro Evaluation of the Cytotoxicity of Chlorhexidine Digluconate, Povidone Iodine and Phenolic Compound Mouth Washes on Chinese Hamster V79 Cell Lines

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ABSTRACT

Aim: To assess and compare the cytotoxic potential of Chlorhexidine, Listerine and Povidone –Iodine antimicrobial agents on Chinese hamster lung fibroblast V79 cells.

Materials and Method: Chlorhexidine (0.2%), Listerine, Povidone iodine were diluted with DMEM medium under sterile conditions to obtain the required concentration. V79 cells were used for the experimental procedures. The cells were cultured in DMEM media supplemented with 10% FBS and 1% Gentamycin at 37°C in a humidified 5% CO₂ incubator. For all the assays, cells were maintained at 80-90% confluency in T-25 cm² flasks and used as per requirement. V79 cells were seeded onto 96 well plates at a density of 104 cells per well and allowed to incubate overnight at 37 °C in 5% CO₂ incubator. The following day the cells were treated with different concentrations of Betadine, Hexidine and Listerine for 12, 24 and 48 hours. Following the treatments, the drug containing media was discarded and 100µl of freshly prepared MTT stock prepared in DMEM media was added in to each well and the plates were incubated at 37°C in 5% CO₂ incubator for 4 hours. Viability was determined by the ability of the cells to reduce MTT, a water soluble tetrazolium dye to produce violet crystals of formazan. Formazan crystals formed were solubilized by the addition of 100µl of (Di Methyl Sulfoxide). Optical density which is directly proportional to cell viability, was measured at 540nm using a multi well spectrophotometer. Viability curves were plotted using origin.

Percentage cell viability was obtained using the formula given below:

Percentage viability= [(OD Test – OD Blank)/ (OD Control – OD Blank)] *100

Results: V79 cells treated with serially diluted test compounds showed a decrease in cellular viability in a concentration as well as time dependent manner. Hexidine exhibited maximum toxic effect when compared to Listerine and Betadine; betadine possessing the least toxic nature as obvious by the IC₅₀ values for different time durations.

Conclusion: Chlorhexidine was found to be most toxic when compared to Listerine and Povidone iodine. Povidone iodine being the least toxic amongst the three mouth rinse. All the compounds exhibited toxic effect in a dose dependent as well as time dependent manner. The result of this study showed that all three given mouth rinses caused V79 proliferation inhibition.

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INTRODUCTION

Good oral hygiene is said to be the mirror of individual's systemic health. Maintaining good oral hygiene plays an important role in the overall systemic health and wellness of an individual. Deliberating systemic health conditions may lead to poor oral hygiene

with the associated periodontal breakdown. The oral health maintenance can be achieved by chemical and mechanical methods¹. Medicated mouth rinses offer a simple, easy and effective solution for maintenance of oral hygiene in patients whose ability to do so otherwise is compromised. Mouthwashes are commonly incorporated for oral hygiene maintenance because of their capability to inhibit dental plaque. Plaque forms initially with the accumulation of Gram positive streptococci, and continues with the deposition of gram-negative microorganisms².

Mouthwashes contain various active agents in their chemical structure that help inhibit the accumulation, growth and the enzymatic reactions of the microorganisms to help reduce their levels in the mouth³. A lot of research has been conducted documenting the ability of the mouthwashes in inhibiting biofilms⁴.

The aim of this study was to assess and compare the cytotoxic potential of three commonly used antiseptic mouth rinses on Chinese hamster lung fibroblast V79 cells.

MATERIALS AND METHOD

Chlorhexidine (0.2%), Listerine, Povidone Iodine were diluted with DMEM medium under sterile conditions to obtain the required concentrations. V79 cells were used for the experimental procedures. The cells were cultured in DMEM media supplemented with 10%FBS and 1% Gentamycin at 37°C in a humidified 5% CO₂ incubator. For all the assays cells were maintained at 80-90% confluency in T-25 cm² flasks and used as per requirement. V79 cells were seeded on to 96 well plates at a density of 10⁴ cells per well and allowed to incubate overnight at 37°C in 5% CO₂ incubator. Next day the cells were treated with different concentrations of Betadine, Hexidine and Listerine for 12, 24 and 48 hours. Following the treatments, the drug containing media was discarded and 100µl of freshly prepared MTT stock prepared in DMEM media was added in to each well and the plates were incubated at 37°C in 5% CO₂ incubator for 4 hours. Viability was determined by the ability of the cells to reduce MTT, a water soluble tetrazolium dye to produce violet crystals of Formazan. Formazan crystals formed were solubilized by the addition of 100µl of DMSO. Optical density which is directly proportional to cell viability, was measured at 540nm using a multi well spectrophotometer. Viability

curves were plotted using origin 8.

Percentage cell viability was obtained using the formula given below:

$$\text{Percentage viability} = \frac{[(\text{OD Test} - \text{OD Blank}) / (\text{OD Control} - \text{OD Blank})] * 100}{}$$

RESULTS

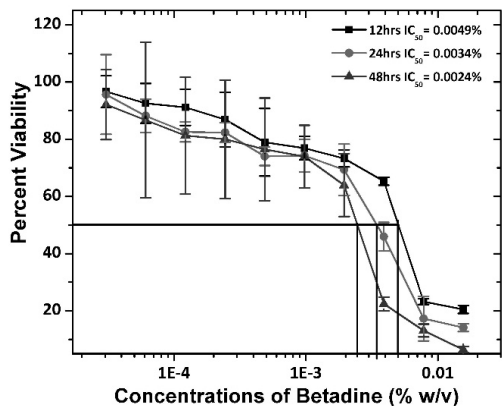
Graphs showing the response of V79 cells treated with different concentration of betadine (A), hexidine (B) and Listerine (C) for 12, 24 and 48 hours. X-axis represents log concentrations of test compounds and the Y-axis represents the % viability respectively. The present study was designed to evaluate the cytotoxicity of three different compounds namely betadine, hexidine and Listerine which are commonly used as oral mouth washes. A comparative analysis on the cell viability has been represented in Graph1,2&3. V79 cells treated with serially diluted test compounds showed a decrease in cellular viability in a concentration as well as time dependent manner. Hexidine exhibited maximum toxic effect when compared to Listerine and betadine; betadine possessing the least toxic nature as obvious by the IC₅₀ values for different time durations.

Test compounds	Inhibitory concentration (IC ₅₀) values (in %w/v)		
	12 hours	24 hours	48 hours
Betadine	49x10 ⁻⁴	34x10 ⁻⁴	24x10 ⁻⁴
Hexidine	9.2x10 ⁻⁴	4.1x10 ⁻⁴	1.9x10 ⁻⁴
Listerine	28x10 ⁻⁴	26 x10 ⁻⁴	23x10 ⁻⁴

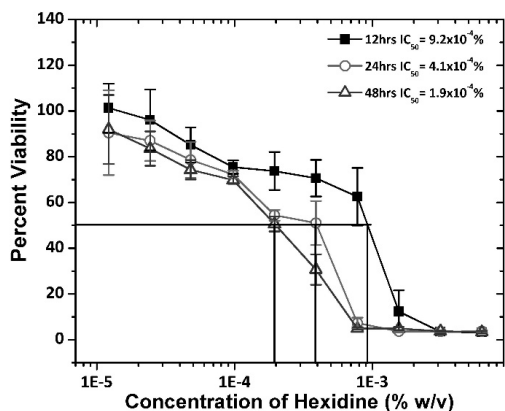
Table:1 Showing the IC₅₀ values of betadine, hexidine and Listerine in terms of %w/v.

Also, from the IC₅₀ values represented in table 1, it clearly indicates that hexidine exhibited maximum toxicity when compared to Listerine and betadine; betadine possessing the least toxic effect when compared to the other two compounds when compared for all the time durations.

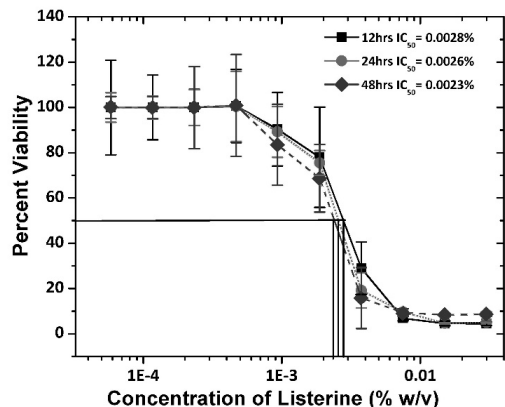
Thus, from the study the above experiment it was clearly observed that Betadine was safest when compared to Listerine and hexidine.



Graph 1: Effect of different concentrations of Betadine on the viability of the V79 cells



Graph 2: Effect of different concentrations of Hexidine on the viability of the V79 cells



Graph 3: Effect of different concentrations of Listerine on the viability of the V79 cells

DISCUSSION

Results from the study showed that Hexidine was the most toxic among the three mouthwashes even in low doses. Listerine and Betadine were comparatively

less toxic.

It was observed in this study when fibroblasts were exposed to different concentrations of Chlorhexidine, the fibroblast cell death increased as the concentrations increased. This result was in accordance with previous studies which stated that Chlorhexidine reduced gingival fibroblast proliferation in a dose-dependent manner.

Also Mariotti et al.⁴ suggested that Chlorhexidine will induce a dose-dependent reduction in cellular proliferation and that concentrations of Chlorhexidine that have little effect on cellular proliferation can significantly reduce both collagen and non-collagen protein production of human gingival fibroblast in vitro. Wilken et al.⁵ in their study have proved the in vitro cytotoxicity of Chlorhexidine on human gingival fibroblast.

It was also found in this study that Povidone–Iodine at commercially available concentration is cytotoxic to fibroblast cells. This study was in agreement with a previous study, which found that Povidone –Iodine at concentration of 5.0% to 0.05% was lethal to canine embryonic fibroblast in vitro. The findings were in accordance with studies conducted by Lineaweaver et al.⁶ and Barnhardt et al.⁷ who proved the cytotoxic effect of Povidone-Iodine on human gingival fibroblasts.

In a study conducted by Pucher and Daniel, human fibroblasts derived from oral and skin tissues were used to test the effects of chlorhexidine on viability, growth, collagen gel contractions, and total protein synthesis. The results demonstrated that chlorhexidine is highly cytotoxic to cells in vitro and various cell functions such as proliferation, collagen gel contraction, and protein synthesis are affected to different degrees by the drug⁸.

In an in-vitro study conducted by Heinz-Dieter Müller et al. exhibited the cytotoxic effects of the oral rinses. They concluded that oral rinses are heterogeneous with respect to them in vitro antimicrobial activity against bacteria and their effects on oral cell viability⁹.

There have been extensive clinical studies using Chlorhexidine, Listerine and Povidone-Iodine showing significant effect on preventing dental plaque accumulation and gingival inflammation. The results obtained in this study demonstrate the detrimental effect of these three mouth rinses on gingival fibroblast proliferation, which could interfere with wound healing.

CONCLUSION

Chlorhexidine was found to be most toxic when compared to Listerine and povidone iodine. Povidone iodine being the least toxic amongst the three mouth rinses. All the compounds exhibited toxic effect in a dose dependent as well as time dependent manner. The result of this study showed that all three given mouth rinses caused V79 proliferation inhibition.

Ethical Clearance : Taken from Institutional ethical committee AB shetty Memorial Institute of Dental Sciences, Mangalore.

Conflict of Interest: The authors have no conflict of interest to disclose.

Source of Funding: Self.

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Secure and Efficient Subnet Routing Protocol for MANET

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ABSTRACT

Mobile ad hoc Network have no base station wireless network and a decentralized way for a large network¹. The network topology of MANET is in general movable, because the connectivity among the mobile nodes may change location with time due to node mobility and change communication range¹; therefore, the secure connection established between source nodes to the destination node is very difficult. Some challenges of MANET are congestion control; overhead control and established connection between intended node and recipient node and provides secure data transmission among the nodes. This paper has focused on design an efficient and adaptive subnetting hybrid gateway discovery mechanism on the basis of dynamic time to live value adjustment² such that congestion and unnecessary overhead is reduced selecting the subnet head on the basis of one parameters will increase the performance of networks and throughput of the network and provide secure communication³.

Keywords: AODV, TTL, PDR, MANET, RREQ, RREP, HYBRID GATEWAY.

INTRODUCTION

Mobile Ad hoc networks is a complex distributed system. Mobile Ad hoc networks are very useful in current Wireless Technology, it is associated to business, education, socially and in some critical applications like Military etc, The network which is self-configuring wireless links which are connected to each other. However in such Wireless Network will be more exposed to different types of security attacks⁴. Several existing protocols for handling issues of mobile ad hoc network There are three different approaches to gateway discovery first approach is proactive this approach used for the small and less movable network. In proactive routing protocol, each node maintains the information about the other nodes in the form of a table. The second approach is reactive in this approach network is movable but increases the number of nodes then increase delay for search the gateway for a route discovery. The third approach is Hybrid routing protocols in this protocol we combine the best features of proactive and reactive algorithms.⁵ Proposed protocol has to divide large networks into small sub network and each sub network has a subnet head and this subnet control all nodes those are in subnet range.

Each subnet head node broadcast the message nearest gateway and communicates to each other nodes and selection of subnet head after a periodic interval.⁶ For secure communication this paper proposed algorithm Data transmission Evidence and Report, **it contains four phases first communication phase, in which nodes communication is sessions and Evidence and token as a security for authenticating nodes which submits in the form of report to Trusted Party (TP), Classifiers phase, involves in classifying fair and cheating reports**⁷. In this approach the Subnet Members (SM) submits a report to the Subnet Head (SH) and temporarily stores Evidence as a security token. The reports contain digital signatures. The SH will verify the consistency of the SM report and updates to Accounting Centre (AC). AC will verify the uniformity of reports and clears the cryptographic operations for attacker nodes, the security tokens are requested to classify and expel the attacker nodes which submits wrong reports.^{8,9}

Voting based Subnet

Voting based subnet mechanism invalidates the attacker report through votes from valid nodes. URSA¹⁰ proposed the eviction of malicious node using

voting based. Arboit et al.¹¹ proposed scheme, where all the participating nodes can vote together. There is No Certification Authority required. The participating nodes itself will monitor the activity and behavior of neighboring nodes. The nodes with variable weight vote in URSA method. Trustworthiness of the participating node is calculated as its weight.

Non-Voting-Based Mechanism

Clulow et al.¹² proposed self destruction of node strategy, in which malicious node behavior can be evocated in one accusation. The attacker node is removed from the network by the accused node in the network. Park et al.¹³ proposed a Cluster-based certificate scheme is nonvoting based mechanism, in which the Subnet Authentication is responsible for controlling and managing those node which is enter in the sub network.¹⁴ in this scheme each participating node stores and manages its own credit account.

Methodology for the proposed protocol

Implementation for this proposed model divided into three sections- (i) In the first section we will describe adaptive hybrid subnet protocol, subnet creation, minimum dropped packets and maximum network throughput. In the second section, we will describe the proposed subnet based adaptive hybrid energy efficient algorithm for increasing the efficiency of the battery, in the third section we will describe proposed algorithm data transmission evidence and report for secure communication in a mobile ad hoc network

Proposed Adaptive Hybrid Subnet Protocol

Subnet Formation

Step1. In the beginning each node is subnet head. Initially the network contains only single node subnet and this state is aceived when the nodes in the network boot up for the first time. Node is considered as subnet Head

Step2. Each node broadcast SH subnet Hello Packet. Each node will broadcast an initial Subnet hello packet (SH). This packet is the basis for determining both the nodes in the subnet and links between the subnet

Step 3. Receiving a SH Packet node generate Subnet Hello Reply Packet SHR if both nodes are not the same member of Subnet. Subnet Hello Reply packet (SHR)

is generated by a node, n, when n receives a SH packet from a node in the same subnet as n. The SHR packet for each node is propagated back to the subnet head for that nodes subnet

Step 4. If a node in the same subnet then rebroadcast SH Packet and wait a specified amount of time.

Step 5. The node will send out a Subnet Merge Request Packet (SMR). The SMR packet is sent to a subnet Gateway and is always forwarded up to the subnet head in the recieving subnet. The receiving subnet head then must make the decision of whether or not to merge with the requesting subnet.

Step 6. The Receiving subnet head then must make the decision of whether or not to merge with the requesting subnet. If the decision to merge is reached, then the receiving subnet head will send a Subnet Merge Preapproval packet (SMP) back to the original subnet

Step 7 Receiving a SMP Packet the requesting subnet head must now decide to merge, and then a Subnet merges Approved packet (SMA) is sent. At this point, if requesting subnet head will either be the new subnet head of the merged subnet or will become the new backup subnet head for the merged subnet.

Step 8. If the requesting subnet head will remain the subnet head, then a Subnet Head Backup Packet (SBH) will be sent out to the subnet.

Step 9. If requesting subnet head will become the backup subnet head and will sent out a subnet Head Takeover Packet (SHT) and Merge Subnet A & B and SHT instructs all nodes to set the backup subnet head to be the current subnet head and to set the subnet head as the subnet head node that originated the SHT packet.

The Proposed Adaptive Hybrid Energy Efficient Algorithm [AHEEA] for MANET

THE PROBLEM FORMALIZATION

- Let $S_H = \{1, \dots, H\}$ be the set of subnet-heads,
- $S_N = \{1, \dots, N\}$ be the set of ordinary nodes to be assigned to the subnets
- Let d_{ik} =distance between subnet-head i and node k($i=1, \dots, H$; $k=1 \dots, N$)
- $r_i = d_{ij}$ when j is the farthest node controlled by subnet-head i

- Matrix $L = \{l_{ij}\}$, dimension = $|S_H| \times |S_N|$ where each entry l_{ij} represents the lifetime of subnet-head i when its radius is set to $r_i = d_{ij}$ and it covers $n_{ij} = \{k \in S_N | d_{ik} \leq d_{ij}\}$

$S_s = \{1 \dots S\}$, set of subnet-heads and $S_N = \{1 \dots N\}$ be the set of ordinary nodes to be assigned to the subnet. The lifetime is calculated according to the following equation:-

$$l_i = \frac{E_i}{\alpha r_i^2 + \beta |n_i|}$$

Where E_i is the initial amount of energy available at subnet-head i , r_i is the coverage radius of subnet-head i , n_i is the number of nodes under the control of subnet-head i , and α and β are constants.^{15 16} Considering that the limiting factor to the network lifetime is represented by the subnet-head's functioning time, the lifetime is defined by

$$L_s = \min_i \{L_i\}$$

The main objective is to maximize L_s . The Algorithm for assignment of the nodes is as follows

Step 0 Begin **Assignnodes**

Step 1 All nodes i is set of subnetwork

Step 2 calculate the initial Energy of subnet head

Step 3 Every j nodes is the member Subnetwork

Step 4 Compute $d_{ij}, |n_{ij}|, l_{ij}$

Step 5 $L_s(\text{new}) = L_s(\text{old}) = L_s$

Step 6 Difference energy $\Delta = 0$

Step 7 while($L_s(\text{new}) \leq L_s(\text{old}) - \Delta$)

Step 8 $\Delta = \Delta + 1$

Step 9 All nodes i is set of subnetwork

Step 10 Every j nodes is the member Subnetwork

Step 11 Recompute $E_i = E_i - \Delta(\alpha r_i^2 + \beta |n_{ij}|)$

Step 12 Update $l_{ij} \forall i \in S_s, j \in S_N$

Step 13 **Selectsubnet** and update L_s

Step 14 $L_s(\text{new}) = L_s$

Step 15 end while

Step 16 end **Assignnodes**

Proposed Algorithm for Data Transmission Evidence and Report

START

Step 1- Initialize node n_i in the network

Step 2- if (n_i is the source node) then encrypted message send

Step 3- $E_x \leftarrow [R, X, \text{Timestamp}, \text{Massege}_x, \text{Signature}_x(R, X, \text{Timestamp}, H(\text{Massege}_x))];$

Step 4- send (E_x)

Step 5- else

Step 6- if (($R, X, \text{Timestamp}$ are correct) and Verify ($\text{Signature}_x(R, X, \text{Timestamp}, H(\text{Massege}_x)) = \text{TRUE}$))

Step 7- if (n_i is an intermediate node) then

Step 8- Relay the packet;

Step 9- Store ($\text{Signature}_x(R, X, \text{Timestamp}, H(\text{Massege}_x))$);

Step 10- end if

Step 11- if (n_i is the destination node) then

Step 12- send ($h^{(x)}$);

Step 13- end if else

Step 14- Drop the packet;

Step 15- Send error packet to the source node;

Step 16- end if end if

Step 17- if (P_x is last packet) then

Step 18- Evidence = $\{R, X, \text{Timestamp}, H(\text{Massege}_x), h^{(0)}, h^{(x)}, H(\text{Signature}_x(R, X, \text{Timestamp}, H(\text{Massege}_x))), \text{Signature}_D(R, Ts, h^{(0)})\};$

Step 19- Report = $\{R, \text{Timestamp}, F, X\};$

Step 20- Store Report and Evidence;

Step 21 end if

Step 22 STOP

SIMULATION AND RESULTS

Aggressive research in this area has continued since then, with prominent studies on routing protocols such as AODV, DSR, TORA and OLSR.¹⁷ we evaluate the performance of AODV, OLSR, DSR, TORA and AHEEA ad hoc routing protocols in NS2 ¹⁸. In addition, the mobile nodes were randomly placed in the network to provide the possibility of multihop routes from a node to the server. The performance of these routing protocols is evaluated in terms of power consumption and routing overhead.

battery power than the other five protocols for most network sizes. Most importantly, AHEEA, the based network is more energy efficient in comparison to the other proposed adaptive subnetting algorithm. The AHEEA, protocol based network use less battery power especially in small size networks. The battery power of nodes using DSDV and OLSR protocols decreases steadily starting from fairly high levels. With an increasing number of nodes, the battery power of OLSR based networks decreases faster than those for the other protocols.

Figure 1 shows that, on average, Adaptive Hybrid Energy Efficient Algorithm (AHEEA), remaining

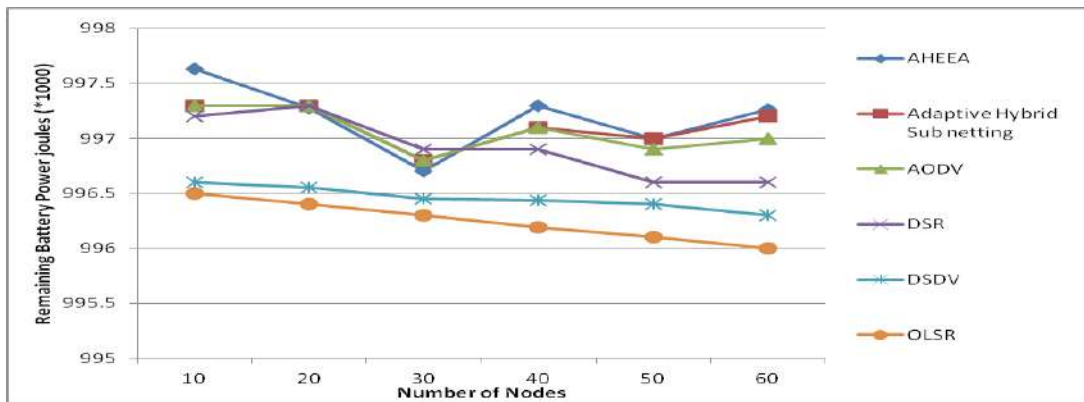


Figure 1: The average remaining battery power

Figure 2 shows the performance of the protocols based on data throughput. It shows that AHEEA, Adaptive Hybrid Subnet, AODV and DSR achieve comparable performance for network sizes greater than 10 nodes. However, Adaptive Hybrid Subnet shows superior performance in larger networks. In Adaptive Hybrid Energy-Efficient Algorithm, Adaptive Hybrid Subnet and AODV protocols, every node does not need

to keep information regarding the route between two nodes. This reduces the amount of signaling required for route discovery and maintenance. OLSR and DSDV both show poor performances compared to the other three protocols. This is because both are proactive protocols and require table updates that generate relatively high large Networks, especially in mobile networks, and reduces data rate performance of the network.^{19 20}

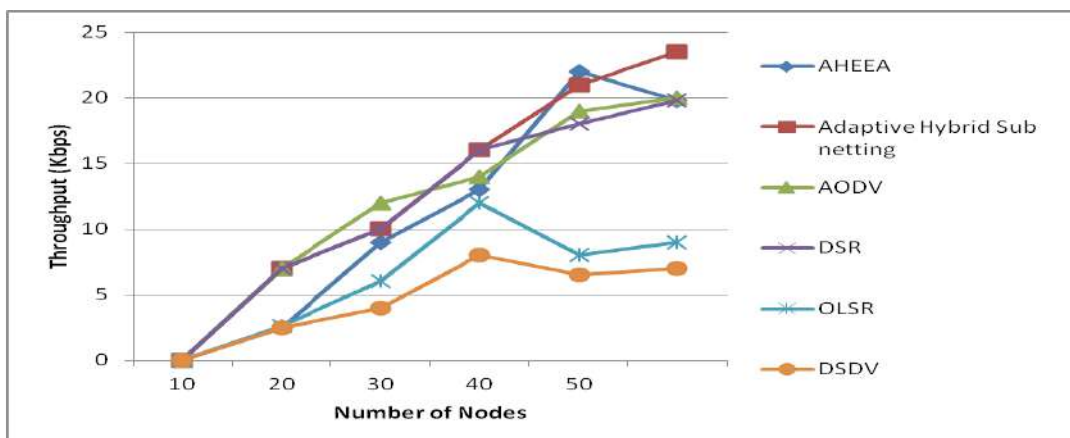


Figure 2: Comparison of data throughput for various network sizes (number of nodes)

Communication and Overhead

In secured communication the authentic nodes communicate with correct reports, thus reducing their node overhead by using light cryptographic techniques. In this approach compute between time versus packet delivered then find some malicious activity like packet drop, this approach tries to manipulate report, and submits report by reducing node overhead.

CONCLUSIONS

This Paper has presented the simulation results and comparison of existing Ad Hoc routing protocols with proposed protocols Adaptive Hybrid Sub netting Protocol and Adaptive Hybrid Energy-Efficient Algorithm (AHEEA). All the results have been presented in terms of the number of packets dropped, remaining battery power, consumed power, throughput, routing load, and dropped packets. Proposed Algorithm AHEEA, the based network is more energy efficient in comparison to the other existing protocol like AODV, DSDV, DSR, and OLSR. Simulation results and a report based submission to AC is defined to classify the fair and cheating nodes. The report based decreases the node overhead by reducing the cryptographic operations. In the case of cheaters a nodes the Evidence is requested and processed and our simulation result shows the node process low overhead Communication for submitting fair reports, the node submitting the correct reports to AC, increasing throughput by delivering the packets.

Conflict of Interest – Nil

Source of Funding- Self

Ethical Clearance – Not Required

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Awareness about Privacy and Security of Patient Health Information

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ABSTRACT

Privacy and Security of patient health records is a matter of concern in India, as we gradually move from manual to electronic methods of data management in healthcare. Studies on understanding the awareness about privacy and security among healthcare professionals is a method of identifying the preparedness of the healthcare team and knowing their attitude. A cross-sectional study done using a questionnaire survey among 601 healthcare professionals working in private clinics, handling patient health information, in a specific district of Southern India, showed limited awareness about privacy and security of patient health information. The limiting barriers found were mainly insufficient funds to put security measures, inadequate space, shortage of qualified health information professionals and unenforced laws. Concluding, this study definitely calls for directing attention towards creating awareness about Privacy and Security of Patient Health Information handling.

Keywords: Privacy, Security, Patient Health Records, Patient Data, Health Information

BACKGROUND

Privacy refers to those practices which keeps a patient's information protected; it is about a patient's right. Security, on the other hand, is the ability to control access and protect any patient-related information from accidental or intentional disclosures to unauthorized persons, often using various technical controls. ⁽¹⁾

Privacy and security of patient information is of great concern to the medical fraternity and the patients themselves as India rapidly transits from manual to electronic health records. Also, increased statutory regulations, and need for exchange of information between various end users of health information has

given added importance to this topic. Experts point towards the fact that these transitions have often not been matched with a legal framework on data collection, processing, analysis, dissemination, use and breaches. ⁽²⁾ Regular reporting of incidences of breach of health information all over the world, definitely points to a gap between the availability of measures to safeguard health information and supporting attitude in that direction, leaving the medical industry vulnerable to instances of regular data breach. The US Department of Health and Human Services, under which the Office of Civil Rights functions, has estimated that in the year 2015 alone there were over 100 million records that were breached. ⁽³⁾ A leading news daily reported in December 2016 about 35,000 patient records being hacked and sensitive information leaked online in the state of Maharashtra in India. ⁽⁴⁾ Similar incidences of breach of privacy were reported from other states of India as well during the recent years. ^{(5), (6)} In the light of such incidences, it is often pointed out that unavailability of separate laws governing data protection and privacy could be the major reasons. Of note here is the fact that India has various laws and acts to ensure protection and privacy

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of information provided by the patient to the doctor, including that related to their personal and domestic lives, like IT Act of India 2008 and The Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations, 2002, Consumer protection act 1986, Indian evidence act, Law of privileged communication, Law of Torts, and IPC section 52 (good faith), section 80 (accident in doing lawful acts) section 89 (for insane and children) section 90 (consent under fear) section 92 (good faith/consent), section 93 (communication in good faith), which are intended to protect the privacy and security of the patient health information. It has also been argued that these legal frameworks are seldom enforced and most importantly the lack of awareness about these acts and laws among the healthcare professions cannot be negated either.

The present study, conducted among the healthcare professionals working in clinics and nursing homes of a district in southern India, captures the awareness among the healthcare providers about Privacy and Security of patient health information.

MATERIALS AND METHOD

Study setting—Clinics and Nursing homes of a community in southern India, which has 17 nursing homes and 247 clinics, governed by the District Health Office (DHO).

Study design—A cross sectional study was carried out from February to May 2016

Study population—Doctors, nurses, allied health professionals, pharmacists, and laboratory technicians handling patient health information.

Sampling method—For the questionnaire survey, the samples were selected through convenience sampling method, employing healthcare professionals who consented for participating in the study and were available during the data collection. For in-depth interview, simple random sampling, using random number table, was used to identify the participants.

Sample size—For survey, 601 participants, consisting of 113 doctors, 320 nurses, 43 pharmacists, 76 laboratory technicians, and 49 Allied Health professionals participated and for in-depth interview, 7 participants, 2 doctors, 3 Nurses, 1 pharmacist, 1 laboratory technician and 1 physiotherapist consented to participate from the list drawn.

Exclusion criteria—Individuals not willing to participate and not handling patient health information

Data collection—Data was collected from clinics and nursing homes of a community in southern India, using a structured questionnaire. Investigator's observation and in-depth interviews supplemented the data findings. The study questionnaire was developed in English according to the objective of the study. Written consent was obtained from each participant before administering the questionnaire. The principal investigator was present throughout to explain and provide clarifications, if any, during administration. The completed questionnaires were then collected, coded and included for analysis. Observations were made and field notes were made to supplement our findings. For added information on data breach and barriers to privacy and security of patient health information, 7 participants who consented to participate were included and interviews conducted with the selected participants.

Data analysis—The data was analysed based on the study objectives using descriptive and inferential statistics, employing SPSS version 20. The data was presented in terms of frequency and percentage.

RESULT

Demographic details

Out of the total 601 respondents who participated in the study 135 (22.5 percent) were Male and 466 (77.5 percent) were Females. Mostly the Nurses, who constituted 53.4 percent of the sample size, and the Allied Health professionals were females. The healthcare professionals in this community were mostly in the age-group of 20 to 35 years, with 32 percent of respondents having work experience of 1-5 years while 23.6 percent of respondents had work experience of 6 to 10 years.

Ownership

In our survey, we found that only 3.3 percent of the respondents knew that healthcare facilities are the actual owners of the medical records/files; while 30.3 percent thought that doctors are the owners, 64.7 percent presumed that the medical records officers/managers are the owners and rest told that patients are the owners. When asked if they knew "who is the owner of health information contained in the medical records," only 2 percent (12) of these respondents knew that the patient is the owner of their own health information contained

inside the medical records maintained by the hospitals/healthcare facilities. There are laid down policies in this regard and an awareness in this regard is of utmost importance.

Privacy and Security – what does it mean to them?

More than 99 percent respondents of our study said the terms privacy and security means the same for them and 97 percent of the respondents felt that it is acceptable to discuss the details of a patient's condition freely in a cafeteria. Also, paper based medical records were found on the counter with no safety of information ensured.

The study revealed that most healthcare professionals did not bother much about these aspects. They discussed the case with other providers in presence of other patient and sometimes even carried out physical examination in the vicinity of other patients. They discussed their case in the cafeteria of their facilities and did not think it was unacceptable. The acceptance could be due to the notion that the discussion takes place to find solutions to a clinical problem. Lack of space and heavy patient load were cited as the main reasons for not being able to follow all privacy and security norms. To quote a Physician in this regard, "tending to the patient is more important for me"

Storage, Disposal and Data breach

Surprisingly, 97 percent of the respondents said that patient health information can be viewed by anyone who wants the information. According to Medical Council of India's code of ethics, chapter 1, B-1.3.2, "If any request is made for medical records either by the patients/authorized attendant or legal authorities involved, the same may be duly acknowledged and documents shall be issued within the period of 72 hours," thus making it mandatory to obtain consent of the owners of health information and restricting access to such information. ⁽⁷⁾ Though the justification given by most of respondents were that the information is only viewed by healthcare staff of their own center and this is for the continuity of the care; still making patient health information available to all increases the susceptibility to violation of patients' right to privacy of "sensitive information".

The study found that most clinics and nursing homes in this district still relied on paper-based medical records, but they have started migrating to a computer-

based system. Computers mostly had brief history of the patient and also discharge summary at many centres. Most respondents (78 percent) did not find any problem in storing patient data in computers, with or without specific security features. Many healthcare personnel were also found to operate computers without any passwords; this practice can lead to breach of privacy of sensitive information. The respondents were of the opinion that their settings are safe, and 81 percent respondents did not feel the need to have any separate internal security measures to protect Medical records in their settings. They felt that the existing measures are good enough and any additional measures would only mean additional expense. Computer-based health information is more susceptible to hacking than manual records. Rindfleisch classified privacy threats into organisational threats and systemic threats; further the National Research Council detailed the levels of organisational threats as accidental disclosure, insider curiosity, data breach by insider and data breach by outsider with physical intrusion. Strong and updated security measures are the only ways to keep patient health information safe. Section 43(a) and section 72 of the Information Technology Act provide the broad framework for the protection of personal information in India. ^{(8), (9)}

Since the medium of storage or transmission of such electronic medical record will be owned by the healthcare provider, it is the duty of the provider to notify a patient of any data breach that the nursing home or clinic comes to know about and no accidental disclosure can be neglected. Most of the respondents were aware of this fact. It is the duty of healthcare facility to notify a patient of any data breach (unauthorized access or leak) that comes to their notice. A similar incident had occurred in Sentara Healthcare, where they notified 5,454 patients regarding their data breach. The data breach affected vascular and thoracic patients who received medical services at Sentara Healthcare's Virginia hospitals between 2012 and 2015.

Campbell et.al (2007) found that around 28-35 percent of patients showed neutrality towards their health information being used by physicians for storage, disposal or other purpose. ⁽¹⁰⁾ The perspective of the healthcare professionals in our setting showed that 92 percent of them agreed that health information can be given to external agencies for storage or disposal with de-identification. This difference in the acceptance of disseminating health information to external agencies

among two different categories of population in two countries can be accounted to their awareness about the consequences of unethical use of patient health information.

India makes it illegal to disclose gender of the foetus even to the parents. According to the The Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act (PCPNDT Act), which prohibits the sex selection for preventing the misuse of prenatal diagnostic techniques for sex determination leading to female foeticide. ^{(11), (12)} More than 95 percent of the healthcare professionals were aware of this.

Limiting factors to privacy and security of patient health information

Observations and key themes generated from the in-depth interviews with the healthcare personnel, pointed towards some factors which are the major barriers to the practice of privacy and security at the nursing homes and clinics of this community.

Patient load: Owners of nursing homes and clinics expressed that there is ever-increasing patient load that visit them as the patients, and it is always about providing services first. They said that they hardly find time to think about any other aspect of healthcare.

Cost factor: Most healthcare professionals felt that incorporating security measures involves investing in additional infrastructure, which often leads to additional cost. Most of them felt that the patients might not be willing to pay extra and increased cost can actually result in losing clients.

Lack of knowledge on the issue: The healthcare professionals were not very clear about the issue to privacy and security. They were more worried about perfecting their documenting and reporting activities.

Lack of ownership: The clinics and nursing homes in this area rely on “Visiting healthcare professionals,” who are employed elsewhere or are freelancers and come to these settings depending on the requirements. These personnel are often less informed about the regulations that are to be adhered to and many of them even do not bother.

IMPLICATION OF STUDY

The study encompasses a multidisciplinary

group which includes doctors, nurses, pharmacists, lab technicians and other health related professionals who handle patient health information. Thus the result could be generalized for all healthcare professionals handling health information. The study also points to the fact that awareness programmes to propagate the privacy and security related issues among the healthcare professionals working in Clinics and Nursing homes are the need of the hour.

Ethical Consideration: Ethical clearance was obtained from the institutional review board of an Indian medical college prior to the administration of the survey. Permission to carry out the study was formally obtained from the District Medical Officer (DHO) of the region. Further permissions were taken from each clinic, and nursing home before approaching for the study. Written consent from the respondents were also obtained before interview, after explaining the implications. It was assured to all, that the information collected for this study will be strictly used for academic purpose only, without disclosing individual identity.

CONCLUSION

This study throws light on the existing state of awareness of the healthcare professionals working in private Nursing homes and Clinics about the ownership, storage and disclosure of patient health information. Factors like work pressure, shortage of professionals, or even outlook towards issues like privacy and security are the main barriers identified in the study. Based on the evidence generated in this study we draw the attention of public health policy makers to empower the private healthcare providers across the geographical area about the basic principles of health information handling, thus contributing to improved protection of patients’ right to privacy and security of health information. Training programs could be the immediate solutions which can empower as well as bring the change in attitude of the healthcare professionals.

Conflict of Interest – None

Source of Funding – Self

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Correlation between Type of Diet and Periodontal Parameters

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ABSTRACT

Introduction: Investigations about the Correlation between type of diet and periodontal parameters are very few and with less sample size. The main objective of this study was to establish the possible co-relation between type of diet and Wear patterns (erosion, abrasion, attrition) periodontal status (gingival index, periodontal pocket depth), plaque index and oral health parameters along with the help of questionnaire survey.

Materials and Method: Sample sizes of 260 healthy male and female subjects within the age group of 18-50 years were equally distributed into vegetarians and non-vegetarian groups. Clinical checkup will include examination of all the parameters. A questionnaire has been prepared for the participants for assessing the oral habits, dietary habits and the knowledge of oral health care. Statistical analysis of the data was conducted using pearson chi-square tests

Results: Periodontal findings comparing both the groups were not statistically significant. In the questionnaire survey, it was found that halitosis was greater in non-vegetarians when compared to vegetarians which were statistically significant. The remaining findings were not statistically significant.

Conclusion: Type of diet does not really affect the periodontal status of an individual. Both vegetarians and non-vegetarians show almost same level of gingival index, plaque index and periodontal pocket depths with dental education slightly lower in non-vegetarians than vegetarians with equal amount of regular dental visits. However, with proper oral hygiene procedures such as vertical brushing, brushing twice daily, using interdental aids and regular dental visits alone one can maintain good periodontal health regardless of diet being followed.

Keywords: Vegetarian, Non-vegetarian, Periodontal parameters, full mouth examination, questionnaire, wasting diseases

INTRODUCTION

Relation between diet and oral health is the most basic and often controversial subject and also there are increasing number of individuals complaining about oral health. Eating habits in developed and developing countries have changed in recent years. Various food stuffs have been introduced into diet that previously did

not form a part of nutritional choices. This has resulted in an enrichment of daily diet, with the opportunity to vary foodstuffs more often and moreover this has led to the assumption, at least apparently, of wider spectrum of nutrients required for the wellbeing of the body.¹ Considering the relevance of effects of diet and food habits on oral health care, recent research reports have showed an actual co-relation between diet with that of parameters such as erosion ,attrition ,abrasion, gingivitis, periodontal status, amount of plaque etc. To understand this relation and promote better oral health , better knowledge of diet is very important.

However, there is a lack of established facts and knowledge with regard to the concerned co-relation of

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diet and oral health parameters². The purpose of this clinical study was mainly to understand and establish a better pathway to improve oral hygiene among the people in society with different food habits.

MATERIALS AND METHOD

Sample size of 260 healthy male and female subjects within the age group of 18-50 years, equally distributed in both the groups (vegetarians and non-vegetarians) respectively have participated in this study. Taking into consideration the possible risk factors affecting the parameters taken for the study, the exclusion criteria were: subjects with medical disorders, undergoing antibiotic or other anti-microbial therapy.

The inclusion criteria were subjects who were smokers and alcoholics. The subjects received verbal and written information about the study.

This study was a randomized controlled clinical study which included 260 participants, divided into two groups. Clinical checkup included examination of the following parameters: wearing of teeth, plaque index, periodontal status apart from which also the other parameters like color of gingiva, depth of periodontal pockets if present, gingival inflammation, bleeding on probing, number of decayed, missing teeth ; that is a full mouth assesment².A questionnaire was prepared for the participants for assessing the habits and the knowledge of oral health care among them. This was also done to sub categorize participants under the major study groups to narrow down the results obtained to a more accurate conclusion.

Baseline data on the medical history and previous hospital visits of the participants was recorded to minimize the factors affecting the results of the study and maintain the exclusion criteria. The participants were asked to answer the questionnaire.

Following this, clinical check-up was done on subjects for all the parameters included in the study using mouth mirror, an explorer and a periodontal probe². The subjects were examined mainly for plaque to calculate plaque index, periodontal status, wearing of

teeth which included abrasion, attrition and erosion and also for other parameters such as gingival inflammation, bleeding on probing and depth of gingival pocket.

Based on the clinical check-up the participants were asked to undergo dental treatment if needed or advised to take necessary oral prophylactic measures.

Clinical assessment of plaque index and gingival index was performed on four sites (buccal, lingual, mesial, distal) of the six key teeth (FDI tooth number 16,12,24,36,32,44) according to Loe H & Silness J.³⁻⁶. Each of the sites was given a score from 0-3 depending on the severity of the gingival condition.

Periodontal pocket depth and clinical attachment loss was recorded using William's graduated periodontal probe

Statistical analysis-

The calculation of the sample size was carried out using nQuery Advisor 6.0 (Statistical Solutions, Saugas, MA, USA). The analysis showed that a sample size of 160 in each group had a power of 80%. The recorded data were documented and analysed by the data procession program SPSS 17.0 for Windows (SPSS, Chicago, IL, USA).

RESULTS

In this study, 130 healthy male and female subjects aged 18-50 years for both the groups were included as participants. The prevalence of smoking and alcohol consumption was statistically similar in both the groups, with the non-vegetarian group being slightly greater.

Mean and range values of periodontal parameters are presented in table-1. There was greater probing depth in the vegetarian group compared to the non-vegetarian group, which was statistically not significant. While comparing the plaque index, it was higher in the vegetarian group and was statistically non-significant. But, even though statistically non-significant, the gingival index was seen to be a little greater in the non-vegetarian group when compared to the vegetarian group.

Table-1: Results of T-test for plaque index, gingival index and probing pocket depth among vegetarians and non-vegetarians

	1. DIET	N	Mean	Std. Deviation	t	df	P VALUE
PI	VEGETARIAN	129	1.22062	0.473661	1.299	258	0.195
	NON VEGETARIAN	131	1.14313	0.487665			
GI	VEGETARIAN	129	1.02744	0.560884	-0.173	258	0.863
	NON VEGETARIAN	131	1.03977	0.588518			
PPD	VEGETARIAN	129	2.7669	0.677827	0.506	238.97	0.614
	NON VEGETARIAN	131	2.71626	0.920669			

The wear pattern was not same among both the groups. Vegetarians had greater amount of attrition as compared to non-vegetarian group out of which occurrence of generalized attrition was found more in non-vegetarians. The cervical abrasion was more in non-vegetarian group as compared to vegetarians. This was also associated with the increased horizontal technique of brushing seen in non-vegetarian group.

Analysis of questionnaire showed that vegetarians and non-vegetarians had similar frequency of oral hygiene maintaining practices. It revealed that both the groups had similar number of dental visits. The brushing technique among the non-vegetarian group was more of horizontal technique when compared to the vertical technique used by vegetarian which was statistically significant. Also another statistically significant finding in the questionnaire was that halitosis was a more common complaint among the non-vegetarian group when compared to the vegetarian group. Level of dental education was about the same in both the groups apart from the type of brushing.

DISCUSSION

The effects of a vegetarian diet on systemic diseases like cancer, type 2 diabetes and coronary heart diseases have been studied by various authors and revealed predominantly less systemic diseases in vegetarians.^{8,9} Studies investigating correlations between vegetarianism and oral health are rare. Most authors assessed dental

parameters or performed a saliva test.¹⁰⁻¹⁴ In this study, emphasis on effect of diet on periodontal parameters is given. A very few studies have shown effect of diet on periodontal parameters as most of them compare oral health care among vegetarians and nonvegetarians.¹⁵⁻¹⁸ Also, the studies done earlier have a comparatively smaller sample size (20-60), whereas this study has a significant sample size (n=130).

In addition, this study along with investigation of plaque score, gingival status, wear pattern have also gathered data regarding brushing technique, oral habits (smoking, alcoholism), oral hygiene practices, level of dental education and oral health problems via a multiple choice based questionnaire.

Our data indicates plaque index is slightly higher in vegetarian compared to non-vegetarian but it is not statistically significant. In our study the gingival index among non-vegetarians is slightly greater than vegetarians, yet statistically not significant. Since both the interrelated indices are inconsistent in both the groups and are almost similar, we believe that type of diet does not affect the periodontium in further causing gingivitis or periodontitis. In contrast a recent study by I Staufenbiel et al² in 2013 showed that gingival inflammation was significantly lesser in vegetarians. In addition, a study by Linkosalo et al.¹⁶ revealed less bleeding on probing in vegetarians.

There are several pathways, which may lead to less inflammatory signs. Generally, vegetarians show more physical activity and a lower BMI. Hence, the prevalence of obesity, which may cause an increased local inflammatory response is lower.¹⁹ Additionally, vegetarians consume a higher amount of antioxidants, which improves immune response,²⁰ and may lead to less inflammation.

Second, according to our study the average periodontal pocket depth in vegetarians was slightly higher than non-vegetarians. This is explained by the gingival score for vegetarians which was found slightly higher suggesting the presence of plaque causing slight loss of attachment, increasing the pocket depth. This may suggest chance of developing periodontal destruction irrespective of the type of diet and both vegetarians and non-vegetarians are equally susceptible to periodontal destruction. This is in contrast to the importance of an adequate nutrition for a healthy periodontium which was documented by Jenzsch et al.²¹ They demonstrated that solely a dietary change from non-vegetarian to vegetarian, according to the recommendations of Korber et al.²² leads to better periodontal conditions. Jenzsch et al.²¹ showed that 1 year after a dietary change without affecting dental hygiene and without dental therapy, patients had lower PPDs, less inflammatory signs and lower concentrations of interleukin-1 β and interleukin-6 in the gingival crevicular fluid.

Third, the wear pattern observed among both the groups revealed that generalized attrition was more prevalent in non-vegetarians compared to vegetarians, but attrition of selected teeth was more common in vegetarian group. However, prevalence of cervical abrasion was notably greater in non-vegetarians than vegetarians. The potential etiological factors for such non-carious cavities are not very clear but it can be attributed to improper horizontal brushing technique. Interestingly, increased use of horizontal brushing technique in non-vegetarians was seen which was statistically significant.

This is in contrast to the recent study report given by Herman et al in 2011^{1, 15}, stating that vegetarians are more susceptible to non-carious cavity. He reported horizontal brushing technique is more in vegetarians than in non-vegetarians to his conclusion. In contrast, other authors could not find a different prevalence of erosion between vegetarians and non-vegetarians.

Herman et al.²³ evaluated the prevalence of erosion and the consumption of acidic products in vegetarians and non-vegetarians. Regarding the prevalence of erosion, they could not show significant differences between the groups, although a significantly more frequent consumption of acidic products was observed among vegetarians.

Questionnaire analysis revealed equal level of dental education among both the groups and also similar frequency of regular dental visits. In contrary to this, various authors have showed higher level of dental education in vegetarians^{24, 25} and also several studies have reported a lower use of prescription medications and health services by vegetarians.²⁵ Statistically significant finding obtained from questionnaire reveals greater horizontal brushing in non-vegetarian group, this can be co-related to the increased amount of cervical abrasion seen in non-vegetarian group than in vegetarian group. This gives us quite a clear picture of how dental education is related to brushing technique which if faulty may cause cervical abrasion as seen in the non-vegetarian group.

Another statistically significant result from the questionnaire tells us halitosis was more common in non-vegetarians, which could probably arise because of the basic biochemical degradation of major component which constitutes an individual's diet. Meat being rich in protein undergoes putrefaction unlike carbohydrate that undergoes decomposition. Vegetarians usually tend to have high carbohydrate and low protein diet. When the results of smoking and alcoholism were matched in between vegetarians and non-vegetarians, both the group had similar distribution of smokers and alcoholics. This is in contrary to a study which states that Vegetarians consume less tobacco and alcohol, are physically more active and have a lower BMI compared with nonvegetarians.^{21, 22}

CONCLUSION

Type of diet does not really affect the periodontal status of an individual. Both vegetarians and non-vegetarians show almost same level of gingival index, plaque index and periodontal pocket depths with dental education slightly lower in non-vegetarians than vegetarians with equal amount of regular dental visits. However, with proper oral hygiene procedures such as vertical brushing, brushing twice daily, using interdental

aids and regular dental visits alone one can maintain good periodontal health regardless of diet being followed.

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Nutritional Assessment in Obese Children with and without Non-Alcoholic Fatty Liver Disease (NAFLD) in an Urban Area of Punjab, India

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ABSTRACT

Background: Non-alcoholic fatty liver disease (NAFLD) has been reported recently as the most frequent liver disease among obese children and adolescents in industrialized countries. **Objective:** Nutritional status of obese children with and without NAFLD. **Methodology:** We studied 160 obese children of 5-18 years age. Their anthropometric, biochemical measurements and ultrasonography were carried out to identify NAFLD in them. Z-score of body mass index (Z- BMI), mid arm circumference (MAC), waist circumference (WC) and triceps skinfold thickness (TSF) were done. Serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), gamma-glutamyl-transferase (GGT) low-density lipoprotein cholesterol (LDL-c), high-density lipoprotein cholesterol (HDL-c), triglyceride (TG), cholesterol, FBG (fasting blood glucose), high sensitivity C-reactive protein (HSCRP) and uric acid were measured. Their eating habits and dietary intake were recorded. **Results:** These patients were divided into two groups: group 1: without NAFLD (n= 54) and group 2: with NAFLD (n=106). NAFLD was detected in 66.2% of obese children. Median Z-BMI, MAC, TSF, WC and ALT, AST, GGT, TG, FBG, HSCRP, uric acid were significantly higher in NAFLD group as compared to without NAFLD ($p < 0.05$). HDL-c was significantly lower in NAFLD group ($p < 0.001$). Daily consumption of soft drinks (60.4 %) and fried chips (58.5%) were more in NAFLD group than without NAFLD group. **Conclusion:** Z-BMI, MAC, TSF, WC and ALT, AST, GGT, TG, FBG, HSCRP and uric acid were significantly higher in NAFLD and HDL-c was lower but most significant associated risk factors with NAFLD were TG and Z-BMI. Calorie intake was more in obese children but excess in NAFLD group. Early lifestyle interventional approach for the treatment of NAFLD can prevent nonalcoholic steatohepatitis (NASH) and cirrhosis.

Keywords: NAFLD; risk factors; obesity; children; adolescents; lifestyle

INTRODUCTION

Obesity is one of the major public health threats that is increasing worldwide. Currently, World Health

Organization (WHO) globally estimated that more than 340 million children and adolescents aged 5-19 years are overweight or obese. Overweight or obesity is most prevalent in north Indian children according to epidemiology survey conducted in different states of India and found that 19% combined prevalence of overweight or obesity.⁽¹⁾ Recent researches proved that the development of non-alcoholic fatty liver disease (NAFLD) in children is vigorously associated with

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obesity and its prevalence is up to 70-80%.^(2,3) NAFLD is the one of the common upcoming causes of chronic liver disease in pediatric population with an incidence of 3-10%.⁽⁴⁾ It is macro vesicular fat accumulation in more than 5-10% of hepatocytes and it encompasses spectrum of liver disease ranging from steatosis, steatohepatitis, fibrosis to cirrhosis.⁽⁵⁾ Sartorio et al. concluded that Z score of body mass index (BMI), serum alanine aminotransferase (ALT), uric acid, glucose during oral glucose tolerance test (OGTT) and insulin during OGTT were independent predictors of NAFLD in obese children but most predicted by ALT and Z-BMI.⁽⁶⁾ However, significantly high levels of triglyceride (TG), glucose, insulin, serum ALT, increased BMI and waist circumference (WC) are all possible clinical features of NAFLD in pediatric obesity.⁽⁷⁾ Moreover, the diet of children with NAFLD is rich in high fructose corn syrup (HFCS), meat, saturated fat and cholesterol and low in consumption of dietary fiber, fish, omega-3 fats and vitamin E.⁽⁸⁾ Excessive dietary fructose consumption in form of soft drinks is associated with NAFLD and it affects carbohydrate and lipid metabolism cause hepatic steatosis by increasing lipid peroxidation.⁽⁹⁾ HFCS (mixture of glucose: 42% and fructose sugars: 53-55%) has been directly linked with growth of fat cells, produce oxidative stress and nitric oxide synthase inhibition.^(10,11) More recently, another study showed excess intake of refined carbohydrates and sedentary lifestyle are the major significant risk factors for NAFLD occurrence in obese children.⁽¹²⁾ Central adiposity and higher BMI is widespread in Punjab, because of excessive adoption of western diets among children and poor dietary patterns may be related with pathogenesis of NAFLD. Therefore lifestyle-based intervention has emerged as cornerstone modality for the prevention of NAFLD in obese children. Before planning the dietary intervention, nutritional screening is essential in these children so that treatment could be given according to their risk factors. In present study, we assessed the nutritional status of obese children with and without NAFLD and have also highlighted the risk factors and dietary intake in them.

MATERIAL AND METHOD

A cross-sectional study was conducted from December 2016 to October 2017, 160 obese children of age group 5-18 years were enrolled on the basis of BMI ($\geq 95^{\text{th}}$ percentile) for study from schools of Jagraon city, Punjab, India. Fasting blood tests for predicting NAFLD were performed at Babe Ke Medical Hospital, Moga,

Punjab.

Inclusion criteria: 160 children of age group ranging from 5 - 18 years with a BMI of $\geq 95^{\text{th}}$ percentile for age and gender using WHO standard reference and without alcohol intake.

Exclusion criteria: Secondary obesity, patients on medications, Hepatitis B (HBV) and Hepatitis C (HCV), Hepatitis A & E infection, wilson disease, autoimmune hepatitis (AIH).

Ultrasonography (USG) (convex transducer 2-5MHz probe) was performed by radiologist by using following criteria:

1: Mild steatosis: Slightly increased echogenicity of liver parenchyma, normal visualization of diaphragm and intrahepatic blood vessels.

2: Moderate steatosis: Markedly increased echogenicity of liver parenchyma, slightly impaired visualization of diaphragm and intrahepatic vessels.

3: Severe steatosis: Severely increased echogenicity of liver parenchyma, with poor or no visualization of diaphragm and intrahepatic vessels and posterior part of the right liver lobe.

Normal liver was defined by the absence of fatty liver. On the basis of this, children were divided in two categories: Obesity with NAFLD (n=106) and obesity without NAFLD (n=54).

Nutritional Assessment: Anthropometric measurements: weight was measured by Dr. Diaz digital weighing scale to the nearest 0.1kg. Height was measured by measuring tape to the nearest 0.1cm. BMI was calculated by weight (kg)/height (m²). Z-BMI was calculated from WHO reference data.⁽¹³⁾ TSF(triceps skinfold thickness) was measured to the nearest 0.2 mm by Harpenden skinfold caliper (Holtain Ltd.). MAC (mid arm circumference) and WC (at the midpoint between the lowest rib and iliac crest) both were measured by measuring tape to the nearest 0.1cm. Laboratory measurements: Fasting serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), gamma-glutamyl-transferase (GGT) low-density lipoprotein (LDL)-cholesterol, high-density lipoprotein (HDL)-cholesterol, triglyceride (TG), cholesterol, high sensitivity C-reactive protein (HSCR), uric acid and fasting blood glucose (FBG) were measured using

standard laboratory methods. Three days dietary recall was taken by registered dietician to evaluate their dietary intake. Average three days intake of calorie, protein, fat and carbohydrate were calculated by using Diet-Cal, software a tool for dietary assessment and planning (version-1). Their baseline calorie was compared with revised RDA calorie (recommended dietary allowances for Indians) released in 2010.⁽¹⁴⁾ Lifestyle pattern: food habits and physical activity of participant's were examined with a self reported questionnaire which indicated the daily consumption of junk food especially soft drinks(coke, sprite, mountain dew, fanta, pepsi), french fries or fried chips and others(pizza, burger, noodles) over a week. The study protocol was approved by Institutional Ethics Committee (IEC), Post Graduate Institute of Medical Education and Research Chandigarh and informed consents were taken from their parents before assessment.

Statistical analysis; Statistical analysis was performed by SPSS version-16, Most of the variables were skewed and Mann-Whitney U test was applied for abnormal distribution of variables. All data were expressed in medians with interquartile ranges IQR in [square brackets] and minimum- maximum values were given in (round brackets) for biochemical parameters. Chi-square test was used for categorical data. Multinomial logistic regression analysis to assess variables associated with predictor of NAFLD i.e. soft drinks consumption, BMI Z- score, serum ALT, TG, uric acid (unadjusted) in obese children. Results were presented in odds ratio (OR), p value<0.05 was considered statistically significant.

RESULTS

Out of the 160 obese children, 106(66.2%) children were diagnosed with NAFLD. Among NAFLD children, 41(38.6%) had mild, 54(51%) had moderate and 11(10.4%) had severe form of NAFLD. There were no age difference in both the groups (p= 0.778). Z-BMI, MAC, TSF, WC were found higher in NAFLD children than without NAFLD (p<0.001) (Table1). Serum AST, ALT, GGT, FBG, TG (p<0.001) and HSCRP (p= 0.001), uric acid (p= 0.027) were found higher and HDL-c was lower in NAFLD group (p<0.001) as compared to those without it (Table 2). In multinomial logistic regression analysis, the most significant factors affecting NAFLD were TG (p<0.001) and Z-BMI 2, 3SD (standard deviation) (p =0.005, 0.004) (Table 3).

Daily consumption of soft drinks (60.4%), fried chips or french fries (58.5%) and others (30.2%) were higher in NAFLD group as compared to those without NAFLD i.e (37%), (38.9%) and (25.9%) over a week. NAFLD children were taking +310 kilocalories (kcal) and Non NAFLD group were taking +110 kcal more than RDA. The difference in energy intake was 200 kcal between the two groups. The energy intake in NAFLD and Non NAFLD group from fat and CHO was comparable i.e 32% vs. 31% from fat and 58.4% vs. 56.3% from CHO (Table 4). 85.5% children with NAFLD were physically inactive. These children were more inclined to playing video games, watching television or surfing on internet. The rest 14.5% does physical exercises (aerobics, jogging and sports) at least three times a week for 30 minutes. 58.2% of obese children without NAFLD were not doing physical activity and 41.8% children were physically active.

Table1. Baseline anthropometric parameters of obese children without and with NAFLD

Measurements	Without NAFLD(n= 54)	NAFLD (n= 106)	p value
Age (yrs)	12.2 [11-13.7]	12.5 [10-14]	0.778
Gender (Boys/Girls: n)	22/ 32	63/ 43	0.429
Weight (kg)	55 [52-60]	59.4 [53.6-66]	0.016

Cont... Table1. Baseline anthropometric parameters of obese children without and with NAFLD

Height (cm)	154 [145-158]	153 [137-158]	0.424
BMI (kg/m ²)	23.6 [22.8-25.9]	26 [24.5-29.7]	<0.001
BMI z score	2.05 [2.00-2.10]	2.36 [2.01-2.70]	<0.001
MAC (cm)	30 [28-31.2]	33 [32-35]	<0.001
TSF(mm)	17 [15-19.2]	20 [18-22]	<0.001
WC (cm)	83.5 [82-85]	86 [84-88]	<0.001

Table 2. Biochemical parameters of obese children with and without NAFLD

Measurements	Without NAFLD(54)	NAFLD(106)	p value
AST (IU/L)	31.5 [23.7-39] (19-42)	45 [43.7-51] (33-59)	<0.001
ALT (IU/L)	25 [23-27.8] (18-37)	46.5 [42.7-56.2] (32-70)	<0.001
GGT (IU/L)	20 [18-22] (15-29)	24 [23-29] (20-34)	<0.001
LDL-c (mg/dl)	97.7 [89.0-106.9] (83-116)	99 [91-112] (80-122)	0.081
HDL-c (mg/dl)	44 [42.0-46.2] (38-55)	42 [39-44] (32-49)	<0.001
Triglyceride (mg/dl)	140 [135-148] (107-151)	150 [148-154] (120-165)	<0.001
Cholesterol (mg/dl)	169.2 [164.1-176.3] (156.4-182.5)	171.7 [167-178] (145-187)	0.065
HSCRP (mg/L)	0.88 [0.78-1.00] (0.50-2.05)	2.10 [1.54-2.50] (0.87-3.20)	0.001

Cont... Table 2. Biochemical parameters of obese children with and without NAFLD

Uric acid (mg/dl)	4.60 [4.0-5.0] (3.40-6.00)	5.0 [4.3-5.9] (3.7-7.0)	0.027
Blood sugar fasting (mg/dl)	84.7 [79.7-90] (77-95)	94.5 [88-98.9] (78-106)	<0.001

Table 3. Variables associated with prediction of NAFLD in obese children

Variables	OR*	95% CI	p value
Uric Acid (mg/dl)	2.98	1.05- 8.45	0.04
Triglyceride (mg/dl)	30.68	6.31- 149.1	< 0.001
ALT (IU/L)	7.84	1.41- 43.4	0.018
BMI 2 SD	7.20	1.84- 28.1	0.005
BMI 3 SD	11.91	2.23- 63.4	0.004
Soft Drink (daily consumption)	4.11	1.40- 12.0	0.010

OR*: Odds ratio, CI: confidence Interval, P<0.05

Table 4. Three day average dietary intake of obese children without NAFLD and with NAFLD

Nutrient Intake	Without NAFLD (n=54)	NAFLD (n= 106)	p value
RDA(2010) Energy (kcal)	2190	2190	
Energy (kcal)	2300 [2107-2500]	2500 [2417-2615]	<0.001
Protein (g)	64.5 [55-68]	63.5 [55-68]	0.968
Fat (g)	79 [77-87.2]	89 [86-93]	<0.001
Carbohydrates (g)	325 [289-357]	365 [328-400]	<0.001

DISCUSSION

In the present study, USG detected NAFLD in 66.2% of obese children. Previous studies reported that NAFLD was present in 44% to 75% of obese children and had high intake of junk food with physical inactiveness.^(6, 15) Our study results indicate that high consumption of soft drinks and fried food are responsible for obesity and

NAFLD. Their calorie intake increased due to visible or invisible sugars and fats present in junk food items that promotes lipid per oxidation, insulin resistance (IR), increase in advance glycation end products and hepatic inflammation.⁽¹⁶⁾ Siddiqi et al. reported that students with NAFLD who were taking >2 soft drinks per day had significantly higher BMI, WC and also had elevated TG, FBG, ALT and lower HDL-c.⁽¹⁵⁾ In present study,

daily soft drink consumption of NAFLD children was 60.4% and also had significantly higher Z-BMI, MAC, TSF, WC and elevated serum AST, ALT, GGT, TG, FBG, with lower HDL-c (Table 1,2). Moreover uric acid was also significantly higher in NAFLD. Interestingly, in another study uric acid was the independent predictor of NAFLD in obese children and adults because of high fructose intake caused ATP depletion.⁽¹⁷⁾ Excess visceral fat and free fatty acid accumulation in liver increases the production of HSCRP in NAFLD patients. NAFLD group had significantly higher HSCRP as compared to those without NAFLD (2.10 vs. 0.88, mg/L p= 0.001). In accordance with our findings, Kitsios et al. saw that obese and overweight children with NAFLD had significantly higher levels of HSCRP compared to without NAFLD (0.78 vs. 0.34 mg/dl, p= 0.016).⁽¹⁸⁾

In the current study, 10% obese children with NAFLD had higher FBG > 100mg/dl putting them at the risk of IR. In similar study, EI-Koofy et al. found that 73% of NAFLD children had IR with higher prevalence of metabolic syndrome and obesity including half of NAFLD children had higher ALT.⁽¹⁹⁾ In our study, children who consumed soft drinks daily (1-2 standard glass) had 4.1 folds higher chances of NAFLD and its risk factors (Table 3). All obese children were taking more calories from fat and CHO rather than protein. In present study, observation about the physical activity in obese children with NAFLD was closely identical with previous study of Felix et al.⁽¹²⁾

This is the first study done on nutritional assessment in obese children with and without NAFLD in India.

CONCLUSION

Z-BMI, MAC, TSF, WC and ALT, AST, GGT, TG, FBG, HSCRP and uric acid are significantly higher in obese children with NAFLD and HDL-c is lower but most significant associated risk factors with NAFLD are TG and Z-BMI. Daily higher consumption of soft drinks with fried foods and sedentary lifestyle among obese children are major risk factor of NAFLD. Most of the calories they consumed from carbohydrate and fat that may play a role in the pathogenesis of NAFLD and its risk factors. Generally, untreated NAFLD in children will subsequently suffer full blown metabolic syndrome as they become young adults. Nutritional screening is the first step to identify the risk factors of NAFLD and lifestyle-based interventional approach could be defined

before its occurrence.

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Impact of Noise on Hearing of Individuals Working in the Temples

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ABSTRACT

Introduction: One of the most mystifying problems faced by individuals who are exposed to high levels of noise (either occupational or recreational) is the slow deterioration of hearing that takes place. Evidence from the literature also indicates that noise exposure causes a significant sensory neural hearing loss. Hence we planned to compare the hearing of priests and workers of temples using Pure tone Audiometry and the fine spectral DPOAEs.

Method: Twenty three male participants between the ages of 20 to 65 years were included in the study. Group 1 participants worked in the temple premises for more than 5 years and all the individuals had reported to have been exposed to noise during work. Group 2 was not exposed to noise.

Results: The temple workers had poor thresholds and significantly reduced SNRs compared to the control group.

Conclusions: Temple noise has impact on individuals working in the temple premises presence of NIHL.

Keywords: - NIHL, Temple Noise, hearing Loss

INTRODUCTION

Slow deterioration of hearing that takes place in individuals who are exposed to high levels of noise (either occupational or recreational) is one of the most mystifying problems. Noise-induced hearing loss (NIHL) is the second most common form of sensorineural hearing loss, after presbycusis. The damage caused by the noise is imperceptible, painless, and enormously slow, that the individual is unaware of his loss of hearing for a long time, and hence it is the most pervasive of all the

occupational health hazards. Noise exposure is perhaps the most common etiology of preventable hearing loss. Generally, this prolonged exposure to sounds as high as 85 dBA is hazardous even though the most important factor is the amount of sound exposure. Both the levels as well as the length of exposure are important and are interrelated [1-2].

The pathophysiology of the ear damage due to the noise exposure has been widely studied in humans and the mechanism whereby excessive sound exposure damages the ear is very well understood. Lesser levels of damaging sound exposure results in a temporary threshold shift (TTS). If this TTS occurs regularly, there is a poor recovery resulting in a permanent threshold shift (PTS). This PTS occurs as a consequence of persistent exposure to such sounds resulting in some hair cells not able to recover from damage. The outer hair cells in the basilar part of the cochlea which is the area that responds to 4 kHz and also the adjacent areas

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of 3 and 6 kHz, are the first to fail permanently. This area of the ear is identified to be most sensitive, because of the harmonic amplification by the ear canal and also because of the absolute sensitivity. Once these hair cells start degenerating they are less likely to recover and a permanent hearing loss is expected. Characteristically thus, following a long duration of noise exposure, hearing loss is presented as an audiometric notch, which is usually greatest at 4 kHz but can also be anywhere between 3 kHz and 6 kHz. With higher noise exposure for prolonged duration, the loss starts extending to the neighbouring frequencies. Moreover, if the sound is intense, it produces a more severe pattern of TTS which may result in a PTS more rapidly [3].

Outer hair cells are more susceptible to noise exposure than inner hair cells. Noise exposure causing TTS is anatomically correlated with decreased stiffness of the stereocilia of outer hair cells. The stereocilia become disarrayed and floppy. Presumably, in such a state they respond poorly. These are associated with fusion of adjacent stereocilia and loss of stereocilia. With more severe exposure resulting in PTS, injury can proceed from a loss of adjacent supporting cells to complete disruption of the organ of Corti. Histopathologically, the primary site of injury appears to be the rootlets that connect the stereocilia to the top of the hair cell. With loss of stereocilia, hair cells die. Death of the sensory cells can progressively result in Wallerian degeneration and further loss of the primary auditory nerve fibres. Hence, it becomes important to study the effect noise exposure in individuals working in different areas as they are exposed to different types of noises, with similar pattern of cochlear loss [3].

NIHL has been studied extensively in various occupational groups and using various testing procedure [4-6]. Silva and Cabral studied the Noise Exposure Levels of Priests and Worshippers in Churches and found that the exposure level varied between 95.4 to 99.5 dBA which also poses risk to the worshipper, so they reported that hearing conservation programs with adequate acoustical sanitation measures must be implemented [7]. Nevertheless, the impact of noise in temples has not been studied, even though pujas (worships) in temples are usually associated with lot of noise. This includes sounds of drums, bells, people shouting prayers, the sounds from various instruments like Saxophone, Nadhaswara, Thaal, Dholki, Drums, etc. The temple workers and worshippers are thus exposed to sounds of

high intensities (as high as 100 dB) and of a wide range of frequencies. Hence, these individuals could be prone to have hearing loss due to this kind of noise exposure. This makes it important for us audiologists to evaluate the level of hearing so that a good Hearing Conservation Program can be implemented.

Pure-tone audiometry has been a gold standard in evaluating the hearing status since decades based on which the Boyler's notch has been the most commonly reported pattern in NIHL [8]. However OAEs are also gaining popularity due to the type of information it gives regarding outer hair cells (OHC) functioning, which is essential for a healthy hearing, but are most vulnerable part of the ear in response to noise. It is also commonly agreed that the onset and gradual development of NIHL is mainly a consequence of OHC loss [9]. The spectral changes in DPOAEs were employed in this study as DPOAEs identify the slightest changes in the cochlear function, and DPOAEs were reported to be more reliable than PTA, ideal for monitoring the cochlear functioning in those exposed to noise [10]. Hence, it was decided to carry out this present study using fine spectral changes in DPOAE in addition to the PTA and immittance measures.

Need: NIHL is a more prevalent disorder among hearing disorders. Evidence from the literature also reports that noise exposure causes a significant sensory hearing loss. We hypothesised that noise exposure (due to exposure to sounds of drums, bells and other sounds) would have a negative impact on hearing health of individuals working in the temple premises throughout the day. Pharmacological line of management is not an effective choice in bringing the hearing back to normal level in individuals with NIHL. Hence, it is important to assess the hearing in this group, so that appropriate preventive measures may be advised either by using globalised hearing conservation programme or by other means like shifting of the work area away from noise.

Aim: To evaluate the hearing of priests and workers of temples using Pure tone Audiometry and the fine spectral changes in DPOAEs.

Subjects and Method

Participants: Twenty three male participants (Group 1: 9 workers from the temple and group 2: 14 controls) between the ages of 20 to 65 years (mean age of group 1 and group 2 was 40.11 and 41.11 respectively) were included in the study. All the individuals in group 1

worked in the temple premises for more than 5 years and all the individuals had reported to have been exposed to noise during work. All participants did not have history of/presence of neurological problems, middle

ear pathology or vestibular problems. In figure 1 hearing threshold of all the participants from each group across the octave frequencies are shown.

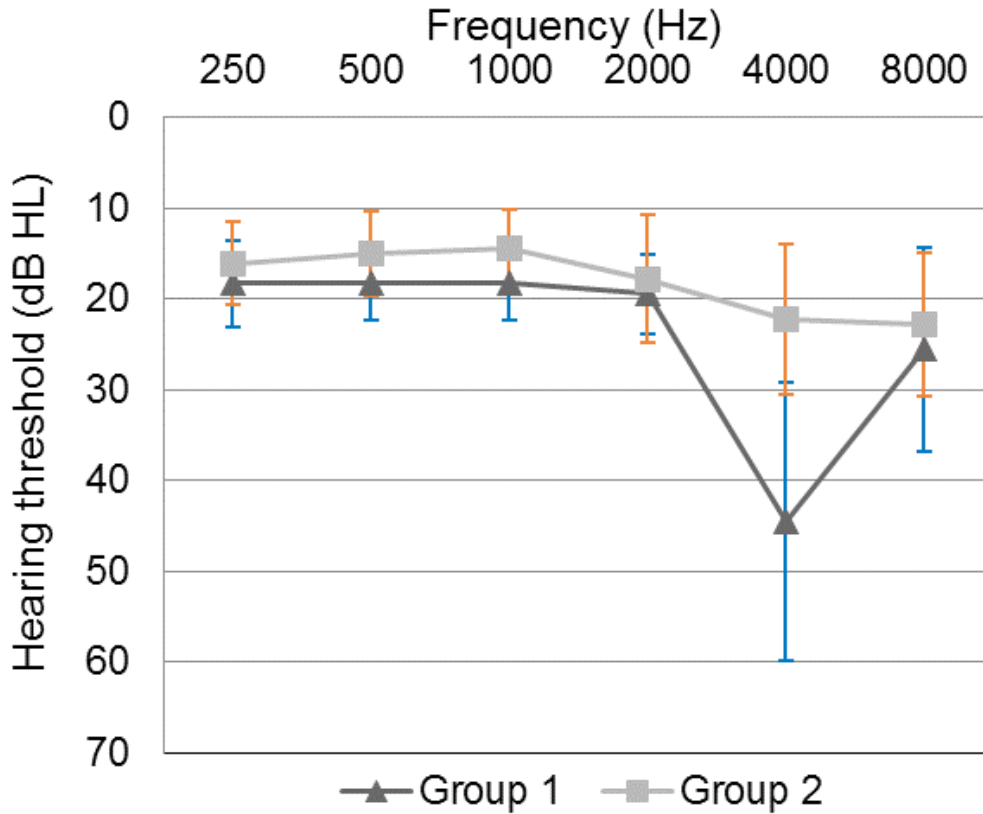


Figure 1: Shows PTA mean thresholds across the frequencies for all the participants.

Procedure: The participants were first seated in a sound treated audiometric laboratory. A brief case history was taken followed by an otoscopic evaluation. Immittance audiometry was conducted to rule out middle ear pathology because the transmission properties of the middle ear directly influence OAE characteristics. Then, pure tone audiometry using the instrument GSI 61 clinical audiometer was performed and audiometric thresholds were obtained at 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz and 8 kHz for both ears. The pure tone average (average of thresholds obtained at 500 Hz, 1 kHz, 2 kHz & 4 kHz) for each participant was calculated for both ears. The participants were then evaluated using fine spectral changes in DPOAEs using a computer-based DPOAE analyser (GSI AUDERA). DPOAEs were recorded for a total 49 pairs of frequencies with a resolution of 12 points per octave between 1 kHz to 8 kHz. With f2:f1

ratio of 1.20 in all occasions and Intensities of f1 and f2 kept at 65/55 dB SPL [11]. In this study, data was represented with reference to f2 with rejection criterion set at 30 dB SPL or if L1 and L2 differed by > 2 dB from the target values beyond which a frame was rejected [12].

RESULTS

The frequency specific thresholds revealed that the temple workers had poor hearing thresholds indicating the presence of hearing loss. The DPOAE values showed that the SNRs were poorer in the temple workers compared to the control group. The mean and standard deviations as shown in Table 1 were higher in the control group compared to the temple workers.

Table 1: Showing the mean and standard deviation of the DPOAE amplitude and SNRs at the four octaves.

Frequency in octaves	Temple Workers (dB)	Control Controls (dB)
	Mean & SD	Mean & SD
500 Hz – 1kHz signal amplitude	2.40 ± 3.33	2.72 ± 4.52
500 Hz – 1kHz SNR	8.92 ± 3.49	12.10 ± 6.37
1kHz – 2kHz signal amplitude	4.76 ± 5.60	7.19 ± 5.65
1kHz – 2kHz SNR	17.31 ± 5.94	23.51 ± 6.59
2kHz – 4kHz signal amplitude	-2.64 ± 7.61	3.02 ± 5.72
2kHz – 4kHz SNR	18.41 ± 7.92	26.52 ± 5.25
4kHz – 8kHz signal amplitude	-13.29 ± 6.30	-10.90 ± 6.34
4kHz – 8kHz SNR	7.98 ± 6.33	12.09 ± 5.81

On applying Mann Whitney U test for the values, a statistically significant difference was observed between the two groups which was specific to the octaves 1 kHz to 2 kHz, 2 kHz to 4 kHz and 4 kHz to 8 kHz at $p < 0.05$.

Pearson’s product moment correlation was employed to observe the degree of correlation between the age, PTA and DPOAEs. The results revealed a good degree of positive correlation between Age and the PTA at $p = 0.004$, $r = 0.64$ which suggests that the PTA increased as age increased. It was also observed that there was a good degree of negative correlation between the age and the DPOAE values specific to the octaves 2kHz – 4kHz at $p = 0.00$, $r = -0.771$ and 4kHz – 8kHz at $p = 0.01$, $r = -0.712$ which indicates that as age increased the DPOAE SNRs at the higher octaves reduced. In addition, a good degree of negative correlation was observed between the PTA and the DPOAE SNRs between 2 kHz – 4 kHz octave at $p = 0.00$, $r = -0.771$.

DISCUSSION

This study aimed at investigating the hearing sensitivity among temple workers using PTA and DPOAE. The results showed that most of the Temple workers had pure tone thresholds higher than the normal limit with majority showing a notch at high frequencies between 3 - 6 kHz. This particular pattern is typical of the Boyler’s notch observed in individuals with NIHL [8] which is attributed to the OHCs dysfunction which takes place maximally in this frequency region as a result of the harmonic amplification by the external ear and absolute

hearing sensitivity, secondary to noise exposure [13].

The results also showed that the temple workers had lower DPOAE signals and SNRs at all the three octaves in comparison to the controls. This can be attributed to the impact of the temple noise on the hearing sensitivity of the individuals working in the temple leading to outer hair cell dysfunction indicative of Sensory-neural Hearing loss.

A significant positive correlation between age and PTA was observed which suggested that older individuals working in the temple premises had higher thresholds which could be due to the longer years of exposure to the damaging noise leading to higher degree of hearing loss and also permanent threshold shifts. The age also showed a negative correlation with the DPOAEs at higher octaves indicative of the DPOAEs (at high frequencies 2 kHz to 4 kHz & 4 kHz to 8 kHz) reducing as the age advances. These particular findings could be attributed to an interaction of the noise NIHL and age related loss. The noise NIHL owing to years of exposure to loud noise which impacts the higher frequencies specifically, as well as age related loss of hearing sensitivity as a result of the deterioration in the structural aspects and functional metabolism of the inner ear. An influence of presbycusis on noise induced hearing loss has been suggested [13]. The effect of noise is hence equivocal. The interactions between NIHL and age related hearing loss are complicated, difficult to determine, and poorly understood [13]. Hence poorer pure tone thresholds and reduced DPOAE SNRs were

obtained as age advanced.

The PTA also significantly correlated with the DPOAE SNRs specific to 2 kHz to 4 kHz which indicates more loss in those frequencies which is associated with the Boyler's notch, a typical characteristic of NIHL. This specific finding lessens the chances of age related hearing loss while supporting the presence of NIHL in this population. This in accordance with the findings that the outer hair cells (OHCs) in the most basilar part of the Cochlea are the first to get damaged permanently, the area that responds for sound frequencies between 3 and 6 kHz. This has been attributed to the absolute sensitivity as well as the harmonic amplification by the ear canal in response to the noise. Hence, after a long period of noise exposure, sensory neural hearing loss is presented as an audiometric notch, which is usually maximal at 4 kHz but may also range anywhere from 3 kHz to 6 kHz³ at par with the observations in these temple workers. All these findings increase the possibility of NIHL in the individuals working in the temple premises, in line with the reports by the other researchers on the various populations^[4-6]. The findings of this present study are also in coherence with the findings of the study done on individuals working in the churches who are reported to have hearing loss due to noise exposure^[7]. This present study provides valuable insight about the effect of the damaging noise on the hearing in the individuals working in the temple premises. This may be helpful in understanding the impact of noise on the hearing of these individuals. The present findings stress the need to implement good preventable measures for individuals working in the temple premises.

CONCLUSION

These results could be attributed to the impact of the temple noise on the hearing sensitivity of the individuals working in the temple leading to a hearing loss, demonstrating the presence of NIHL among the individuals working in the temple premises. However study needs to be replicated using a larger sample for generalisation of finding.

Source of Funding- Self

Conflict of Interest - Nil

Ethical Clearance- Taken from Institutional Ethical Committee.

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Effect of Sudarshankriya Yoga on Some Auditory Processing Abilities and Speech Perception in Noise among Middle Aged Adults

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ABSTRACT

BACKGROUND AND OBJECTIVES: Auditory transduction is the process by which sound is converted to neural impulses to pass via the auditory pathway structures to reach the auditory cortex and for with this auditory physiology oxygenated blood supply is a necessity. SudarshanKriya Yoga (SKY) is known to improve lung functioning and oxygen level in blood circulation. Hence objectives of the present study was to compare the performance of modulation detection threshold, gap detection threshold, pitch discrimination threshold and speech perception in noise among middle aged adults who practice and do not practice SKY.

MATERIALS AND METHOD: Middle aged individuals who practiced SKY for a minimum of 1year were considered in the experimental group and who did not practices any form of yoga formed the control group. Auditory processing tests of modulation detection threshold, gap detection threshold and pitch discrimination threshold were assessed along with speech perception in noise.

RESULTS: The mean modulation detection threshold and SNR 50 scores showed no significant difference between the groups whereas the pitch discrimination and gap detection thresholds showed a significant difference between the groups.

CONCLUSION: SKY has a variable effect on the auditory processing abilities.

Keywords:- SudarshanKriya Yoga, Auditory processing abilities, Speech in Noise

INTRODUCTION

Perception and interpretation of auditory information is referred to as auditory processing. Temporal and spectral processing abilities are important aspects within the umbrella term of auditory processing.

Speech perception is the process by which the sounds of language are heard, interpreted and understood. Decline in temporal processing has been correlated with reduced performance in speech recognition as well as longer gap to perceive the stop consonant within a word among middle aged adults in comparison to younger adults. (1,2) Sudden sensorineural hearing loss with slow blood flow in the vertebrobasilar system in humans has been reported. (3)

Auditory transduction is the process by which sound is converted to neural impulses to pass via the auditory pathway structures to reach the auditory cortex. Oxygenated blood supply is a necessity for this process to take place. (4) SudarshanKriya Yoga (SKY) is one of the popular forms of yoga practice which

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involves cyclical controlled breathing practiced in four distinct consecutive segments separated by 30 second periods of normal breathing: Ujjayi – 3 cycles of slow breathing per minute; Bhastrika - 20-30 cycles of rapid exhalations per minute; Om chanting with prolonged expiration and SKY – slow, medium and fast cycles of rhythmic, cyclical breathing. Rhythmic breathing variations which is the last step of the SKY is practiced in the seated position with eyes shut and complete focus on the breath.^(5,6) In short, SKY involves different kinds of pranayama along with rhythmic breathing practices. According to Ramdev ⁽⁷⁾, the outcome of pranayama practices is known to improve lung functioning and blood circulation. Research in the past has been able to explore the effects of SKY on cognition, oxygen saturation level, vital capacity, and other ailments. ^(5,8,9) However, there is a dearth of studies on the effect of SKY practices on human auditory behaviors. Hence we aim to assess the effect of SKY on some auditory processing abilities and speech perception in noise among middle aged adults.

MATERIALS AND METHOD

A total of 40 middle aged individuals in the age range 40-65 years participated in this research who were recruited by convenient sampling. 20 individuals comprised the experimental group (mean age=49 years, SD=±6.9) and 20 individuals formed the control group (mean age=51 years, SD=±5.5). All the individuals considered for the study had hearing thresholds within normal limits and were free of circulatory, neurological and renal issues. Any individual who scored less than 25 on the Mini-Mental State Examination (MMSE) was excluded from the study.⁽¹⁰⁾ The experimental group consisted of individuals who practiced SKY for atleast 1 year and the control group did not practice any form of yoga. All the individuals for the study were native kannada speakers. All the stimuli for the psychophysical and speech perception tests were presented from a Dell Inspiron 14 64-bit laptop. The output from the laptop was routed through a Focusrite Scarlett solo sound card and the stimuli were presented through Sennheiser HD 280 headphones binaurally. The mlp (maximum likelihood procedure) toolbox using the MATLAB code was used for the temporal and spectral processing tests.⁽¹¹⁾ All the auditory processing tests employed a three alternative forced choice (3afc) paradigm using a 2-down 1-up staircase procedure.

Modulation detection threshold (MDT). Sinusoidal

amplitude modulated 500ms Gaussian noise was presented at the rate of 8Hz, 20Hz and 60Hz. Modulated and unmodulated stimuli were equated for total RMS power. Noise stimuli had two 10msec raised cosine ramps at onset and offset. The MDT was based on the smallest level or depth of modulation that the participant identifies. The carrier was presented in three consecutive intervals separated by silent intervals of 200ms. In the randomly chosen interval, the carrier was sinusoidally amplitude modulated. The participant was asked to indicate if the modulation was present in the first, second, or third intervals. The starting level was reduced to -9dB for 8Hz modulation rate and -15dB for 20Hz and 60Hz respectively. The modulation depth was decreased by a factor of 3 for 2 consecutive responses and was increased by a factor of 1.5 for a single incorrect response. 12 reversals were measured from which the last 8 reversals were arithmetically averaged for threshold estimation. 3-4 practice trials were given before the commencement of the test.

Gap Detection Threshold (GDT). The standard stimulus used was a 750ms broadband noise with 0.5ms cosine ramps at the beginning and end of the gap which was presented for 500ms. Interstimulus interval was 1500ms. The variable stimuli contained the gap and the two standard stimuli did not contain any gap. The participants were instructed to indicate if the gap was present in the first, second or third interval. For two consecutive correct responses, the gap was reduced by a ratio of 2. Similarly, for a single incorrect response, the gap was increased a factor of 1.41421. The starting level of the gap duration was kept at 50ms. Similar to the modulation detection threshold procedure, the last 8 reversals from the 12 reversals were arithmetically averaged for threshold estimation.

Pitch Discrimination Threshold (PDT). 3 successive complex tones of 250ms were presented, which had the same power spectrum but differed only in pitch. The standard stimulus was a complex tone ($F_0=330\text{Hz}$) with 4 harmonics (lower harmonics, 2-5). The stimulus had 10ms cosine gated onsets and offsets. The starting level was set to a difference of 50Hz from the standard stimulus. A 2 down 1 up paradigm was used. The difference in pitch was decreased by a factor of 2 for successive two correct responses whereas the difference was increased by a ratio of 1.41421 for a single incorrect response. The participants were asked to indicate whether the first, second or third interval had

the higher pitch than the standard tone.

SNR 50. The QuickSin test in Kannada was used. (12) For the current study, three lists of sentences were presented at a comfortable level. The SNR (signal-to-noise ratio) was varied from +20dB to -10dB in 5dB steps per sentence in each list. The listener was asked to repeat the key words in the respective sentences. The number of correctly identified keywords from each list were calculated. Using the Spearman and Karber equation, total scores were converted to SNR 50 and averaged for 3 lists. The minimum signal to noise ratio at which one can repeat words 50% of the time is referred as SNR 50.

$$SNR\ 50 = i + (1/2 * d) - (d * correct / w),$$

Where, i = initial presentation level

d = step size

correct = number of keywords identified

w = number of keywords per decrease in SNR

Statistical Analysis.

Using SPSS 17 descriptive statistics was done to obtain the mean and standard deviation measures. Independent sample t-test was done to compare the mean thresholds for the auditory processing abilities and speech perception in noise scores between the groups. Correlation between years of SKY practice and auditory processing abilities and speech perception in noise was calculated using the Pearson’s correlation coefficient.

RESULTS

Figure 1 shows the mean modulation detection threshold for both groups across the modulation rates. The mean threshold at the three modulation rates was almost alike in both groups.

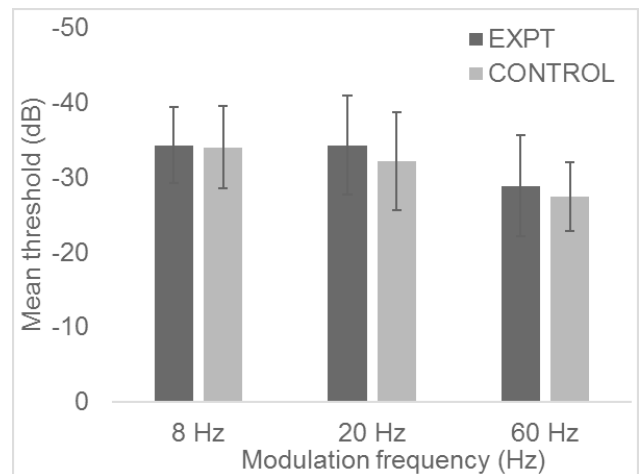


Figure 1: M ± 1 SD of Modulation detection threshold at 8Hz, 20Hz and 60Hz for the experimental and control groups (M-Mean, SD-Standard deviation)

Figure 2 shows the mean GDT scores for experimental and control groups. The mean gap detection thresholds for the experimental group was better than the control group and this difference was found to be statistically significant (p ≤ 0.05).

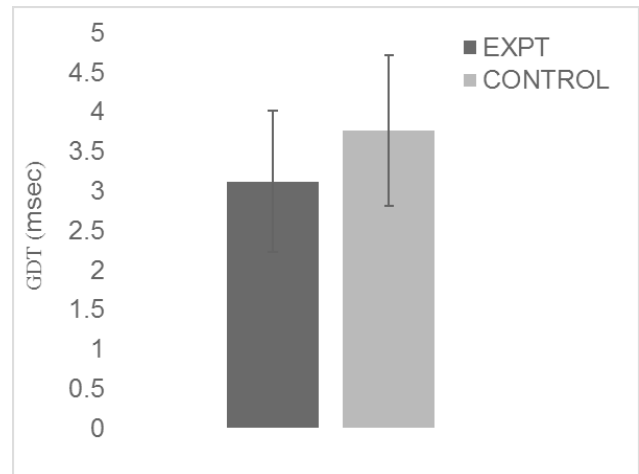


Figure 2: M ± 1 SD of GDT scores for experimental and control groups (M-Mean, SD-Standard deviation)

Figure 3 shows the mean PDT scores for experimental and control groups. The mean pitch discrimination thresholds was better in the experimental group which is suggestive of better discrimination abilities in the experimental group in comparison with the control group and this difference was statistically significant (p ≤ 0.05).

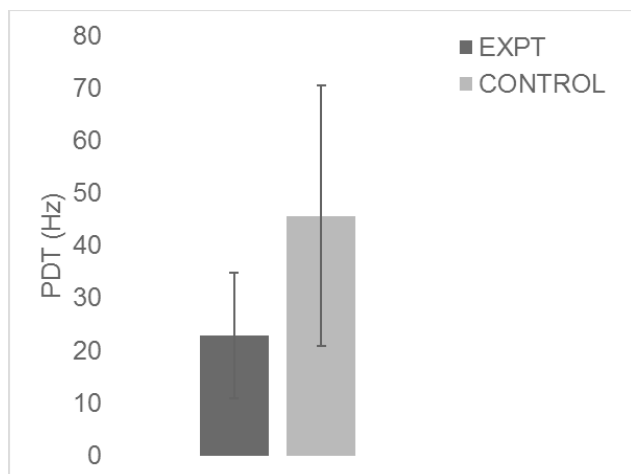


Figure 3: M ± 1 SD of PDT scores for experimental and control groups (M-Mean, SD-Standard deviation)

Figure 4 shows mean SNR 50 scores for experimental and control groups. The mean SNR 50 scores was almost equivalent between both the groups.

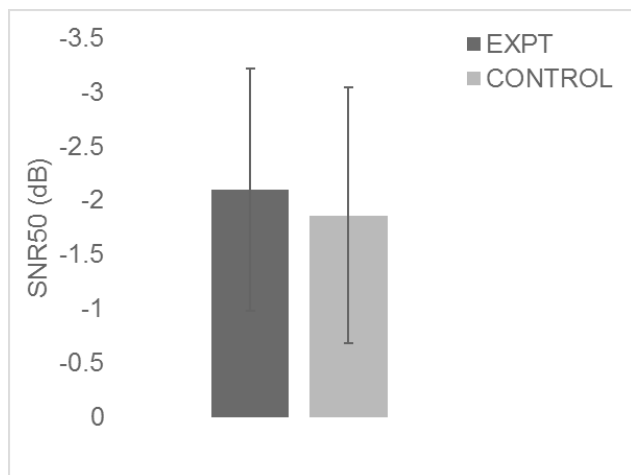


Figure 4: M ± 1 SD of SNR 50 scores for experimental and control groups (M-Mean, SD-Standard deviation)

Independent samples t-test was done to compare the mean scores of modulation detection threshold, GDT, PDT, and SNR 50. Table 1 below depicts the F and p values of the independent t-test done to compare modulation detection threshold at the 3 modulation rates, GDT, PDT and SNR 50 between the experimental and control groups.

Table 1: F values and p values of independent t-test for modulation detection threshold (at modulation rates 8Hz, 20Hz, 60Hz), GDT, PDT and SNR 50

Parameters	F value	p value
MDT at 8Hz	0.051	0.79
MDT at 20Hz	0.02	0.35
MDT at 60Hz	5.76	0.54
GDT	0.06	0.04*
PDT	11.98	0.00*
SNR 50	1.95	0.53

The association between years of experience of SKY practice and the performance on the tasks was assessed using the Pearson correlation coefficient, controlling for age as a confounding variable. All the measures showed no significant correlations with years of experience of SKY practice. Table 2 represents the R values for the correlation studied between years of experience of SKY practice and modulation detection threshold (at 3 modulation rates), GDT, PDT and SNR 50.

Table 2: Correlation between years of practice and modulation detection threshold (at 8Hz, 20Hz, & 60Hz), GDT, PDT, and SNR 50

	Parameter	Correlation coefficient
Years of SKY practice	MDT at 8Hz	0.35
	MDT at 20Hz	0.05
	MDT at 60Hz	0.16
	GDT	0.39
	PDT	0.01
	SNR 50	-0.05

DISCUSSION

SKY practice showed no significant effect on MDT which can be attributed to unknown reasons. Contrary to our study improved blood circulation due to physical exercise resulted in better modulation detection abilities for lower carrier frequency (500Hz) at three modulation rates (16Hz, 32Hz and 64Hz) except for 8Hz modulation rate has been reported, in old aged adults who engaged in physical exercise compared to age matched peers

who did not engage in any form of physical exercise. However, no significant difference for higher frequency carrier tone (4000Hz) across the modulation rates was reported among old aged adults practicing physical exercises.⁽¹³⁾

GDT in the group of participants who practiced SKY showed significant improvement compared to the group of participants who did not practice SKY. This improvement can be attributed to improved oxygenated blood supply to the auditory system due to SKY practice. However, there is no literature available affirming improvement on auditory processing measures in effect to SKY practices. Temporal envelope processing those assessed through MDT and GDT, the findings from these measures are not comparable due to the within subject variability observed for these measures.⁽¹⁴⁾

Pitch discrimination was measured for a 330Hz fundamental frequency tone with lower harmonics (2 to 5 harmonics). The better performance on pitch discrimination abilities in the middle aged participants who practiced SKY could be attributed to better TFS coding due to improved oxygenated blood supply to the auditory system due to SKY practice. A high degree of variability was observed in pitch discrimination abilities between the participants and this finding is in accordance with literature.^(15, 16)

SNR 50 which is a measure of speech perception in noise, was almost identical between both the groups. There is no available literature to support the current finding. Pitch discrimination of a complex tone with lower harmonics and speech perception in noise both make use of temporal fine structure processing. However, there are various other factors which are important for speech perception in noise. Understanding speech in noise depend on fundamental frequency and other acoustic features such as formants, fine structure, etc.⁽¹⁷⁾ In the present study, the fundamental frequency of the QuickSin sentences (F= 233Hz) was lower than the fundamental frequency of the complex tone stimuli (F= 330Hz) used in the pitch discrimination task. So the findings from these two measures cannot be compared with each other.

The years of SKY practice failed to show any correlation with the performance on the auditory processing and speech perception in noise abilities. All the participants considered in the research had a

minimum of 1 year of experience in SKY practice. Probably, the improvement in auditory measures due to improved oxygenated blood circulation would have already taken place which maintained as the years of experience increased. Similar findings have also been reported among participants practicing meditation.⁽¹⁸⁾

CONCLUSION

From the present study, it can be implied that SKY practice has a beneficial effect on some aspects of auditory processing abilities. This can pave way for an alternative strategy to offset the decline in auditory processes and maintain a healthy auditory system.

Source of Funding- Self

Conflict of Interest - Nil

Ethical Clearance- Taken from Institutional Ethical Committee.

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Influence of Family Structure and Gender on Oral Health Behavioral Characteristics in Siblings, a Narrative Review

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ABSTRACT

Aim: To comprehensively address the concerns regarding the influence of family structure and gender on sibling oral health behavioral characteristics.

Background: The maintenance of one's oral health is influenced by the behavioral characteristics and structure of a family, parental attitudes, presence or absence of siblings, paternal and maternal behavior and the gender of the child. The intricate, subtle and sensitive directives a child's mind perceives and receives on a daily basis within the home environment plays a vital role in determining the mind set of a child in relation to oral health.

Clinical significance: Psychology, Psychiatry, Sociology, Developmental Physiology, Sibling behavior patterns and background family factors are key related fields in the formative years which guide us for a comprehensive understanding. Comprehending the intricately networked branches of behavioral sciences and sibling behavior helps us to refine our response to patients, for improved oral health counsel and advise.

Conclusion: Adoption of the best practices for improving oral health related interaction at home and for bringing about a sensitive and constructive approach in the mindset of siblings contribute to improved health outcomes.

Keywords : family, gender, oral health

INTRODUCTION

It is known that a family environment does play a role on the health and oral health of a child . What needs to be further explored is the role of family, gender differences and the influence of sibling behavior on oral health. This narrative review attempts to throw light on the family structure, parental, paternal, maternal and

related perspectives of gender, age and adolescence.

It has been established that the mother is of the utmost influence when it comes to the oral health of the child, however there are some variables which are not well explored.

Parents' oral health habits have a direct influence on the children, and this has been documented to be slightly stronger in sons, when compared to daughters. Among girls, the father's high occupational level influences oral health for the better¹, a possible explanation which could be awareness and access to better facilities and care. A lesser known dynamic of families is the gender tilt, as illustrated by Milevksy. Families with a male tilt i.e families with more males in the home, have reported higher levels of family hostility and lower levels of family satisfaction than female-tilted families². This patriarchal influence has been shown to have an indirect

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correlation with oral health and dental injuries. Sanders et al attempted to understand this by scrutinizing various parental rearing styles and the stress experienced by adolescents, which increases their likelihood to sustain dental injuries and poor periodontal/gingival health. Adults who described their rearing as unsupportive, reported lower levels of control, life satisfaction, and greater stress³ which would then increase their predisposition to poor oral and general health. Parental co-habitation was not seen to have a significant association with the adult's psychosocial profile. Sole parent status may not disadvantage the child's psychosocial development in the event that the parent provides a sense of security (provided the socioeconomic profile is adequate) when compared to children in two parent households who are exposed to conflict³. More experienced and more educated parents have been expected to exhibit a higher awareness when it comes to oral health, but no correlation exists between parental age/level of education and compliance of children in specific issues when asked to use a mouthguard in a study conducted by Matalon V et al⁴.

Family size is yet another influencing variable which directly impacts the division of labor and finances which go towards attaining education and maintaining good oral health. Smaller families have more effective communication and are able to monetarily concentrate on each member including the children, owing to greater nurturing, education/awareness, access to dental treatment and dental aids. In a larger family, additional effort must be invested in order to maintain smooth daily functioning, and such families have more diversified roles as well as less likelihood of conflict² despite the need to cut down on expenses at the cost of poorer attention to dental health, owing to higher caries rates⁵.

Studies on birth order and sibling relationships have consistently found that elder siblings in the family often take on a semi-parental role by offering support, advice, and mentorship to the younger child. Consequently, younger siblings admire and venerate their older siblings². It has been shown that the eldest children bear the burden in cases of a chronically ill sibling, thus lowering their educational attainment- while the younger siblings are insulated. **Having a brother works in favor of this insulation from negative impacts of household hospitalizations**⁶. The study of gender differences in children and siblings in regard to general and oral health has showcased some interesting findings. A study in

older unlike sex twins showed females to have more total health conditions, most of which were not life threatening, whereas males had lesser health conditions though most were life threatening⁷. As per the general consensus over the years, females have been shown to have a greater awareness and concern for their dental health which is concurrent with the rates of decline in dental visits during the transition from childhood to adulthood, the risk being more in males as described by Brocklehurst P⁸. This is further illustrated by more frequent toothbrushing habits in girls across all age groups, countries and regions. Due to certain baseless societal norms, girls in the past have grown to be more conscious of their physical appearance when compared to boys. This assumption is concurrent with findings from a study conducted by Matalon et al, which showed a higher compliance to wearing mouthguards in boys, and a significantly lower compliance with girls⁴. It showed that the reason for the difference was not entirely clear but it was not a result of societal standards of beauty, but in fact due to how individuals view areas for beauty.¹⁰. A survey conducted in Hiroshima University, Japan has shown that the average number of teeth present in those over 75 years of age, were more in males than in females¹¹.

Gender, however is not the only factor influencing oral health compliance behaviors. A study by Mak KK in Hong Kong, showed that the male gender as well as Chinese background are significantly associated with lower odds of regular toothbrushing, annual dental visits and use of dental floss¹².

Sibling relationships are impacted by their gender composition, dyads of brothers have been found to be more aggressive and hostile rather than the supportive and intimate and nurturing relationship shared by sisters². Mixed sex dyads as well as brothers have been repeatedly shown to harbor less supportive and less intimate relationships than sister dyads.

Sister dyads have displayed increasing closeness at the age of adolescence with more reciprocal advice and trust than the other dyad combinations, owing to higher sibling relationship satisfaction when compared to males. Mixed sex dyads can be assumed to show a higher propensity for conflict. Literature highlights more harmony between same sex dyads, more so in sister dyads leading to the further assumption that **gender does impact the quality of sibling relationships**

and behaviors. However, mixed sex dyads have been shown to develop a closeness during the age of middle adolescence, more than the same sex dyad siblings. Kim et al have proposed that this could be perhaps due to a developing desire to learn about the opposite gender in the beginning of early romantic relationships at this age².

Caregivers/ Teachers oral health attitudes and their effect on siblings :

At a young age, children mostly interact with their parents/siblings/other caregivers at home, and teachers in school. A large portion of oral health practices acquired by the child are imparted by the school teachers which are then passed on to their siblings at home. An excellent example of this in Japan, is by the prevalence of Yogo Teachers who are equivalent to school nurses and care for the child by promoting health. Certification for the same can be procured in the field of dentistry and oral health and is existing in many institutes such as Hiroshima University, Baika Women's university, Kyushu University of Nursing and Social Welfare etc. Caregivers with a positive attitude towards oral health such as frequent visits to the dentist, use of fluoride varnish etc, would no doubt extend these behaviors and attitudes to the children they care for^{13,15,16} and such children would be more aware and display better oral care patterns which their siblings would try to emulate. Most of the participants in school based studies, to evaluate oral health attitudes of school teachers, have been female staff^{15,16,17} They have shown better oral hygiene scores as well as awareness, most of the knowledge being received from their dentists, followed by books and then television¹³. Since school teachers are teaching children about oral hygiene maintenance, they themselves must be well versed with the principles and techniques of oral care. It has been shown that nearly 80% teachers use potentially traumatic techniques for interdental cleaning, many do not regularly visit the dentist, and eat high amounts of refined sugar¹⁸. It would be detrimental if they were to pass on this information to children, and it can be prevented by carrying out organized training to demonstrate proper use of tooth cleansing aids to strengthen their oral health knowledge. This would likely be a success due to the positive attitudes towards oral health education exhibited by primary school teachers^{16,17} especially towards learning more about dental trauma management¹⁹. Two potential paths which the siblings may be led down are worth discussing here. One situation would be one where one sibling attempts to

emulate what the other has learned from his/her teacher, and the other could be that the sibling tries to defy the same. In both these scenarios the impact on the sibling's oral health would largely depend on what the child has been taught at school, and if accurate dental care methods are expressed. Further, two or more siblings, learning from two different teachers at school, may be taught differently and upon discussion and comparison, the siblings could help improvise on each other's oral behaviors thus developing an oral care pattern which is a combination of two, or bettered version of one.

Media and sibling behavior :

The only inanimate entity a child learns from at this age is various forms of media, be it advertisements in magazines, posters and television. Thus it is crucial what a child watches on television, whether it is their favorite programs or the advertisements in between. The information children gain from watching programs on television are then transmitted to their friends and siblings who often watch with them. An interesting study by Rodd and Patel, described the nature of television advertisements and their effects on pediatric viewers. In this study, over a 2 month period, 984 ads were transmitted, out of which on average 24 adverts were shown per hour of children's television broadcasting. Shockingly among the 41 hours of recording, there was seen to be only one advertisement for an oral hygiene product, and nearly 95% of ads were centered on high sugar and/or acid products. Children are being overwhelmed with harmful information via TV advertisements and being targeted for the marketing of these harmful products²⁰ which has an impact on sibling attitudes towards oral health. A positive outcome that can come from tweaking these advertisements is through motivational interviewing which is shown to benefit siblings and adolescents in particular²¹. Creative exploration of bringing about such positive outcomes is illustrated by an app called Toothsavers which has a virtual brushing game for children with instructions, available in English and Spanish. The use of such a modality has shown to impact children as well as sibling behavior, and leads to regular twice daily brushing within a year of use²².

CONCLUSION

The major influencer in learning of oral behaviors is the mother followed by one's siblings. The impact is far more with the elder sibling in a family with multiple

children. Children learn a majority of their behaviors including sleep habits, oral hygiene habits such as tooth brushing, from their parents but even more so from their elder siblings in an attempt to emulate their behavior and gain parental approval. This is concordant with modeling.

The presence of siblings in a child's life has intangible benefits owing to superior emotional maturity, closer friendships, healthier competition, **preemptive support** and higher fulfillment when compared to those without siblings. Modeling is successfully used in the dental clinic to alleviate dental anxiety in a child with the help of a sibling model who then encourages positive and cooperative behavior from the previously anxious child.

Closeness between siblings is influenced by the gender of the children, of which sister dyads have the closest and healthiest relationship, and the older brother-younger sister pair are the least intimate. Female tilted families (with more female members) display more harmony and less hostility, and aggression than male tilted families. This is more conducive in acquiring and maintaining health behaviors.

Conflict of Interest: None.

Source of Funding: None

Ethical Clearance : Not indicated.

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Comparison of the Influence of Different Tooth Tapers on Retention of Metal Crowns Luted with Two Resin Cements

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ABSTRACT

Background: Taper of the prepared tooth is one of the most important factor for retention while luting cements are weak but a critical link for retention

Aims: Compare the influence of different tapers of prepared teeth on retention of metal crowns when luted with two commercially available adhesive resin cements

Materials and Method: 48 extracted human premolars were used in this study. Each tooth was mounted in a PVC ring with auto polymerizing acrylic resin. A customized device was used to standardize the tooth preparation. Teeth were divided into 3 equal groups representing taper 6°, 12°, and 30°. Metal crowns were fabricated for each tooth. Prepared teeth were luted with either RelyX Ultimate Clicker or Multilink Automix. Specimens were subjected to 'Crown Pull Off' test using Universal Testing Machine

Statistical analysis used: One way ANOVA with Tukey post-hoc and Independent 't' test

Results: Statistically significant difference was found in the mean failure stress at 6° degree taper angle compared to 30° with p value ≥ 0.003 for both the adhesive resin cements. There was no significant difference of mean of failure stress for metal crowns luted with RelyX Ultimate Clicker and Multilink Automix

Conclusions: Mean failure stress was highest at taper at 6° with a steady decrease at 12° and significant decrease at 30° taper. It is utmost important for clinician to prepare the tooth within the range of 12° taper. While adhesive resin cements RelyX Ultimate and Multilink Automix are equally effective in terms of retention of the crowns

Key-words: Crown retention, Failure stress, Luting agent, Resin cements.

INTRODUCTION

Tooth preparation is an art and requires lot of skill and planning and is governed by biological, mechanical and esthetic principles. A prepared tooth should receive a crown in such a manner that it should restore the function in harmony with adjacent soft and hard tissues.

Retention is one of the most important mechanical principle of tooth preparation. It is the quality of prepared tooth that prevents the restoration from being dislodged by forces acting parallel to the path of placement.¹

Taper is defined as the convergence of the two opposing external walls of a tooth preparation viewed in a given plane. Recommended taper is 6 degrees.¹ Although in practice various studies have shown dentists to produce taper angles ranged between 12.2 to 27 degrees.²

On the other hand luting cement is a weak but a critical link for retention of an indirect restoration. Function of luting cement is to 1) fill the space between

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the crown and the prepared tooth; 2) provide retention resisting dislodgement; and 3) provide good aesthetical conditions for the indirect restoration.^{3,4,5}

Luting cements consists of two types⁶

1. Conventional water based luting cements
2. Anhydrous or polymerizing cements

Polymerizing cements are usually composite resins in conjugation with adhesive or self-adhesive systems. Self-adhesive systems are now been popular due to ease in manipulation but show less bond strength than cements with additional adhesive systems. On the other hand method of curing also plays important role. Self-cured cements shows less bond strength than light cured cements.⁷ This is especially true for metal crowns where light curing is not an option due to the opacity of the metal. Adhesive resin cement retention can be enhanced by using a bonding agent in such cases. The adhesive properties consists of both, the bond to the prepared tooth as well as bond to the indirect material that covers the tooth.

Present study determines the effect of tapers 6°, 12° and 30° on metal crowns luted with two commercially available cements adhesive resin cements Multilink Automix (Ivoclar Vivadent) and Rely X Ultimate Clicker (3M ESPE) . It also compares retentive ability of two adhesive resin cements.

MATERIALS AND METHOD

Specimen preparation

48 freshly extracted human pre molar teeth were collected. Roots of each tooth were notched with grooves for added retention. Autopolymerizing acrylic resin was mixed in thin consistency and poured in PVC ring of 2.5 inch height and 1 inch diameter. Each tooth was embedded in acrylic resin in the PVC ring by centering it in the ring and covering the root until 2 mm apical from cement enamel junction.(Fig 1) PVC ring was held firmly on a surveyor base with a cast holder and complete crown preparations were done using a high speed hand piece which was stabilized by a specially fabricated customized holding device(Fig 1) that can be moved around a rotational axis to obtain the desired degree of taper for the preparation.



Figure 1. Mounting of extracted premolar with acrylic in PVC Ring



Figure 2. Tooth preparation with customized device

Straight diamond points with a rounded tip were used to prepare axial surfaces and to establish a chamfer finish line. With the hand piece rigidly secured, the axial surface was prepared by rotating the surveyor base against the diamond point. (Fig 2) Occlusal surface of the teeth

were made flat, parallel to the floor and Occlusocervical dimension (h) of the teeth were standardized at 3 mm for all the specimens according to study done by Sekar et al.⁸ The crown preparation with different tapers 6, 12, 30 degrees respectively were achieved by tilting then

hand piece to their respective degree. (Fig 2) Angulation of each specimen was verified by using tool room microscope.

The prepared tooth was considered as truncated cone for surface area calculations. Zidan et al ⁹ used a mathematical formula for calculation of surface area.

D= diameter of the base of conical frustum

d= diameter of the apex of conical frustum

h= axial height

A1= the conical surface of the frustum of a right cone

A2= Surface area of top of frustum

The surface area A = A1 + A2

$A1 = \pi (r1 + r2) [h^2 + (r1 - r2)^2]^{1/2}$ where $r1 = D/2$, $r2 = d/2$, and A2 the surface area of the top of frustum was calculated according to the following equation: $A2 = \pi(r2)^2$. Impressions of all the specimens were made with 2 step technique with polyvinyl siloxane putty and light body (Flexceed).

All the impressions were poured in type IV stone or die stone (Pearlstone). Wax patterns were made in form of uniform copings with type 2 inlay wax (Starwax). with loop on the occlusal surface to facilitate crown pull off test. Copings were then invested with phosphate bonded

investment material (Bellasan). Casting was done using nickel chromium metal pellets (Wiron 99) in a centrifugal casting machine (Bego). 48 Specimens were divided into 24 (6, 12, 30 degrees) each for cementation with either Multilink Automix or RelyX Ultimate Clicker. All the specimens were then kept in water for 7 days before testing. On 8th day the samples were subjected to testing. Samples were connected to universal testing machine with the help of U shape orthodontic wire passing through the loop of the cemented crowns. Crowns were subjected to pull off test with a crosshead speed of 1mm/min

The force of removal was noted and was recorded in newtons. The force was then converted from newtons into failure stress as Megapascal (MPa) by the following formula *Failure stress (Megapascal) = Force (Newtons) / Surface area of prepared tooth in sq.mm* The data obtained was subjected for statistical analysis.

RESULTS

Statistical analysis was executed using IBM SPSS statistics 20. A parametric test; One-way ANOVA presenting the mean values of force of retention with standard deviations of RelyX Ultimate Clicker resin cement and Multilink Automix resin cement on the three different tapers is provided in Table 1 and Table 2 respectively.

Table 1. Comparison of force of removal with RelyX Ultimate Clicker resin cement on the three different taper angles 6°, 12° and 30°

Taper angles	6°	12°	30°	*p-value	Post hoc test
	Mean ± SD	Mean ± SD	Mean ± SD		
Force(Mpa)	5.42 ± 0.98	4.76 ± 0.76	3.97 ± 0.81	0.016	6° > 30°

*One way ANOVA with post hoc Tukey’s test

There was a significant difference between the force of removal for Relyx Ultimate at 6 and 30 degree taper.

Table 2. Comparison of force of removal with Multilink Automix resin cement on the three different taper angles 6°, 12° and 30°

Taper angles	6°	12°	30°	*p-value	Post hoc test
	Mean ± SD	Mean ± SD	Mean ± SD		
Force(Mpa)	5.23 ± 0.69	4.44 ± 0.82	3.75 ± 0.72	0.003	6° > 30°

*One way ANOVA with post hoc Tukey’s test

There was a significant difference between the force of removal for Multilink Automix at 6 and 30 degree taper group IIA and IIC.

The mean values with standard deviations of the retentive properties of both the cements were obtained using Independent 't' test, provided in Table 3.

Angle	RelyX Ultimate	Multilink	p – value
	Mean ± SD	Mean ± SD	
6°	5.42±0.98	5.23±0.69	0.65*
12°	4.76±0.92	4.44±0.82	0.47*

The influence of three different tapers; 6°, 12°, and 30° on the mean forces of removal of the metal crowns from the prepared teeth when tested individually with two cements, displayed statistically significant differences ($p < 0.05$). Within the three different convergent angles, post hoc Tukey test was carried out, the results demonstrated greater degree of force of removal with 6° convergent angles when compared to 30° convergent angle.

However, the two adhesive resin cements; RelyX Ultimate Clicker resin and Multilink Automix when compared and evaluated for the retentive properties did not show any statistically significant differences. ($p > 0.05$)

DISCUSSION

The present investigation was conducted to determine the effect of the taper of the tooth 6°, 12° and 30° on retention of metal crowns when luted by the resin cements. Two commercially available adhesive resin cements RelyX Ultimate Clicker and Multilink Automix were chosen. The failure stress was assessed by the use of crown pull off test. The other method to assess the adhesive properties of cements include tests for bond strength, tensile strength, and micro-tensile strength.³ Bond strength test is reliable test and easy to conduct but is criticized as it does not simulate clinical situation. Crown pull of test simulates the clinical condition better than other tests. Various studies have been published where crown pull off test was used.⁷

The influence of taper angle on retention of metal crowns using resin cements was noted in the present study. The study showed that mean retentive failure stress on metal crowns luted with Relyx Ultimate and Multilink Automix showed statistically significant decrease when taper angle of prepared tooth was 6 degrees compared to taper angle of 30 degrees. But mean retentive crown pull off failure stress on metal crowns showed no statistically significant difference at 12 degree taper when compared to either 6 degree taper or 30 degree taper. Rosensteil et al¹ described and various studies explained that when the taper is less it limits the path of withdrawal. While as taper increases free movement of restoration increases and results in decreased retention. Studies by Jogrenson¹⁰, Kaufman et al¹¹, Dodge WW et al¹², Hovijitra et al¹³ had reported these results earlier. Wilson et¹⁴ recommended taper of 6 as ideal taper, however some studies reveal that many dentists show tendency to overtaper the tooth preparation especially in posterior teeth with limited access. The present study therefore took in account taper angle as high as 30°

Zidan et al⁹ reported that increase in taper angle from 6 degrees to 24 degrees decreased the mean failure stress value by 20 percent for resin cements and 40 percent for the glass ionomer cement. Omar mowafy et al¹⁵ found out significantly higher failure stress at 12 degree convergence angle compared to at 35 degrees.

In contrary to the present study Osman et al 2010 et al¹⁶ found no statistically significant difference in failure stress values for metal crowns luted with Panavia Resin Cements for taper angle as low as 12 degrees and as high as 120 degrees.

Present study also compared the influence of adhesive resin cements on failure stress. There was no statistically significant difference when the mean of value of failure stress for Multilink Automix and RelyX ultimate clicker at all the taper (6, 12, 30) were compared. (Table 3).

In similar study Zidan et al⁹ did not find significant difference between two adhesive resin cements (C&B Metabond and Panavia) at different taper angles (6, 12, 24). Ernst et al¹⁷ compared different commercialy adhesive resin systems and found no significant difference in retentive properties between them.

Even though RelyX ultimate showed better results than Multilink automix there was not much of difference

between retentive qualities of the two cements. As oral conditions are difficult to simulate in the laboratory, the results obtained should be interpreted with caution and clinical validation. Also in this study metal castings were used which limited the use of light curing option, therefore retentive properties of these cements may vary when used in all ceramic crowns

CONCLUSION

Within the limitation of the study it can be concluded that angle of convergence for the tooth preparation should be as minimal as possible (6 degree), but angle until 12 degrees is acceptable for good retention. Whereas when the taper angle increases as high as 30 degrees the retention is affected even with the use of adhesive resin cements.

RelyX Ultimate Clicker and Multilink Automix are equally effective as luting agents for cementation of metal crowns.

Ethical Clearance: Permission taken from the institutional research committee. Animal or human subjects are not involved in the study.

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When Sustainable Development Matters in Health Care Supply Chain: An analysis of Influential Factors of Waste Management

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ABSTRACT

Sustainable development(SD) practices has been adopted by organizations from various sectors to improve their socio-environmental performance. This is because, these days improved socio-environmental performance is key to ensure sustainability in long and gain competitive advantage. Hence, the health care industries are also trying to exploit the benefits of SD practices. SD policies stress on incorporation of sustainability concepts on every stage of organizational activities starting from procurement to disposal of waste. Success of implementation of SD practices in any industry depends on how efficiently it identifies the factors influencing it, their interdependence and degree of influence on SD practices. This study explore the influential pressures of sustainability practices in management of waste in health care sector. Grey relational approach(GRA) is used to prioritize these factors according to their degree of influence on health care waste management (HCWM) practices.

Keywords: HCWM, Enablers of HCWM, GRA, SD

INTRODUCTION

Hospitals and allied health care facilities have been established to provide services required for the treatment of sick people. However, there has not been much awareness that these units produce significant amount of waste material during the process of rendering health care related services which have a potential to degrade environment and cause many dreaded disease in humans or animals when exposed to it. Health care or biomedical waste consists of materials that include syringes, needles, used bandages, disposable gloves, human tissues, blood, used culture media along with food materials, packaging materials and scraped medical equipment. Direct exposure to these waste lead to blood, skin, respiratory, eye and intestinal infections even transmission of dreaded diseases like typhoid, cholera, HIV, Tuberculosis, Hepatitis B and C^[1]. Prior studies

reveals many HCUs either dump their waste in low lying areas or burn in open air or allow the untreated liquid waste to flow through sewerage water. These lead to contamination of soil with heavy metals and toxic chemicals killing useful organisms and reducing soil fertility. Mixing of liquid waste lead to water pollution and burning of these waste without proper precaution lead to contamination of air with carcinogenic gases like dioxin. HCUs have begun to realize the importance of proper waste management practices towards their sustainability and gaining economic advantage as well. In this context, an understanding of influential factors of HCWM and their degree of influence on HCWM practices assumes its importance. Hence, this research focused on investing these factors and evaluating their degree of influence using GRA method.

LITERATURE REVIEW

Sustainable Development

Sustainability which has been found to be good not only for the society and environment, but also for economic health of any organization by enabling the them in reducing risks of environmental accidents, avoiding or reducing generation of waste, increasing energy and material efficiency^[2] and innovating new eco-friendly services and process^[4] has increasingly become important to businesses^[3].

Sustainable Development in Health Care Sector

A sustainable development concept in the context of health care sector is gaining importance these days. HCUs have started procuring devices and equipment which could be either recycled, reuse or safely disposed of after their useful life. Similarly, for safe disposal of wastes several guidelines have been formulated. SD practices could enable the HCUs to reduce their expenditure on material, energy and penalties as well. Aside from the cost investment funds, usage of legitimate SD practices benefits the health care units to get ISO certification and in addition letter of thanks from regional as well as governments which thus will improve the general public image and brand value of the hospitals and empower them to draw more number of patients and remain separated from rivalry. Patients even don't hesitate to pay higher hospital services charges in these health care units(HCUs).

Previous Studies.

Review of literature on sustainable development practices revealed that in Indian context few researchers^{[18][8][19][20][21][1][26]} have studied HCWM practices. However, these studies mostly, employed either questionnaire based survey or field research and personnel interviews for investigating HCWM issues and ignored analytical studies on various influential factors of HCWM. From the literature review it has been identified 10 enablers and 13 barriers of HCWM.

The enablers are being categorised as strength, opportunities and Barrier as Threats. Different enablers

as being identified(internal) are anticipated economic benefit^[11]. Competitive advantage, CSR Activities, Top management vision and Involvement^[21]. Policies to comply legislative requirement^{[(11),[27]}. Identified enabler categorized as external opportunities are Reduction in landfill capacities, Availability of Advanced Technology, Support and Initiatives from Various Organizations^[21], Pressure from socially responsible groups, Awareness and training programs^[18]. The barriers variables as identified from the literature review are Poor Segregation Practices^{[(16)[26]}, Inappropriate Waste Management Operational Strategy, Lack of Green Procurement Policy^{[(18)}, Financial Constraints^[21], Deficient in Accountability of Authorities of Health Care Facilities towards HCWM, Resistance to Change and Adoption, Less Priority to Waste Management issues and Policies^[1]. Lack of Waste Treatment Facilities^[21]. Insufficient Support from Government Agencies^[26]. Unavailability of Adequate Waste Management Equipment and Facilities, Inadequate Awareness and Training Programs^[1], Lack of coordination between municipality, Pollution Control Board and hospital authorities^[19], Lack of Strict implementation of infection control measures like sterilization and disinfectant techniques.^[1]

MATERIALS AND METHOD

The degree of importance of influential factors of waste management practices in health care sector is evaluated with the help of GRA approach. GRA approach is mainly used when there is an uncertainty in decision making. In general, GRA has five steps and they are as follows:

Step one: Collection of initial assessment values from experts and make decision matrix.

Step two: Performing data normalization of the variables using either "Smaller - the better" or "larger is the better" using equations (1) and (2) respectively depending upon their nature.

$$r_{ij} = \frac{\max_i(x_{ij}) - x_{ij}}{\max_i(x_{ij}) - \min_i(x_{ij})} \tag{1}$$

$$r_{ij} = \frac{x_{ij} - \min_i(x_{ij})}{\max_i(x_{ij}) - \min_i(x_{ij})} \tag{2}$$

Step 3: In addition, the reference sequence for the variables is calculated using equation (3).

$$\Delta_{ij} = |r_{oj} - r_{ij}| \tag{3}$$

Step four: Determining the grey relational coefficient:

$$\gamma_{ij} = \frac{\Delta_{\min_{ij}} + \xi \times \Delta_{\max_{ij}}}{\Delta_{ij} + \xi \times \Delta_{\max_{ij}}} \tag{4}$$

Where, $\xi (0 \leq \xi \leq 1)$ is the distinguishing coefficient i.e., used to control the range of the grey relational coefficient; usually $\xi = 0.5$ [18].

Step five: Determining the grey relational degree and rank the factors.

$$\Gamma_i = \sum_{j=1}^n [w_j \times \gamma_{ij}], \tag{5}$$

$$\sum_{j=1}^n w_j = 1$$

where, W_j is the weight of the jth criterion. On the basis of grey relational degree the priority ranking can be estimated. The one with the highest grade of relation is recognized as the best solution.

RESULTS AND DISCUSSION

7 point scale was used to collect data from doctors, nurses, lab technicians and hospital administrators

working in hospitals. Five numbers of respondents from each group were requested to suggest their perception regarding the degree of influence of the barriers and enablers on waste management practices. This study considered 10 numbers of enablers and 13 number of barriers. The numerical value assigned by experts' of each category for a particular variable are summed and shown in table 1.

Table 1: Responses of experts regarding HCWM enablers and Barriers

Variables	Doctors	Nurses	HAs	Lab technicians
E1	21	16	21	24
E2	23	23	18	22
E3	20	24	18	22
E4	24	25	27	21
E5	24	30	24	23
E6	13	20	12	14
E7	21	21	21	22
E8	21	25	23	20
E9	26	23	20	24
E10	26	31	25	21
B1	15	26	15	7
B2	14	29	15	9
B3	13	26	16	7
B4	12	25	15	8
B5	13	27	14	8
B6	15	32	20	8
B7	13	29	18	7
B8	14	30	12	9
B9	13	28	18	9
B10	15	28	13	10
B11	10	25	17	9
B12	13	30	10	9
B13	13	29	16	8

After construction of decision matrix, normalization is done for the enablers respectively and the result is shown below.

Table 2: Normalization results for enablers and Barriers of HCWM

Variables	Doctor	Nurses	HA	Lab technician
E1	0.61538462	0	0.6	1
E2	0.76923077	0.466667	0.4	0.8
E3	0.53846154	0.533333	0.4	0.8
E4	0.84615385	0.6	1	0.7
E5	0.84615385	0.933333	0.8	0.9
E6	0	0.266667	0	0
E7	0.61538462	0.333333	0.6	0.8
E8	0.61538462	0.6	0.733333	0.6
E9	1	0.466667	0.533333	1
E10	1	1	0.866667	0.7
B1	0	0.85714286	0.5	1
B2	0.2	0.42857143	0.5	0.333333
B3	0.4	0.85714286	0.4	1
B4	0.6	1	0.5	0.666667
B5	0.4	0.71428571	0.6	0.666667

Cont.... Table 2: Normalization results for enablers and Barriers of HCWM

B6	0	0	0	0.666667
B7	0.4	0.42857143	0.2	1
B8	0.2	0.28571429	0.8	0.333333
B9	0.4	0.57142857	0.2	0.333333
B10	0	0.57142857	0.7	0
B11	1	1	0.3	0.333333
B12	0.4	0.28571429	1	0.333333
B13	0.4	0.42857143	0.4	0.666667

Table 3. Grey relational co-efficient of HCWM enablers

Enablers	Doctor $\gamma_{ij}(1)$	Nurses $\gamma_{ij}(2)$	HA $\gamma_{ij}(3)$	Lab technician $\gamma_{ij}(4)$
E1	0.56521739	0.333333	0.555556	1
E2	0.68421053	0.483871	0.454545	0.714286
E3	0.52	0.517241	0.454545	0.714286
E4	0.76470588	0.555556	1	0.625
E5	0.76470588	0.882353	0.714286	0.833333
E6	0.33333333	0.405405	0.333333	0.333333
E7	0.56521739	0.428571	0.555556	0.714286
E8	0.56521739	0.555556	0.652174	0.555556
E9	1	0.483871	0.517241	1
E10	1	1	0.789474	0.625
B1	0.33333333	0.777778	0.5	1
B2	0.38461538	0.466667	0.5	0.428571
B3	0.45454545	0.777778	0.454545	1
B4	0.55555556	1	0.5	0.6
B5	0.45454545	0.636364	0.555556	0.6
B6	0.33333333	0.333333	0.333333	0.6
B7	0.45454545	0.466667	0.384615	1
B8	0.38461538	0.411765	0.714286	0.428571
B9	0.45454545	0.538462	0.384615	0.428571
B10	0.33333333	0.538462	0.625	0.333333
B11	1	1	0.416667	0.428571
B12	0.45454545	0.411765	1	0.428571
B13	0.45454545	0.466667	0.454545	0.6

Finally, grey relational grade of the variables were calculated using equation (3) and the influential factors (enablers and barriers) were ranked based on these values as shown in table 4. The higher the grey relational grade the greater is the influence of the variable.

Table 4 Grey relational grade and rank of the enablers

Enablers	GRG	Rank
E1	0.6135	5
E2	0.5842	6
E3	0.5515	9
E4	0.7363	4
E5	0.7987	2
E6	0.3514	10
E7	0.5659	8
E8	0.5821	7
E9	0.7503	3
E10	0.8536	1
Barriers	GRG	Rank
B1	0.6528	4
B2	0.4450	12
B3	0.6717	2
B4	0.6639	3
B5	0.5616	7
B6	0.4000	13
B7	0.5765	5
B8	0.4848	9
B9	0.4515	11
B10	0.4575	10
B11	0.7113	1
B12	0.5737	6
B13	0.4939	8

CONCLUSION AND SCOPE OF FUTURE WORK

This study is conducted with an objective to explore various influential factors for implementation of sustainable practices in health care waste management. Through review of literature and expert consultation 23 such factors were identified. The identified factors were further classified as enablers those encourage adoption of HCWM practices and barriers those offer resistance to its adoption. Both the enablers and barriers were further categorized as external and internal. External enablers were termed as opportunity while the internal as strength similarly the internal and external barriers were categorized as weakness and threat respectively. All the factors identified in this study were prioritized with respect to their degree of influence

on HCWM practices using GRA methodology. The factors with rank 1 indicates its higher influence on HCWM practices. Similarly, a factor with rank 10, 11, 12 and 13 indicates lesser influence of these factors on HCWM. The results revealed that Awareness and training programs are perceived as the most important factor while Top Management vision and involvement is the second most important factor for success of HCWM practices. Analysis of the barriers claimed that Inadequate Awareness and Training Programs and Lack of Green Procurement Policy were observed as the major hindrances. Hence, Organizations interested for implementation of HCWM practices should conduct intensive training and awareness programs. Proactive involvement of top management should be implemented in green procurement policies. Though, this study quantified the degree of influence of various influential pressures yet failed to capture the vagueness in human judgement. Hence, a fuzzy GRA analysis may be performed in future to capture the vagueness.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

Source of Funding- Self

Ethical Approval: Necessary permission and proposal submitted to Medical Research (Ethical Committee) of the IMS & SUM Hospital for survey from hospitals staffs. The research does not involve any issues related to Animal or Human,

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Mineral Trioxide Aggregate Apexification a Novel Approach for the Tooth with Open Apex – A Case Report

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ABSTRACT

Mineral Trioxide Aggregate (MTA) was introduced as an alternative to traditional materials for the pulp-capping, repair of root perforations and as a retrograde root filling due to its superior biocompatibility and ability to seal the root canal system. Traditionally, calcium hydroxide has been the material of choice for the apexification of immature permanent teeth but MTA holds significant promise as an alternative to multiple treatments with calcium hydroxide. The inadequacy of calcium hydroxide apexification due to its long time span and re-infection because of temporary seal led to the use of MTA. In this case report of MTA apexification along with backfilling using thermoplasticised Gutta Percha and coronal rehabilitation of a fractured upper central incisor with open apex.

Keywords : *Open-apex, mineral trioxide aggregate, apexification*

INTRODUCTION

Trauma to the tooth during the eruption period may damage the Hertwig's epithelial root sheath leading to cessation of root end development, resulting in an open apex. Generally root development continues for 3- 4 years after eruption.^{1,2} American Association of Endodontists in 2003 defined apexification as 'a method to induce a calcified barrier in a root with an open apex or the continued apical development of an incomplete root in teeth with necrotic pulp'. The main objective of apexification was to prevent the passage of toxins and bacteria into the periapical tissues by forming a barrier at the root apex, and also to allow the compaction of the root filling material.³

Even though Calcium hydroxide has been widely used over the years for the stimulation of hard tissue

barrier, it requires 5–20 months to form the barrier.⁴ Studies have also shown an increased risk of tooth fracture with prolonged exposure to calcium hydroxide.^{5,6,7}

In recent times, mineral trioxide aggregate (MTA) has replaced calcium hydroxide as the most popular material for the apexification procedure, as it has shown a greater consistency in producing apical hard tissue when compared to calcium hydroxide.⁸ In this case report of MTA apexification along with backfilling using thermoplasticised Gutta Percha and coronal rehabilitation of a fractured upper central incisor with open apex.

Case report

An 18 year old female patient reported to the dental clinic with a fractured central incisor, Figure 1 (A). Patient gave a history of trauma 12 years back. There was no relevant medical history. On clinical examination, there was a blackish discoloration associated with tooth #21 along with fracture of the incisal edge extending into the dentin. The tooth was tender on percussion. Periapical radiograph showed a wide open apex with a well-defined periapical radiolucency in relation to tooth #21. Figure 1 (B)

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Figure 1:
A: Pre-operative clinical picture, note the discoloration w.r.t tooth #21
B: IOPA showing open apex

Access opening was done under rubber dam isolation and working length was determined using the radiographic method (Figure 2-A). Chemo mechanical preparation of the root canal was done using the no. 80 K-file and 0.5 % sodium hypochlorite solution was used for irrigation of the canal along with saline and 17% EDTA.

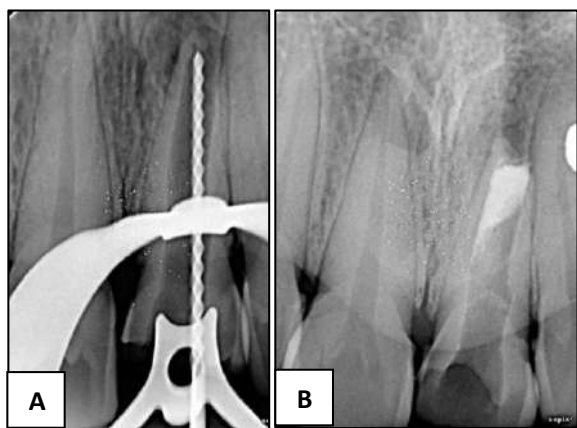


Figure: 2 A: Working length determination B: MTA plug at the apex

White MTA Angelus (Angelus, Londrina, PR, Brazil) was mixed according to manufacturer’s instructions and gently condensed using hand pluggers, gently condensed to form 4 mm of apical plug. [Fig: 2(B)]. Moist cotton pellet was placed and a temporary restoration done using Zinc oxide eugenol cement. Patient was recalled after one week for obturation. Gutta percha obturation was with using the backfilling technique with Obtura thermoplastic obturation system (figure 3-A). AH plus sealer was used. Post operative clinical picture is as shown in figure 3(B). Post endodontic restoration was

done using Filtek Z 350 (3M ESPE, USA) and tooth was prepared to receive ceramic crown fused to metal. (Figure 4)



Figure: 3
A: Post-obturation radiograph
B: Post endodontic build up was done using composite.



Figure: 4
A : Tooth preparation for receiving porcelain fused to metal, full coverage restoration
B: Post crown cementation picture.



Figure: 5
A and B : Pre operative and post operative clinical images

DISCUSSION

Over the years, calcium hydroxide has been the considered as the gold standard material for apexification;

since it has bactericidal effect with an alkaline pH, which is considered responsible for stimulating apical calcification.⁹

The basic disadvantage of calcium hydroxide is the formation of necrotic zone, therefore its usage and popularity has drastically reduced. Other drawbacks include delayed treatment, multiple visits, low patient acceptance, unpredictability of apical closure and difficulty in patient follow-up.¹⁰ An alternative to calcium hydroxide is MTA.

Thorough irrigation, and proper disinfection protocol has to be followed for the success of the root canal before the obturation. When compared to completely closed apex, the root canals with open apices have more communication. So disinfection of canal was done using 0.5% sodium hypochlorite in this case and calcium hydroxide dressing was given for periapical healing and eliminating the survived bacteria after cleaning and shaping.^{11,12} MTA is condensed using Endodontic pluggers at the root end, followed by obturation.

The mineral trioxide aggregate (MTA) in 1998 was considered as a therapeutic endodontic material for humans by US Food and Drug Administration.¹³⁻¹⁵ MTA has been proved to have superior sealing ability compared to amalgam, zinc oxide eugenol and super-ethoxybenzoic acid.¹⁶⁻¹⁹ Because of its superior properties, MTA has shown effective results as direct pulp-capping agent when compared with Ca(OH)₂.²⁰⁻²²

MTA has a good sealing ability which results in less microleakage, better antibacterial properties making it biocompatible, high marginal adaptation, and a pH of 12.5. MTA has also been used for scaffolding for hard tissue formation. It helps in the production of interleukins and cytokines release. Hence, it is capable of promoting hard tissue formation. Clinicians may restore the tooth after setting of MTA. Thus, the fracture resistance of teeth with thin dentinal walls increases.²³

CONCLUSION

Selection of material as an apical plug for the formation of the hard tissue barrier and the thickness of MTA apical plug plays a crucial role for the clinical success of procedure. A 5mm apical plug of MTA is considered better when compared to 2mm apical plus as it produces less microleakage. In this present case report, MTA as an apical plug helped in root end closure and

good healing which resulted in successful treatment out

Conflict of Interest- Nil

Ethical Clearance – Taken from Institutional Ethical Committee

Source of Funding- Self

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Goal Directed Physiotherapy Treatment Program for Improving Lower Extremity Function in a child with Spastic Paraplegic Cerebral Palsy. A Case Report

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ABSTRACT

Spastic Paraplegic Cerebral Palsy (CP) involves both the lower limbs which effects balance and gait in children. These individuals are treated by physiotherapy with various means like Stretching, Strengthening, application of Neurodevelopmental Therapy (NDT), Task oriented approach and Proprioceptive Neuromuscular Facilitation (PNF) but there is no evidence on goal oriented physiotherapy program using various approaches for the treatment of spastic paraplegic CP children. Here we report a case of a 9-year-old boy diagnosed with spastic paraplegic CP, who underwent 5 months of Goal directed Physiotherapy Program. Documented improvements in muscle tone, balance and various parameters of gait reveal promising outcome. Hence we propose goal directed physiotherapy treatment might improve balance and gait in children with spastic paraplegic CP.

Keywords: Spastic Paraplegic CP, Physiotherapy, Rehabilitation, NDT, PNF, Physical activity, Paediatric Rehabilitation.

INTRODUCTION

Cerebral palsy describes a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of Sensation, Perception, Cognition, Communication and behavior: by epilepsy, and by secondary musculoskeletal problems.¹ Prevalence in general population is found to be 2-2.8/1000.²

Children with spastic paraplegic cerebral palsy suffers with spasticity of lower limb muscles.³ Spasticity associated with cerebral palsy can lead to

musculoskeletal complications, such as contractures, pain and subluxation⁴. which affects the pelvic movements and thereby causing alterations in the lower trunk control which leads to functional limitations. Most of these limitations will affect the individual's physical, socially and emotional health leading to decline in their health related quality of life⁵.

Children with spastic CP involving lower limbs have a very good upper limb function but the disability involving the lower limbs hinders the child to involve with the peer group and participate in various outdoor activities.⁶

There is a paucity in the literature related to spastic paraplegic cerebral palsy. Studies regarding goal directed treatment for improving lower limb function is also scarce. Bobath concept aims to improve Gross Motor Function and Postural Control by facilitating muscle activity through key points of control assisted by the therapist.⁷ The purpose of this case report is to explain the importance of goal directed physiotherapy program involving NDT, Task oriented approach, PNF Techniques in the treatment of balance and gait issues in

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children with spastic paraplegic CP.

Case Report:

The child was a 9 years old boy diagnosed with Spastic Paraplegic Cerebral Palsy. He was presented with the following problems in Physiotherapy department of Justice KS Hegde Charitable Hospital, Deralakatte Mangaluru, Karnataka, India

Problem List:

Spasticity Grade 1+ in Bilateral hamstrings, Hip adductors, hip flexors Grade 1 was noted in bilateral plantar flexors according to Modified Ashworth Scale. Final 10 degrees of active Extensor lag was noted in left knee joint and 5 degrees was noted in right knee joint Lacks ability to shift weight in standing posture, weakness of bilateral gluteus maximus, hip abductors, knee extensors, and dorsiflexors of ankle. Cannot maintain balance in activities involving transitions in positions. Difficulty in walking independently not even 5 steps, scissoring was noted in gait.

On the day 1, assessment was taken where spasticity was measured by modified ashworth scale (MAS)⁸, balance was measured by Paediatric Balance Scale (PBS)⁹, parameters of gait like Stride length (by chart paper), Cadence (number of steps using stop watch) and Speed (by 10 meter walk test) were measured. Child was at Stage III of GMFCS.¹⁰

Child was treated from June 2017 to October 2017 at Justice K S Hegde Charitable hospital for 1-and-a-half-hour session, 6 days a week for 5 months. Task oriented training and NDT were given together followed by strength training by PNF the next day.

Treatment goals are the basis for treatment planning, gives direction to the treatment and helps in planning discharge.

Long term goal (5 months): Mr. X will walk from his bedroom to washroom (approx.30 meters) at his home independently for five consecutive days without scissoring of lower extremities

Short term goal 1(6 weeks): Mr. X will stand independently by holding a ball with both hands and throw it in basket which is kept at 5 meters' distance without losing balance at least 5 times in 2 mins

Short term goal 2 (12 weeks): Mr. X will walk for

10 steps independently without scissoring while entering home from parking area

Treatment goal 1: Mr X will be able to maintain balance in kneeling position to lift a ball from ground and to throw it in a basket kept at 3 meters' distance.

Treatment goal 2: Mr. X will be able to do transition from kneeling to half kneeling with minimal assistance progressed to independent transition to get up to standing position.

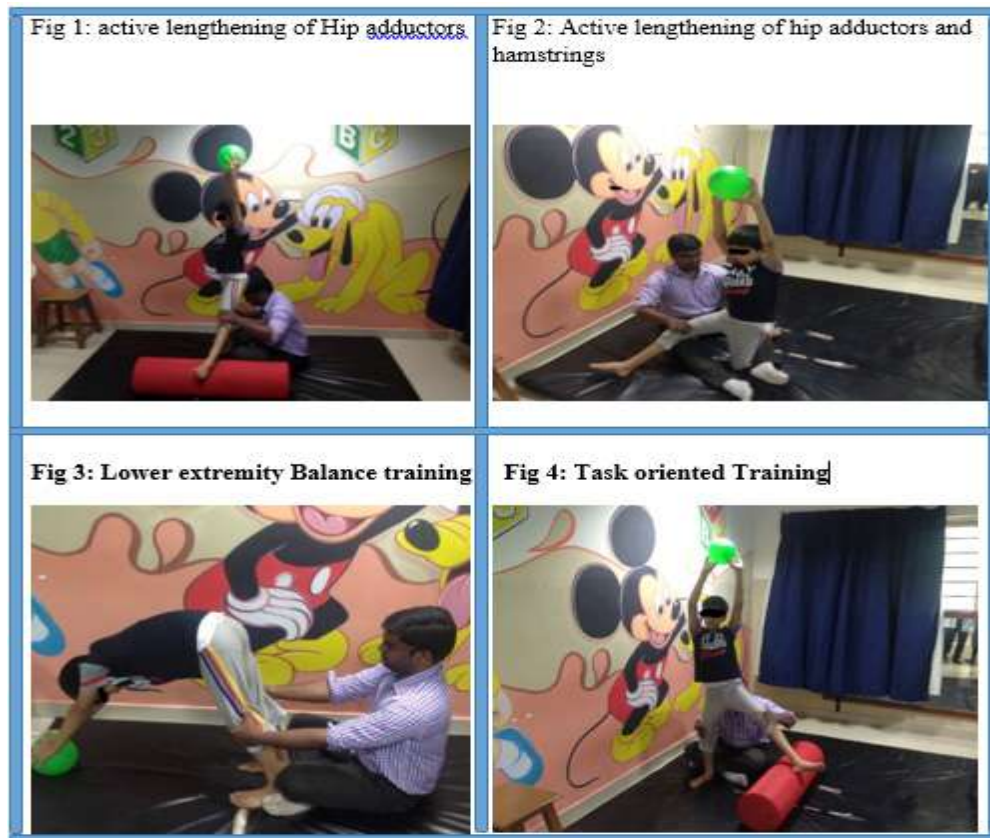
Treatment goal 3: Mr. X will shift the weight on his left leg and place the right leg on a stool of 15 cms height with minimal support of therapist without losing balance

Treatment goal 4; Mr. X will walk 20 steps in parallel bar with mirror without support for 10 steps.¹¹

Our first priority was to normalize the tone and it was achieved by prolonged lengthening with various functional positions it was followed with application of various strategies using principles of NDT in task oriented environment targeting transitions involving lower limb. Rhythmic initiation and dynamic reversals were used to strengthen the antagonists to achieve controlled mobility of lower limb in various positions. Task oriented training in standing and walking were used for improving balance. Treatment goals were given priority and timely achievement of treatment goals helped us to achieve short term goals and long term goals in time. Tone was measured by (Modified Ashworth Scale), stride length was measured by chart paper and ink, cadence was measured by using stop watch, gait velocity was measured by using 10 meters walk test, balance was measured by using Paediatric Balance Scale (PBS) on day 1 and after 5 months. Differences in outcome measures before and after treatment Shown in **table 1**, various treatment strategy is shown in **figure 1-4**.

Table 1: Outcome measures before and after treatment

Balance/ gait parameters	Pre intervention	Post intervention
Stride length (Inches)	55	60
Cadence (Steps/min)	72	100
Gait velocity (m/min)	54	63
Paediatric balance scale	35	48



DISCUSSION

NDT is defined as a client centered, hands-on, problem solving approach. It is used in the management and treatment of children who have disorders of function, movement or postural control because of damage in their central nervous system. This approach uses clinical reasoning rather than a series of standardized techniques.⁷ We have followed principles of NDT in International classification of functional disability and health (ICF) format. Long term goal is the therapist professional judgement of how long a client requires to achieve the functional task our long term goal was based on the priority of child and parents. To achieve the controlled mobility Spasticity, strength and range of motion of joints were our primary concern. To achieve them we used Task oriented strength training, focused on strengthening the lower extremities and practicing functional tasks similar to those the child performs during daily activities. Task-oriented training is defined as the repetitive training of significant, functional activities or element of such activities, to acquire well-organized and effective motor skill.¹² Proprioceptive Neuromuscular Facilitation (PNF) techniques stimulates the proprioceptors of the muscle to enhance the

performance, flexibility and balance. PNF has been proven to be effective in improving the lower limb function in cerebral palsy children with spastic diplegia.¹³ Rhythmic initiation and dynamic reversals were used to strengthen the weak muscles to achieve controlled mobility of lower limb. Weight shifting training and controlled stepping helped in improving stride length. Improved strength of bilateral gluteas maximus, hip abductors and knee extensors along with dorsiflexors of ankle helped in improvement of cadence and gait velocity thereby balance. The child's active participation helped in the faster recovery. Accurate planning, continuity of treatment and periodic measurements of outcome helped in successfully achieving the treatment goals. Short term goals and Long term goals. Hence application of evidence based approaches by setting a proper goal and achieving it stepwise is proved to be beneficial rather than targeting the impairments alone.

CONCLUSION

Goal directed treatment using NDT, Task oriented approach and PNF proved to be effective in the management of children with spastic paraplegic cerebral palsy.

Conflict of Interest- None

Funding: Nil

Consent Form: A written informed consent was taken from the parents of the child.

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What is the Nature of the Activities Used for Children in Kindergarten?

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ABSTRACT

Aim: To do the analysis of the activities used for children in kindergarten

Material and Methods: A cross-sectional study was undertaken to do activity analysis of the activities used for children in kindergarten from Manipal, Udupi district, Karnataka. The proforma based on Occupational Therapy Practice Framework, third edition was used and the teachers were interviewed to collect the list of activities. The activities were analyzed and results were interpreted.

Findings: The descriptive statistics was used to analyse the activities conducted for children based on observed performance with respect to expected performance. The activities were focusing on the performance skills as follows: process skills (59.76%), motor skills (52.53%) and social interaction skills (50.2%).

Conclusion: The results of the current study conclude that the activities conducted in the kindergarten classrooms do focus on process skills, motor skills and social interaction skills.

Keywords: Performance skills, kindergarten school, activity analysis, school children, occupational therapy, activities.

INTRODUCTION AND BACKGROUND

The early school environment seems to be a pivotal aspect in children's social development, motor development, and for enhancement of cognitive skills¹. Kindergarten forms the foundation for a more structured setting for learning with their peers². Authors of the book 'Eager to learn - educating our pre-schoolers' believe that the first five years are crucial for development of all performance areas. The teachers or educators may notice

many variations in the children's social, cognitive, motor or physical skills and it is essential for them to understand that these differences are connected to the functional characteristics of the child³.

Adequate functioning in the school is one of the main performance tasks of any student and the role of occupational therapy in any school environment is to first achieve adequate performance skills to improve student performance. Suggestion for activity adaptations, activity and/or task modifications and assistive devices may be necessary to optimize the child's performance in the school setting⁴. A document made by the authors Gloria Frolek Clark, Leslie Jackson and Jean Polichino states that the occupational therapy services in early school based programs helps the child to participate in activities of daily living, education, work, play, leisure, and social interactions⁵.

A study conducted by the Chief Medical Health Officer of the Saskatoon Health Region showed that about

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30.1% of kindergarteners in this region were considered developmentally delayed or 'not ready for school' at the time of entry to primary school⁶ in the Western countries. However, reviewed literature showed that no data was available in India related to school readiness in kindergarteners and/or whether the activities conducted in kindergarten focused on the performance skills. Hence, the current study was initiated as a preliminary study to capture this concept in India with the following aim and objectives.

Aim: To do the analysis of the activities used for children in kindergarten

Objectives:

To collect the list of activities used for children in kindergarten.

To do the activity analysis of the collected activities used for children in kindergarten.

Material and Methods:

Research design: A cross sectional study

Sampling method: Convenience sampling

Sample size: 13 kindergartens out of 16 in Manipal were included in the current study. 3 were excluded as the permission was denied.

Selection criteria: Kindergartens which follow Central Board of Secondary Education (CBSE), Indian Certificate of Secondary Education (ICSE), State Board or Matriculation curriculum and within 5 kilometer radius of Manipal were included in the study.

Tool used:

The Occupational Therapy Practice Framework (OTPF): Domain and Process, third edition was used in the current study. The proforma that was developed based on performance skills of OTPF that include motor skills, process skills and social interaction skills was used to analyze the activities.

Procedure

Principals of the 16 kindergartens were approached to obtain permission out of which 13 consented to conduct the study. The study was reviewed and approved by Institute Ethics Committee (KMC, IEC 51/2016). The Principals and the teachers were informed about

the study and written consent was taken from them. Appointments were fixed for interviewing the teachers and the school Principals were assured that the name of their institution would be kept confidential. Teachers were interviewed and list of activities were collected from them. The activities were analyzed and results were interpreted.

DATA ANALYSIS

The descriptive analysis was used to find out the percentage of performance skills in 83 different activities. The collected 83 activities were initially analyzed individually by the three of the investigators to avoid bias (as shown in the Table 1). The total number of sub-categories based on performance skills of OTPF were considered as expected performance which was derived by multiplying the individual subcategories of each performance skill by the number of activities and converted to percentage. The data was included for interpretation only when two of the investigator consented for a particular performance skill to be present in the analyzed activity which was considered as the observed performance. The same pattern was followed for all the 83 activities to collect data for interpretation. The percentage of each component was taken to check for expected performance and observed performance.

Table 1: Example of Activity Analysis

Name of the Activity	Activity Demands		
	Motor Skills	Process Skills	Social Interaction Skills
Coloring			-
Origami	-		-
Vegetable printing		-	

FINDINGS

The aim of the study was to collect the list of activities that were used in kindergarten and to analyze the performance skills that these activities demand. A list of 83 activities was obtained and analyzed by three investigators separately and then compilation of the data was done. Literature on kindergarten, describes that children need to have access to good quality kindergarten experiences that focus upon all areas of development as

required for their optimal achievement throughout the early childhood years^{7,8}.

Out of 13 kindergartens, 4 were CBSE and ICSE each and 5 were state board. As seen in the table 2, the activities were categorized based on approach to activity (individual/group), settings of activity (home-based/school-based) and location of activity (indoor/ outdoor). These details were provided by the kindergarten teachers and this helped us to develop some characteristics about the activities used. An article written by Bassok, Latham and Rorem compared the kindergartens classrooms through 1998 to 2010 and found that the whole class activities was about 15% in 1998 and by 2010 it increased to 32%⁹ Our study findings are contrary to the above mentioned study, and it concludes that most of the mentioned activities were individual based (55.38%) as opposed to group based (44.62%). An assumption can be made that this shift is majorly seen because in India it is seen that the classrooms generally consist of a large number of students and it might become difficult for one teacher to monitor big groups hence they prefer to conduct individual activities, but no data as such was found to support the current assumption.

Table 2: Descriptive Characteristics of Activities used in Kindergarten

Characteristics of activities	Frequency	Percentage
Approach to activity		
Individual	72	55.38%
Group	58	44.62%
Setting of activity		
Home based	18	13.84%
School based	112	86.16%
Location of activity		
Indoor	97	74.61%
Outdoor	33	25.39%

A total of 83 activities were then analyzed by three individuals separately and the analysis showed that 59.76% of the activities demanded process skills, 52.53% demanded motor skills and 50.2% demanded social interaction skills as observed performance against the expected performance of 100% as shown in Table 3.

Table 3: Percentage of Expected Performance and Observed Performance among Performance Skills

Performance Skills	Expected performance	Observed performance
Motor skills	100%	52.53%
Process skills	100%	59.76%
Social Interaction skills	100%	50.2%

In the current study, the results showed that the kindergarten activities are focused on process skills (59.76%) with reference to Table 3. A lot of kindergarten teachers believe that process skills are fundamental and that kindergarten is the time when children learn the behaviors of teacher directed tasks and learn the rules of the classroom. Hence, it could also be said that kindergartens are now developing a culture of learning related behaviors^{10,11}. Thus, it is seen that many other studies support the findings of the present study that most kindergartens are concentrating upon process skills.

According to Table 3, 52.53% of the activities demanded motor skills in the current study. There are still some differences seen in the expected and observed performance for motor skills. The lack in motor skills could be attributed to the fact that most of the activities are indoor activities which focus more on the fine motor skills than the gross motor skills.

Kindergarten is assumed to be the time when the child learns the ropes of social conventions which assist in communicating with peers, adults as well as in social situations¹². However, the present study showed that social interaction skills (50.2%) has some deficiency in the expected and observed performance level as can be determined from Table 3, and this could be ascribed to the fact that most teachers assign individual activity and so the interaction factor may be comparatively less.

Strengths and limitations

The activity analysis was done by the three investigators independently is one of the strengths of the current study. This was a preliminary study which could aid in further research in this field. The number of schools that were a part of this study were relatively less and hence more number of activities could not be

collected. The study was done on the basis of convenience sampling to get an understanding of the current scenario of kindergarten classrooms and concrete conclusions cannot be drawn from the study because of the fact that the study participants are not randomized. The list of activities analyzed were on a hearsay basis and not on an observational basis because this would have been more time consuming and the investigators had time restraints.

Recommendations

Future studies analyzing the minimum percentage requirement of performance skills for school readiness may be conducted. A longitudinal study with random sampling could also be conducted to get a broader understanding of the scenarios in the kindergarten classrooms. As an occupational therapist who are aware of the developmental stages, we could assist in making universal guidelines for preparatory stages of school readiness.

CONCLUSION

The results of the current study conclude that the activities conducted in the kindergarten classrooms do focus on process skills, motor skills and social interaction skills.

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Comparative Study of Carbapenem-Sensitive Acinetobacter Infection with Carbapenem-Resistant Acinetobacter Infection among Inpatients of a Tertiary Care Teaching Hospital in South India

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ABSTRACT

Introduction: Acinetobacter (gram-negative bacteria) has become a threat in all the hospitals, especially in the Intensive Care units, being mainly treated with Carbapenem. But now, Carbapenem-resistant bacteria have evolved, Thus, treatment of such a patient with Carbapenem-resistant Acinetobacter infection becomes more difficult. This study will compare the factors that may cause Carbapenem-resistant and Carbapenem-sensitive Acinetobacter infection thereby helping in management of multidrug resistant Acinetobacter infections.

Materials & Method: This study is retrospective hospital based study executed in hospitals associated with Kasturba Medical College, Mangalore, Karnataka. Records of, 75 patients with Carbapenem-resistant Acinetobacter infection and 75 patients with Carbapenem-sensitive Acinetobacter infection were evaluated using a Proforma prepared after extensive literature review. The collected data were entered in, and analysed using SPSS version 16.0. For qualitative analysis of data, statistical Chi-square test was used and $p < 0.05$ was taken as statistically significant.

Results: Among 75 reports, with Carbapenem-resistant Acinetobacter 3 (4%) of the 75 reports had Acinetobacter resistant to Meropenem and Imipenem. 56 of the 75 reports had Acinetobacter resistant to all the Carbapenems. More than three quarters of individuals with Resistance had Co-morbid conditions present compared to 64% in Sensitive.

24% of Carbapenem-resistant individuals had pneumonia compared to 4% in Carbapenem-Sensitive. ICU admissions were less (26.3%) in sensitive cases compared to resistant (49.3%). Recovery was better in Acinetobacter Sensitive individuals (42.7%) when compared to Resistant which was just 11%.

Keywords: acinetobacter, carbapenem resistance, co-morbid conditions, ICU Admission.

INTRODUCTION

Acinetobacter (gram-negative bacteria) has become a threat in all the hospitals, especially in the Intensive

Care units, all over the world ^[1]. It is more common in patients who are intubated, catheterized etc. They mainly colonize skin, oropharynx, respiratory tract and urinary tract. They colonize (not so frequently) the gastrointestinal tract ^[2]. Meningitis, peritonitis, urinary tract infections, endocarditis (native valve infective endocarditis and prosthetic valve endocarditis), community-acquired pneumonia, and cholangitis are very rare association of infection of Acinetobacter. It has been found that patients who undergo liver

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transplantation^[3] or cardiac surgery^[4] get Carbapenem-resistant *Acinetobacter* infection.

Predisposing Factors:

Colonization of *Acinetobacter* is of high tendency when agents of antimicrobial therapy have insignificant or no action against *Acinetobacter*.

Staying where other patient (like ICUs) are infected with *Acinetobacter*.

Clinical symptoms: There are no specific clinical symptoms.

Many patients get colonized by *Acinetobacter*, but all patients do not suffer from infection. It depends on the immunity of the patient.

Acinetobacter species (mainly, *Acinetobacter baumannii*), are usually treated with Carbapenem. But now, Carbapenem-resistant bacteria have evolved, and treatment is given with a combination of Carbapenem and Cephalosporin or Carbapenem and Colistin.^{[4],[5]}

Thus, treatment of such a patient with Carbapenem-resistant *Acinetobacter* infection becomes all the more difficult. This study will compare the factors that may cause Carbapenem-resistant and Carbapenem-sensitive *Acinetobacter* infection. Carbapenem-resistant and Carbapenem-sensitive *Acinetobacter* infection treatment outcomes have not been analyzed and compared in nearly all the studies^[5]. So, the data obtained from this study will bring forth such a comparison, as well, thereby helping in management of multidrug resistant *Acinetobacter* infections.

OBJECTIVES

To compare various parameters between the two categories (Carbapenem-sensitive *Acinetobacter* infection and Carbapenem-resistant *Acinetobacter* infection) namely, age, number of days of hospital stay, number of co-morbid conditions, number of antibiotics taken, which can lead to the infection.

To compare the outcome of treatment in both the groups of patients

LITERATURE REVIEW

In 2016, a study by C Q Aline et. al, retrospective in nature, was carried out to find out if there were lower

chances of survival in patients who had *Acinetobacter* spp. bacteremia compared to those who had bacteremia due to other pathogens, aiming the critically ill patients. There was no dissimilarity found between patients with *Acinetobacter* spp. and other pathogens, regarding age, sex, APACHE II score, Charlson Comorbidity Score and type of infection according to the investigation done. Diabetes mellitus, Age above 60 years and *Acinetobacter* spp. infection were allied with poor prognosis. From the multicomponent model, *Acinetobacter* spp. infection (HR=1.93, 95 % CI: 1.25–2.97) and more than 60 years of age were individualistic prognostic factors.

In 2015, a study by Avkan-Oguz V et. al, microorganism's effect was the basis of investigations, which were found in culture of recipients of liver transplant with infection of the surgical site on antibiotic treatment. Findings were that, eighteen (25.4%) cases were polymicrobial especially, *Acinetobacter baumannii* and *Enterococcus* species.

In 2014, a study by Nguyen Thi Khanh Nhu et. al, retrospective in nature, done over an 11-year period, aiming at understanding and documenting changes in the agents causing VAP and their susceptibility to antimicrobials in a major infectious disease hospital located in southern Vietnam. A prominent shift from *Pseudomonas* to *Acinetobacter* spp. was observed, as the most prevalent bacteria and was also found in ventilator's tracheal aspirate associated with Pneumonia patients. Though resistance to antimicrobials was a common occurrence, there was a proportional annual rise in carbapenem-resistant *Acinetobacter* spp. as recorded from 2008 upto next 3 years (annual trend; odds ratio 1.656, $P=0.010$).

In 2014, a study by Pascale G D, a retrospective study of data, collected prospectively, was performed in a teaching hospital's ICU in Rome, to find the safety and efficiency of Tigecycline doses that was higher than the normal standard dose. Among the main isolated pathogens (mostly *Acinetobacter baumannii* and *Klebsiella pneumoniae*), the use of higher than standard doses of tigecycline was the only individualistic predictor of clinical cure (odds ratio (OR) 6.25; 95% confidence interval (CI) 1.59 to 24.57; $P=0.009$).

In 2014, a study by Balkhy H H, retrospective in nature, to examine the extent of resistance to multiple

drugs among common microbial causes of VAP in the adult intensive care unit (ICU), showed that *Acinetobacter* spp. was highly (60-89%) resistant to all antimicrobials including carbapenems (three- and four-class MDR prevalence were 86% and 69%, respectively). There was a worse profile of ICU patients with resistant *Acinetobacter*, but not patients' outcomes.

In 2008-2009, a retrospective study comparing the results of carbapenem-resistant *A. baumannii* VAP treated with colistin or with ampicillin-sulbactam, were analysed and it was established to have same results.

In 2003-2004, a retrospective, matched, cohort study by Sunenshine R H et. al, was carried out to study the effect on mortality rates, hospital stay duration and intensive care unit (ICU) stay duration of patients infected with multi - drug resistant strains of *Acinetobacter*. Healthcare-acquired and community-acquired *Acinetobacter* infections were taken into consideration. In-hospital mortality rates with MDR *Acinetobacter* infections (26%) were higher than susceptible references (18%) or uninfected ones (11%). Antimicrobial drug therapy (discordant) was more customary for MDR *Acinetobacter*-infected patients than for susceptible ones (91% vs. 65%, $p < 0.001$). On the other hand, patients with MDR *Acinetobacter* infection, who were treated with conflicting antimicrobial drug therapy, initially were five times more likely of an increased duration of stay in the ICU.

MATERIALS AND METHOD

This study is retrospective hospital based executed in hospitals associated with Kasturba Medical College, Mangalore, Karnataka. Records of, 75 subjects for Carbapenem-resistant *Acinetobacter* infection and 75 subjects for Carbapenem-sensitive *Acinetobacter* infection were evaluated using a Proforma prepared after extensive literature review and based on information available from records of patients who were admitted to the hospital. The study population included patients admitted to the hospital with hospital-acquired or community-acquired Carbapenem-sensitive or Carbapenem-resistant *Acinetobacter* infection.

The collected data were entered in, and analysed using SPSS version 16.0. For qualitative analysis of data, statistical Chi-square test was used and $p < 0.05$ was taken as statistically significant.

RESULTS

TABLE 1: Carbapenem-resistance variation:

Name of carbapenem to which the bacteria is sensitive	Number of individuals (N=75)
None	56 (77.7%)
Meropenem	2 (2.7%)
Imipenem	13 (17.3%)
Ertapenem	0
Both Meropenem and Imipenem	3 (4%)

In the study, it was found that among all the 75 reports collected, of patients with Carbapenem-resistant *Acinetobacter*, their respective laboratory specimens, were sensitive to one or the other Carbapenems, while 3 (4%) of 75 reports had *Acinetobacter* resistant to Meropenem and Imipenem. 56 of the 75 reports had *Acinetobacter* resistant to all the Carbapenems. The above data was highly significant, statistically (p value < 0.05).

There was presence of co-morbid conditions in both the categories of individuals, Carbapenem-resistant and Carbapenem-sensitive. An association between the presence of co-morbid conditions and acquitting of Carbapenem-resistant or Carbapenem-sensitive *Acinetobacter* infection, was proved statistically (Pearson's chi-square test: $df=1$, p value =0.047).

Though the presence of co-morbid conditions had an association with Carbapenem resistance, the total number of Co-morbid conditions didn't have any statistical significance with Carbapenem resistance or sensitivity.

In the study, it was found that among the 75 individuals who had Carbapenem-resistant *Acinetobacter* infection, DM was present in 20 (26.7%) patients. In 75 individuals with Carbapenem-sensitive *Acinetobacter* infection, DM was present in 15 (20%) patients.

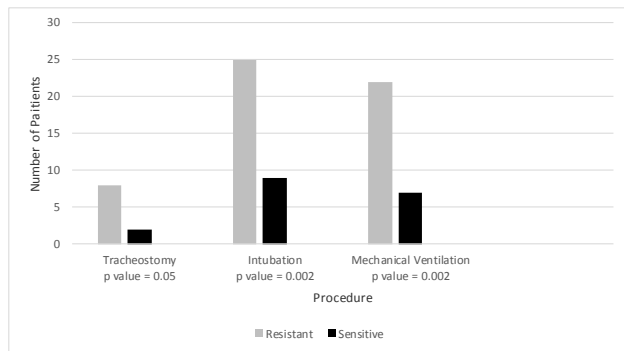
In the study, out of the 75 individuals with Carbapenem-resistant *Acinetobacter* infection, 21 (28%) of them had Hypertension, and out of the 75 individuals with Carbapenem-sensitive *Acinetobacter* infection, 22

(29.3%) had Hypertension.

It was noted, only individuals with Carbapenem-resistance also had bronchial asthma as one of the comorbid conditions. Among the Carbapenem resistant individuals who were 75 in number, 5(6.7%) of them had bronchial asthma (Pearson’s chi-square test: df-2, p value < 0.05).

There was a strong association (Pearson’s chi-square test: df-2, p value = 0.001), found between Carbapenem-resistant and Carbapenem-sensitive Acinetobacter infection, and presence of other comorbid-conditions (which did not include Hypertension, Diabetes Mellitus, COPD, bronchiectasis). These co-morbid conditions which were taken into account were cancer, CKD, RVD, anemia, IHD, CVA, respiratory problems, hypothyroidism, ALL, IHD, alcohol dependence syndrome, cardiac disorders, urinary incontinence, acute coronary syndrome, encephalitis.

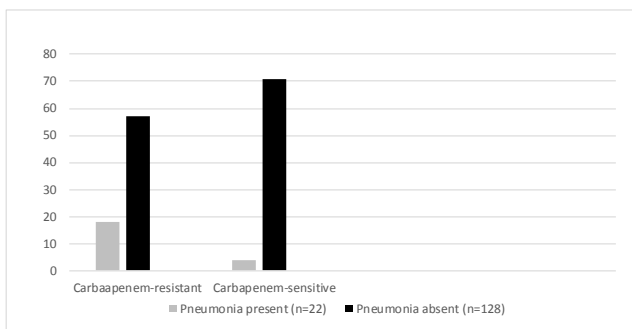
Following Bar Graphs show invasive procedures that were done which shows a strong statistical significance. There was an association between the invasive procedures and Carbapenem-resistant or Carbapenem-sensitive Acinetobacter infection.



Graph 1: Comparison of Invasive Procedures done in Carbapenem Resistant Vs Sensitive Groups

Pneumonia was present in quite a few individuals, both with Carbapenem-sensitivity and Carbapenem-resistance.

The following Bar Graph Number 2 shows a comparison between pneumonia in Carbapenem-sensitive and Carbapenem-resistant patients



Graph 2 : Comparison between pneumonia in Carbapenem-sensitive and Carbapenem-resistant patients

49.3% of Carbapenem-resistant were admitted to ICU compared to 20.6 % of Carbapenem-sensitive. There was high statistical significance (Pearson’s chi-square test: df-1, p value = 0.004) among individuals with Carbapenem-resistant or Carbapenem-sensitive Acinetobacter infection and ICU admission.

There were varied specimens from which Carbapenem-resistant Acinetobacter and Carbapenem-sensitive Acinetobacter were obtained.

Out of these samples sputum samples had the highest frequency of Acinetobacter prevalence. Among the 49 sputum samples which had Acinetobacter, 21 (28%) samples contained Carbapenem-resistant Acinetobacter and 28 (37.3%) samples contained Carbapenem-sensitive Acinetobacter.

TABLE 2: Outcome of Treatment

Outcome	Carbapenem-resistant (n=75)	Carbapenem-sensitive (n=75)
Recovered	1 (11%)	32 (42.7%)
Improved	31 (41.3%)	31 (41.3%)
Unchanged	6 (8%)	6 (8%)
Deteriorated	5 (6.7%)	2 (2.7%)
Expired	18 (24%)	4 (5.3%)
Unknown	4 (5.3%)	0

The outcomes of treatment showed high statistical significance (Pearson’s chi-square test: df- 5, p value <0.05). Among the 75 patients with Carbapenem-sensitive Acinetobacter infection, maximum, i.e., 32 (42.7%) of them recovered. Among the 75 patients with Carbapenem-resistant Acinetobacter infection, maximum, i.e., 31(41.3%) improved. Among the Carbapenem-resistant patients, 18 (24%) expired while

among the Carbapenem-sensitive patients, 4 (5.3%) expired.

DISCUSSION

The aim of the study was to compare various parameters between the following two categories of patients - Carbapenem-sensitive Acinetobacter infection and Carbapenem-resistant Acinetobacter infection. The various parameters which were considered included, age, number of days of hospital stay, number of comorbid conditions, number of antibiotics taken, which can lead to the infection and to compare the outcome of treatment in both the groups of patients. The study was retrospective in nature, and was carried out in Karnataka, in two tertiary care hospitals in Mangalore. Data was collected in a proforma prepared after extensive literature review that would help, gain information on all the above mentioned objectives.

The current study included 150 patients' records, of whom 75 were of patients with Carbapenem-resistant Acinetobacter infection and 75 were from patients with Carbapenem-sensitive Acinetobacter infection. In the study by Aline C Q et. al [1], which was also retrospective in nature just like the present one, it was found that critically ill patients who were of age more than 60 years and who had Diabetes Mellitus had significantly poorer prognosis when combined with Acinetobacter infection. But in the present study, it was seen that Diabetes Mellitus or age more than 60 years had no such association with Acinetobacter infection. In this study, it was seen that, bronchial asthma had an association with Carbapenem-resistant Acinetobacter infection. And, it was seen that only individuals with Carbapenem-resistant Acinetobacter infection also had bronchial asthma. There was a high statistical significance ($p=0.001$) noted with other comorbid conditions(as mentioned previously) and Carbapenem-resistant Acinetobacter infection.

In the study by Balkhy H H , it was seen that there was a worse profile of patients with ICU admission who had Multidrug-resistant Acinetobacter infection. Same was the case with the present study. The current study compared ICU patients with Carbapenem-resistant Acinetobacter infection and ICU patients with Carbapenem-sensitive Acinetobacter infection. It was found that, for Carbapenem-resistant Acinetobacter infection, ICU admission was a strong risk factor. It

was seen that, out of the 75 Carbapenem-resistant Acinetobacter infected patients, 37 (49.3%), had been admitted to ICU. In the aforementioned study, there was a worse profile of patients with drug resistant Acinetobacter infection, but not with patients' outcomes. But the present study showed that outcomes of treatment and Carbapenem-resistance had a high significance.

In the study by Gurjar M et. al, it was seen that Carbapenem-resistant Acinetobacter infection with Ventilator Associated Pneumonia (VAP) acted as a strong risk factor for the former. Same was the result with the present study. But in this study, risk factors of Carbapenem-resistant Acinetobacter infected patients were compared with Carbapenem-sensitive Acinetobacter infection. Also, presence of pneumonia at ICU admission has an impact on the outcome of the patients, according to the mentioned study. In this study also, when pneumonia was taken as a factor, it proved to be a high- risk factor for both Carbapenem-sensitive and Carbapenem-resistant Acinetobacter infection.

In a study by Rebecca H Sunenshine et. al [5], first of its kind, that it directly assessed the outcomes of patients with drug-resistant Acinetobacter infection. But in the current study, the treatment outcomes of patients with Carbapenem-resistant Acinetobacter-infected patients were compared with Carbapenem-sensitive Acinetobacter-infected patients. It was seen that, patients of the former category improved after treatment but those of the latter category recovered completely.

So, all the above mentioned studies mostly assessed drug-resistant Acinetobacter infection or drug-sensitive Acinetobacter infection. But the two categories were never compared. The present study compared the two categories of patients, those with Carbapenem-resistant Acinetobacter infection and Carbapenem-sensitive Acinetobacter infection. The co-morbid conditions like cancer, CKD, etc. did act as strong risk factors for both the categories of patients. But bronchial asthma was a risk factor for only Carbapenem-resistant Acinetobacter-infected patients, as no patients were found in the study of 150 patients' records, where a patient had Carbapenem-sensitive Acinetobacter infection and bronchial asthma alongside. Previous studies [1] showed that DM was a risk factor for Acinetobacter infection. But, in the current study DM did not prove to be a risk factor for any of the two categories of patients.

CONCLUSION

Co-morbid conditions like cancer, CKD, ARDS, anemia, cor pulmonale, etc acted as risk factors for both Carbapenem-sensitive Acinetobacter-infected patients and Carbapenem-resistant Acinetobacter infected patients.

For patients infected by Acinetobacter that is resistant to Carbapenem, bronchial asthma is a risk factor.

ICU admission was a risk factor for both the categories of patients.

No importance was found in the number of days of hospital stay, number of antibiotics taken, or incidence of hospital-acquired and community-acquired infections in the two categories of patients.

Maximum patients with Acinetobacter infection that is resistant to Carbapenem recovered after treatment while maximum patients with Acinetobacter infection that is resistant to Carbapenem infection recovered after treatment. So, the outcomes of treatment for the two categories of patients were different.

RECOMMENDATIONS

Patients with bronchial asthma should be looked after, specifically so that they don't acquire Carbapenem-resistant Acinetobacter infection. Prophylaxis can be an option, especially for those admitted to the ICU, or who are intubated, or getting mechanical ventilation or those who have tracheostomy done.

Patients with co-morbid conditions should be looked after specifically, so that they don't acquire Carbapenem-sensitive or Carbapenem-resistant Acinetobacter infection.

ICUs should be disinfected and monitoring of all patients in the ICU should be done for Acinetobacter infection (both Carbapenem-resistant and sensitive).

Monitoring (especially, culture and sensitivity) of intubated, mechanically ventilated patients for Acinetobacter infections should be done. Tracheal aspirates should also be cultured for Acinetobacter in tracheostomy patients.

Conflict of Interest – None

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Ethical Clearance - Ethical approval was obtained from the ethics committee of Institution Kasturba Medical College, Manipal Academy of Higher Education, located in Mangalore.

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Gender Differences in Quality of Life in Type-2 Diabetics with Metabolic Syndrome

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ABSTRACT

BACKGROUND: Diabetes mellitus, a chronic metabolic disorder, may have a negative effect on the quality of life of diabetics.

AIM: To evaluate the gender differences in quality of life (QOL) of type-2 diabetics with metabolic syndrome (MS).

METHOD: The cross-sectional study was conducted at the outpatient clinic of a tertiary hospital in Madurai, on 166 type-2 diabetics with MS. Baseline characteristics, anthropometric measurements and biochemical profile were elicited through a pre-tested questionnaire. QOL of the diabetics was evaluated using the WHOQOL-BREF questionnaire. Gender comparisons were statistically tested.

RESULTS: The overall mean QOL scores were 28.08±6.95 and 32.35±12.08 for male and female diabetics respectively which differed significantly ($P<0.001$). Women diabetics had better perception of QOL compared to men.

CONCLUSIONS: QOL as reported by the diabetics was poor, with women scoring better than male diabetics.

Key-words: Diabetes, Metabolic syndrome, Quality of Life, Gender

INTRODUCTION

Type-2 diabetes mellitus is a complex, heterogeneous metabolic condition with serious short-term and long-term consequences¹. Metabolic syndrome (MS) indicates a cluster of unfavourable health factors such as obesity, insulin resistance, dyslipidemia and hypertension that increase the risk of developing cardiovascular diseases, especially in type-2 diabetes^{2,3}. Metabolic syndrome is recognized as a reliable long-term predictor of adverse health outcomes⁴. The long-term complications of

diabetes, with their considerable impact on health, may as a result also have a negative impact on quality of life.

Quality of life (QOL) is defined by WHO⁵ as “individuals’ perceptions of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”. It is a broad ranging concept affected in a complex way by the person’s physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment.

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SUBJECTS AND METHOD

The study was based on a cross-sectional representative sample of 1126 adult type-2 diabetics attending the outpatient clinic in Southern Tamil Nadu.

The subjects were selected based on the inclusion criteria of being able to read the questionnaire and provide informed consent, were >18 years of age, diagnosed as suffering from type-2 diabetes mellitus for at least one year and an exclusion criteria of having severe comorbidities or psychiatric disorder. Institutional ethical clearance was obtained for the study, conducted between April and October 2017. A pre-tested questionnaire was used to elicit information on the demographic and socio-economic profile of the subjects. Anthropometric measurements were obtained directly from the patients at the outpatient department and the biochemical data were collected from the hospital records. The definition of MS used in the study adhered to the National Cholesterol Control Program Adult Treatment Panel (NCEP ATP-III) definition modified for Asian Indians⁶: central obesity measured by waist circumference(WC) ≥ 90 cm in men and ≥ 80 cm in women; fasting plasma glucose(FPG) ≥ 100 mg/dl or diagnosed with type-2 diabetes; hypertension with systolic BP ≥ 130 mmHg or diastolic BP ≥ 85 mmHg; elevated triglyceride level ≥ 150 mg/dl; reduced HDL-cholesterol level < 40 mg/dl for men and < 50 mg/dl for women.

From the identified type-2 diabetics with MS, a sub-sample was chosen for the study on quality of life. The Tamil version of the WHOQOL-BREF questionnaire was used to facilitate better understanding by the respondents. Prior permission was obtained from WHO and the questionnaire was field tested for reliability. The WHOQOL-BREF questionnaire consists of 26 questions: two questions from the overall QOL and general health and 24 questions of satisfaction, divided into four domains: physical and psychological health, social relationships and environmental health. The response of each question was rated on a 5-point Likert scale and the raw scores in each domain were transformed to a

4 - 20 score according to WHO guidelines⁷. The mean score of questions in each domain was used to calculate the domain score that was finally transformed linearly to a 0-100 scale⁸. The total score and hence QOL was classified by the investigators as poor (<33), average (33-66) and good (>66).

Data Analysis

Data were analysed using SPSS version 22.0 for Windows (SPSS Inc., Chicago, USA). Based on normality test, all continuous data were found to be normally distributed and were presented as descriptive statistics i.e., mean and standard deviation, and gender comparisons using unpaired 't' test. The statistical significance was assumed at a p-value of < 0.05 . The level of correlation between the overall QOL scores and MS parameters was examined using Pearson's correlation coefficient. Independent t-test and chi-square test were used to investigate the relation between the QOL scores and baseline characteristics.

RESULTS

Prevalence of Metabolic Syndrome among the type-2 diabetics

The overall prevalence of metabolic syndrome among the type-2 diabetics (N=1126) was above three fourth (77.44%) of the sample population, higher among women (84.67%) as compared to men (72.40%). The sub-sample for QOL study was selected based on the presence of more than three positive parameters of MS. A sub-sample of 166 (14.74%) adult type-2 diabetics with metabolic syndrome (**92 female and 74 male**) were identified for the QOL study. The profile of the selected sub-sample of type-2 diabetics with metabolic syndrome is presented in the following table.

Table 1: Gender-wise comparison of MS components in type-2 diabetics with MS

Parameters	Female (n=92)	Male (n=74)	P value
	Mean \pm SD	Mean \pm SD	
Age (yrs)	50.78 \pm 11.66	53.77 \pm 11.39	0.099
BMI (kg/m ²)	28.73 \pm 4.54	27.16 \pm 4.002	0.021*
Waist Circumference (cm)	96.75 \pm 9.84	81.34 \pm 9.81	P<0.001***
BP-Systolic (mmHg)	144.34 \pm 19.18	140.27 \pm 14.14	0.130

Cont... Table 1: Gender-wise comparison of MS components in type-2 diabetics with MS

BP-Diastolic (mmHg)	87.8±11.3	87.0±10.84	0.643
Fasting Plasma Glucose (mg/dl)	188.9±61.5	198.22±66.52	0.352
LDL Cholesterol (mg/dl)	132.04±38.43	119.29±42.02	0.043
HDL Cholesterol (mg/dl)	38.68±5.03	33.51±2.95	P<0.001***
Triglycerides (mg/dl)	255.88±98.48	265.97±121.93	0.556

*p<0.05 - Significant , **p<0.01 and ***p<0.001 highly significant.

The mean age of the subjects was comparable between genders. A mild significant difference (p=0.021) in BMI was noted between the male and female subjects. The mean WC of the male subjects was lower than the cut-off for men (P<0.001). Women diabetics had a higher mean WC and lower HDL level when compared to men which may explain the higher prevalence of MS in women. The mean values of parameters such as BP, FPG and TG were above the cut-off values as per MS definition and were comparable between genders.

The quality of life measure were tested for the reliability and the Cronbach's Alpha was 0.801 which well exceeds the minimum value of 0.70^{9,10}.

Gender comparison of association between overall QOL scores and baseline characteristics

Most of the male (59.5%) and female (65.2%) subjects were in the age range of 41 to 60 years and women in this age range had highest overall mean QOL scores (33.5±12.4) when compared with men (26.4±2.4). Men had higher mean QOL score (31.3±6.1) in the age range of 21 to 40 years when compared to women (29.3±11.6) in this age group. Marital status led to significant (P<0.001) difference in QOL scores within the male group. Most of the female (71.7%) and male (59.5%) subjects belonged to joint family which contributed to higher QOL scores. The QOL scores had no significant association with religion. A majority (64%) of the subjects in both genders had professional education and almost 42% of each gender group belonged to upper middle class.

Table 2: Comparison of overall QOL scores and demographic variables between genders

Parameters	Overall Quality of Life scores within groups					
	Female (n=92)		P value	Male (n=74)		P value
	n(%)	Mean±SD		n(%)	Mean±SD	
Age ≤20yrs	0	0	0.405	1(1.3)	58. ±0	P<0.001***
21-40yrs	18(19.6)	29.3±11.6		6(8.1)	31.3±6.1	
41-60yrs	60(65.2)	33.5±12.4		44(59.5)	26.4±2.4	
≥60yrs	14(15.2)	31.3±10.9		23(31.1)	29.2±9.5	
Marital Status			0.418			P<0.001***
Unmarried	0	0		2(2.7)	54.8±4.6	
Married	89(96.7)	32.2±12.1		69(93.2)	27.4±5.5	
Widowed	0	0		1(1.3)	28.3±0	
Divorced	2(2.17)	28±0		0	0	
Separated	1(1.08)	52±0	2(2.7)	25.8±3.2		
Family members			0.552			0.899
≤ 4 members	42(45.7)	31.5±11.9		29(39.2)	27.9±6.9	
> 4 members	50(54.3)	33.04±12	45(60.8)	28.2±7.1		

Cont... Table 2: Comparison of overall QOL scores and demographic variables between genders

Family type			0.081			0.289
Joint	66(71.7)	33.7±13.3		44(59.5)	28.7±8.2	
Nuclear	26(28.3)	28.9±7.6		30(40.5)	27.03±4.5	
Religion			0.660			0.783
Hindu	66(71.7)	32.7±12.3		57(77.0)	28.3±7.82	
Muslim	13(14.1)	29.5±9.4		10(13.5)	27±2.23	
Christian	13(14.1)	33.3±13.5		7(9.5)	27.1±2.43	
Education			0.096			0.315
Middle school	9(9.8)	37.0±14.7		9(12.2)	25±4.36	
Higher secondary	9(9.8)	38.6±17.8		6(8.1)	26.04±2.21	
UG/PG	15(16.3)	34.7±14.6		11(14.9)	30.3±8.0	
Professional	59(64.1)	30.1±9.4		48(64.8)	28.3±7.35	
Socio-Economic Status			0.19			0.423
Lower	0	0		0	0	
Upper Lower	23(25.0)	36.5±15.7		15(20.3)	26.2±4.45	
Lower Middle	24(26.1)	29.1±9.5		21(28.4)	29.7±9.5	
Upper Middle	39(42.4)	32.1±11.3		32(43.2)	28.2±6.47	
Upper	6(6.5)	30.7±6.56		6(8.1)	26.04±1.87	

Significant association was observed between QOL scores and age (p<0.001), marital status (p<0.001) and occupation (p<0.05) respectively in male subjects. This observation may explain the reason behind the low QOL scores among the male diabetics since QOL is a subjective measure, influenced by the dependent variables.

Comparison of mean QOL scores of each domain between genders

QOL scores of each domain were tested for significance using an independent sample t-test.

Table 3: Comparison of QOL domain scores between genders

QOL Domains	Gender(n)	Mean QOL scores	P value
Physical health	Male(74)	30.85±9.25	0.041*
	Female(92)	34.45±12.50	
Psychological health	Male(74)	34.17±7.58	0.02*
	Female(92)	37.47±10.45	
Social relationship	Male(74)	22.31±9.97	0.01*
	Female(92)	27.54±16.16	
Environment health	Male(74)	24.97±6.82	0.007**
	Female(92)	29.62±13.34	
Overall QOL	Male(74)	28.07±6.95	0.009**
	Female(92)	32.35±12.08	

Women diabetics had significantly higher scores than that of men within each domain. The highest score was obtained in the psychological domain and the lowest score for social relationships among both groups. Although a significant difference (P=0.009) was noted in the overall QOL scores between groups, the differences in the individual domain scores were not highly significant, except for the scores in the environment domain (P=0.007). The higher scores by women may be attributed to the younger age range when compared to men in the study group. Further, an equal percentage of women subjects had professional education compared to men, which may have contributed to their better perception of QOL.

A majority of male diabetics with MS had low levels of perception of quality of life in all domains while the women diabetics had better perception of QOL especially in variables such as physical and psychological health domains. Highest proportion (95.9%) of male subjects had poor perception of their social relationships, followed by 94.6% with poor scores in the environmental domain.

The correlation of quality of life scores with the individual parameters of MS was analysed using Pearson’s correlation coefficient and the values were compared between genders. WC, BMI and TGL in male, and HDL and TGL in female subjects showed a positive correlation with QOL compared to the other parameters

of MS. Although WC was negatively correlated with QOL in female subjects, BMI showed negligible positive correlation. It may be inferred that the overall occurrence of MS had more impact on the QOL scores than individual parameters of MS.

DISCUSSION

The study aimed to compare the QOL of male and female type-2 diabetics with metabolic syndrome in a tertiary out-patient diabetic clinic. Metabolic syndrome was present in majority (77.44%) of the type-2 diabetics, also stated by various studies^{11,12,13}. Women had a higher prevalence rate which maybe a result of difference in the cut-off values of individual parameters of MS^{14,15}.

A majority of the male and female diabetics were in the age group of 41-60 years with a mean overall QOL score of 26.4±2.4 in men and 33.5±12.4 in female subjects. It is observed that younger type-2 diabetics had significantly higher QOL scores than older persons^{16,17}. However, a study embarked on an elderly population in a small town in Tamilnadu¹⁸ showed a better mean QOL score. Association of QOL scores with marital status, exhibited in unmarried male subjects (2.7%) have negligible implication. It may be noted that QOL was not influenced by any specific demographic parameter in women. However, the QOL scores were significantly associated with age, marital status and occupation in male diabetics¹⁸. Among the MS parameters, WC and HDL had varying correlations with QOL scores for male and female subjects. Women diabetics had significantly higher waist circumference which may have influenced the negative correlation ($r = -0.10$) with QOL. HDL cholesterol had mild negative correlation in men (0.07). It was found that dyslipidemia had the lowest correlation with QOL¹⁹. Blood pressure was the only parameter that had similar negative correlations in both genders.

The individual domain QOL scores were significantly higher in women than among men diabetics in contrast to most findings^{20,21}. However, other studies support our observation of higher QOL in female than male diabetics^{22,23}. Both genders perceived lowest levels of QOL in the social domain followed by the environmental domain. This suggests that external factors exhibit greater influence on QOL of diabetics than their personal factors such as physical and psychological influences, irrespective of gender. Thus, diabetic individuals with MS were more likely to have poor scores in the domains

of general health, vitality, social functioning and role limitations due to emotional problems. QOL can be enhanced among people with diabetes by interventions that improve glycaemic control, changes in insulin delivery systems, and educational and counselling sessions that support the development of diabetes specific coping skills²⁴.

Limitations:

In this study, sample was limited to diabetics with MS in a tertiary hospital and hence the findings cannot be generalised to populations. Diabetics without MS were not included in the study, therefore impact of MS in diabetes on QOL could not be compared. Other associated factors related to QOL, such as, behavioural characteristics, social wellbeing and environmental health were not included in the study owing to paucity of time

CONCLUSION

The cross-sectional study measures the burden of MS on type-2 diabetics and its effect on their quality of life. These findings suggest that MS as a constellation of conditions has a greater impact on QOL than the individual disorders. Quality of life of diabetics is a strong indicator of the patient care process, influenced by the available healthcare facilities, family support, social and environmental influences. Further, longitudinal studies are recommended to assess the effect of social and environmental factors on quality of life of diabetics.

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Study on Role of Deviance Behaviour & Its Impact on Entrepreneurship

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ABSTRACT

Purpose - The purpose of this study is to explore relationship between entrepreneurship and deviant behavior.

Design - Conceptual development using cases as illustrative examples.

Findings- Clearly, deviant and unethical behavior issues are of surprising situation to companies, which need to find a way to determine m, on equivalent time as encouraging ethical culture. Feels that furthermore research is required using more qualitative and definitive estimations to research extra about one's practices.

Value- This study finds that there is an overlap between way deviant behavior is defined and way entrepreneurship is conceptualized in literature. It also finds that previous research, distinguishing between desirable and undesirable deviant behavior based on intentions or outcomes of behavior, insufficient in relation to entrepreneurship as deviant behavior. Reason is that for entrepreneurial ventures, underlying intentions are often good, but outcomes often not; and that making assessments of outcomes of entrepreneurial ventures a prior is notoriously difficult. Assessing deviant behavior based only on organizational level evaluations is likewise insufficient in relation to entrepreneurship.

Research limitations - The cases used to illustrate overlap between entrepreneurship and deviant behavior are conspicuous and not necessarily representative of entrepreneurship and deviant behavior in general.

Originality - This is an attempt at merging deviant behavior and entrepreneurship literature, which highlights an important niche with a great promise for future research.

Keywords — *Entrepreneurship, deviant behavior, Deviance, Norm and Institution.*

INTRODUCTION

Although deviant behavior is risky, it can also have positive consequences for organization, its members, or both. Research on positive consequences of deviant behavior is a neglected area of literature and requires further research. In order to develop previous conceptualizations of deviant behavior, this study draws on emerging strand of research that focuses on dark side of entrepreneurship and limited work that emphasizes positive aspects of deviant behavior as deviance and

rule-breaking. In doing so, it explores links between entrepreneurship and deviant behavior theoretically and empirically.

We suggest that it is necessary to broaden view of which institutions determine whether a venture classifies as deviant behavior, when analyzing entrepreneurship. Reason for this is that support for venture may be needed also from actors outside of organization, and what constitutes relevant organization is not always clear. Therefore, we develop a framework for assessing entrepreneurship as deviant behavior based on reviewed literature. This framework captures potential inconsistencies in institutional frameworks by which behavior is assessed. In addition to se

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conceptual developments, study discusses links between entrepreneurship and deviant behavior and uses a number of noticeable instances of independent and corporate entrepreneurship in order to illustrate how institutional constraints affect entrepreneurial ventures. Lastly, we discuss study's findings and assess them critically and conclude with suggestions for further research.

What is Entrepreneurship?

Entrepreneurship has been defined in a myriad of ways not only by practitioners but also by academics. Perhaps archetypal description of entrepreneurship is a process where someone starts a firm, combining means of production and labor; process or output is novel.

More recent research has re-framed scope of entrepreneurship. In their seminal paper, Shane and Venkataraman defines entrepreneurial opportunities as "those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at [a price] greater than their cost of production"²³. They acknowledge that entrepreneurship occurs for reasons other than for profit, but limit their discussion to for-profit situation and to capitalist paradigm. In order to provide a more general definition of entrepreneurial opportunities, Davidson and Wiklund's discussion is helpful. In their view, entrepreneurship is about "emergence of new economic activity"⁹. They highlighted that entrepreneurship takes place not only in new organizations, but also in existing organizations and in cooperation of less formal. Therefore, what separates entrepreneurial opportunities from opportunities in general, is that they are associated with emergence of new economic activity. Although Shane and Venkataraman's discourse²³ is framed in a capitalist paradigm and assumes legality, there is nothing, in principle, that prevents phenomena of opportunity recognition and exploitation from taking place in either settings.

Although most people have norms that roughly correspond to legal framework, in some respects norms, beliefs, and values of large groups in society deviate from laws and regulations. For example, using undocumented labor and sharing copyrighted files over Internet are examples of activities that are illegal (in most countries), but nevertheless deemed legitimate by large parts of population. Consequently, some entrepreneurial opportunities may exist and may be pursued in what Webb et al.²⁶ refer to as informal

economy. Informal economy is part of economy that is illegal but considered legitimate by a large portion of population. Renegade entrepreneurs operate outside of both formal and informal institutions. Although Webb et al.²⁶ do not give a name to type of economy that is legal but considered illegitimate by large parts of population, activities falling into this category are clearly conceivable. For example, prostitution is legal in many countries, but is still considered illegitimate by large parts of population. We term this category offensive entrepreneurship. Separation between formal and informal types of entrepreneurship is likewise found within corporate entrepreneurship literature²⁷. Corporate entrepreneurship denotes entrepreneurial processes within already established firms²⁴. Within this literature it is emphasized that entrepreneurial initiatives often originate from bottom-up processes^{6,7,16}. At times these bottom-up ventures are informal, that is, they are not sanctioned formally by organization²⁷.

As illustrated in Table 1, entrepreneurs can break norms or laws (or both) in their pursuit of entrepreneurial opportunities. In other words, entrepreneurial action (i.e., pursuing entrepreneurial opportunities) is only partly constrained by institutions²⁶. In addition, strategies employed by entrepreneurs to respond to institutional pressures may influence very institutional framework in which they find themselves and their organizations²⁰. Thus, some scholars use term institutional entrepreneurship in reference to entrepreneurial actions that reshape our institutional frameworks^{1, 2}. Conspicuous firms like Ford, IKEA, and McDonalds have reshaped not only peoples' habits but also their view of reality¹². However, these processes are not predictable. As humans are myopic to impact of their ventures in market place¹⁹, they are even more so with regards to their impact on institutions^{1, 2}. Of course, this has neither stopped people from starting firms, nor from trying to influence institutions. In other words, despite being unable to control and foresee outcome of their actions, entrepreneurs start ventures, which inevitably involve uncertainty¹⁵ and great variance in outcomes²³. As entrepreneurs strive to introduce new products, services, methods, or to reach new groups with existing ones, they often find themselves in conflict with existing norms and rules. These conflicts sometimes stifle entrepreneurial ventures, at or times redirect entrepreneurial effort⁵ and sometimes lead to emergence of new institutions such as norms, rules, and laws.

Table-1. Typology of Entrepreneurship Based on

	Legality	
	Legal	Illegal
Legitimacy		
Legitimate	Formal entrepreneurship	Informal entrepreneurship
Illegitimate	Offensive entrepreneurship	Renegade Entrepreneurship

Institutional Trespassing

Deviant Behavior and Institutional Frameworks

This general framework (summarized in Table 2) allows for different types of deviant behavior depending on which institutions are trespassed against. Separating kind of institutions people can trespass against also removes blind spot created by a monolithic view of institutions. For example, where as Robinson and Bennett have argued that dumping toxic waste in a river should not be considered deviant behavior if organizational norms encourage such behavior, framework suggested in this study captures both unlawfulness and societal illegitimacy of such behavior²². In or words, this study’s framework captures potential inconsistencies in institutional frameworks in which people exist.

In addition to misalignment of societal and organizational institutions, re may also be discrepancies between formal and informal institutions within same level of analysis (i.e., organizational or societal). Webb et al. highlight discrepancy between how large parts of population and people in some countries view sharing of copyrighted files²⁶. Furthermore, within organizations, formal and informal institutions may be contradictory. Returning to toxic waste—it is unlikely today that formal rules of any organization would condone dumping, although informally norms may encourage it. In such cases, employees find m-selves between a rock and a hard place. Regardless of their actions, y will misbehave from some perspective. In fact, this discrepancy may be used as a buffer for managers, who, in case of external exposure, can blame particular employees who got caught.

Table-2. Institutions defining Deviant behavior.

Level	Type of Institution	
	Formal	Informal
Societal	Laws	Societal norms
Organizational	Rules	Organizational norms

Links between Entrepreneurship and Deviant Behavior

According to definitions provided above, entrepreneurship is deviant behavior if it involves trespassing against organizational or societal formal or informal institutions. Our definition of entrepreneurship makes distinction between entrepreneurial action and non-entrepreneurial action possible. Entrepreneurial actions are associated with pursuing entrepreneurial opportunities, which in turn are associated with emergence of new economic activity. Thus, seizing opportunity to steal cash or some products from organization is not entrepreneurship, where as seizing opportunity to produce a new type of product or finding a new use for old products is. Stealing cash from organization would fit neatly under wide deviant behavior umbrella, where as a new use for old products could be deviant behavior, but need not be necessarily. For example, reusing pace makers from dead people would not be in accordance with US institutions if reuse takes place in United States²¹ and would therefore constitute both deviant behavior and entrepreneurship.

Recycling plastic bottles to produce fleece fabric, on other hand, would be entrepreneurship but not be deviant behavior as it would be in accordance with both formal and informal institutions. Therefore, according to definitions discussed in this study, re is a conceptual overlap between deviant behavior and entrepreneurship as some entrepreneurial ventures break rules and norms and Therefore qualify also as deviant behavior In addition to discussed conceptual overlap between entrepreneurship and deviant behavior, re is a range of potential empirical commonalities between two phenomena. Such commonalities can stem from organizational factors that enable both entrepreneurship and deviant behavior. For example, autonomy is positively

related to entrepreneurial behavior^{17, 18}, but it has also been found to be positively related to deviant behavior²⁵. Consequently, attempts at supporting entrepreneurial behavior can unintentionally enable deviant behavior. Another source of overlap may be common characteristics of entrepreneurs and entrepreneurship. For example, Wright and Zahra portray entrepreneurs as rule breakers²⁷; Klofsten, M claims that entrepreneurs are often suspicious of authority¹⁴; Johannisson that entrepreneurs frequently assume role of an anarchist in relation to existing institutional framework¹²; and Kramer, Cesinger, Schwarzinger, and Gelle'ri find that narcissism and psychopath are positively related to entrepreneurial intentions^{17, 18}. Furthermore, Shane draws upon a substantial body of research when he claims that many entrepreneurs are uninterested in working for others²³. However, successful business start-ups regularly employ people and consequently owner-managers often end up with substantial power over firm's employees. This power can corrupt and in doing so promote both deviant and harmful acts by entrepreneur. In order to exemplify how entrepreneurship can clash with existing norms and rules and how these clashes are viewed by entrepreneurs, managers, and society, we draw on some noticeable cases of entrepreneurship. These examples are all prominent and large-scale ventures that have been represented as controversial. They range from rather mild organizational deviant behavior, via examples involving both legal and social complications, to those that members of general public have branded outrageous deviant behavior. These examples are chosen because they are conspicuous and are therefore not necessarily representative for entrepreneurship and deviant behavior in general.

Defending Project against Project Review Procedures

Ulcer drug – Losec – is most successful product developed by pharmaceutical group Astra. From its introduction in 1988 until expiry of patents, Astra had income from Losec as a mainstay. Still, while now competing with generic drugs, worldwide sales in 2010 amounted to almost \$1 billion⁴. However, Losec was not developed as a consequence of corporate top management strategy nor even a continuously accepted development effort. In fact, it was developed in defiance of corporate management research portfolio norms, and development project was saved from premature termination five times between 1966 and 1984¹⁰.

Innovating Social Networking to Find a Successful and Legal Solution

Like most or entrepreneurial ventures, idea behind internationally renowned social networking site Facebook developed during an extended period of time including experimentation and interaction with many people¹⁴.

Some early experimentation started with Zuckerberg obtaining photos of female Harvard students from student Houses' online archives and creating website Facemash, where users could rate relative attractiveness of students based on their photos being presented two at a time. Also, representatives of Harvard female student associations sharply criticized site as Zuckerberg did not have permission from either those photographed or from organizations that stored files online. Entrepreneurial action is consequently based on illegal use of photos (violating copyright and violating individual privacy) and for purposes deemed unethical by Harvard administration and by a number of female students. Venture Facemash could thus qualify for label renegade entrepreneurship in terms of Table 1, and it violated all four types of institutions in Table 2. However, view of violation of social norms is not universal. Large amount of users at Harvard obviously did not see system as violating its norms sufficiently to refrain from using it¹¹.

Innovating Sharing of Digitized Material in Legal Borderlands

Pirate Bay is one of world's largest sites facilitating file-sharing and, according to web information company Alexa's traffic ranking, 75th most accessed website in world³. Unlike our other examples, it was intended to be controversial, as an active part of anti-copyright movement. It is an Internet site upon which general public can post and follow links, called Torrent files or, more recently, Magnet links, which direct users to chunks of another file, potentially allowing them to download it. Because site does not itself contain copyrighted material, it is likely that it was legal when it was first founded. However, after a change in law, a Swedish court deemed founders to be guilty of facilitating copyright infringement, a sentence they have appealed. Pirate Bay was an example of legal entrepreneurship when it first started, but ceased to be legal after a change in law and current court rulings.

Monetizing Healthcare Too Far

Like Pirate Bay, our final example is played out in an area where public opinion is divided. However, unlike entrepreneurs in Pirate Bay case, entrepreneurs behind for-profit healthcare provider Capiro, did not wish to provoke opponents or upset feelings. Capiro Group, with annual sales of approximately 1,100 million EUR, comprises about 60 operating units with some 9,000 employees and operates in Sweden, Norway, France, Germany, and United Kingdom. In Sweden, firm has been one of front runners in establishing for-profit care and healthcare when politicians started to allow such ventures to expand. Capiro's official ambition is to be healthcare provider that best fulfills demands imposed by patients, public healthcare, companies, and organizations. In order to fulfill that ambition, they claim to focus on high-quality and effective care services and place individual patient's needs and expectations in center⁸.

DISCUSSION

From a purely analytical perspective, most entrepreneurship could be viewed as deviant behavior, if we hold that entrepreneurship involves breaking of habits, norms, or rules^{12, 27} and that ventures expose organization hosting m to risk because of their uncertain outcomes^{1,2,26}. As illustrated by examples in preceding section, most ventures of any importance have proponents and opponents, and assessments of character of entrepreneurial ventures tend to differ between people and over time. For example, Ostholm's persistence in pursuing development of Losec in face of corporate top management opposition and in violation of standard evaluation rules in pharmaceutical group breached corporate institutions. However, in retrospect, when Ostholm's faith in research path and subsequent drug turned out to be warranted, success silenced concerns, and few would any longer view it as a case of deviant behavior, even if y did before success became evident.

Similarly, Zuckerberg's early defiance of norms appears more forgivable given subsequent success of Facebook. Had he quenched his entrepreneurial urge after Facemash, those who had learned about his actions would probably have considered m as offensive or even renegade entrepreneurship.

Pirate Bay intentionally challenged laws and copyright norms, championing free-content norms

pervasive in parts of society. By launching themselves into a contested area, it was obvious that there would be people condoning and people condemning their venture. This case illustrates how public opinion was influenced by relationship between law making, case, and people's own behavior and positions. Swedish voted Pirate Party into European parliament, partly in protest against changes in law that strengthened position of copyright holders and decreased individual's right to privacy.

Capiro case, finally, illustrates how actions of individual entrepreneurs can influence proponents of general principles. In Sweden, re has been a political divide between those proposing that for-profit operation can help vitalize healthcare sector and make it more efficient, and those who maintain that it is unethical to make money from peoples' need for care and treatment.⁶

As illustrated by these examples, rather than being objective and static, assessment of entrepreneurship as deviant behavior depends on perspective of assessor, which in turn can change over time and both influence and be influenced by laws and societal norms. Judgment of where entrepreneurship is deviant behavior rests on people's emotional and moral assessment of venture. This judgment is influenced, but not determined, by (assumed) intentions of entrepreneurs and/or noted consequences, and relations to or acts.

An important risk in this regard is that successful ventures end up in entrepreneurship literature and unsuccessful ones in deviant behavior literature. Losec case is not unique. In fact, entrepreneurship literature highlights informal nature of many entrepreneurial ventures in existing organizations^{6, 7, 16, 27}. However, deviant behavior literature tends to omit successful ventures as post hoc evaluations tend to be skewed by outcomes. For example, development of laptop computer by Toshiba, mentioned earlier, was a clear example of both deviant behavior and entrepreneurship. However, it ends up in entrepreneurship literature and not in deviant behavior literature.

Another issue in assessment of deviant behavior is that of organizational versus societal norms. In a start-up, norms will be built around entrepreneur's idea (l) s, and are thus highly unlikely to clash with entrepreneurial venture. For entrepreneurs acting in existing firms, on or hand, re will be established norms, rules, and routines that, at least to some extent, can be expected to be

compromised by entrepreneurial venture. Indeed, if no such clashes occurred, venture would hardly qualify as entrepreneurial. Entrepreneurial venture might or might not clash with societal norms surrounding organization.

CONCLUSION

In this attempt to explore entrepreneurship as deviant behavior, this study has suggested that entrepreneurship is often in conflict with organizational and societal institutions, such as norms and rules. In fact, we have found that there is an overlap between definitions of deviant behavior and conceptualizations of entrepreneurship in previous literature. In addition, study has found previous research, distinguishing between desirable and undesirable deviant behavior based on intentions or outcomes of behavior, insufficient in relation to entrepreneurship as deviant behavior. Reason is that for entrepreneurial ventures, underlying intentions are often good, but outcomes are often not^{1, 2, 19}; and that making assessments of outcomes of entrepreneurial ventures a priori is notoriously. Assessing deviant behavior based only on organizational level evaluations²² is likewise insufficient in relation to entrepreneurship. Reason for this is that support for venture may be needed also from actors outside of organization. Furthermore, what constitutes organization is not always clear. Therefore, we argue that it is necessary to broaden view of what institutions determine where a venture classifies as deviant behavior when analyzing entrepreneurship. Doing so highlights frequent inconsistencies between various institutions' assessments. Such inconsistencies can put employees in situations where they have to choose which institutions to trespass against. In this regard, exiting organization to pursue venture elsewhere is not a guarantee against being classified as deviant behavior. Considering emphasis that entrepreneurship literature puts on informal nature of many entrepreneurial ventures within existing organizations^{16, 23} and lack of research on deviant behavior with positive consequences overlap between entrepreneurship and deviant behavior seems to be fertile ground for future research.

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Serodiagnosis of Listeriosis among Pregnant women and Neonates using a Rapid Serological Assay

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ABSTRACT

Background: Listeriosis a serious food-borne illness, most often affects pregnant women, the unborn, newborns and the immunocompromised. Infection in pregnant women results in intrauterine infection, preterm labor, spontaneous abortion, still birth and neonatal meningitis/ sepsis leading to high morbidity and mortality. The present study aimed to detect human listeria antibody in pregnant women and neonates visiting Government general hospital, Puducherry, India using a rapid serological assay (ELISA).

Study Design: A cross sectional study.

Method: A total of 269 samples which includes 125 serum samples from pregnant women, 34 serum samples from women with bad obstetric history, 91 serum samples from neonates and 19 CSF samples from neonates collected were tested for Human Listeria Antibody IgM (LST-IgM) ELISA.

Results: Out of 269 cases tested 51 (19.0 %) were found positive for listeria antibody. Of the 125 pregnant women tested 43 (34.4%) were seropositive, Among the 34 women with bad obstetric history 7 (20.6%) and of the 110 neonatal cases only 1(0.93%) case showed seropositive for Listeria antibody. 16/34 (47.1%) of pregnant women in first trimester, 5/18(27.8%) women with preterm labor were reported seropositive for Listeria. 35/51 (68.6%) of seropositive cases had only fever.

Conclusion: The overall seropositivity of Listeriosis in pregnant women and neonates was to the tune of 19.0%. To conclude any pregnant women with a fever or flu like symptoms with or without gastrointestinal symptoms needs to be diagnosed for Listeriosis. Moreover Listeriosis being a foodborne infection, information regarding avoidance of certain foods in Pregnancy can be incorporated into formal antenatal education in addition pregnant women need to be cautioned regarding the feto-maternal consequences of Listeriosis infection in pregnancy.

Keywords : Seroprevalence, Listeria, Pregnancy, newborns.

INTRODUCTION

Listeriosis a serious emerging food-borne illness most commonly caused by the ubiquitous gram-

positive organism *Listeria spp*¹. *L. monocytogenes* is of major concern as it accounts for about 98% of human Listeriosis cases². Pregnant women, newborns infants, immunocompromised individuals and geriatric population are high-risk groups primarily affected with Listeriosis than healthy individuals³. Listeriosis infection in pregnancy can lead to intrauterine infection resulting in severe complications such as preterm labor, spontaneous abortion, still birth and neonatal infection / neonatal meningitis/ sepsis resulting in high morbidity

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and mortality ^{4,5}. There has been global increase in incidence of Listeriosis from foods and humans mainly due to widespread use of refrigerated foods, consumption of processed foods and the long shelf-life of foods ^{6,7}. In India most often the naturally occurring cases of human Listeriosis is unrecognized or unexposed mainly due to lack of rapid, suitable and a reliable diagnostic tool. Moreover reports on Listeriosis in humans are very few mainly because of failure to isolate the pathogen, due to its rarity or lack of awareness or low incidence rate or many a times its been missed owing to lack of identification ⁸. Many Conventional serological / serodiagnostic assays have been used for screening the animal and human Listeriosis cases employing the somatic(O), flagellar (H) and L. monocytogenes-specific ELISAs ⁹, more recently the serodiagnosis of Listeriosis has been improved by the introduction of assays for the detection of antibodies in serum ¹⁰. Listeriosis incidence in pregnancy has been reported 18 times greater than in the general population. Moreover Listeriosis infection in pregnancy shows poor prognosis for fetuses ^{6,11}. With the increasing industrialization, changing food habits, drug resistance, non-availability of suitable vaccine, capability of this bacterium to survive at refrigeration temperature and its case fatality rate ¹². Considering all the above mentioned facts and the zoonotic nature of this pathogen the present study aimed to detect the seroprevalence of *Listeriosis* among pregnant women and neonates visiting Government general hospital, Puducherry, India.

METHOD

A cross-sectional study conducted over a period of 1 year from June 2014 to May 2015 in the Department of Microbiology, Sri Lakshmi Narayana Medical College, Hospital and Government General Hospital, Puducherry, India. This study was approved by the Institutional Human Ethics Committee and Informed consent was obtained from all participants included in the study. In order to accomplish the objective a total of 269 samples collected from pregnant women and neonates were analyzed for detection of antibodies to listeria by enzyme linked immunosorbent assay (ELISA) which includes 125 serum samples from pregnant women, 34 serum samples from women with bad obstetric history, 91 serum samples from neonates and 19 CSF samples from neonates collected were screened for seroprevalence of Listeriosis using qualitative human listeria antibody IgM (LST-IgM) ELISA kit- marketed by My BioSource

Cat.No.MBS109141. Study design and study population includes 250 blood samples collected from pregnant women, neonates and women with bad obstetric history presented with either diarrheal or flu like symptoms or symptoms of sepsis. All blood samples collected were centrifuged at 3000 rpm for 20 minutes for collection of serum and stored at -20°C until processed. 19 CSF samples were collected from neonates with clinical presentation of meningitis/ meningoencephalitis / encephalitis were centrifuged at 3000 rpm for 20 minutes. The particulates were removed and the supernatant was stored at -20°C until processed. The ELISA for qualitative detection of human listeria antibody was performed using (LST-IgM) ELISA kit- marketed by My BioSource Cat. No.MBS109141, the Optical Density (OD) value was measured and the results were interpreted according to manufactures instructions.

RESULT

In the present study attempt has been made to detect the seroprevalence of Listeriosis among pregnant women and neonates. Further attempts have also been made to analyze the clinical condition with the seropositivity potentials. A total of 269 symptomatic pregnant women and neonates were screened for detection of antibodies against Listeria. From (Table No. 1) it is evident that out of 269 cases screened 51 (19.0%) showed seropositivity for Listeria. (Table No. 2) shows the category of patients screened for Listeria antibody. Out of 125 pregnant women tested 43 (34.4%) were seropositive. The seroprevalence among women with bad obstetric history was 7 (20.6%) and of the 110 neonates tested only 1 case (0.9%) showed seropositive for Listeria. From (Table No. 3) it is evident that out of 34 pregnant women in first trimester who were tested 16 (47.1%) of cases were found seropositive for Listeria. Among the 35 pregnant women in second trimester who were tested only 5 (14.3%) showed seropositivity and of the 38 pregnant women in third trimester screened 15 (39.5%) were reported positive for listeria antibody. 5 out of 18 women (27.8%) who had preterm labor were found seropositive for Listeria antibody and 7 out of 34 (20.6%) women who had miscarriage/ spontaneous abortion showed seropositive. Among the 86 neonates who had early onset sepsis only 1 (1.2%) case showed seropositive for Listeria antibody and out of 24 neonates who had late onset sepsis none were found positive for listeria antibody (Table No.3). Comparison of seropositive cases with clinical symptoms is given in (Table No.4)

Among the 51 seropositive cases reported in this study nearly 35 cases (68.6%) had only fever and 14 (27.5%) cases had symptoms of fever and diarrhea. Only 1 (1.9%) case who had symptoms of sepsis were found seropositive and one case (1.9%) who also had symptoms of sepsis and meningitis were found seropositive to listeria.

Table No.1 : Overall seroprevalence of Listeriosis in Pregnant women and neonates

No. of cases	No. positive	% Percentage
269	51	19.0%

Table No.2: Distribution of Listeria seropositive cases.

Patient category	No. of cases	No. of cases positive for Listerial antibody	% positive
Pregnant women	125	43	34.4
Women with bad obstetric history	34	7	20.6
Neonates	110	1	0.9

Table No.3: Analysis of Listeria seropositivity cases.

Category	No. of cases	No. of seropositive cases (%)
Pregnant women in first trimester	34	16 (47.1%)
Pregnant women in second trimester	35	5 (14.3%)
Pregnant women in third trimester	38	15 (39.5%)
Preterm labor	18	5 (27.8%)
Miscarriage/ Spontaneous abortion	34	7(20.6%)
Early onset sepsis	86	1 (1.2%)
Late onset sepsis	24	0 (0%)

Table No.4: Comparison of Listeria positive cases with clinical symptoms.

Clinical symptoms	No. of seropositive cases (%)n=51
Only fever	35(68.6%)
Fever + diarrhea	14 (27.5%)
Fever + sepsis	1 (1.9%)
Fever + meningitis	0 (0%)
Fever + diarrhea + sepsis	0 (0%)
Fever + meningitis + sepsis	1 (1.9%)
Fever + meningitis + diarrhoea	0 (0%)
Fever + meningitis + diarrhea + sepsis	0 (0%)

DISCUSSION

The study on seroprevalence of Listeriosis among pregnant women and neonates revealed seropositivity for listeria antibody to the tune of 51 (19.0%) by (LST-IgM) ELISA. This finding is endorsed by several studies^{13,14,15}; nearly 16-27% of all *Listeria* infections has been reported in pregnant women^{6,14}. The seroprevalence of Listeriosis in neonates was very low in the present study, it was to the tune of 0.9%. Similar observation has been made in a study from North India where the incidence of neonatal Listeriosis was reported as 0.2% in total births and 2.2% in meconium stained babies^{16,17}. Similarly reports on Perinatal Listeriosis prevalence varies between 8.6 and 17.4/100,000 of live births^{11,18}. The present study reveals close association of pregnant women and neonates with seroprevalence against Listeriosis which also indicates the presence of this bacterium in the food chain. Listeriosis being a food borne illness steps must be taken to prevent pregnant women from consumption of food known to be at higher risk of contamination with *Listeria*.

A total of 34.4% of pregnant women and 20.6% of women with bad obstetric history were found to be seropositive for Listeriosis. The results are well correlated with a study carried out by Krishna et al. in 1966 who reported 14% Listeriosis in 150 cases with poor obstetric history in Mumbai¹⁹. Whereas the results of the present study was quite higher when compared to studies carried out in India by Bhujwala et al. in 1973 who reported 3% of listeriosis in women with bad obstetric history from Delhi²⁰. In another study 1.34% screened were positive for listeria²¹. The reasons for the recent increase in pregnancy-associated Listeriosis could include the poor food hygiene practices, the pathogen, environmental and host factors^{6,22}. Serodiagnosis being a quick method of detection could be employed for cases with high clinical suspicion². In the present study pregnant women in first trimester showed higher seropositivity 47.1% followed by pregnant women in third trimester 39.5%. Most of the earlier studies have reported higher incidence in third trimester^{6,23,24}. In the present study 14.3% of pregnant women in second trimester was found seropositive to *Listeria*. Mylonakis et al., in 2002 in their study reported out of 11 cases 2 pregnant women in the second trimester with *Listeria* infection ended in a spontaneous abortion²⁵. Pregnancy-associated Listeriosis can occur at any stage of gestation, though widely reported or detected in the third trimester^{6,23}. In this study 27.8% of

women who had preterm labor were tested seropositive for listeria and 20.6% of women who had spontaneous abortion or miscarriage showed seropositivity to *Listeria*. Earlier studies have reported 1 of 5 pregnancies with Listeriosis infection results in stillbirth or spontaneous abortion and poor prognosis in early pregnancy⁶. Giraud et al in 1973 reported Listeriosis infection in 2.1% miscarriages and in 1.6% of cases with preterm births or spontaneous abortions²⁶. Only one neonate out of 86 cases with early onset sepsis was found seropositive for Listeriosis. Since there more chance of preterm delivery and abortion in pregnancy associated Listeriosis, differential diagnosis of Listeriosis in pregnant woman should be considered⁷.

Pregnant women are at high risk for Listeriosis, but symptoms are non-specific and diagnosis is difficult¹⁹. In the present study nearly 68.6% of listeria seropositive cases presented only with fever and 27.5% presented with fever and diarrhea. In a study on 191 cases of Listeriosis in pregnancy 32% of women had symptoms of a flu-like illness, 65% had only fever and only 7% had vomiting/diarrhea. Diagnosis of maternal Listeriosis is difficult due to the lack of GI symptoms generally associated with food-borne pathogens^{6,14,25} and Fever is the most common symptom reported in several studies²⁷. Investigation and treatment of any women during antenatal period presenting with either fever or flu like symptoms, with or without GI symptoms for Listeriosis is essential in order to prevent fetal loss, stillbirth, preterm labor, neonatal sepsis and meningitis^{7,14}. This study mandates the awareness for diagnosis / detection of pregnancy associated Listeriosis among obstetricians.

CONCLUSION

In the present study the overall seroprevalence of Listeriosis among pregnant women and neonates was 19.0% which was found to be higher. Further research is required to establish the causes for the current increase in pregnancy associated Listeriosis. 34.4% of pregnant women and 20.6% of women with spontaneous abortion/miscarriage showed seropositivity to Listeriosis. About 47.6% of pregnant women in first trimester were found seropositive for Listeriosis and 27.8% of women who had preterm labor were positive for *Listeria* antibody. Hence this study concludes that a high index of clinical suspicion is a required for the diagnosis of maternal Listeriosis, which may occur at any stages in pregnancy. A close collaboration among obstetrician, pediatrician,

microbiologists and epidemiologists is needed to investigate the increasing epidemiology of Listeriosis and to modulate the signs and symptoms of this infection.

Ethical Clearance- Institution Ethics committee (Human studies): No. IEc/c- P/40/2014

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A Study on Quality of Life (QOL), Stress and Coping among Wives of Alcohol Dependence Syndrome (ADS) Clients Admitted in Selected Hospitals of Udupi District

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ABSTRACT

Background: Alcohol related deaths and death due to disease related to alcoholism are major concerns in India. Persistent use of alcohol not only affects the individual but also the spouse who faces stressful life events and emotional problems **Aim:** The study aimed to determine the Quality of life, stress and coping among wives of alcohol dependent clients and to find the relationship among them. **Settings and Design:** The study was conducted in selected tertiary care hospitals of Udupi district with descriptive survey approach. A total of 60 wives of alcohol dependent individuals were selected based on nonprobability sampling. **Materials and method:** Stress rating scale, Coping scale and BREF-QOL by WHO were used to collect the data. **Statistical analysis used:** Karl Pearson coefficient of correlation was used with the help of SPSS 16 version. **Results and conclusions:** The obtained WHOQOL-BREF scores were converted to WHOQOL-100 for all the domains. The mean score for the physical domain was 22.05 ± 10.51 . The psychological domain and social relations domain got a score of 24.63 ± 10.44 and 84.45 ± 19.48 respectively, whereas the environment domain got a mean score of 16.53 ± 8.50 . The relationship between domains of quality of life and stress showed that physical domain ($r = -0.524, p < 0.001$) psychological domain ($r = -0.527, p < 0.001$), social relations ($r = -0.460, p < 0.001$) and environmental domain ($r = -0.480, p < 0.001$) have a moderate negative correlation. No statistical relationship was found between quality of life and coping, though a low positive correlation exists ($r = .265, p = .041$) between physical health and withdrawal coping.

Keywords: Alcohol dependent syndrome, stress, coping, quality of life

INTRODUCTION

Alcohol was an inherent part of the human culture for many years. Before the modern era the fermented alcohol was available in tribal and village societies where it was consumed traditionally in an occasional manner ^[1]. During early modern industrialization the production and consumption of the alcohol changed drastically and replaced the traditional patterns of

drinking ^[2]. Distilled spirit was available and marketing strategies were developed and implemented in the same period. The consequences of this were catastrophes in various part of the world by causing substantial social and health problem.

Alcohol is considered as a psychoactive substance with properties of producing dependence ^[3]. Alcohol use disorders are one of the major leading causes of disability in many countries ^[4] and it is not just a health problem; it is a social and public health problem which can have an adverse impact on the family involved in care giving ^[5].

The recent WHO data showed that the total per capita consumption of alcohol was 6.2 litres of pure alcohol per year and 13.5 grams of pure alcohol per person per day. The Global data of consumption of alcohol showed that 50.1% was consumed in the form of spirits, 34.8%

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was consumed in the form of beer. This resulted in approximately 3.3 million deaths each year [6].

Alcohol related deaths and death due to disease related to alcoholism are major concerns of developing countries. In India, every year 3.3 million deaths attributed to alcohol consumption that puts her in a precarious score of 4 out of 5 in the 'Years of life lost scale' which means that a large number of people lost their lives in the early stages due to alcohol consumption and fell out [7].

Indian drinking habits were greatly different from state to state. During the period of 1992-2012, the per capita consumption of alcohol has increased to the third highest in the world by 55%, after Russian Federation and Estonia [8]. Persistent use of alcohol not only affects the individual but also affects the family members, especially the spouse who faces stressful life events and emotional problems. The effects of substance abuse frequently extend beyond the limit of spouse and children. The feelings of anger, abandonment, anxiety, concern, embarrassment, fear and guilt may be experienced in the extended family members [9]. Female partner of male alcoholic suffers from various stressors due to the alcohol dependence. The psychological consequences of this include denial or protection of the male partner with the hopelessness, neglected health, shame, stigma and isolation. The wife of a person abusing substances is likely to protect the children and assume parenting duties that are not fulfilled by the husband who abuses substances [9].

The female partners of the alcoholics show maladaptive behaviour as a reaction to stress [10]. The common coping behaviour reported were avoidance, discord, indulgence and fearful withdrawal while marital breakdown, taking special action, assertion and sexual withdrawal [11]. The female partners of the alcoholics are exposed to high rates of domestic violence which include physical, verbal and sexual abuse. [12]. The marital dissatisfaction, high economic burden, poor familial and social support are some other major issues faced by the spouses of alcoholics [13] [14]. To decrease the burden and improve the coping skills and quality of life of the spouses of clients with the alcohol dependence syndrome, a thorough understanding of their various issues are essential.

On this background, the study was designed with the following objectives:

1. To determine the quality of life, stress and coping among wives of Alcohol-dependent patients
2. To find the relationship between quality of life, stress and coping
3. To find the association between quality of life, stress, coping and selected variables.

MATERIALS AND METHOD

Sixty wives of clients diagnosed with Alcoholic Dependence Syndrome admitted in selected psychiatric wards of tertiary care hospitals of Udupi district were included in the study by non-probability convenient sampling. The participants were selected based on the criteria such as the ability to read any one the languages -Kannada, English and Malayalam, age within 20-65 years and living with the Alcohol dependent person for the past one year.

The study proposal was submitted to the ethical committee members of Kasturba hospital, Manipal and ethical clearance were sought. Permission was also taken from the administrators of the institutions from where the subjects were selected. On the days of data collection, the researchers introduced themselves and the purpose of the study was explained to the subjects and written consent was taken. After ensuring the confidentiality a written consent was taken from the participants who were willing to participate in the study.

The data collection materials are described below.

Background Proforma:

The researchers developed the background proforma to get details from the participants as well as their spouse. It has two sections, the first section with eight items was used to collect the details from the wives of alcohol dependent person and the second section with nine items was used to collect data from alcohol dependent persons.

World Health Organization Quality of Life (WHOQOL)

The World Health Organization Quality of Life (WHOQOL) [15] was used to determine the quality of life of the spouse of the alcoholic dependent person. It is a 5 point Likert rating scale of 26 items with forward and

reverse scoring. Also, two items from the Overall Quality of Life and General Health facet have been included, among which question one asks about an individual's overall perception of quality of life and question two asks about an individual's overall perception of their health. It has four domains namely physical health, psychological, social-relationship and environment. The four domain scores denote an individual's perception of quality of life in each particular domain.

Stress Rating Scale

The researchers developed the Stress rating Scale to measure the stress of the wives of clients with the alcohol dependence syndrome. It is a 33 item Likert scale and with responses as never, rarely, sometimes and always. The reliability of the tool was done with Chronbach alpha ($\alpha=0.872$) and found to be reliable. The maximum possible score is 99 which is arbitrarily classified into "No stress" (0-33), moderate stress (34-66) and severe stress (67-99).

Coping Scale

It is a standardized tool with 30 items [16]. The maximum possible score is 90. The scale also includes three subscales namely "Engaged coping", "Tolerant coping" and "Withdrawal coping".

RESULTS

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 16. SPSS Inc software. Descriptive statistics included the mean and standard deviation for quantitative variables. The Karl Pearson coefficient of correlation was used to determine the relationship between the quality of life, stress and coping. The Chi-square test was also used to determine the association between the quality of life, stress, coping and selected variables.

Socio-demographic characteristics of wives of alcohol dependent clients

The data regarding the socio demographic characteristics of the participants showed that 91.7% of the wives of alcoholic dependent clients belong to Hindu religion and the majority of the participants ie, 61.7 % were living in a nuclear family. Majority of the wives ie, 60% were living with the alcoholic dependent husband for 11 to 40 years.

Socio-demographic characteristics of alcohol dependent individual

The age of the men who were admitted for de-addiction was ranged between 28 and 59 years with the mean age being 42 ± 7 years. Most of the participants were having primary education and self-employed. Many participants history of the previous admission for de-addiction, 30.0% of them were admitted once and 26.70% were admitted two times. Twenty percent of the participants had been admitted for more than 2 times in the de addiction centres. Twenty-one percent of them have the habit of drinking alcohol once every day where as 55% drank thrice or more than three times a day. The mean age at which they had their first drink was 26 ± 8 years with a range of 12 to 56 years.

Quality of life

The mean score obtained for WHOQOL- BREF domain 1 –physical- was 7.5 with a standard deviation of 1.68 which was later converted into WHOQOL-100 with a mean score of 22.05 and standard deviation of 10.51. Similarly mean score of domain 2 -psychological domain- was computed (18.27 ± 10.29) and later converted into WHOQOL-100 (24.63 ± 10.44).

Domain 3- social relations- got a mean score of 17.51 ± 3.11 was converted into 84.45 ± 19.48 . Environment domain got a mean score of 10.00 ± 1.37 was later converted into 16.53 ± 8.50 .

Stress

The wives of alcoholic patients with ADS had a mean stress score of 53.8 ± 17.12 with a minimum score of 2 and a maximum score of 83. Majority of the participants ie, 36 (60%) showed moderate stress and 16 (26.67%) showed severe stress.

Coping

The coping ability of the wives of patients with alcohol dependence syndrome showed a mean of 46.48 with a standard deviation of 15.68. The subscale analysis showed that the mean score of "Engaged coping" and "Tolerant coping" is 23.05 ± 7.75 and 13.41 ± 5.74 respectively. Meanwhile "Withdrawal coping" showed a mean of 11.45 ± 3.20 . When comparing the coping strategies 44.32 % is "Engaged coping", 49.69% is tolerant coping and 63.61% is withdrawal coping.

Relationship among quality of life, stress and coping among wives of alcohol dependent individual

To assess the relations between quality of life, stress and coping among wives of alcohol dependent patients, Karl Pearson coefficient of correlation was calculated with alpha set at 0.05 for each calculation. The relationship between quality of life and stress among wives of alcoholic dependent individual showed a moderate negative relationship ($r = -0.575$ $p < 0.001$). The relationship between domains of quality of life and stress showed that physical domain ($r = -0.524$ $p < 0.001$), psychological domain ($r = -0.527$ $p < 0.001$), social relations (-0.460 $p < 0.001$) and environmental domain ($r = -0.480$ $p < 0.001$) have a moderate negative correlation with stress.

The correlation analysis also found that there is no statistical relationship between quality of life and coping, though a low positive correlation ($r = .265$, $p = .041$) is observed between withdrawal coping and physical health (domain 1) of quality of life. No significant relationship between stress and coping was found.

DISCUSSION

In the present study, the researchers found that the majority of wives of patients with alcohol dependence had moderate stress. Severe stress among them was found to be 26.67% and this was in accordance with a clinical study which showed that 26% female spouses living with lifetime at-risk male drinkers have psychological distress^[17]. The wives also experienced more life stressors and had lower mental/psychological quality-of-life and show a significant relationship with the substance use among their partners^[18].

The present study revealed that physical domain ($r = -0.524$ $p < 0.001$), psychological domain ($r = -0.527$ $p < 0.001$), social relations (-0.460 $p < 0.001$) and environmental domain ($r = -0.480$ $p < 0.001$) had a moderate negative correlation. The relationship between coping and stress showed that there was no significant correlation exists between them. This was contradictory to the findings of a study conducted at Chennai where there was a positive correlation between the level of stress and coping strategies among the wives of alcoholics ($r = .312$) showed that there was a high statistical significant at $p < 0.01$ level^[19]. Also, the spouses of alcoholic patients may benefit from coping skills training to deal with these situations.

CONCLUSION

This study brings light to the stressful lives of spouses of alcohol dependence syndrome patients. There is a need for continuous and sustained support from family, community and health care professionals to remove the alcohol abuse, strengthen the coping abilities and Quality of life of spouses.

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Four Vital Capacity Breaths Can Delay the Onset of Haemoglobin Desaturation Following Nasopharyngeal Oxygen Insufflation

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ABSTRACT

Introduction. Prolonged apnoea occurring during endotracheal intubation leads to a fall in oxygen saturation. Preoxygenation helps in delaying the onset of fall in saturation

Aim The aim of the study was to determine whether insufflation of oxygen via a nasopharyngeal catheter would prolong the duration of apnoea (fall in SpO₂<95%) after preoxygenation with 4 vital capacity breaths.

Methods and materials Patients were divided into two groups of 20 each. Group 'case' received additional insufflation with oxygen during the period of apnoea while Group 'control' did not. O₂ saturation was monitored during the period of apnoea and the study was terminated with a fall in O₂ saturation to 95%, following which patients were ventilated.

Results Time to fall in SpO₂ to 95% in group 'case' was 6 mins (360 seconds) compared to group 'control' which was 4.1 mins (246 seconds) with a P value <0.05. The rise in EtCO₂ in Group case was 16.6 mm of Hg as compared to the 11.7 mm of Hg rise in the Group control during the apnoeic period which was attributed to longer period of apnoea. The average rise in the EtCO₂ per minute during the period of apnoea was 2.8mm of Hg.

Conclusion Thus we concluded that nasopharyngeal O₂ insufflation during the period of apnoea, after preoxygenation with 4 VC breaths, does delay the onset of O₂ desaturation during apnoea and can be used as an effective tool in difficult airway management.

Keywords: saturation, apnoeic diffusion, difficult airway, preoxygenation, end tidal carbon dioxide

INTRODUCTION

Until the airway has been secured, an Anesthesiologist, is frequently faced with the challenging task of maintaining adequate arterial oxygenation in apnoeic patients, after the induction of general anesthesia and muscle relaxation. While this is less likely to be a major factor while dealing with normal healthy individuals, pregnancy¹ and obese individuals² tend to desaturate

faster during the period of apnoea. Before critical haemoglobin desaturation sets in, preoxygenation has long been proven to help in prolongation of the duration of apnoea^{3, 4,5}. Preoxygenation fills the functional residual capacity with oxygen, thus increasing the patients' oxygen reserves. Preoxygenation using tidal volume breathing for three minutes has been shown to be far superior to the four vital capacity breath technique in prolonging the duration of apnoea^{6, 7, & 8}. Holmdahl in 1956⁹ introduced the term Apnoeic Diffusion Oxygenation⁹. This was achieved by preoxygenation with 100% oxygen followed by oxygen insufflations during the subsequent apnoeic period. He proposed the fact that during apnoea, oxygen was extracted from the alveoli (functional residual capacity) at the rate of 250

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ml/minute, which is the basal oxygen consumption. CO₂ being highly soluble in the blood, is added to the alveoli at a meager 10 ml/minute. This causes the functional residual capacity to decrease to the rate of 240ml/minute. The ambient gases were drawn en masse into the lungs⁹, at this sub atmospheric pressure. If oxygen were to be insufflated into the nasopharynx, this oxygen would be drawn in en masse thus maintaining the oxygen content of the functional residual capacity, which would help maintain PaO₂ of blood for a longer period during subsequent apnoea as compared to en masse diffusion of ambient air, the nitrogen content of which would further dilute the existing stores. The functional residual capacity body weight ratio was inversely proportional to the rate of nitrogen accumulation. This is based on the term introduced by Holmdahl in 1956 known as *apnoeic diffusion oxygenation*⁸. Apnoeic diffusion oxygenation is defined as the en masse diffusion of oxygen into the lungs during apnoea following preoxygenation and nasopharyngeal oxygen insufflation. Thus onset of haemoglobin desaturation⁴ is delayed by the insufflation of oxygen via a nasopharyngeal catheter as shown in **Figure 1**.

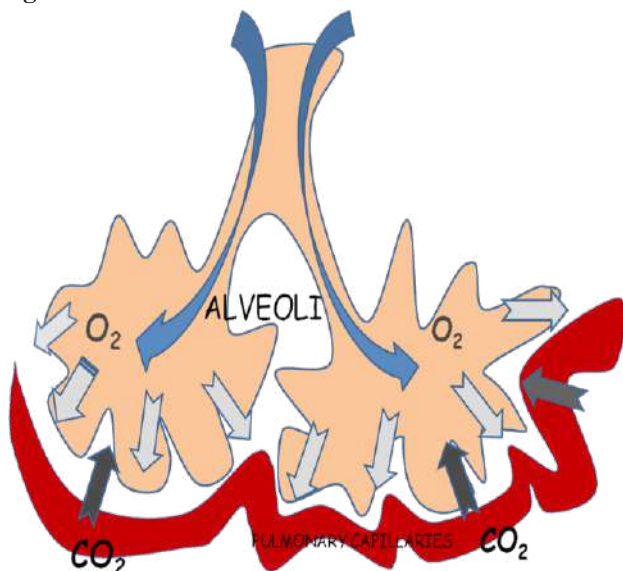


Figure 1. *En Masse* diffusion of gases during apnoea as proposed by Holmdahl in 1956. The white arrows indicate the uptake of oxygen (at the rate of 250ml/minute). The grey arrows indicate the carbon-di-oxide release from the pulmonary capillaries into the alveoli (at the rate of 10ml/minute). A net deficit of 240ml/minute occurs in the alveoli and this leads to the development of a sub atmospheric pressure in the alveoli. This causes the ambient gases to diffuse *en masse* into the lungs, which is represented by the blue arrows.

The objectives of this study were to

Study the effect of nasopharyngeal oxygen

insufflation, in the presence of an open airway, following preoxygenation by four vital capacity breath technique.

To study the duration of apnoea which is defined as time from stopping preoxygenation to fall in SpO₂<95% or 6 minutes of apnoea.

The rise in end tidal carbon dioxide (EtCO₂) following apnoea and the effect of the duration of apnoea on the end tidal carbon dioxide.

METHOD AND MATERIALS

This was a prospective observational study conducted after obtaining approval for the study from the Institutional Human Ethics committee and an informed consent was obtained from all patients. The study was performed on 40 patients of American society of Anesthesiologists (ASA) physical status 1 and 2 with an age range of 20-50 years scheduled for elective surgery under general anesthesia. All the patients who refused, had difficult airway predictors, had upper or lower respiratory tract infections, chronic disease of the airways or history of allergies were excluded from the study. Patients were assigned to one of the two groups, being the group 'control' who did not receive nasal oxygen insufflation during the period of apnoea following preoxygenation and group 'case' being the group receiving nasal insufflation. All patients were assessed by a detailed history, general physical and systemic examination with appropriate investigations. On the day of surgery, an infusion of ringer lactate solution was started in the recovery room. Patient was explained previously the face mask breathing and the four vital capacity breath preoxygenation technique. The study patients were monitored using electrocardiography, non-invasive blood pressure monitoring, pulse oximetry and end tidal capnography (EtCO₂). Baseline vitals were noted. The patient was preoxygenated with 8 L/min oxygen using four vital capacity breaths in 30 seconds using a well fitted face mask. Anesthesia was induced using inj. fentanyl 2µg/kg IV, inj. Propofol 2mg/kg IV and neuromuscular blockade was achieved with inj. rocuronium 0.6mg/kg i.v. Boluses of Propofol 10mg was administered two minutes after the induction dose and then every one-minute to avoid awareness in patients. With the disappearance of the carbon dioxide waveform, which indicated onset of apnoea, the face mask was removed. A 10 Fr catheter was inserted nasally into the nasopharynx after measuring the length of the catheter

from the distance between the angle of the mouth and the tragus of the ipsilateral ear. In group case (n=20) oxygen was insufflated at the rate of 5L/minute via the nasopharyngeal catheter and in group control no oxygen was used. The time from the onset of apnoea which was identified by the disappearance of the carbon dioxide waveform to the fall in SpO₂ to 95% was recorded. Apnoea was allowed to continue till SpO₂ either fell to 95% or apnoea of 6 minutes' duration had occurred, after which the patient were ventilated using 100% oxygen, and tracheal intubation using direct laryngoscopy was performed. Inspired oxygen (FiO₂), EtCO₂ after four deep breaths and on initiation of positive pressure ventilation were recorded using a gas monitor.

Statistical Analysis

To determine the number of subjects required for the study a power analysis was conducted. For data analysis, we considered that a 5% change in oxygen saturation was clinically significant. We also considered Type I and Type II errors of 5% and 15 %, respectively (With 95% confidence interval and power of 85%). From a previous study, we determined that the standard deviation of oxygen saturation was 1.15% as such, the power analysis indicated that at least 17 patients were needed in each group. Student's t-test was used for statistical analysis (SPSS 10.0 for Windows Software).

Data are expressed in Frequency, Percentage, and Mean & Standard deviation. The inferential associations and comparisons between different parameters were done using Chi Square Test which was used as the non-parametric test. Student's t test was used to compare the mean value between 2 groups. To compare different groups with each other, non-parametric Mann Whitney's U test was employed. For all statistical evaluations, a two tailed probability 'p' value of < 0.05 was considered significant.

RESULTS

From Table 1 it is observed that the patients in both the groups were comparable with regard to the demographic data as no significant difference was observed between these two groups with respect to the age, sex, weight, height and ASA physical status.

Table 1. Demographic Data and ASA physical status

	Control (N=20)	Cases (N=20)	
Age in years	35.4 ± 10.1	32.9 ± 8.2	p=0.407
Weight in kgs	60.7 ± 8.6	55.9 ± 5.5	p=0.055
Height in cms	168.4 ± 8.9	163.5 ± 6.2	p=0.058
Sex M:F	11:9	8:12	p=.342
ASA physical status I:II	20:0	18:2	p= 0.147

Table 2 shows the time to the onset of apnoea in the two groups after the administration of rocuronium. This was indicated by the loss of chest wall movements clinically and by the loss of the EtCO₂ tracing on capnograph

Table 2. Time to onset of apnoea

	Group	N	Mean (seconds)	p
Time to apnoea	Case	20	24.5 ± 4.1	0.543
	Control	20	25.2 ± 3.0	

Data are presented as mean ± SD

The SpO₂ values obtained initially and at the onset of apnoea showed no statistical significance as seen in figure 2. Thus indicating that the saturation in the two groups were identical prior to the onset of apnoea. The SpO₂ obtained in the first minute after the onset of apnoea was similar. However, from the second minute onwards there was a statistically significant difference occurred in the SpO₂ values between the groups only and this increased in significance in the subsequent duration of the study, with the maximum difference observed in the third minute of the study.



Figure 2. Distribution of oxygen saturation

Figure 3 shows the graphical representation of the rise in the EtCO₂ during the period of apnoea. The rise in the case group was 16.6 mm of Hg as compared to the 11.7 mm of Hg rise in the control group during the apnoeic period (p of 0.013). The average rise in the EtCO₂ per minute during the period of apnoea was 2.8mm of Hg, and this is comparable to the results obtained by Baraka et al.⁸

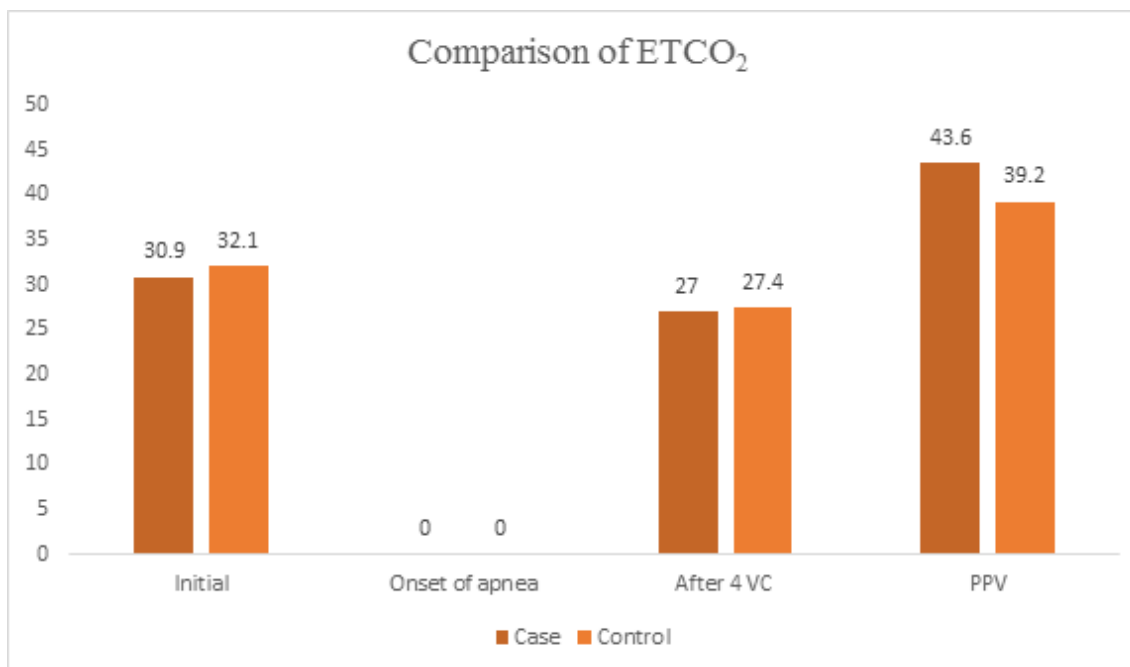


Figure 3. Rise in the End tidal carbon dioxide during apnoea time

DISCUSSION

The present study proved that nasopharyngeal insufflation of oxygen after preoxygenation with the four vital capacity breaths, during the period of apnoea can significantly delay the onset of Hb desaturation in an

apnoeic patient, which is after the induction of anaesthesia and muscle relaxation.

Delay in the onset of hypoxemia after nasal oxygen insufflation, in preoxygenated patients, has numerous applications such as in difficult mask ventilation in

patients with craniofacial anomalies. Insufflation of oxygen can provide additional time for laryngoscopy should tracheal intubation be difficult. Otolaryngologists can safely be provided with a minimum of 10 minutes to visualize the airway⁴, unimpeded by the presence of ET tubes or patients' respiratory movements. However, the fact that insufflation always postpones the development of hypoxemia¹⁰ suggests that this qualitative finding may be applicable to most preoxygenated patients whose airways remain patent between the alveoli and the pharynx.

The present study showed that patients in both groups were comparable with regard to age, weight, height and sex and involved ASA grade physical status 1 & 2 patients, and thus the quantitative data of this study are only applicable to such patients.

The SpO₂ after the four vital capacity breaths was 100% and was similar to the findings of Valentine et al¹¹. This was comparable to the O₂ saturation produced by 3-minute tidal volume ventilation^{12,13}. The duration of apnoea was comparatively shorter, even though the preoxygenation by the four vital capacity breath technique produced comparable PaO₂ and O₂ content to that produced by 5-minute tidal volume ventilation, as demonstrated by Norris in 1985¹⁴. The reasons being, in the four vital capacity breath technique the minute ventilation far exceeds the FGF of 10ltrs/min, which leads to rebreathing. This in turn causes the dilution of the FRC by nitrogen content of air which in turn decreases the O₂ stores in the FRC. Hamilton et al¹⁵ demonstrated that at flows of 10 liters/min, at 28±6.9sec the nitrogen content of the FRC was 30% and this reduced to 5% at 144±24sec. The four vital capacity breath technique causes faster desaturation as it requires a longer duration for tissue and venous compartments to fill with oxygen than while breathing room air. If the sum of the alveolar, arterial and tissue compartments is considered, they collectively can store 1200ml and 800ml, from the end of the first half minute and 60 seconds to 180 seconds respectively¹³. This is worth 3 to 4 minutes of O₂ consumption. Thus pre oxygenation using the four vital capacity breaths technique is considered to be inferior to tidal volume ventilation with the eight vital capacity breaths in 60 seconds^{16,17}. However, in case of emergency when the five-minute tidal volume ventilation cannot be applied, such as in obstetric emergencies¹ or in critically ill patients¹⁰, nasopharyngeal O₂ insufflation would help delay the onset of haemoglobin desaturation and provide

added safety time of desaturation free apnoea till the trachea is secured.

The FiO₂ and the SpO₂ were not significantly different in both groups following the preoxygenation with the four vital capacity breath technique. Following the onset of apnoea, the SpO₂ values recorded in the first minute of the study was similar in both groups. However, from the second minute onwards, the fall in the oxygen saturation in the control group was significant with the maximum fall occurring in the third minute after the onset of apnoea. This indicated that the oxygen stores provide by the four vital capacity breath technique was sufficient to provide for a maximum period of 246 seconds when considering a haemoglobin desaturation to 95%. The results of the present study contrasted with those obtained by Baraka et al⁸. Baraka et al obtained a mean time of 219 seconds. This could be explained by the absence of uniformity in the monitoring equipment used and also do to the use of fingertip pulse oximetry in the present study.

The case group was able to maintain SpO₂ in excess of 99% for 360 seconds at which the study was terminated, indicating that nasopharyngeal insufflation of oxygen was capable of prolonging the duration of desaturation free apnoea to a significant extent. This occurred due to the en masse diffusion of the insufflated gases from the nasopharynx into the lower respiratory tract due to the development of a sub atmospheric pressure in the alveoli as the period of apnoea increased. This correlates with the findings of Baraka et al 2006.⁸

The EtCO₂ in the control group was 27.4 mm of Hg as compared to the case group which was 27 mm of Hg and there was no statistically significant difference between the two groups at the onset of apnoea. However, the increase in the EtCO₂ at the termination of the study when positive pressure ventilation (PPV) was initiated showed a rise of 16.6 mm of Hg in the case group as compared to an 11.7 mm of Hg rise in the control group. This showed a significant difference with a 'p' value of 0.013. The average rise in the EtCO₂ per minute was 2.8mm of Hg. The greater rise in the EtCO₂ in the case group occurred due to a longer period of apnoea in this group of patients⁸. However, none of the patients in the study showed any ill effects due to a rise in the EtCO₂ with the six minutes of apnoea. The average rise in value of EtCO₂ in the case group B was 43.6 mm of Hg as compared to the control group which showed an average

maximum value of 39.2 mm of Hg. A study done by Rudolf¹⁸ in 2013, found that insufflating low flow oxygen insufflation via the nasal route into the trachea of patients undergoing endoscopy reduced the rate of CO₂ rise by approximately 50% to 1.8mm/ min. Thus, if high flow nasal cannulation could achieve a flow of just 1L/min in the trachea this might just be sufficient to achieve significant ventilation and not just oxygenation. In 2015, Patel¹⁹ et al and Miguel-Montanes²⁰ published supporting the use of high flow nasal cannula for preoxygenation and apnoeic oxygenation. Patel et al additionally found that high flow nasal cannula provided apnoeic ventilation.

Limitations of the study

The study population was limited to two academic medical centers

The sample size was fairly restricted in number

CONCLUSION

The present study concludes that

1. Nasopharyngeal oxygen insufflation following preoxygenation by the four vital capacity technique can significantly delay the onset of haemoglobin desaturation after the induction of general anesthesia and muscle relaxation.

2. The duration of desaturation free apnoea in the case group was 6 minutes.

3. The fall in the SpO₂ in the apnoeic patients is the maximum in the third minute of apnoea.

4. The rise in the EtCO₂ is on an average at the rate of 2.8mm of Hg per minute

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Ethical Clearance from: Institutional Ethics committee of Kasturba Medical College, Mangalore (Reg no. ECR/541/inst/KA/2014)

Source of Funding: Self

Conflict of Interest: Nil

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Oral Health Status of 12 Years Old Children in Rural Area of District Indore, MP: A Cross Sectional Study

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ABSTRACT

Introduction- Oral health is an integral part of the general health and well-being of an individual and is now recognized as an equally important criterion. Among the common oral diseases, dental caries and periodontal diseases are the two foremost conditions that remain widely prevalent and affect all populations throughout their life span. Poor oral health in childhood often continues into adulthood, affecting economic productivity and quality-of-life.

Methodology- Present cross sectional study was conducted among 12 years old children of rural school in the catchment area of Sri Aurobindo Institute of Medical Sciences, Indore. 400 children were included in the study and oral cavity examination was done by trained personal. Data was analysed using SPSS19.0 and frequency were calculated for quatitative variables and chi square test was applied for categorical variables.

Results- The present study srevealed that out of 400 participants 140(35%) were female and 260(65%) male. Decay teeth were more in male(36.05%) than the female(34.08%) and the difference was found statistically significant ,it was more in lower socioeconomic class as 64%of male and 59% of female of this were affected with decay teeth and developmental defects of enamel was more in male in comparison of female, it was found statistically significant.

Conclusion-The study reveals that dental caries still remains as a major oral health problem among school children of all age group. Oral health education should be organized in schools to maintain proper oral health.

Keywords- Oral health status, 12 years old children, Rural, school, Indore

INTRODUCTION

Dental caries can be traced to be as old as civilization with its evidence seen even in skeletal remnants of prehistoric humans¹. Dental caries is the most prevalent dental affliction of childhood. In spite of credible advances in dentistry, the disease continues to be a major public health problem. Untreated oral diseases in children frequently lead to serious general health problems, significant pain, interference with

eating, and lost school time². Dental caries is highly prevalent among children and persists to be a significant public health problem. It has detrimental consequences on children's quality of life by inflicting pain, premature tooth loss, and malnutrition, eventually influencing overall growth and development. The children suffering from poor oral health are twelve times more likely to have restricted activity days as compared to their healthy counterparts³. It has been observed that during 1940, the prevalence of dental caries in India was 55.5%, and during 1960, it was reported to be 68%⁴. The National Oral Health Survey and Fluoride Mapping 2003 reported that the prevalence of dental caries among 12 year old children was 72.5% and among 15 year old children was 75.4% in India⁵. Decreased prevalence of dental caries

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in developed countries can be attributed to changing lifestyle and behavior patterns, fewer intakes of refined sugars, and widespread use of fluoridated toothpaste and utilization of the dental care services. Contrary to this, increase dental caries in developing countries can be related to factors, such as economic development, changing living standards, rapid urbanization, and changing of dietary patterns to more refined carbohydrates⁶. India, a developing country, faces many challenges in rendering oral health needs. The majority of Indian population resides in rural areas⁷. Decayed, missing, and filled teeth (DMFT) and SiC of 1.8 and 3, respectively. The majority of children aged 12 years had experienced caries in one or more of their total number of teeth⁸. Study of this age group is important as India is a country of widespread diversity in the socioeconomic status and oral health status in rural and urban areas of same country⁹. India is a rapidly growing nation in terms of population and economic growth almost 31% of the total population belongs to the 0–14 years of age group¹⁰ Children <18 years constitute about 40% of the Indian population¹¹. There is lack of organized school health programs in our country. The children in schools are relatively easily accessible, compared to any other population groups for any health promotion programs aimed at effecting the lifestyle changes. School health programs have proven effective in promoting health in many developed countries^{12,13}. This age group forms a significant proportion of Indian population today and is likely to further increase in the years ahead. Further, 12 years is a WHO recommended index age group for oral health survey. The objective of present study to assess the oral health status of children going in government schools.

METHODOLOGY

This study was conducted among 12 years old children of government rural schools in the catchment area of Sri Aurobindo Institute of Medical Sciences, District Indore. After getting the ethical approval from the institute ethical committee, list of schools was obtained from the office of District Education Officer of District Indore. The schools were stratified into primary, middle, high school and of which middle and high schools were selected. A pilot study was conducted to get the prevalence of dental caries and on this basis sample size was calculated by using $4pq/L^2$ where prevalence of caries 52.3% was used and sample size came 400. Sample was collected by including 12 yrs of student

from the schools and the age of students was verified by school records. The selected students were then evaluated for oral health status by a trained examiner who took training in department of community dentistry and Pedo-odontology.

All the children were examined under adequate illumination in the school premises. WHO criterion was used for evaluation of dentition status and treatment needs. The criterion recommends examination for dental caries using mouth mirror and community periodontal index (CPI) probe. The examination was conducted with a plain mouth mirror and CPI probe as given by the WHO 1997. The examination proceeded in an orderly manner from one tooth or tooth space to the adjacent tooth or tooth space. Clinical examination included the assessment of dentofacial anomalies according to the WHO Oral Health Assessment form (1997)¹⁰ by recording: Enamel hypoplasia Development defects of Enamel Index¹⁰, Dental fluorosis Index Modified criteria, Dental Aesthetic Index (DAI). Oral Hygiene Index Simplified (OHIS)¹¹ was used to assess oral hygiene. The school authorities were requested to pass on this information to all the parents/guardians so that children could be taken to dental college for availing free treatment through the referral cards given to them at the time of study.

RESULTS

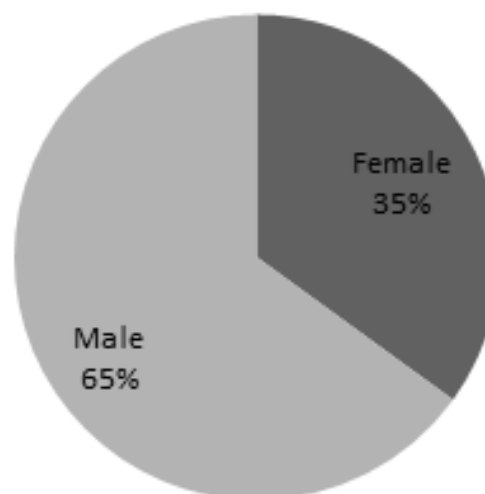


Figure -1 Distribution of participants

Above figure shows that 400 participants were included in the study out of which 140 (35%) were female and (65%) male.

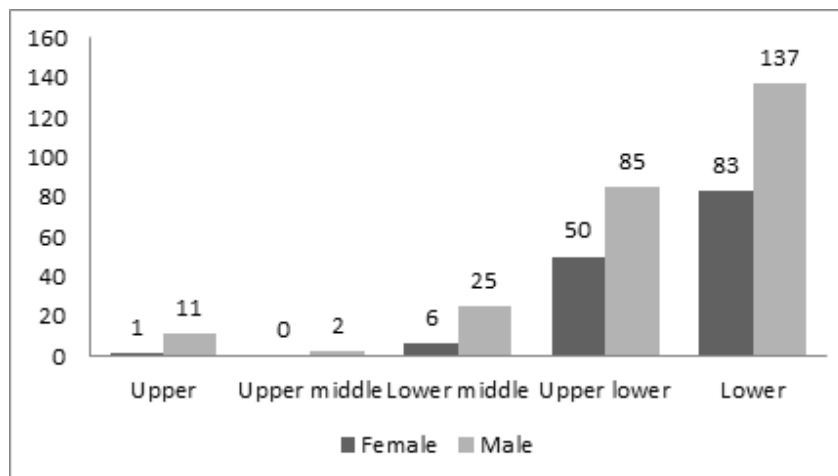


Figure-2 Distribution of participants according to socioeconomic class

Above figure shows that 113 (28.25%) belonged to upper lower of socioeconomic class and 220 (55%) of them from the lower socioeconomic class.

Table 1- Association of DMFT with gender

S. No.	Variables	Gender		Total	Chi-square value	P value
		Girls	Boys			
1.	Decay Teeth				4.3	<0.05
	Present	40(34.08%)	112(36.05%)	152(38%)		
	Absent	100(65.92%)	158(63.95%)	258(62%)		
2.	Missing Teeth				0.19	>0.05
	Present	3(2.23%)	4(1.5%)	7(1.67%)		
	Absent	137(97.77%)	256(98.5%)	393(98.33%)		
3.	Filled teeth				2.4	>0.05
	Present	8(5.71%)	27(10.38%)	35(8.75%)		
	Absent	132(94.29%)	233(89.62%)	365(91.25%)		
4.	Traumatic Teeth				3.7	=0.05
	Present	3(2.15%)	20(7.08%)	23(5%)		
	Absent	137(97.85%)	240(92.02%)	380(95%)		

Above table depicts that out of 400 participants 152 (37.5%) had decay teeth and of which 40(34.08%) were female and 112 (36.5%) boys. decay teeth was more in male than female and the difference was found statistically significant. Above table describes that 35(8.75%) of participants had filled teeth and filled teeth was found more in males than females but the difference was not statistically significant. Table shows that 19(4.75%) of participants had decay teeth and decay

teeth was found more in boys than girls but the difference was not statistically significant and also describes that only 7 (1.67%) of participants had filled teeth and filled teeth was found more in males than females but the difference was not statistically significant. Above table depicts that 20(5%) of participants had trauma teeth and teeth was found more in males than females but the difference was statistically significant.

Table 2- Distribution of 12-year-old students by CPI score and gender

CPI Score	Gender		Total
	Girls	Boys	
Healthy	132(47.15%)	148(52.85%)	280(70%)
Bleeding	3(75%)	1(25%)	4(1%)
Calculus	34(29.31%)	82(70.68%)	116(29%)
Total	169(42.25)	231(57.75%)	400(100%)

Above table shows that majority of children (70%) had healthy gums only 1% of participants had bleeding gums and 29% had calculus.

Table 3-Association of developmental defects of enamel with sex

Sex	Developmental defect of enamel				Total
	Healthy	Hypoplasia	Diffuse opacity	Demarcated Opacity	
Female	107 (84.9%)	17(7.64%)	16(4.14%)	1(.32%)	140(100%)
Male	221(84.98%)	26(10.09%)	9(3.65%)	3(1.29%)	260(100%)
Total	328(82.25%)	36(9.00%)	15(3.75%)	4(1%)	400(100%)

Chi square value=10.5, pvalue <.05

Above table describes that boys has more developmental enamel defects and hypoplastic enamel was found 10.09% among the boys than the girls 7.64% and prevalence of diffuse opacity was slightly more in girls (4.14%) than the boys (3.65%), demarcated opacity was found more among boys (1.29%)than the girls (0.32%) and this difference was found statistically significant.

Table 4-Association of oral mucosal condition with sex

Sex	Oral mucosal condition			Total
	Normal	Ulcerated	Abscess	
Female	136(97.45%)	3(1.91%)	2(.62%)	140(100%)
Male	253(97.42%)	7(2.58%)	1(0%)	260(100%)
Total	389(97.25%)	10(2.5%)	1(.25%)	400(100%)

Chi square value=1.4, pvalue >.05

DISCUSSION

Present study was conducted in Government middle schools of District Indore the catchment area of Sri Aurobindo Institute of Medical Science, Indore. 400 participants were included in the study out of which 140 were females and 260 males. Similar findings were found in a study conducted by Sarve et-al. Majority of participants were from lower socioeconomic class. Study carried out by George and Mullanmottill¹²and also found that majority of the children were from lower

socio-economic class. Prevalence of decay teeth was found 38% among the participants. Study conducted by Thakur et al¹⁵ found that the prevalence of decay teeth was 35.2% in rural schools. Decay of teeth were more in boys compared with girls and the difference was found statistically significant. Prevalence of Missing teeth was 1.67% and filled teeth was 4.75% similar finding was found in a study by Zafer Azizi¹⁶. Majority of children had healthy gums (70%) and similar findings were observed in study conducted by George and Mullanmottill

in Kerala. In present study 24% of girls in the age group of 12 years suffered from gingival problems which was less (50.8%) compared to a study conducted in Chennai⁷. 27% percent of boys in the same age group suffered from gingival problems which was lower (51.7%) compared to school children in Chennai.

This study observed that 82.25% of children had normal, 9% hypoplastic, 3.75% diffuse opacity and 1% had demarcated opacity in enamel. Hypoplastic enamel was dominant type of developmental enamel defects. Enamel defects were dominant in girls than boys and this difference was found statistically significant. Similar finding has observed in a study conducted by Fabiana vargas and Ferreira¹⁷.

Conflict of Interest- None

Source of Funding- No

Ethical approval- Ethical committee of SAIMS, Indore

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Effect of Neuro Muscular Electrical Stimulation in Swallowing Muscle Function on Post Stroke Dysphagia

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ABSTRACT

Aim And Objectives: To determine the effects of Neuro Muscular Electrical Stimulation in improving Muscles Function of Swallowing among subjects with post stroke dysphagia. **Methodology:** Quasi experimental study design was used this study. Total 30 Post stroke dysphagic patients were selected and all 30 patients underwent sEMG study for massator, sub mental and infra hyoid muscles. Neuromuscular electrical stimulation over the Pharyngeal muscles given for 4 weeks. End of the fourth week post test measurement was taken values were tabulated and statistically analyzed. **Results:** surface electro myography of bilateral massator, submental and infrahyoid muscle function in amplitude is improved in between pre and post intervention, test values that is P value is 0.001. **Conclusion:** Neuro muscular electrical stimulation is more beneficial effect in swallowing muscle activity in measures of amplitude on post stroke dysphagia.

Keywords: Post stroke dysphagia, sEMG, NeuroMuscular electrical stimulation

INTRODUCTION

Dysphagia is defined as an impairment of the complex and integrated sensorimotor system. Neurogenic dysphagia (ND) typically occurs in patients with neurological diseases of varying etiologies, and it is associated with high mortality, morbidity, and social costs because of the increased risk of aspiration pneumonia and its sequelae.¹⁻⁶ Immediately, after stroke oropharyngeal dysphagia is seen in 50% of stroke patients. Of these, up to 40% remain dysphagic a year later⁷. Complications of dysphagia includes aspiration, pneumonia, and malnutrition⁸ for which patients require enteral sustaining through a nasogastric tube or percutaneous endoscopically presented gastrostomy tube, which frequently requires long term institutional care⁹. Post Stroke Dysphagia is thought to be due to damage to the cortex and sub cortical structures

¹⁰. In spite of the fact that dysphagia might be dealt with utilizing a few physical procedures, there is no conclusive medications¹¹. Dysphagia usually follows stroke that affects the predominant swallowing muscles that is bilateral massator, submental and infrahyoid. In the last 20 years, physiotherapy techniques in which neuromuscular electrical stimulation (NMES) is the usually used technique for swallowing function but very minimal literature is found regarding the electromyography activity of swallowing muscles after NMES. In this study, we concentrate on the electromyography activities of swallowing muscles.

METHODOLOGY

Participants: the sample will be drawn from Physiotherapy department OPD and IP at Saveetha Medical hospital. The subjects will sign an informed consent form after a elaborate education about the study purpose, duration and other aspects by the researcher. The subjects who fulfill the criteria's of inclusion will be selected for the study. Inclusion criteria: Age group: 50 – 55 years, both genders. Post stroke subjects with difficulty in swallowing. Subjects confirmed swallowing difficulty with positive water swallow test. Exclusion criteria: Recent trauma, unstable vital signs, recent surgeries around the neck. Subjects with any other

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neurological disorders, Symptomatic cardiovascular diseases, Skin allergies.

Ethical consideration: The study was approved by the Institutional Ethics Committee (Number 015/02/2017/IEC/SU on 28/02/2017) and done in accordance with the Ethical Guidelines for on Human Participants, The study protocol was approved by institutional ethical committee.

Procedure: The patient willing to participate in this study were explained about the safety and simplicity of the procedure and informed consent and information sheet were obtained. 30 subjects were selected according to the inclusion and exclusion criteria. All the 30 subjects underwent surface electromyography as a pre test measurement. The Patient position was sitting and three muscle groups were investigated and muscle activity recorded. Three muscle locations were examined in the study: (1) masseter (2) submental (3) Infrahyoid. All EMG recording were made using surface electrode which was made up of silver chromium. Allengers Scorpio EMG EP NCS, computer based EMG system with software. The Electrodes have wide band pass filter band with (RMS) - of 30 to 500 Hz and a 60 Hz Notch filter. It consists of two bipolar electrode and ground electrode. Specific electrode positions were as follows the interelectrode distance was 10 mm in all locations except sub mental. For massator muscle two bipolar electrodes were placed parallel to the massator muscle fibers on the left side of the face. Sub mental muscle two surface electrodes were attached to the skin beneath the chin on the right side of midline to record submental myoelectrical activity over the platysma. And two electrodes were placed on the left side of the thyroid cartilage to record from the infrahyoid muscle group. Electrical impedance at sites of electrode contact was reduced because target areas were lightly scrubbed with alcohol gauze pads, followed by application of an electrode gel. All the 30 subjects received Electrical stimulation with the frequency of 30 Hz, duration of

100ms, intensity was increased till minimal palpable observable contraction and interrupted direct current was used. The patient position was supine lying and pillow kept under the head. And inactive electrode was placed nape of the neck, active pen electrode was placed pharyngeal muscles either side of the hyoid bone for 5 days/week for 4 weeks. The post test measurement was taken similar to pre test measurement. The surface electromyography measures in amplitude. All the data were tabulated and statistically analyzed.

RESULT

In surface electro myography left massator Muscle Amplitude Pre test Mean-16.952mv, standard deviation-1.435, Post test mean-64.215mv, standard deviation-3.859, t value-86.580, P value <0.001, extremely statistically significant. left Submental Muscle Amplitude Pre test Mean-24.5013mv, standard deviation-3.0071, Post test mean-121.9050mv, standard deviation-6.0513, t value-116.1416, P value <0.001, extremely statistically significant. left Infrahyoid Muscle Amplitude Pre test Mean-22.0040mv, standard deviation-1.8564, Post test mean-74.1043mv, standard deviation-17.5628, t value-15.9395, P value <0.001, extremely statistically significant. (table-1)

Right massator muscle amplitude pre test mean 16.9970mv, standard deviation-1.360 and post test mean-64.229mv, standard deviation-3.811. t value-86.9896, P value is <0.001, extremely statistically significant. Right Submental muscle amplitude pre test mean 24.3210mv, standard deviation-3.0902 and post test mean-121.9257mv, standard deviation-6.0063, t value-115.7434, P value is <0.001 extremely statistically significant. Right Infrahyoid muscle amplitude pre test mean 21.9440mv, standard deviation-1.7722 and post test mean-74.4547mv, standard deviation-18.0887. t value-15.5360, P value is <0.001 extremely statistically significant. (table-2)

Table-1- Left Massator, submental, Infrahyoid sEMG Pre and Post test values

Name of the Muscle		Mean	Standard deviation	t value	p value
Left massator	Pre	16.952	1.435	86.580	<0.001
	Post	64.215	3.859		
Left Submental	Pre	24.501	3.0071	116.1416	<0.001
	Post	121.9050	6.0513		
Left Infra hyoid	Pre	22.004	1.8564	15.9395	<0.001
	Post	74.1043	17.5628		

Table-2- Right Massator,submental,Infrahyoid sEMG Pre and Post test values

Name of the Muscle		Mean	Standard deviation	t value	p value
Right massator	Pre	16.9970	1.360	86.9896	<0.001
	Post	64.229	3.811		
Right Submental	Pre	24.321	3.0902	115.7434	<0.001
	Post	121.925	6.0063		
Right Infra hyoid	Pre	21.944	1.7722	15.5360	<0.001
	Post	74.454	18.0887		

DISCUSSION

The purpose of the study is to determine the effect Neuro Muscular Electrical Stimulation in facilitating the swallowing muscle activity. Several earlier studies have been directed to show the viability of NMES treatment strategies for dysphagia.¹² It was predicted that repeated neuromuscular electrical stimulation will improve the muscle function in swallowing. This was based on the previous study pharyngeal electrical stimulation for neurogenic dysphagia¹³. EMG data is collected and supported this hypothesis. The result shows significant increase in the pharyngeal muscle activity.

The previous study conducted in Japan on the effect of pharyngeal electrical stimulation on swallowing performance by Ryosuke Takeishi and Jin Magara as an effective function in swallowing muscle activity on post stroke dysphagia. The Limitations in this study were that the study was conducted in only one hospital, the results were derived from a small sample of stroke patients and only one technique to facilitate swallowing was done. The data collection took longer than expected. Larger numbers are needed in future investigations, as are variations in treatment regimens. In a future study, different electrical stimulation can be given with variations in duration, and intensity.

CONCLUSION

This study showed that Neuro Muscular Electrical stimulation is effective in improving swallowing Muscle function in Electromyographic activity on patients with Post stroke dysphagia.

Conflict of Interest: Nil

Sources of Funding: Self

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Estimation of Random Blood Glucose from Gingival Crevicular Blood- A Cross Sectional, Diagnostic Study

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ABSTRACT

AIM: To prove that gingival crevicular blood can be used as a novel, minimally- invasive, diagnostic tool to screen undiagnosed diabetic population with gingivitis and periodontitis as compared to invasive phlebotomy and finger puncture blood collection procedures.

OBJECTIVES: To estimate random blood glucose levels from gingival crevicular blood through glucometer. To compare the random blood glucose levels from venous blood by laboratory glucometric methods. To prove that gingival crevicular blood is a minimally invasive diagnostic tool as compared to phlebotomy and finger puncture procedures with good patient compliance.

METHODOLOGY & RESULT: 75 Out-patients with gingivitis and periodontitis who are unaware of their diabetic status undergoing routine intraoral clinical examination will be subjected to periodontal probing after isolating the area to be examined. Blood oozing through the gingival crevice from the anterior maxillary region will be collected by a glucometer for random blood glucose. Samples obtained by phlebotomy technique will be analyzed for random blood glucose through calorimetric methods in the laboratory. Results obtained from both the gingival crevicular blood and venous blood will be compared and statistically analysed. 25 Out-patients who have already been diagnosed as diabetic are included as controls in the study. Correlation between Gingival crevicular blood glucose (GCBG) and Venous blood Glucose (VBG) in total samples were statistically analyzed using SPSS version 11. Highly significant correlation between GCBG & VBG ($r=0.993$) in total was found. Correlation is highly significant at $p<0.01$.

CONCLUSION: Random blood glucose levels measured in GCBG is almost equal to that of VBG. Hence we conclude saying that GCB can be used as a minimally invasive and easy to collect tool for screening diabetes in our routine dental practice as early diagnosis of diabetes helps to prevent its long-term complications, high morbidity and mortality.

Keywords : Diabetes mellitus, Gingival Crevicular Blood, Minimally invasive, Random Blood Glucose.

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INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder with an estimated prevalence of 7% in industrialized countries of which nearly half the cases are undiagnosed.¹ India has nearly 33 million diabetic

subjects today with an overall prevalence rate of 4.3%.² Type 2 DM .i.e. NIDDM constitutes nearly 70% of population in any country, with a prevalence of 2.4% in rural population and 11.6% in urban population.³ The chronic hyperglycemia of diabetes is associated with a wide range of complications like diabetic retinopathy, atherosclerotic cerebrovascular, cardiovascular and peripheral vascular diseases, peripheral neuropathy, progressive renal dysfunction, delayed wound healing and periodontitis.⁴ Recent evidence indicates that diabetic complications such as retinopathy, cardiovascular disease and neuropathy may begin several years before the diagnosis of type 2 diabetes mellitus is established. The early diagnosis of diabetes, therefore, might help to prevent its long-term complications that are responsible for the high morbidity and mortality of these patients.⁵ Early diabetes detection could identify diabetes-related complications at an earlier stage, suggesting the value of screening to discover unrecognized illness, manage existing complications, and prevent the progression of disease.⁶ Periodontal disease is considered to be the sixth complication of diabetes. The interrelationship between diabetes mellitus and periodontitis has been studied for many years. Diabetes and Periodontitis seem to interact in a bidirectional manner⁵.

For over 100 years, various methods have been used to measure glucose level in biological fluids, but the search for more specific, sensitive and simple method continues. Since centuries, the clinicians are sending venous blood, or urine samples for determining glucose levels to clinical biochemistry laboratories. But these days portable glucose monitors are in use both as a bedside testing of glucose⁵. Portable glucose monitors can be used for the estimation of blood glucose in dental set up also. Periodontal disease itself is associated with gingival bleeding and if the patient is diabetic, it is more severe. Bleeding from the gingival tissues is found to be further pronounced if the diabetic patient's condition is poorly controlled or is in association with undiagnosed diabetes⁶. Thus ample extravasated blood is produced during routine diagnostic procedures. Probing during a periodontal examination is more familiar to the practitioner and less traumatic than a finger-puncture with a sharp lancet. This blood oozing during routine periodontal examination can be the source for the estimation of blood glucose is more severe. Glucometers are commonly used by diabetic patients for home monitoring of blood glucose levels. Recently, more

sensitive self-monitoring devices have been developed for testing small amounts (<2microlitre) of blood obtained from areas much less sensitive than fingertips, such as the forearm, upper arm, thigh, or base of thumb. In general, accuracy of these novel glucometers has been acceptable.⁷ The conventional laboratory methods that are employed to screen for diabetes are time consuming and elaborative equipment are needed to employ these techniques. The advent of blood glucose monitors allows the clinician to assess blood glucose at the chair side. In contrast to laboratory methods, results are obtained instantaneously, which helps the clinician to decide if further confirmatory test are required to diagnose diabetes.⁸ Inflammatory markers are seen raised markedly in undiagnosed diabetic population which signify the severity and progression of the disease. Three most common markers are C-Reactive Protein, TNF-alpha and IL-6. Studies show that elevated CRP levels are a strong independent predictor of type 2 diabetes and may mediate associations of TNF-alphaR2 and IL-6 with type 2 diabetes⁹.

MATERIALS AND METHOD

75 patients who were not aware of their diabetic status and 25 patients who were Type II Diabetic and were under medication who reported as outpatient to the Department of Oral Medicine and Radiology, Sree Balaji Dental College and Hospital, Chennai were included in the study. Inclusion criteria were the same mentioned above. Exclusion criteria were patients with known bleeding and clotting disorders like hemophilia, thrombocytopenic purpura, etc.

All the patient's detailed case history were recorded followed by routine intraoral examination where the patient's periodontal status was recorded examined intraorally and the area to be examined was isolated with cotton rolls to prevent contamination with saliva. A detailed periodontal status was recorded with graduated periodontal probe (Williams) and classified according to the American Academy of Periodontology. The degree was moderate if periodontal depth was 3- 5mm and severe if periodontal depth was greater than 6mm. Bleeding on probing was elicited 1-2minutes after probing. An appropriate site with profuse bleeding was chosen for collecting the gingival crevicular blood (GCB).

Probing was repeated until sufficient bleeding was there in the sulcus. A plastic capillary tube of 2mm bore

marked was used to collection of blood from the gingival sulcus after probing force of approximately 0.2N was used to elicit bleeding from the site.

The Accu-chek Active Glucometer (Roche Diagnostics, Germany) monitoring device was loaded with the active test strip (impregnated per cm² with glucose dye oxidoreductase 0.7μ) 2μl of blood was transferred on to the test strip. The testing time is about 10 seconds. Then venous blood was collected by routine phlebotomy technique for measurement of Random Blood Glucose levels. All the 100 samples were analyzed and readings were recorded and tabulated.

STATISTICAL ANALYSIS

Statistical analysis was performed by SPSS 20.0. Statistical test used was Pearson Correlation Coefficient.

RESULTS

100 patients comprising 54 males and 46 females took part in the study with a mean age of 49.99 years (Table 1). No significant difference between RBS(GCB) and RBS(VB) when compared to age and sex group were found (Table 2). The mean RBS(GCB) and RBS(VB) derived from all samples were 199.25 mg/dl and 197.83 mg/dl respectively with a Standard Deviation of 50.2 in both groups. (Table 3). Correlation between RBS (GCB) and RBS(VB) of the 100 samples were analyzed with Pearson correlation coefficient using the SPSS version 20.0 and scatter plot was done. Highly significant correlation between RBS (GCB) and RBS(VB) ($r=0.993$) in total samples was found. The correlation was significant at $p<0.01$ (Table 4).

Table 1: Sex Distribution

		Frequency	Percent
Valid	Male	54	54.0
	Female	46	46.0
	Total	100	100.0

Table 2: Age distribution

Frequency		Percent
21-30	4	4.0
31-40	23	23.0
41-50	27	27.0
51-60	25	25.0
61-70	16	16.0
71-80	5	5.0
Total	100	100.0

Table 3. Descriptive analysis of RBS from GCB & VB

	Minimum	Maximum	Mean	Std. Deviation
Age in years	29	80	49.99	12.201
RBS (GCB)	136	400	199.25	50.216
RBS (VB)	130	390	197.83	50.235

Table 4 : Pearson Correlation Coefficient

		RBS (GCB)	RBS (VB)
RBS (GCB)	Pearson Correlation	1	.993(**)
RBS (VB)	Pearson Correlation	.993(**)	1

DISCUSSION

Testing for Type 2 Diabetes Mellitus at should be carried out in individuals who are obese, have a 1st-degree relative with diabetes, are members of a high-risk ethnic population, have delivered a baby weighing 4.05 kg or have been diagnosed with gestational diabetes mellitus are hypertensive (>140/90), have an HDL cholesterol level <35 mg/dl and/or a triglyceride level >250 mg/dl, had on previous testing an impaired glucose tolerance or an impaired fasting glucose⁴. Undiagnosed diabetic patients are at significantly increased risk for development of complications and the bidirectional relationship of diabetes with periodontitis underscores the necessity for early detection of diabetes¹⁷.

Testing crevicular blood glucose level with the Accu-Chek self monitoring device is sensitive, since it can provide results with just 2- 3ul of blood within 10 seconds. With regard to the development of painless and non-invasive methods to measure blood glucose, considerable effort has been made in the past few years. Since periodontal inflammation with or without the complication factor of diabetes mellitus is known to produce ample extravasate of blood during diagnostic periodontal examination¹. As we compared our study with the similar studies 1, 5, 6, 7, 8, 10, 14, the results obtained were much consistent with highly significant correlations ($r= 0.993$, $p<0.01$) were found between RBS(GCB) & RBS (VB).

The strong correlation ($r=0.993$, $p<0.01$) between the random blood glucose levels from the gingival crevicular blood(GCB) and venous blood(VB) that was obtained from our study clearly shows that easy availability of GCB as an alternative to the VB as GCB can be collected by a minimally invasive painless method as compared to the later. In contrast to a study⁷ in which the results did not show any evidence for the usefulness of GCB for testing random blood sugar during routine periodontal examination, our study showed accurate results as the

blood was collected from the gingival cervical after thorough cleaning and probing thus avoiding the chance of contamination to get accurate results.

From the above discussion, we can say that gingival crevicular blood from probing may be an excellent source of blood for glucometric analysis using the technology of portable glucose monitors. Subjects can reliably be screened for diabetes by measuring glucose levels in gingival crevicular blood, since probing and sample collection takes a very little time and there is no discomfort to the patient. Thus, a dental clinician can use this crevicular blood to test for glucose levels instead of puncturing the patient's finger tip to obtain a blood sample and can make a referral to a physician for further evaluation for diabetes when warranted⁵.

The incidence rate of DM in India is increasing at an alarming rate. Hence if the dentist participate in the challenge of undiagnosed diabetes by the routine screening of patient especially those with pronounced gingival inflammation, it would be a major role and life saving service¹⁸.

CONCLUSION

From our study we found that random blood glucose levels measured in GCB is almost equal to that of VB. Hence, GCB can be used as a minimally invasive and easy to collect tool for screening diabetes in our routine dental practice as early diagnosis of diabetes helps to prevent its long-term complications, high morbidity and mortality. However as the incidence of Diabetes Mellitus is increasing in our nation, the study can be carried out in a larger sample size.

Funding: Self-funding.

Ethical Clearance: Obtained from the Institutional Ethical Committee

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Comparison of Salivary Nitric Oxide Levels among Smokers and Non-Smokers in Chronic Periodontitis- A Biochemical Study

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ABSTRACT

Background and Objective: Nitric oxide (NO) is a gaseous, colorless, highly reactive, shortlived free radical plays a pivotal role in the regulation of various physiological and pathological mechanisms in the body. The pathogenesis of periodontal diseases may be affected by alterations of the inflammatory response by smoke. The aim of this study was to assess the levels of salivary NO among both the smokers and nonsmokers having chronic periodontitis and also to compare them with periodontally healthy controls.

Method: Sixty subjects who were in the age group of 30-55 years, who participated in this study participated and were divided into three groups: group I, which includes 20 healthy nonsmoking subjects; group II, 20 subjects who are Non-smokers with Chronic periodontitis ; Group III 20 subjects who are smokers with Chronic periodontitis. The biochemical estimation of NO in the collected saliva was performed using the Griess colorimetric reaction.

Statistical Analysis and Results: The statistical comparisons were done under the Griess Reaction. There were statistically significant salivary levels of NO in the groups of periodontitis (group II and III) as compared to those in the healthy controls (group I). The salivary nitric oxide levels are statistically significant among smokers than non-smokers in chronic periodontitis patients.

Conclusion: NO play an important complex role in the immuno-inflammatory process and in the remodeling and maintenance of osseous structures. As smoking increases the risk of periodontitis, the present study aimed to evaluate the effect of smoking among periodontitis patients, that is, the NO levels in these patients.

Keywords: Chronic periodontitis, Nitric oxide, Smoking.

INTRODUCTION

Nitric oxide (NO) is an ubiquitous intercellular messenger molecule with important cardiovascular, neurological and immune functions. Nitric oxide, a free radical gas, is a noxious chemical in the atmosphere, but in small controlled concentrations in

the body, it acts as a physiological and pathophysiological mediator and it plays an important role in the biological systems¹. It is formed in almost all cell types and despite the fact that it has a short half-life of approximately 4 seconds in vivo, it penetrates the surrounding tissues and activates a variety of cellular signaling pathways. NO is synthesized by the oxidative process of the guanidine of

the amino acid Larginine by a family of enzymes named NO synthases (NOS) ².

In mammalian cells, NO is produced by a group of isoenzymes which are collectively termed as the NO synthases (NOS). The endothelial NOS and neural NOS are constitutive and they release small amounts of NO for a short period following the stimulation of their receptors. In contrast, iNOS is expressed in response to proinflammatory stimuli and it produces large amounts of NO for sustained time periods ³.

Saliva may contain biomarkers which are specific for the unique physiological aspects of periodontitis, and the qualitative changes which occur in the composition of these biomarkers could have diagnostic and therapeutic significance ⁴.

Periodontitis, a chronic inflammatory disease of the periodontal tissues, is a multifactorial disease of bacterial origin ^{5,6}. The products of the bacteria and proinflammatory cytokines produced by inflammatory cells trigger the expression of iNOS, which is involved in inflammatory processes and accelerates periodontal disease ⁷.

Risk factors for periodontitis may be systemic or local, and among them, smoking is the most significant^{8,9}. Thus, cigarette smoke increases the oxidative burden, as it contains a large number of free radicals, and it has been suggested that it may increase the susceptibility to periodontal pathogens ¹⁰.

As smoking increases the risk of periodontitis, the present study aimed to evaluate the effect of smoking on oxidative stress in gingivitis and chronic periodontitis patients and also compare the levels to prove the significance of salivary NO levels on smoking which increases with increasing disease.

MATERIALS AND METHOD

The present study was conducted in the Department of Periodontology, Sree Balaji Dental College And Hospital, TamilNadu, Chennai, India. The institutional ethical committee of the faculty approved the study.

This cross-sectional study was performed to evaluate and compare the salivary NO levels of smokers and Non-smokers among the chronic periodontitis patients to those of clinically healthy patients as controls.

Sixty subjects who were in the age group of 30-55 years, who participated in this study participated and were divided into three groups: group I, which includes 20 healthy nonsmoking subjects; group II, 20 subjects who are Non-smokers with Chronic periodontitis ; Group III 20 subjects who are smokers with Chronic periodontitis.

Clinical examinations

This was performed using the plaque index (PI), gingival index (GI), probing pocket depth (PD) and clinical attachment level (CAL). The pocket depth was measured as the distance from the gingival margin to the base of the pocket in millimeters. Informed consent was obtained from all of the patients before participating in the study

Inclusion Criteria And Exclusion Criteria

The inclusion criteria which was followed generally were the patients of both genders who were in the age group of 30-55 years, with a dentition of at least 20 functioning teeth.

I. CONTROLS:

Inclusion criteria

Healthy subjects in the age group of 30 – 55years, with no probing pocket depth, with no bleeding on probing and no attachment loss.

Exclusion criteria

Patients who have received any topical or systemic antimicrobial treatment or steroid therapy in the past six months. Patients who had periodontal treatment in the past six months. Smokers- both past and present. Patients with any systemic diseases and Patients with salivary gland disorders.

II. STUDY GROUP: NON SMOKERS WITH CHRONIC PERIODONTITIS

Chronic periodontitis patients (nonsmokers) Subjects with $\geq 30\%$ of sites with the presence of a PD of ≥ 4 mm along with a CAL of ≥ 4 mm .

III. STUDY GROUP: SMOKERS WITH CHRONIC PERIODONTITIS

Chronic periodontitis patients (smokers) Subjects having a smoking habit for the past 6 months or more

and smoking at least 10 bidis or cigarettes per day, and with $\geq 30\%$ of sites with the presence of a PD of ≥ 4 mm along with a CAL ≥ 4 mm.

Exclusion criteria

Patients who have received any topical or systemic antimicrobial treatment in the past six months including the use of mouthwash

Patients who had periodontal treatment in the past six months.

Patients on anti-oxidant supplements in the past six months.

Patients with salivary gland disorders

Collection of samples:

4 mL of unstimulated saliva was collected in a sterile plastic vial, from all of the subjects and controls. The saliva samples were then centrifuged at 2,500 rpm,

for 5 minutes. The biochemical estimation of NO in the collected supernatant obtained from the saliva was performed using the Griess colorimetric reaction by Green et al.¹¹ These solutions were added to the Griess reagent for measurement on a spectrophotometer and their optical densities (OD) were recorded^{12,13}. The optical densities were then correlated in the standard curve and the corresponding concentrations of nitrite were observed.

RESULTS

The detailed data on the salivary levels of NO between the three groups have been listed in [Table/Fig 1]. The detailed data BY t-test for inter comparison three groups for Salivary Nitric oxide Levels have

been listed in [Table 2]. Clinical parameters used for clinical examinations of the three groups have been listed in [Table 3].

Table 1. ANOVA test for Comparison between three groups for Salivary Nitric oxide

Groups	N	Mean	SD	Minimum	Maximum	F-value	P Value
Group I	20	5.69	0.93	4.34	8.16	234.021	0.001
Group II	20	15.43	2.42	10.48	18.94		
Group III	20	16.53	1.51	13.54	20.34		
Total	60	12.55	4.86	4.34	20.34		

P<0.01 Significant

Post Hoc Test of Salivary NO

Comparing the above three Groups, Group II & III has got highest mean value of Salivary levels of nitric oxide when compared to Group I. The above distribution of data shows statistical significance (p<0.01)

Table 2 - Scheffe Test: t-test for inter comparison three groups for Salivary Nitric oxide

Groups	N	Mean	SD	Minimum	Maximum	t-value	P Value
Group I	20	5.69	0.93	4.34	8.16	19.859	0.001
Group II	20	15.43	2.42	10.48	18.94		
Group I	20	5.69	0.93	4.34	8.16	27.352	0.001
Group III	20	16.53	1.51	13.54	20.34		
Group II	20	15.43	2.42	10.48	18.94	1.108	0.001
Group III	20	16.53	1.51	13.54	20.34		

P<0.01 Significant From the above table ,the inter comparison among three group for Salivary levels of NO Shows,

t-test comparing group I and group II reveals group B has statistically significant higher mean value compared to group I (p<0.01)

t-test comparing group I and group III reveals group III has statistically significant higher mean value compared to group I (p<0.01)

t-test comparing group II and group III reveals group III has statistically significant higher mean value compared to group II (p<0.01)

Table 3. Clinical parameters used for clinical examinations of the three groups.

Parameter	Group 1 (n=20)	Group 2 (n=20)	Group 3 (n=20)
Plaque index	0.64±0.18 (0.40–1.00)	1.70±0.19 (1.30–2.10)	1.92±0.18 (1.60–2.20)
Gingival index	0.44±0.10 (0.30–0.60)	1.71±0.21 (1.30–2.20)	1.38±0.18 (1.10–1.70)
Probing pocket depth (mm)	0.84±0.21 (0.40–1.20)	4.35±0.56 (3.40–5.20)	4.59±0.48 (3.80–5.80)
Clinical attachment levels (mm)		6.51±0.40 (5.80–7.20)	6.53±0.41 (6.00–7.20)

Values are presented as mean±standard deviation (range).

Group 1: normal, group 2: nonsmoker, group 3: smoker.

There was positive significant increase in the salivary NO levels among smokers than non-smokers induced chronic periodontitis. the results indicated that there was a significant correlation on the effects of smoking in increased periodontal diseases.

DISCUSSION

Periodontal disease is a chronic bacterial infection characterized by persistent inflammation, connective tissue breakdown and alveolar bone destruction¹⁴.

Nitric oxide (NO) is a gaseous free radical with a short biological half-life, which is generated enzymatically from L-arginine by a family of the NO synthase (NOS) isoforms. Nitric oxide (NO) is formed from the amino acid, L-arginine by a 2-step oxidation of L-arginine to L-citrulline. Nitric oxide is synthesized by a family of enzymes which are called nitric oxide synthases¹⁵. Excessive levels of NO, and consequent modification of proteins, lipids, and nucleic acids by reactive nitrogen species formed in the reaction of NO with O₂⁻. NO reacts rapidly with O₂⁻ to form peroxynitrite, a highly toxic metabolite and a potent oxidant. Controlled generation of peroxynitrite may play a role in host defense, but excessive generation can lead to tissue damage. However, there is also peroxynitrite-independent mechanisms by which nitrotyrosine can be

formed. The complexity of NO chemistry in part may help explain the sometimes opposing results obtained in the research of the role NO in pathogenesis of the diseases¹⁶.

The expression of iNOS has been investigated in salivary gland-related diseases¹⁷, temporomandibular joint disorders and oral cancer as well¹⁸. Several studies suggest that tissue injury in inflammation involves induction of iNOS by certain cytokines or endotoxin, which leads to production of large quantities of NO¹⁹.

As smoking increases the risk of periodontitis due to the destructive molecular and genetic factors²⁰, the present study aimed to evaluate the effect of smoking on oxidative stress in gingivitis and chronic periodontitis patients and also compare the levels to prove the significance of salivary NO levels on smoking which increases with increasing disease .

In the present study, we made an attempt to evaluate the roles of smoking and its effects in increasing periodontal diseases. Various studies have reported the significance of NO as an inflammatory marker, but the present study has correlated the salivary elevated levels of NO among the smokers and non-smokers in gingivitis and chronic periodontitis.

The source of salivary nitric oxide was studied by Sato H et al., 2006²¹. Many of the oral microorganisms express enzymes that can effectively reduce nitrate. The

facultative anaerobic bacteria in the oral cavity reduce the salivary nitrate to nitrite and this nitrite enhances the gastric generation of NO in acidic conditions. Although nitrite is converted non-enzymatically to NO at a low pH, the rate of this conversion at the physiological pH (about 6.2–7.6) in the oral cavity is fairly low and, hence, the mechanism of the oral production of NO remains obscure.

The source of serum nitric oxide was studied by Menaka et al., 2009¹². The results of this study showed significantly increased concentrations of nitrite in the patients with periodontitis, as compared to those in the healthy control group. The significantly higher levels of NO in this study group had contributed to the development of the frequently found clinical symptoms of periodontitis. The increased alveolar bone resorption may be due to the stimulatory effect of NO on the activity of the osteoclasts.

Interestingly, a study report of Aurer A et al., 2001²², showed that salivary nitrite, a stable metabolite of NO, was decreased in the saliva of the periodontitis patients than in the healthy subjects. This may be due to the fact that NO is relatively unstable in the presence of oxygen and that it quickly autooxidizes to produce nitrogen oxides. Moreover, because of NO's reactivity and shortlife, directly measuring NO in the cells and tissues is very difficult.

Biochemical and immunological markers present in saliva, serum or GCF can partially determine the extent of periodontal disease and even may predict its progression (Ugar-cankal D et al 2006)²³. Study resulted by Deeptiwadhwa et al., 2013 showed a positive correlation with the present study with significant increased concentrations of salivary nitric oxide in patients who have smoking habits in chronic periodontitis patients than non-smokers which was supported now with the present study that levels have increased with smoking and in increasing disease⁶.

This study was performed to investigate the role of smoking as well to prove the influence of smoking on increasing periodontal disease by using a noninvasive tool as saliva to estimate the levels of NO as a potential bio marker for periodontal diseases.

CONCLUSION

To summarize, as the studies which have highlighted

on effects of smoking in the role of increasing diseases are lacking and as for the biochemical tests, this study utilized easy chair side diagnostic tools i.e, saliva, this study was indicated to focus on the relationship of the salivary levels of NO among smokers and non-smokers in chronic periodontitis patients. The results of our study indicated that there was a direct positive correlation among smokers which may throw light on the future research to evaluate the effects of tobacco on various diseases effectively.

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Detection of Vancomycin MIC by Agar Dilution in Clinical Isolates of MRSA Showing Reduced Zone of Inhibition by Disk Diffusion Method

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ABSTRACT

Introduction: *Staphylococcus aureus* is one of the most common causes of nosocomial infections, especially pneumonia, surgical site infections and blood stream infections and continues to be a major cause of community-acquired infections. Methicillin Resistant *Staphylococcus aureus* (MRSA) is resistant to the majority of antimicrobial agents available for clinical use, the glycopeptides vancomycin has been proposed as the drug of choice for treating such infections. The glycopeptide vancomycin was considered to be the best alternative for the treatment of multi drug resistant MRSA⁴. However, there are increasing numbers of reports indicating the emergence of vancomycin-resistant *S. Aureus*. Methicillin Resistant *Staphylococcus aureus* (MRSA) is resistant to the majority of antimicrobial agents available for clinical use, the glycopeptides vancomycin has been proposed as the drug of choice for treating such infections. **Materials and Method:** The present study was carried out to find out the presence of VISA and VRSA among 186 MRSA strains isolated from clinical specimens. Minimal inhibitory concentration (MIC) of vancomycin was determined by agar dilution method in Muller Hinton agar. **Results:** The MIC for 169 of 186 isolates (90.86%) for vancomycin was ≤ 2 mg/l indicating VSSA. 11(5.91%) isolates showed an MIC range between 4-8 mg/l, indicating VISA. Out of 11 VISA isolates the MIC for 6 (0.32%) isolates was in the range of >16 mg/l indicating that VRSA. **Conclusion:** The present study reveals the emergence of VRSA in tertiary care hospitals. Continuous efforts should be made to prevent the spread and emergence of glycopeptides resistance by early detection of the resistant strains and using proper infection control measures in hospital settings.

Keywords: *Staphylococcus aureus*, MRSA, MIC, VRSA, VISA,

INTRODUCTION

Staphylococcus aureus is considered as a major pathogen causing a diversity of infections including bacteremia, pneumonia, skin and soft tissue including osteoarticular infections. Since 1961, Methicillin Resistant *Staphylococci aureus* (MRSA) emerged

has one of the major and common cause of hospital acquired infection.^{1,2} The emergence of *Methicillin-resistant S. aureus* (MRSA) has posed a serious therapeutic challenge.³ The first case of MRSA was reported in 1961, these MRSA isolates are usually resistant to multiple classes of antimicrobial agents including macrolides, lincosamides, tetracyclines, fluoroquinolones and aminoglycosides and it has made the therapy of staphylococcal disease a global challenge. The glycopeptide vancomycin was considered to be the best alternative for the treatment of multi drug resistant MRSA.^{4, 5, 6, 7}

Since the emergence of vancomycin resistance in enterococci in 1988 and its *in vitro* demonstration that its resistance genes (*Van A and Van B*) are transmissible

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to other bacterial species including *S.aureus*. In 1997, the first case of vancomycin intermediate *S. aureus* (VISA) was reported in Japan, exhibiting two different resistance mechanisms. Initially vancomycin-intermediate *S. aureus* (VISA). From that time forward, more cases of VISA, and of vancomycin resistant *S. aureus* (VRSA). The resistance was believed to be due to the thickened cell wall, where many vancomycin molecules were trapped within the cell wall. The trapped molecules clog the peptidoglycan meshwork and finally form a physical barrier towards further incoming vancomycin molecules. The second, noted in United States in 2002 among *S. aureus*, was identical to the mechanism seen in vancomycin-resistant *Enterococcus*. Vancomycin-resistant *Enterococcus faecium* harbours the vanA operon, which contains five genes, *VanS*, -R, -H, -A and -X. But Tiwari and Sen have reported a VRSA which is van gene-negative. Subsequent isolation of VISA and VRSA isolates from other countries including Brazil, France, United Kingdom, Germany, India and Belgium has confirmed that the emergence of these strains is a global issue.^{7,8}

The aim of the present study was to determine the Minimum Inhibitory Concentration of vancomycin to *Staphylococcus aureus* strains isolated from different clinical specimens exhibiting reduced zone of inhibition with vancomycin(30 µg) by disc diffusion test and to determine the antibiogram of these isolates to different antimicrobial agents.

MATERIALS AND METHOD

Staphylococcus aureus isolates: A total of 186 consecutive isolates of *S.aureus* were obtained from clinical specimens (pus, urine, sputum, throat swabs, blood, C.S.F, catheter tip, and body fluids) were collected between January 2014 to April 2017 in the Department of Microbiology, Sri Lakshminarayana Institute of Medical Sciences, Pondicherry, were included in the study. All the isolates were identified as *S. aureus* by culture and biochemical tests which included test for clumping factor, slide and tube coagulase test and mannitol fermentation.

Antibiotic susceptibility testing: Antibiogram was determined by the Kirby–Bauer disc diffusion method using different antimicrobial agents e.g., Penicillin (10 units), Ampicillin (10µg), Amikacin (30µg), Cefotaxime (30µg), Cefoxitin (30µg), Clindamycin

(2µg), Ciprofloxacin (10µg), Erythromycin (15µg), Gentamicin (50µg), Linezolid (30 µg), Oxacillin (1µg), Vancomycin (30µg), (Hi-media).

S.aureus isolates showing reduced zone of inhibition to vancomycin (30µg) were subjected to MIC determination by agar dilution test. The diameter of zone of inhibition was compared with CLSI zone size interpretative chart. ATCC 29213 was used as reference strains for VSRA. The test strain was considered as sensitive if zone size was ≥ 15 mm and was considered as resistant if zone size was <15 mm.

Determination of MIC: Minimal inhibitory concentration (MIC) of vancomycin was determined by agar dilution method in Muller Hinton agar according to the guidelines of CLSI (9). Vancomycin gradient plates were prepared in Mueller-Hinton agar (Hi-media) concentration ranging from (0.5-256 mg/l). Compare 18-24 h old culture with 0.5 McFarland standard. Spot 0.01 ml of inoculum using a calibrated loop on to gradient plates. Plates were incubated at 37°C for 48 h. before assessing the visible growth, *S. aureus* ATCC 25923 was used as control. Before reading and interpreting the results, growth control and results with quality controls mains were checked. The lowest concentration that inhibited visible growth is the minimum inhibitory concentration (MIC) of vancomycin.

CLSI MIC interpretative criteria for vancomycin in *S.aureus* is, Vancomycin susceptible *S.aureus* (VSSA): $\leq 2\mu\text{g/mL}$, Vancomycin intermediate *S.aureus* (VISA) : 4-8µg/mL Vancomycin resistant *S.aureus* (VRSA) : $\geq 16\mu\text{g/mL}$.^{9,10}

RESULTS

Out of 186 clinical isolates, 127 (68.2%) patients were from male and 59 (31.7%) were female patients. The male to female ratio in the present study was 2:1. Majority of the patients were of age 51-60 years.

Out of the total 186 samples 329 samples were pus, 216 samples were urine, 26 blood samples, 23 sputum samples, 65 catheter tip samples, body fluids 59 sample, 7 from throat swabs, CSF sample 9, as shown in (**Table: 1**).

Table- 1: Characteristics of specimens

Characteristics	No.	Percentage
I. Age(yrs):		
1 -10	78	9.0%
11-20	87	10.0%
21-30	64	7.4%
31-40	89	10.3%
41-50	116	13.4%
51-60	157	18.3%
61-70	139	16.1%
71-80	131	15.1%
81-90	1	0.11%
II. Distribution of samples		
Pus	52	27.9%
Urine	64	34.4%
Sputum	23	12.3%
Blood	3	1.6%
Body fluids	22	11.8%
Catheter tips	16	8.6%
Throat swab	6	3.2%

The Minimum inhibitory concentration for 169 of 186 isolates (90.86%) for vancomycin was ≤ 2 mg/l indicating that all were sensitive to vancomycin (VSSA). 11(5.91%) isolates showed an MIC range between 4-8 mg/l, indicating vancomycin intermediate resistance (VISA). Out of 11 VISA isolates 7 were from urine, and 3 from pus and 1 from blood sample. For the remaining 6 (0.32%) isolates, the MIC was in the range of >16 mg/l indicating that these six isolates were vancomycin resistant (VRSA) (**Table: 2**). VRSA strains was isolated from urine, pus and blood samples. All these 6 isolates were sensitive to Linezolid, Imipenem and Clindamycin in common.

Table- 2: Distribution of MIC of Vancomycin of VRSA and VSSA among MRSA Isolates Detected By Disc Diffusion Method.

MIC (μ g/ml) of Vancomycin						
	<2mg/l	4 mg/l	8mg/l	16mg/l	32mg/l	Total
VSSA	169 (90.86%)	-	-	-	-	169 (90.86%)
VISA	-	7(3.76%)	4(2.15%)	0	0	11(5.91%)
VRSA	-	-	-	4(2.15%)	2(1.07%)	6(0.32%)

Antibiotic Susceptibility Pattern: Antibiogram of S.aureus showed highest resistance to Ampicillin 92%, followed by, VRSA isolates were susceptible to Tetracyclin, Erythromycin, Gentamicin, Cotrimoxazole and Linezolid. All the six Vancomycin Resistant

Staphylococcus aureus were sensitive to Linezolid and Imipenem in common.

DISCUSSION

Infections caused by methicillin-resistant *S. aureus*

have been associated with high morbidity and mortality rates. Vancomycin is the main antimicrobial agent available to treat serious infections with MRSA but unfortunately, decrease in vancomycin susceptibility of *S. aureus* and isolation of vancomycin-intermediate and resistant *S. aureus* have recently been reported from many countries. Different methods available to determine the vancomycin MIC to *S. aureus* vary in their sensitivity and specificity. Broth microdilution (BMD) recommended by the CLSI is considered to be the gold standard. Agar dilution method is also recommended.^{5,12}

Among the 186 isolates 127 (68.2%) were from male patients and 59 (31.7%) were female patients. Male to female ratio was 2:1. The high frequency of infections among males could be due to their outdoor occupation, more prone for injuries, smoking and due to exposure to contaminated environment. A similar findings has been reported by T.N.Ravi et al., who has reported a male to female ratio of 2:1.¹³

Majority of cases are between 51-60 years, this may be because of waning immunity. The MIC value of 186 isolates varied from 0.5-32 µg/mL. 169 strains had MIC between 0.5-2 µg/mL (VSSA), 11 strains had MIC between 4-8 µg/mL (VISA) and 6 strains had MIC of 32 µg/mL (VRSA).

In our study 169 (90.86%) out of 186 showed susceptibility at < 2mg/l, by agar dilution, indicating sensitive to vancomycin. A study by Jyothi Kumari et al from manipal reported almost similar findings 94/98 (95.9%) were vancomycin susceptible (MIC ≤2 µg/ml) by agar dilution method.¹²

We reported 11 VISA and 6 VRSA in our study, similarly A study by Venubabu Thati et al from south India studied 358 isolates showing reduced zone of inhibition. They reported and seven isolates as VRSA vancomycin MIC in the range of 16-64 mg/L.⁸

CONCLUSION

The present study reveals the emergence of VRSA in tertiary care hospitals. Continuous efforts should be made to prevent the spread and emergence of glycopeptides resistance by early detection of the resistant strains and using proper infection control measures in hospital settings. Hospital infection control committee should be formed in every tertiary health care centres for immediate response from the concerned

authorities to check further emergence and spreading of these notorious VRSA strains.

Ethical Clearance: Taken from SriLakshminarayana Institute of Medical Sciences, Pondicherry. Institutional Ethics committee (Human Studies) Ref.No.IEC/C-P/50/2014.

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Effect of Intravenous Dexmedetomidine on Spinal Anaesthesia with Hyperbaric Bupivacaine in Lower Limb Orthopedic Surgeries - A Randomized Controlled Study

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ABSTRACT

Introduction: Alpha -2 adrenoceptor agonists such as Clonidine, dexmedetomidine both have analgesic and sedative properties when used intravenous. Unsatisfactory regional anesthesia necessitates supplementary intravenous analgesia and deep sedation to relieve anxiety

AIM: To observe the effect of intravenous dexmedetomidine in spinal anaesthesia with respect to sensory block, motor block, depth of sedation and the time to first analgesic requirement in lower limb orthopedic surgeries.

Materials and Method: 60 consenting patients undergoing lower limb orthopaedic surgeries were selected. Dexmedetomidine group (D) received a loading dose of 0.5 mcg/kg dexmedetomidine over 10 mins before spinal anaesthesia followed by an infusion of 0.5 mcg /kg/hr till the end of surgery. Control group 'C' received similar volume of normal saline infusion. The parameters observed were the highest sensory level achieved, time to two segment regression, duration of motor block and time to first requirement of analgesia. Ramsay score was used to assess sedation and hemodynamic parameters noted.

Results: The maximum sensory level achieved was higher in group 'D' than in group 'C'. The time to two segment regression, The duration of motor block and The time to first requirement of analgesia was prolonged in dexmedetomidine then in control group. Also the sedation score were higher in group 'D'.

Conclusion: I.V. Dexmedetomidine as an adjuvant in spinal anaesthesia prolongs the duration of both sensory and motor blockade and also delays the time to rescue analgesia, thus eliminating the need to use multiple drugs for sedation and analgesia.

Keywords: α -2 Adenoreceptor, Dexmedetomidine, Spinal anaesthesia, Ramsay sedation score, analgesia.

INTRODUCTION

Spinal anesthesia has the advantage of avoiding the difficulties in airway management and also is superior to general anesthesia in post anesthesia pain relief. But failures in regional anesthesia is attributable more to inadequate sedation and relief of anxiety than technical

faults. Adequate sedation will not only relieve the anxiety of the patient but also improves physiological and psychological stress and the satisfaction of both the surgeon and patient.^[1]

Several additives such as opioids, alpha agonists among others have been used with local anaesthetics to prolong the duration of spinal anaesthesia. Alpha -2 adrenoceptor agonists such as clonidine have been studied as adjuvants to spinal anaesthesia with promising results. They have both analgesic and sedative properties when used as an adjuvant to regional anaesthesia.^[2-4]

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Dexmedetomidine is a more selective alpha-2 adrenoceptor agonist with sedative and analgesic properties. The analgesic action of dexmedetomidine has been found to be exerted both at spinal and supraspinal levels.⁵ It has been found to reduce the anaesthetic requirements and have opioid sparing properties upto 90% when used as an adjunct to general anesthesia [6-8]. Dexmedetomidine when used intravenously as an adjuvant to spinal anesthesia with prilocaine or ropivacaine has also been reported to prolong the duration of sensory and motor blockade.^[9-10]

The primary aim of our study was to assess the duration of spinal anesthesia (sensory and motor blockade). In this study we are hypothesizing that intravenous dexmedetomidine as an adjuvant to spinal anesthesia could provide prolonged post-operative pain relief.

MATERIALS AND METHOD

A randomized double blinded control study was conducted in 60 consenting patients undergoing lower limb orthopedic surgeries. After approval of institutional ethics committee 60 patients were randomly allocated to study or control group using computer-generated random list. Patients of ASA physical status I and II, aged between 18 and 75 years were included in the study. Patients with hypersensitivity to local anesthetics, coagulation disorders, significant co-existing cardiovascular or hepatorenal diseases, pre-existing neurological diseases and local infection at the puncture site were excluded from the study.

A written and informed consent was taken from all patients. A detailed history and thorough physical examination was done in all consenting patients. The patients were explained about the methods for assessing the sensory and motor blockade. Inside the operating room, intravenous line was secured with appropriate gauge cannula and ringer's lactate infusion started prior to the commencement of the procedure at the rate of 10ml/kg body weight. Standard monitors were connected namely electrocardiography, pulse oximeter and non – invasive blood pressure and baseline vitals were noted.

The study group 'D' received a loading dose of intravenous dexmedetomidine of 0.5 mcg/kg diluted to 20ml in normal saline over 10 minutes. The control group 'C' received same volume of normal saline. Immediately

after the loading dose the patient was positioned in either lateral or sitting position. Subarachnoid block was performed at L3- L4 level. After skin infiltration with 2% lignocaine, 14mg (2.8 ml) of 0.5% heavy bupivacaine was injected intrathecally through 25 gauge spinal needle. Then the patient was positioned supine on the operating table. After subarachnoid block the patients in group 'D' received dexmedetomidine infusion at 0.5 mcg/kg/hour till the end of surgery. The patients in group 'C' received normal saline infusion at the same rate till the end of surgery.

The anesthesiologist marking the sensory level was blinded to drug given intravenously. Pulse rate, blood pressure and oxygen saturation was recorded every 2 minutes for first 10 minutes and every 5 minutes for next 30 minutes and every 10 minutes for next 40 minutes and at end of procedure. Hypotension (defined as systolic blood pressure <90 mm Hg or 20 % fall in blood pressure from baseline or mean arterial pressure lower than 60 mm hg) was treated with additional ringer lactate and bolus dose of intravenous mephentermine 6mg. Bradycardia defined as heart rate less than 50 per minute was treated as per ACLS algorithm. Nausea or vomiting was treated with antiemetics intravenous ondansetron 4 mg and hypoxia defined as decrease in SpO₂ to 90% was treated with supplemental oxygen by mask.

Assessment of sensory blockade was by loss of temperature sensation to cold using a cotton swab soaked in spirit. Sensory level was checked every 2 minutes and the level noted at 20 minutes after the block. Highest level of sensory blockade after the drug given, time for two dermatome regression (duration) was noted. Assessment of motor blockade tested by Bromage scale and degree of motor blockade and duration of motor blockade were noted.

Motor block in the lower limb was assessed by using a modified Bromage scale.^[11] Assessment of sedation was done using Ramsay sedation score^[12]

Score was evaluated every 10 minutes for 30 minutes after the drug is given and every 15 minutes for next 30 minutes and at the end of procedure. Excessive sedation was defined as a score greater than 4/6. All the above tests were performed while monitoring and recording hemodynamic status of the patient.

Pain score was done using visual analogue scale in postoperative period. Patients were educated pre-

operatively on the usage of Visual Analogue Scale (VAS) and reminded in the postoperative period to alert the investigator when the VAS is greater than 3. First dose of analgesia was given when VAS score was greater than 3. The choice of the drug was deemed appropriate by the treating consultant. Time required for the first dose was noted. The time required was calculated from the time of administration of subarachnoid block to the first complaint of pain.

Statistical analysis; analysis was performed using SPSS 17 software. Student’s unpaired T-test was used for analysis of mean age, height and weight distribution, duration of surgery, duration of motor blockade, time to 2 segment regression, rescue analgesic time, Ramsay sedation score. Fisher’s exact test was used for gender, level after 20 minutes, highest sensory level. P value <0.05 was considered statistically significant.

OBSERVATIONS AND RESULTS

All the demographic data were comparable in both the groups [Table 1]. Using fisher’s exact test as the statistical comparison between the two groups it was found p value=0 .0001. It signifies level after 20 minutes of spinal block in the study group to be highly significant with 43.3% of the patients achieving T8 level. Whereas in control group 46.7% of the patients achieved only

T9 level [Table 2]. Highest Sensory level achieved was very highly significant in study group compared to that of control group based on statistical analysis (p value< 0.001). 43.3% of the patients in the study group achieved T6 level and 40% of the patients achieved T7 level whereas in the control group 70% of the patients achieved T9 level.

Mean duration of motor blockade was significantly higher in study group 191.8 mins than in control group where the mean duration was 160.73 mins. [Table 3]. Applying student unpaired t test, p value was found to be <0.0001 implying time to two segment regression was very highly significant in study group. The mean time was 157.9 mins in the study group compared to 111.0 mins in the control group. [Table 3]. Ramsay sedation score intraoperatively was 4.033 mean in the study group significantly higher than the control group where the mean was 2.033, [Table 3]. Mean time for analgesic dose was found to be higher in study group and p value < .0001 implying time for first requirement of analgesia was significantly prolonged in study group. Three patients in study group were found to have bradycardia. Using fisher’s extract test it was found that p value=.119 implying statistically not significant. [Table 4]. Five patients in study group had hypotension which was significant with p value of 0.026 using fisher’s extract test. [Table 4]

Table 1: Demographic Data.

	Study group Mean ± SD	Control group Mean ± SD	p value
Age(yrs)	46.83±9.61	48.83±9.53	0.42, NS
Weight(kg)	61.53±5.28	64.40±5.37	0.062, NS
Height(cms)	162.66±6.25	162.46±5.96	0.90, NS

SD-Standard deviation, NS-not significant

Table 2: Level of Sensory Block after 20 minutes of spinal Anesthesia.

		Study group N(%)	Control group N(%)	Total
Level after 20 minutes of spinal block	T ₇	8(26.7%)	0(0%)	8(13.3%)
	T ₈	13(43.3%)	3(10%)	16(26.7%)
	T ₉	6(20%)	14(46.7%)	20(33.3%)
	T ₁₀	3(10%)	11(36.7%)	14(23.3%)
	T ₁₁	0(0%)	2(6.7%)	2(3.3%)
Total		30(100%)	30(100%)	60(100%)

N- Number of Participants

Table 3: Effect of dexmedetomidine, on Duration of motor block, time to two segment regression and Sedation

	Study group Mean ± SD	Control group Mean ± SD	p value
Duration of motor block (min)	191.8 ± 10.53	160.73 ± 11.87	<0.001, HS
Time to two segment regression (min)	157.96±11.64	111.50±8.48	<0.001, HS
Ramsay sedation score	4.033±0.183	2.033±0.183	<0.001, HS

SD- Standard deviation Fishers exact test p= .0001, HS- Highly Significant.

Table 4: Incidence of Bradycardia, Hypotension

		study group N (%)	control group N (%)	Total N (%)
Bradycardia	A	27(83.3%)	30(100%)	57(95%)
	P	3(10%)	0(0%)	3(5%)
Hypotension	A	25(83.3%)	30(100%)	55(91.7%)
	P	5(16.7%)	0(0%)	5(8.3%)

DISCUSSION

Dexmedetomidine has been used as an intravenous adjunct to spinal anesthesia in this study to observe the effect on the characteristics of spinal anesthesia.

All the patients in this study were comparable with respect to demographic profiles. The sensory level after 20 minutes of spinal block and the maximum sensory level achieved in the study group was found to be higher and statistically significant. Similar results were observed by Kaya *et al*¹³ where the highest sensory level achieved was more in dexmedetomidine group. Harsoor *et al*¹⁴ found that dexmedetomidine hastens the onset of sensory blockade but no statistically significant difference in the maximum sensory level achieved. The dose of bupivacaine used in our study was higher (14mg) compared to 12.5mg of bupivacaine used by Harsoor *et al*¹⁴. Dexmedetomidine's actions at alpha-2 receptors in the spinal cord by inhibiting nociceptive impulse transmission both pre-synaptically and post synaptically might probably be the reason for the higher sensory level achieved in our study.

Single loading dose of dexmedetomidine at 1 mcg/kg as an adjunct to spinal anesthesia has been found to prolong the time for two segment regression by Hong JY *et al*.¹⁵ Tekin *et al*⁹ found the two segment regression time to be significantly prolonged in the dexmedetomidine group (loading dose of 1mcg/kg followed by infusion at 0.4mcg/kg/hr). Our study also corroborates the findings of previous studies in that the mean time for two segment regression was 157.9mins as compared to 111.5mins of control group.

Kaya *et al*¹³ used a single loading dose of 1mcg/kg of dexmedetomidine and did not find any significant increase in motor blockade in their study. Similarly Lugo *et al*¹⁶ did not report any effect on motor blockade though they had used dexmedetomidine bolus 1mcg/kg followed by infusion at 0.5mcg/kg/hr. The mean duration of motor blockade in our study group (191.8mins) was significantly higher than control group and these findings correlate Well with those of Harsoor *et al*¹⁴ and Al Mustafa *et al*¹⁷. The prolongation of motor blockade observed in our study might be attributed to the continuous infusion of dexmedetomidine throughout the duration of surgery.

In our study, the sedation scores were significantly higher in the study group (mean 4.03) compared to control group (mean 2.03). But there was no respiratory depression observed in any patient in our study. Tekin et al⁹ have observed that deeper sedation was induced in study group than control group, indicating that dexmedetomidine may reduce the need for extra sedative agents. The sedative and hypnotic effects of dexmedetomidine may be due to its inhibition of norepinephrine release in locus ceruleus.

The mean time for rescue analgesia in our study in dexmedetomidine group was 241.0 mins whereas in control group the mean was 129.4 mins. This shows dexmedetomidine also provides sufficient analgesia in postoperative patients, similar results also seen by Kaya et al¹³ concluded that the addition of intravenous dexmedetomidine before spinal block provided similar pain relief with delayed-onset of postoperative pain and significantly less analgesic requirements. This may be attributed to the fact that the stimulation of the alpha2-adrenoceptors at Locus Ceruleus, which is the site of origin for the descending medullospinal noradrenergic pathway, known to be an important modulator of nociceptive neurotransmission, terminates the propagation of pain signals leading to analgesia¹⁸.

Postsynaptic activation of alpha-2 adrenoceptors in the CNS results in decrease in sympathetic activity leading to hypotension and bradycardia¹⁸. In our study 5 patients in the study group had hypotension accounting to 16.7% incidence. This was found to be statistically significant with p value 0.026. Whereas only 3 patients in the study group had bradycardia with incidence of 10% and this was not statistically significant (p value 0.119). Elcicek et al¹⁰ found the incidence of bradycardia in study group to be 30% and the mean arterial pressures were significantly lower in group I (study) than group II. Kaya et al¹³ observed no biphasic change or significant cardiovascular variability in their study.

CONCLUSION

Dexmedetomidine when used as an intravenous 0.5mcg/kg loading dose followed by 0.5mcg/kg/hr. intravenous infusion in spinal anesthesia prolongs the duration of both sensory and motor block, provides sufficient sedation and also delays the time to rescue analgesia thus eliminates the need to use multiple drugs for sedation and analgesia

Ethical Clearance: Taken From Institutional Ethical Committee

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Conflict of Interest: Nil

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Evaluation of the Effect of Menopause on Saliva and Dry Mouth- A Cross Sectional Study

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ABSTRACT

Objective: This study was performed to evaluate the effect of menopause on saliva and oral health. Salivary flow rate and pH of stimulated whole saliva, oral sign of dryness were determined in regularly menstruating and postmenopausal women who are not on hormone replacement treatment.

Study design : A cross-sectional study design was undertaken with a sample size of 60 subjects from whom Paraffin stimulated whole salivary samples were collected to record salivary flow rate and pH. sixty subjects are divided equally into two groups:-GROUP A The control group included 30 regularly menstruating healthy women (premenopausal women) (age range: 25-40 years).GROUP B The study group included 30 post menopausal women (age range: 45-52years).Immediately after collection, pH was determined by dipping pH test paper directly into the sample of oral fluid. Oral sign of dryness was recorded respectively.

Statistical Analysis and Results: Salivary flow rate and pH values of the postmenopausal women were significantly lower than those of the control group ($p=0.0001$). Clinical Sign of oral dryness is significantly higher among the post menopausal women than that of the control group ($p\leq 0.0001$). In our study we found salivary flow rate significantly lower in the post-menopausal women in comparison with the menstruating women and it was also observed that the salivary pH of the post-menopausal group was significantly lower than that of the control group

Conclusion: Saliva being an easy diagnostic tool would serve as a diagnostic tool of hypo-salivation which is the most commonest oral changes during menopause.

Keywords: menopause, saliva, flow rate, dryness, hypo salivation.

INTRODUCTION

DEFINITION: Natural menopause is defined as a spontaneous cessation of natural menstruation for 12 consecutive months at 45-55 years of age (mean 50-52) ¹. Formally, menopause is the moment of the final menstruation, directly preceded by the permanent cessation of ovarian follicular function ^{2,3}. The average age of a woman at menopause is 51 years ⁴.

Menopause results from reduced secretion of the ovarian estrogen, which takes place when ovarian follicles are depleted through genetically controlled apoptosis of the ovarian cells. During the menopausal transition the level of inhibin B originating from the follicles decreases and the levels of pituitary follicle-stimulating hormone (FSH) and luteinizing hormone (LH) increase. Nevertheless, hypoestrogenism is the ultimate outcome of menopause. With increasing age, the levels of FSH and LH continue to rise for several

years, but in later menopause these levels decrease ⁵.

WHO has defined three age stages of midlife age for women (Research on the menopause. WHO 1997)⁶: “1) Menopause is the year of the final physiologic menstrual period retrospectively designated as 1 year without flow (unrelated to pregnancy or therapy) in women aged ≥ 45 years.

2) Premenopause begins at ages 35 to 39 years; during this stage, decreased fertility and fecundity appear as the first manifestations of ovarian follicle depletion and dysfunction, despite the absence of menstrual changes.

3) Perimenopause includes the period of years immediately before the menopause and the first year after the menopause.”

The term postmenopause is defined as the prolonged period of hypergonadotrophic hypogonadism after menopause. Postmenopause is further divided into two different stages: early postmenopause, when estrogen is swiftly declining, and late postmenopause, when prolonged hypoestrogenism exists ⁷.

The principal peri- and postmenopausal oral symptoms are dry mouth, sensation of painful mouth (PM) due to various causes and less frequently burning mouth syndrome (BMS). Other symptoms which are commonly linked to the climacteric stage are mood swings, urogenital dryness, tiredness, joint and muscle pains, dizziness, irritability and insomnia^{8,9}.

The sensation of Dry Mouth or xerostomia is defined as a subjective sensation of dryness in the mouth ¹⁰. Xerostomia is a major complaint for many elderly individuals and Women seem to suffer from xerostomia or hyposalivation more often than men¹¹. However, there is no convincing evidence that age alone is a significant cause of xerostomia. The prevalence of xerostomia is difficult to determine. According to a review article by ¹², the prevalence of self-reported sensations of DM (dry mouth) vary between 0.9% and 64.8%. Xerostomia has various causes, and this symptom is often associated with an unpleasant feeling and other symptoms in the mouth and throat ¹³. Hence this study was performed to evaluate the effects of menopause on salivary flow rate and dryness.

DESIGN :

The protocol was approved by the ethics committee of University and all participants gave informed consent before participation in the study.

A cross-sectional study design was undertaken with a sample size of 60 subjects from whom stimulated whole salivary samples were collected to record salivary flow rate. Salivary pH were measured electrometrically. Oral sign of dryness was recorded respectively. Sixty subjects are divided equally into two groups:-

GROUP A The control group included 30 regularly menstruating healthy women (premenopausal women) (age range: 25-40 years).

GROUP B The study group included 30 post menopausal women (age range: 45-55 years).

CRITERIA:

Women with normal chewing ability and who are not under hormonal replacement therapy are included. In study Women without the history of early menopause are included in specific. Patient under systemic medication, who is already under treatment of xerostomia and other mucosal diseases and women consuming any forms of tobacco and any other history of adverse habits are excluded from the study. This study aimed to determine the evidence of salivary dryness among premenopausal and post-menopausal women with the estimation of salivary flow rate and PH with the complaints of oral dryness.

SALIVA COLLECTION

Paraffin Stimulated whole-salivary samples were collected in a quiet room between 9 AM and 12 PM, and at least 2 hours after the last intake of food or drink. Salivary samples of the control group were collected within the first three days of menstruation Stimulated salivary samples were obtained by allowing the Participants to chew a piece of paraffin of standardized size. The flow rate was measured as ml/min. Stimulated whole-saliva samples were collected into a preweighed and dry plastic tube. By subtracting the empty tube weight from the saliva-filled one, saliva sample weight was determined to calculate the salivary flow rate. The flow rate was calculated in grams per minute, which is almost equivalent to milliliters per minute¹⁴. Stimulated saliva flow rates in healthy individuals have found the

average value for whole saliva to be about 1.0 - 3.0 ml/min. Stimulated whole saliva flow rates of < 0.7 ml/min is indicated as salivary hypo function .

ASSESSMENT OF THE PH

After assessing the consistency the pH of the saliva was determined by dipping the pH test strip provided in the kit in to the sample of resting saliva collected for

10 seconds and then the color of the strip was checked with the testing chart provided with the saliva check kit. Accordingly the pH of the saliva was determined and given highly acidic, moderately acidic or healthy saliva comparing with the chart and the color of test strip, if intermediate color was seen in the strip then a higher value was assigned

Table 1. The xerostomia inventory (XI)¹⁵

I sip liquids to help swallow food.
My mouth feels dry when eating a meal.
I get up at night to drink.
My mouth feels dry.
I have difficulty in eating dry foods.
I suck sweets or cough lozenges to relieve dry mouth.
I have difficulty swallowing certain foods.
The skin of my face feels dry.
My eyes feel dry.
My lips feel dry. The inside of my nose feels dry.

Response options: never (scoring 1), hardly (2), occasionally

TABLE II: Comparison of Salivary flow between two groups

SALIVARY FLOW RATE	Group I		Group II	
	NO	%	NO	%
4ml	0	0.0	13	65%
5ml	0	0.0	7	35%
>5ml	20	100.0	0	0.0
Total	20	100.0	20	100%
Inference	Incidence of Salivary flow >5.0 ml significantly associated with Group I while <5 ml is significantly associated with Group II with p<0.001**			

TABLE III: Comparison of Salivary PH between two groups

SALIVARY pH	Group I		Group II	
	NO	%	NO	%
<7.0	4	20%	20	100%
7.0	9	45%	0	0
>7.0	7	35%	0	0
Total	20	100.0	20	100%
Inference	Incidence of Salivary pH <7.0 Is predominant significantly in Group II than group I with p<0.0001**			

From the obtained clinical Questionnaire, the data collected has high statistical significant of ($p \leq 0.0001$) with incidence of salivary hyposalivation among post menopausal women than pre menopausal women. Spearman correlation was performed to see if any relationship existed between severity of OD feeling (XI score) and salivary flow rate. There was significant positive correlation between XI score and saliva flow rate ($r = 0.468, p = 0.039$).

DISCUSSIONS

Different phases of a woman's life: Puberty, menses, pregnancy, and menopause have varied influence on her oral health. During the menopause, women go through biological and endocrine changes, particularly in their sex steroid hormone production, affecting their health. Because the oral mucosa contains estrogen receptors, variations in hormone levels directly affect the oral cavity. A few oral conditions and or diseases are seen more frequently during post menopausal years¹⁶. Estrogen can affect oral mucosa directly or through neural mechanism thus altering the periodontal health in menopausal women¹⁷. The oral problems may include a paucity of saliva leading to xerostomia, burning mouth syndrome, increase in incidence of dental caries, dysesthesia, taste alterations, atrophic gingivitis, periodontitis, and osteoporotic jaws¹⁸.

Saliva acts as a defense mechanism for prevention of caries and reduced salivary flow can encourage oral microbial colonization thus affecting the dental health¹⁹. Salivary glands contain sex hormone receptors and these hormones have been estimated in the saliva²⁰.

In the present study, the salivary flow rate, pH, were evaluated in pre-menopausal, post-menopausal and also comparing the clinical correlation of xerostomia with the flow rate. As saliva is essential for the maintenance of oral health and the number of women receiving HRT is increasing, we excluded the patients under hormonal replacement therapy.

Studies have shown the average age of women attaining menopause being 50 years though it also states that women may attain early menopause in certain conditions where the women are thin in stature and women who smoke attain early menopause than their counter parts, also racial and geographic variations are seen. Hence women who are under smoking habit and also women who revealed history of early menopause are excluded from our present study. In our study we

came across women who had attained menopause in the range of 45-52 years.

Minicucci et al. studied salivary flow rates in menopause and compared them with those of

premenopausal women. Salivary flow was evaluated by a chemical absorption stimulation test. Each subject provided three saliva samples: S1, nonstimulated saliva; S2, saliva initially stimulated with two drops of citric acid 2.5%; and S3, saliva super stimulated with two drops of citric acid 2.5% every 30 s for 2 min. Salivary flow was lower in menopausal group only in S2 and S3. Reduction in salivary flow rate can be responsible for xerostomia.²¹

During the study we also observed that few individuals also had complaints of oral burning sensation, halitosis, and some with complaints of decreased taste acuity which has been also discussed in the study done by studies^(21,23,24).

In our study it was also observed that salivary pH of the postmenopausal group is statistically significantly lower than that of the control group. However, the study done by Yalçın²⁵ disagrees with the findings, which was performed using unstimulated saliva. Studies have demonstrated alterations in various salivary components, such as mucin, IgA, phosphates, alterations in salivary pH and electrical resistance have also been reported²⁵. Our study showed significant reduction of salivary pH among post menopausal women. The changes may result from hormonal alterations taking place in menopausal women, altered sympathetic output related to stress, or from alterations in interactions between the cranial nerves serving taste and pain sensation²⁶.

Women with dry mouth usually are referred to dental personnel. In recent years, dental personnel have made significant contributions to the diagnosis and management of medical disorders. In future years, they will probably be included in the management of various systemic diseases. Because many women visit a dental office more often than a medical office²⁷.

CONCLUSION

It has been observed that life expectancy of women has increased significantly during the last decade, and most women spend one third of their lives after menopause. Our result suggests that there is a marked decrease in the salivary pH and flow rate in postmenopausal women which in turn leads to many

increased oral complaints of which oral dryness is the commonest finding.

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Review on Type-2 Fuzzy in Biomedicine

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ABSTRACT

Application of physiological and biological ethics to clinical practice is called medical science or Biomedicine. This branch includes biochemistry, molecular biology, biological engineering neuro science, immunology, pathology and other life science applied to medicine. In this paper, a review has been done for creating a new path and motivation in this field for the new researchers as an application of fuzzy logic in life science areas. Since medical field has uncertainty in nature this topic will be very useful for the future research.

Keywords : Type-2 Fuzzy, Biological Systems, Biomedicine, Image Processing, Chemical Engineering, Fuzzy Logic Controller

INTRODUCTION

Biological systems are generally too complicated as they are so complex since developing automated systems are not truthful effort always. An explicit model for biological systems may not prevail or may be very difficult to design. Since human minds perform from rough data, condensed relevant information and carrying out crisp solutions, fuzzy logic may be considered as an optimal tool¹. Logic and mechanism of Fuzzy logic approach does not have unperturbed boundaries such as human logic and it is not like sure or binary logic. Fuzzy logic control system is one of the most common application with this concept. This system do not demand complete knowledge based model like PID control system. With the knowledge of medical experts and their experience with the imprecise data Fuzzy systems can be designed^{2,3}.

This model has been used for an automatic control of drug delivery in surgical environment. There is a difficulty of identifying abdominal organs in anticipating the structure of the organ in clinical training, teaching, diagnosis and retrieval of medical image. Fuzzy logic inference system can conquer these problems with the

use of automatic identification from a set of slices of CT image. A precise central segmentation may be useful in analyzing microscope images for detecting pathology. This can be done with the use of semi-supervised training fuzzy logic engine^{4, 5, 6}.

Adaptive nonlinear predictive control can be used to control glucose concentration during fasting subject to type-1 diabetes. Where the controller employs a section model which represents the gluco supervisory system and cover sub models to represent digestion of vaccines and medication regulated short-coming insulin Lispro and interior absorption with the use of Bayesian parameter calculation for determining time varying parameter changes⁷.

Diagnosis of disease associates various levels of imprecision and uncertainty which is essential to medicine. In general precise description of disease individuals uses linguistic terms which is also imprecise and vague and hence fuzzy logic can be used for an optimal result. Segmentation of medical image is a complicated and challenging task due to inherent nature of images. For example brain has a specific complex structure and its exact segmentation is very crucial for identifying edema, tumors and dangerous tissues for applying proper therapy. For the early detection of unusual changes in organs and tissues can be diagnosed by the diagnostic image technique called Magnetic

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Resonance Imaging (MRI)^{8,9}.

Control algorithm combines the expert's knowledge about the treatment of any disease can be treated by using Mamdani-Type fuzzy logic controllers to control the blood glucose level. Fuzzy logic is used to handle uncertainties using natural language and hence it is an approach of qualitative computation. Since impreciseness exists in the field of medicine and huge data in bioinformatics, fuzzy logic is recommended to handle the situation for getting a desired solution. Bioinformatics is also a knowledge based computer analysis of biological data and contains the details stored in the genetic code and empirical results from different sources. Here also impreciseness will occur and hence fuzzy logic will be very useful^{10, 11}.

MR images have a good comparison resolution for various tissues and have an advantage of automatic tomography for brain studies. Thus majority of research concerns about MR images. Threshold determination is very difficult for brain images as the allocation of tissue intensities are complex and hence logic is used for brain segmentation^{9-15, 23-30}.

Even in chemical engineering fuzzy logic plays a vital role to handle the system uncertainties while the process of changing chemicals into valuable forms. In all the above cases the role of fuzzy logic has been explained. While getting more uncertainties in those mentioned cases, type-1 fuzzy cannot give the appropriate result as the consequences may have uncertainties^{16-22, 31-33}. At this junction, Type-2 fuzzy logic can be used for its adaptivity and stability. In the following chapters, literature study and the role fuzzy in different field have been reviewed.

Fundamental Concepts

Role of Fuzzy Logic

In Medicine¹

The difficulty of medical process makes conventional quantitative methods of analysis incorrect. Incomplete information, impreciseness and conflict nature are natural. In the field of medicine impreciseness can be classified by the following sources.

- Patient information
- Patient's medical history which is usually highly subjective and uncertain

- Uncertainty of the physical examination where the boundary between normal and pathological condition is uncertain
- Mistakes in the laboratory results due to patient's lack of support.
- Incomplete information given by the patient like understated/exaggerated

Fuzzy logic can be applied in the following experiments:

- To analyze the reaction to the treatment for alcohol dependence
- To evaluate diabetic neuropathy and early symptoms
- To measure the volume of the brain tissue
- To enhance decision making in radiation therapy
- To stabilize hypertension during unconscious stage due to anesthesia
- To diagnose breast cancer
- To estimate significant estimates of usage of drug
- Also fuzzy logic plays an essential role in clinical support systems.

In Bioinformatics¹¹

Bioinformatics is an automatic analysis of biological data which includes the information saved in genetic code and results of the experiment from different sources, scientific literature and patient statistics. This branch incorporates computer science, principles of chemical and physical thing, biology, methodologies of modelling huge sets of biological data, cloning, training approach of bio-automatic systems etc. Molecular biology is presently employs project of uncertain data collection. DNA microarrays are the high methodologies with rapidly huge amount of data and it is difficult to apply traditional approaches whereas fuzzy logic deals this problem very easily as it handle multiple membership functions.

In Chemical Engineering²²

This branch handles with the physical science and life science application such as biochemistry, biology

and micro biology. Naturally uncertainty occurs in the mentioned areas and obviously fuzzy logic can handle the impreciseness and can produce the desired result.

In Image processing³³

In Image segmentation, Edge detection, feature extraction fuzzy logic plays a vital role whereas Type-2 fuzzy sets can deal with more uncertainties as there is a chance of having the inference may be uncertain.

Review on application of Fuzzy Logic in Bio Medicine

The authors, analyzed the usage of fuzzy logic control and auditing in medical sciences with the possible future diffusion¹. Presented about fuzzy pharmacology with theoretical and applications aspect². Proposed a combined method for automatic diagnosing abdominal organs from a sequence of CT image portions³. Used Bayesian parameter calculation to decide model parameters where there is a fluctuation in time⁴.

Proposed a novel methodology for filtering framework called two-component adaptive vector filters which enables processing cDNA micro array images⁵. Have done a segmentation on cell nuclei using fuzzy logic engine with fuzzy rules under semi supervised training⁶. Used fuzzy c-means clustering for image segmentation as MR images always have noise due to performance of the operator, environment and equipment and analyzed the robustness of the proposed method⁷. Classified multi class cancer using fuzzy support vector machine and binary decision tree with the choice of gene⁸.

Extracted generic feature using fuzzy c-means clustering⁹. Presented a general view of the applications of fuzzy logic in medicine and bioinformatics and presented geometrical perception of fuzzy sets in a fuzzy hypercube¹⁰. Presented a control algorithm subject to type-1 diabetes mellitus and this algorithm connect the expert's knowledge of the treatment for the disease¹¹. Presented classification system using technique of pattern recognition with ARTMAP classifiers to produce a numerical vector representation of a sequence of protein and finding the nature of the sequence into number of given families. And they proved that the proposed system able to classify the protein sequence with an accuracy of 93%¹².

Applied interval type-2 fuzzy logic system to help radiologists to identify micro categorization in mammograms for Brest cancer¹³. Have done an electron tomographic data sets segmentation using the principles of fuzzy set theory¹⁴. Surveyed about the process of fuzzy expert systems in medical area such as the risk of coronary heart disease, prostate cancer, degree of child anemia, determining the level of anemia with iron deficiency, examination of periodontal dental disease, decision on drug dose etc which will helpful for the physicians¹⁵.

Discussed physical fuzzy confidence curves for the natural unusual activity of falling and used modelling and monitoring human activity¹⁶. Presented a way of diagnosing thyroid cancer disease using fuzzy-neural networks¹⁷. Investigated more details on the application of fuzzy logic in chemical engineering¹⁸. Applied a system of telecardiology to help practitioner doctor when clinical data of patient suspect heart failures¹⁹. Developed a diagnostic alarm for clinical purpose based on fuzzy logic to detect diagnostic events when anesthesia is given²⁰.

Presented cost effective method for feature selection for diabetes diagnosis using genetic algorithms and fuzzy logic²¹. Used fuzzy entropy measure along with similarity classifier for feature selection²². Presented a novel approach by combined data mining and fuzzy logic for heart disease diagnosis²³. Used weighted fuzzy rules to predict the risk level of heart disease as a clinical decision support system²⁴.

Used fuzzy c-means algorithm for image segmentation on MR Brain image²⁵. Presented an automatic method based on fuzzy connectedness for extracting an object by segmenting jaw tissues and process of morphology for various views of pseudo orthopantomographic²⁶. Discussed the importance of fuzzy logic in medical field. Presented the common idea for fuzzy logic publications with the applications in different fields of biology²⁸.

Detected breast cancer using fuzzy c means approach²⁹. Have done a performance analysis of derived rule base multivariate type-2 self-organizing fuzzy logic controller employed to anesthesia³⁰. Presented a work on automatic topic spotting in biomedical literature³¹. Generalized triangular fuzzy numbers are applied in medical decision making³². Interval Type-2 Fuzzy has

been Inference System and adaptive filter on raw tumor MRI edge detection³³.

CONCLUSION

Field of Biomedicine includes all the main areas like biological and life science as well. According to the review it is found that fuzzy logic plays an effective role in all the areas and there is not enough research on application of Type-2 Fuzzy in those areas. Hence it is concluded that this review process will give a motivation for the new researchers to do their research on Type-2 fuzzy in the mentioned areas.

Ethical approval

Compliance with ethical Standards

The article does not contain any studies with human participants or animal performed by any of the authors.

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Segmentation of Mammography Calcifications Using Fusion of Fuzzy C-Means and K-Means Algorithm

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ABSTRACT

Breast cancer is the most life-threatening disease among women. The best way to decrease the mortality is early detection of cancer from digital mammogram. The diagnosis can be successful if the pre-processing and segmentation of the digital mammograms identifies the suspicious area correctly. In this paper, the Butterworth bandpass filter along with fusion of FCM and K-means clustering followed by morphological operations is used for the segmentation of calcification areas from the mammogram images.

Keywords: Breast cancer, diagnosis, digital mammogram, pre-processing, Butterworth bandpass filter, segmentation, fusion, FCM, K-means, Cluster, morphology.

INTRODUCTION

The deadliest diseases that threatens human life in modern days is Cancer. Breast cancer is the leading disease in women which increases the mortality rate^[1]. The early detection of breast cancer is the only solution to decrease mortality rate. The screening of breast cancer is done by digital mammogram which aids early detection. Researchers have developed many Computer Aided Detection and Diagnosis methods for detecting the cancer in digital mammographic images^[2]. In general, the CAD systems consists of the following steps: pre-processing, segmentation, feature extraction, feature selection and classification. The classification process classifies the given mammographic image as cancerous and non-cancerous. The quality and performance of the CAD system depends on the initial steps that includes pre-processing and segmentation.

The pre-processing is done on the raw image in order to remove the unwanted details that are present in

the mammographic image^[3]. There are several types of pre-processing filters available which can be categorized into spatial domain and frequency domain filters.

The pre-processed image is given as input for the segmentation process. Segmentation is the process of dividing the image on the basis of grey levels. Segmentations can be achieved using many techniques like thresholding, region-based, edge detection, and hybrid techniques^[4]. Clustering is a region-based segmentation and unsupervised learning technique. Clusters divides the image into groups wherein the members of the same cluster are similar in some manner and shows difference among the members of other clusters. Clustering is an unsupervised segmentation which groups the image based on the grey level value of the image pixels. This method provides meaningful insight over the grey level distribution in image which helps in classifying different features. The Clustering can be broadly classified as soft clustering and hard clustering. This paper uses the fusion of FCM, a soft clustering method and the K-means, a hard clustering and the output image is subjected to iterative morphological operations like erosion and dilation manually to obtain the segmented feature.

LITERATURE SURVEY

Nayan et. al^[5] have applied mean, adaptive median

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and wiener filtering techniques on the mammographic images and proved using mean square error (MSE) and peak to signal noise ratio (PSNR) that the adaptive median filter is best in reducing noise. Further to segment calcification^[6] Butterworth bandpass filter in Fourier domain with the frequency band between 2.891 mm^{-1} to 0.391 mm^{-1} was used. The Butterworth band pass filter was used as an edge detection technique and they proved to be working well in comparison to other standard edge detection techniques. Jabbari H et.al.^[7] has proposed a hybrid algorithm using wavelet algorithm, genetic algorithm and mathematical morphological operations for segmentation of mammographic images. They compared with the existing optimization ant colony and particle swarm optimization and proved that there proposed algorithm gives a classification accuracy of 91.4% and hence better than the other algorithms.

Four methods, gray level stretching and morphological operations, K-means clustering based on intensity and position, FCM and FCM cluster centre passed to K-means clustering based on FCM cluster was compared^[8]. They compared the area of tumour and have suggested for further work for improving segmentation using supervised classification methods. In another technique^[9] authors have used the centroids obtained from subtractive cluster as initial cluster to K-means algorithm. Before subjecting to K-means algorithm they have increased the quality of image using partial contrast stretching. The output of K-means is fed to median filter for removing the unwanted region and for achieving better segmentation. RSME and PSNR were used to compare classical K-means and there proposed model, and found that there proposed model showed better performance. Also, they have suggested for using the morphological operations for improving the segmentation and also performance.

Nalini Singh et al^[10] has proposed a novel approach for segmentation by combining the K-means clustering and FCM clustering. Theoretically authors^[11] tried using principal component analysis (PCA) for initial clustering. The resulting clustering was next fed to K-means for segmentation. Wiener filter was used to remove the noise and then subjected to pillar algorithm for initial centroids optimization^[12]. After applying wiener filter, it was subjected to color transformation using hybrid color systems CIELAB AND HSL and then it was subjected to data normalization using softmax algorithm followed by segmentation using pillar algorithm. The

pillar algorithm was used to optimize the K-means clustering to increase the precision and decrease time for segmentation. This Pillar-Kmeans was compared with conventional K-means and Gaussian Mixture Model and proved to give better results in terms of precision.

Sadhana Tiwari et. al^[13] has proposed optimized K-means clustering in which they have saved the distance and the cluster label of each pixel which reduces the time complexity by not calculating the distance for the pixels every time. It hence reduces the time complexity of the standard K-means clustering technique. S. M. Aqil Burney et. al.^[14] has discussed the various performance evaluation measures that are used for evaluating the results of the K-means cluster analysis. The Silhouette curve is used as one metric which provides an insight of the tightness and separation within and among clusters. The value above 0.71 proves to do best clusters. The Confusion matrix is the other metrics which provides a 2x2 matrix from the actual (TP and TN) and the predicted (TP and TN). From this matrix the accuracy, precision, sensitivity and specificity are calculated. The Precision to Recall graph is drawn in which the performance is considered high if the classifier falls in top left and poor if it is in bottom right.

In the automatic detection of lesions in breast image segmentation algorithm was proposed in which the image is subjected to adaptive median filter followed by adaptive thresholding using local and global thresholding and then continued by the morphological operations of opening and closing to obtain the segmented image^[15]. This proposed method is compared with the manual ROI done by experts and was proved to give better results using dice coefficient, Jaccard coefficient, Hausdorff distance, accuracy, sensitivity and specificity. FCM and K-means clustering for segmentation of mammographic images in terms of Contrast, Energy, Homogeneity, Correlation were compared and also they bring out the strengths and weaknesses of the FCM and K-means clustering algorithms^[16].

P.D.Yadav et al^[17] has proposed an algorithm wherein the image is filtered using tracking algorithm to remove labels and unwanted area, erosion, dilation and median filter and then it undergoes segmentation using k-means clustering, followed by FCM and watershed algorithm followed by erosion and dilation morphological operations. J. Quintanilla-Dominguez et al^[18] has used morphological operation using Top-Hat

morphological transform and a proposed segmentation using K-means, FCM and possibilistic FCM based on the proposed threshold value and conclude that the segmentation results depend on the appropriate threshold value selection.

Rajeev Kumar et al [19] has used adaptive median filter on the image and an edge preservation technique by adding 0 and 1 to the image pixel. Later the author used their proposed segmentation method by combining k-means followed by the morphological operations. This proposed method is compared with FCM, K-means, EM and K-means with FCM and proved to give better results in terms of TP, TN, FP, FN, Accuracy, Precision, Recall with less execution time.

METHODOLOGY

This paper describes the pre-processing of mammography image along with the segmentation of cancerous tissues. For pre-processing of mammography images various filters were used. If the mammogram is RGB image then it is converted to grey level image before subjecting it to processing. Histogram of the image is plotted to understand how the grey levels are distributed. It is used to understand the grey level of background, structural features and cancerous tissues. To enhance the required features and to suppress the unwanted details, the image is then subjected to Butterworth bandpass filter, a frequency domain filter. This filter was analysed

with other filters and was observed that it yielded superior results [20].

The filtered image was next subjected to region-based segmentation technique. A fusion of Fuzzy C-Means clustering, and K-Means clustering is used to segment the calcified region. First the FCM algorithm is used to iterate maximum 100 times or till convergence occurs to produces 4 clusters. All the iterated images are displayed and best clustered image is selected manually and passed to the next stage of K-means clustering. K-Means clustering algorithm is iterated 10 times to produce 4 clusters. The clustered image which reflects the best segmentation is selected using the K-means energy (iteration at the elbow point is selected) to undergo the morphological operations dilation, erosion, opening and closing and to obtain the resultant segmented image. This image segments the calcified region only and serves as the input to calculate the area and other parameters required.

Fuzzy C-Means algorithm uses both fuzzy logic and fuzzy sets. In FCM, a data object belongs to two or more than one clusters. When a specified number of clusters are given, the FCM clusters groups the data elements based on distance measure from the centers. The data object is grouped to the nearest centers. Now the cluster center is recalculated for each cluster. Then these steps are repeated until the cluster centers remains unchanged. The objective function is given by

$$J_m = \sum_{i=1}^N \sum_{j=1}^c u_{ij}^m \|x_i - c_j\|^2 \quad \text{----- (1)}$$

Where m =any real number > 1 , u_{ij} =degree of membership of x_i in the cluster j , x_i = the i th of d -dimensional measured data, c_j = d -dimension center of the cluster

The equation used for calculating the cluster centre in FCM is given below

$$c_j = \frac{\sum_{i=1}^N u_{ij}^m x_i}{\sum_{i=1}^N u_{ij}^m} \quad \text{----- (2)}$$

The membership function is updated using the following equation

$$u_{ij} = \frac{1}{\sum_{k=1}^c \left(\frac{\|x_i - c_j\|}{\|x_i - c_k\|} \right)^{\frac{2}{m-1}}} \quad \text{----- (3)}$$

The process end when,

$$\max_{ij} |M_{ij}^{(k+1)} - M_{ij}^{(k)}| < \delta \quad \text{----- (4)}$$

Where δ =termination value or constant between 1 & K=no to iteration steps

The k-means objective is to minimize the cluster members and cluster centroids. It first selects the number of clusters k and then it randomly generates clusters to determine the cluster centres. After this process it assigns each data point to the nearest cluster centre and then it recomputes the new cluster centres. These steps are iterated until the minimum variance criterion is achieved. To verify this k-energy minimization graph is plotted in the graph where x-axis represents iterations

and y-axis represents the energy. This energy of the cluster k is calculated using the formula

$$E(k) = \text{Sum (all } X(I) \text{ in cluster } k) \| X(I) - Z(k) \|^2$$

The morphological operations are the operations performed on the image to extract its boundaries. These operations are applied on a binary image only. Dilation and Erosion are two operations which are applied iteratively. Erosion is applied twice followed by Dilation

in our process. The segmented image thus obtained identifies the calcified area correctly.

algorithm. In this paper we have considered 136 images obtained from a scan centre. From these four sample images (Fig.1) are shown below

RESULTS AND DISCUSSIONS

Matlab was used to implement the proposed

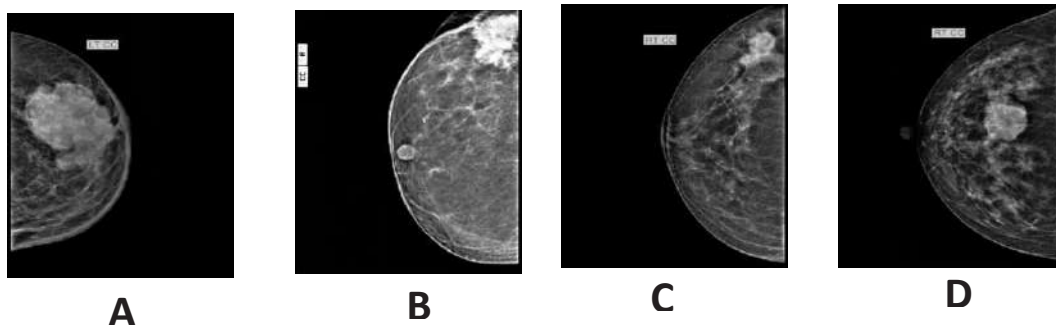


Fig 1. Real-time mammographic images (A), (B), (C), (D)

The size of the images taken for this study is 8584 x 4784. These image size couldn't be processed with the normal system. Henceforth the images are resized to 256 x 256 pixels for easy processing.

i. Image A

The Image A is considered and image comparison of raw image and Butterworth bandpass filtered image is brought out in Fig. 2.

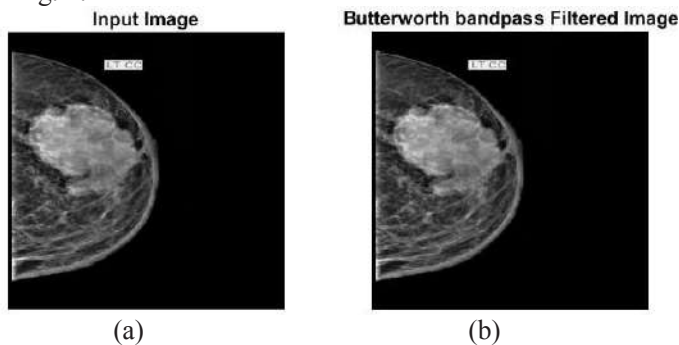


Fig 2. (a) Raw mammographic image (b) Butterworth bandpass filtered image

The filtered image is subjected to FCM and the output of the selected clustered image is brought out in Fig.3.

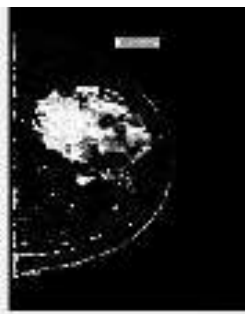


Fig 3. Selected FCM cluster image

The images are manually visualized for selecting the input to k-means algorithm. The selected clustered image is subjected to k-means and using k-means energy as shown in Fig. 4(b) the image obtained at the elbow point is selected for convergence and is shown in Fig. 4(a).

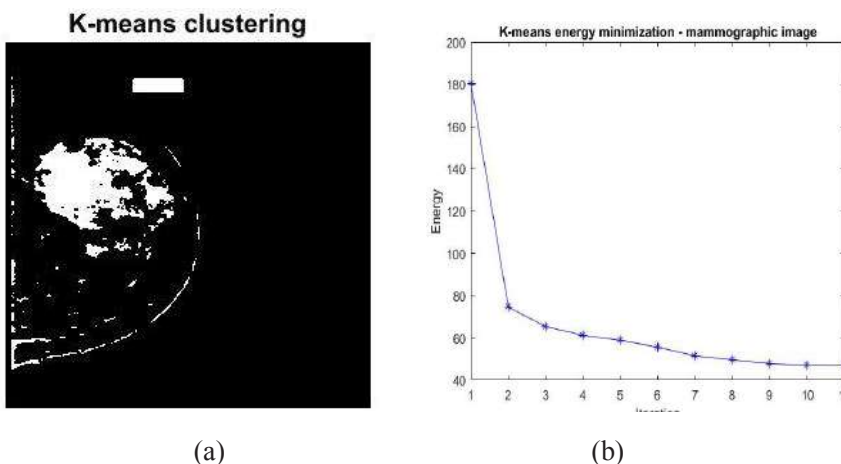


Fig 4. (a)The K-means cluster output, (b) k-means energy graph

The resulting k-means clustered image is cropped to avoid unnecessary spaces and then subjected to iterated erosion and dilation morphological operations and the resultant segmented image is brought out in Fig5.

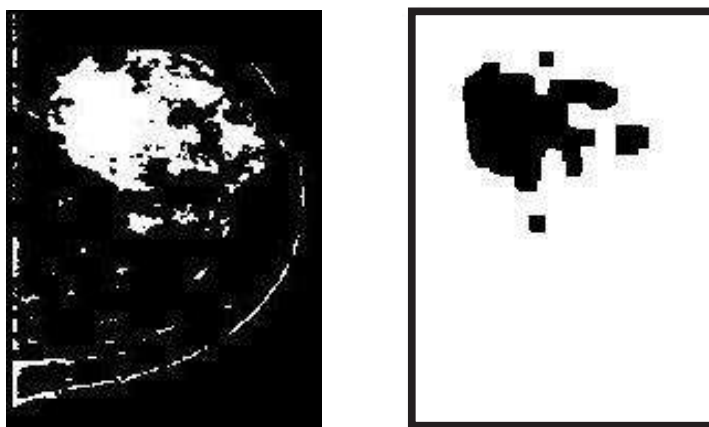


Fig 5. (a) The cropped k-means cluster image (b)Output image after morphological operations

In similar manner the other three images were processed and their outputs are obtained to calculate the calcified area and is compared with the classical FCM and K-means algorithm. The results are tabulated in

table1 given below. It can be observed that the segmented region in proposed algorithm isolates the calcified region and hence area computed reflects only this region and it is minimum in comparison to others

Table1. Area of segmented image using FCM segmentation, K-means Segmentation, Fusion Segmentation

IMAGE	FCM	KMEANS	FUSION ALGORITHM
A	1.18e+05	1.21e+05	2.42e+04
B	1.22e+05	1.29e+05	3.83e+04
C	1.20e+05	1.25e+05	3.35e+04
D	1.24e+05	1.28e+05	3.56e+04

CONCLUSION

The segmentation and the pre-processing are the important phases in the detection and diagnosis of breast

cancer from the mammographic images. In this paper, a fusion algorithm for segmentation is proposed. The image is initially pre-processed with the Butterworth bandpass filter and is then segmented using the fusion

algorithm based on FCM, K-means clustering and morphological operations. The area of the segmented image is calculated and is compared with the standard FCM, K-means algorithm and is evident that the fusion algorithm followed by morphological operations identifies calcification areas as diagnosed by the medical practitioner.

Conflict of Interest – Nil

Source of Funding – Self

Ethical Clearance – Taken from the Saravana Scans and Labs who provided us the mammographic images required for the study.

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Twenty years' (1996-2015) Trends in Deaths Caused by Poisoning in the Transkei sub-region of South Africa

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ABSTRACT

Background: Poisoning is a serious public health problem worldwide. Acute poisoning in South Africa from traditional medicine is a known cause of death. Members of the Xhosa tribe in the Transkei region frequently consult traditional healers and use herbal medicine, when they fall ill.

Objective: To study the trends in deaths caused by poisoning in the Transkei sub-region of South Africa from 1996 to 2015.

Method: An autopsy record review study at the Forensic Pathology Laboratory at Mthatha for a period of 20 years (1996-2015).

Results: Over a period of 20 years, 24 693 autopsies were conducted. In 1139 (4.61%) of these cases, death was caused by poisoning. Male victims numbered 609 (53.46%). The male-to-female ratio was 1.1:1. More than one third 360 (32.78%) were aged between 21 and 30 years of age.

The average number of poisoning-related deaths was 8.9 per 100 000 of the population per year. The highest rate of death, 16.6 per 100 000, was recorded in 2012.

Conclusion: There has been an increasing trend in death as a result of poisoning in the Transkei sub-region of South Africa.

INTRODUCTION

The global incidence of poisoning is not known. It is speculated that up to half a million people die each year as a result of various kind of poisoning, including natural toxins.¹ Poisoning is a significant global health problem. According to World Health Organization (WHO) data, in 2012 an estimated 193 460 people died worldwide from unintentional poisoning.² Of these deaths, 84% occurred in low-and middle-income countries.² Each year, the WHO estimates that almost a million people die from suicide worldwide, and chemicals account for a significant number of these deaths.² It is estimated that deliberate ingestion of pesticides causes 370 000 deaths each year.² Cases of acute pesticide poisoning account for significant morbidity and mortality worldwide, especially in developing countries.³ Poisoning continues to be an important public health problem in the United States. In 1995, two million human poison exposures were reported to all poison centres.⁴

Data on poisoning-related mortality in Africa is inadequate. In South Africa, a report suggest that acute poisoning is responsible for up to 17% of ward admissions of children.⁵ A selected hospital admissions-based study conducted in South Africa by Malangu et al in 2009 showed that the case fatality rate was 2.4%, mainly due to drug abuse and poisoning by carbon monoxide and agricultural chemicals.⁶ Although mortality from acute poisoning is low, it is often high in patients who are victims of suicide.⁷ A study conducted by the author showed that an increasing number of fatalities due to poisoning occur in the Mthatha area of South Africa, especially in the young age group (26.7%) between 21 and 30 years.⁸

A National Injury Mortality Surveillance System (NIMSS) report showed that poisoning is not among the top 10 causes of death in South Africa.⁹ In the Transkei sub-region, poisoning is the eighth most common cause of unnatural death.¹⁰ The major cause of mortality was

traditional medicines (51.7%).¹¹ The local Xhosa tribe that inhabits this area believes in the use of traditional medicines to cure their illnesses. The medicines are mainly herbal preparations. They are prescribed by sangomas or iZinyangas (local Xhosa word) - traditional healers from the African indigenous groups.¹² Alcohol-related mortality is also very high in this region. Approximately 25% of all hospital admissions in South Africa are directly or indirectly related to alcohol use.¹³ The traditional healing system deals with psychosocial stress associated with HIV/AIDS by using herbal medication as well. Sometimes, herbal medicine causes serious, life-threatening complications. For example, large amounts of herbal decoction taken to stimulate vomiting in the belief that cleansing the bowel would rid the system of disease result in gangrene of the large bowel, leading to death.¹⁴ The purpose of this study is to determine the trends in poisoning deaths, and to relate these with gender and different age groups in the Transkei sub-region of South Africa.

SUBJECTS AND METHOD

The retrospective descriptive study was carried out from the records of the post-mortem register of Mthatha Forensic Pathology Laboratory from 1996 to 2015. The Mthatha Forensic Pathology Laboratory is the only laboratory in this region catering for a population of about half a million in the region of Mthatha. It is attached to the Nelson Mandela Academic Hospital, which is the only teaching hospital in this province. It is associated with the Walter Sisulu University Medical School, and all medico-legal cases in this area of South Africa are dealt with at this facility. In total 24 693 autopsies were conducted between 1996 and 2015 and recorded in the post-mortem register at this laboratory. Between 1996 and 2015 the laboratory dealt with 1 139 victims of poisoning death.

The details of names, addresses, age, gender and date of autopsy, with cause of death, were recorded. Fourteen forensic officers are engaged in collecting corpses round the clock from 17 different police stations in four municipalities in the area. These are OR Tambo, Mhlontlo, Chris Hani and the Mbashe municipal area of about 200 square kilometres (Photograph 1). The OR Tambo municipality is the largest, and covered fully by 10 police stations. Mhlontlo municipality has four police stations, there are two in Chris Hani and Mbashe municipality has one. The combined population was

439 091 in 1996, but this number has been increasing at an average of 3% annually. In 2005 there were five police stations to be taken into account. Therefore, the population in the area of this study has increased. Population statistics were calculated with the help of the South African Statistics Department in Mthatha. However, it is difficult to estimate the total population involved. The data were collected in hard copies designed to reflect post mortem number, year, gender and cause of death. These data were transferred to the Excel computer program and analysed with the help of the SPSS computer program.

RESULTS

Between 1996 and 2015 medico-legal autopsies were performed on 24 693 victims of unnatural death (Table 1). Of these deceased, 1 130 (4.6%) died as a result of poisoning (Table 1). The average death rate as a result of poisoning was 8.9 per 100 000 (Table 2). It was highest (16.6/100 000 population) in 2012 and lowest (1.8/100 000) in 1996 (Table 2 and Figure 1). Among males the average death rate as a result of poisoning was 4.8 per 100 000, and among females 4.1/100 000 (Table 2 and Figure 1). It was highest (9.2/100 000) in 2012 among males, and in 2013 (7.9/100 000) among females (Table 2 and Figure 1). The male-to-female ratio was 1.1:1 (Tables 1, 2 and Figure 1).

The highest percentage (32.78%) of victims in this study were aged between 21 and 30 years, followed by 29.05% between 11 and 20 years (Table 3 and Figure 2). In this study 5.82 % were 10 years old or below the age of 10 years, and only 0.54% above the age of 80 (Table 3 and Figure 2).

DISCUSSION

Data on death as a result of poisoning around the world are scarce. After an extensive research on the internet, only a few studies were found, which contained very limited information. In South Africa, a few articles were also published, which were mainly hospital-based. The biggest challenge in South Africa is confirming poisoning deaths through tests at national laboratories. There are only a few centres in South Africa that handle medico-legal tests of tissue for poisoning, and these centres are overloaded with a large number of samples. Therefore, it has become difficult to determine the nature of poisoning.

Most of the Transkei region is rural or semi-rural. Most of the people are Xhosa; they are mostly illiterate and live on subsistence farming. They believe deeply in their culture and traditions. Although the area merged with South Africa soon after the democratic elections in 1994, but it is still not developed. People are ignorant and the illiteracy rate is high; therefore, they believe deeply in misconceptions such as witchcraft and the powers of the sangoma and traditional healers. It is surprising fact that how many literate, educated people still hold these beliefs. There are people who hold degrees, yet visit the sangoma. This is deeply ingrained into the psyche of many Africans. Education is probably the only way to deal with it, but it is going to take more than one generation. Poverty is severe in the Transkei region. Seventy-three percent of the rural people in the Eastern Cape were living on less than R300 per month in 2005/2006, and more than half of them on less than R220 per month.¹⁵

Poisoning ranked eighth among the causes of unnatural death in the Transkei sub-region, which is higher than the national average (Table 1). According to an NIMSS mortuary-based study in 2002, poisoning is not among the top 10 causes of death in South Africa.⁹ Xhosa people still believe in the efficacy of herbal medicine and prefer to use traditional remedies.¹⁶ People assume that because something is herbal (“natural”), it has no side effects, whereas the study found that it might have more side effects than conventional medicine and even, as you point out here, be deadly.

This could be the reason for the high percentage of poisoning in this region of South Africa. Medicinal plants are mainly used in making infusions and decoctions to be taken orally, or poultices.¹⁶ Traditional healers provide decoctions to their patient to clean their gut, but they are unaware of safe concentrations and doses, which leads to fatal poisoning.¹⁷ Although there is no scientific basis to prove the efficacy of these medicines, they may work to relieve symptoms. However, the traditional healers are ignorant of concentrations in the plant decoction. Xhosa people scrupulously obey the instructions of traditional doctors and keep on using the preparation, even if their symptoms do not disappear and continued use leads to toxicity and death.

The average poisoning-related death rate is 8.9 per 100 000 of the population in this study (Table 2 and Figure 1). Most poisoning is regarded as suicidal and

accidental in nature. Surprisingly, the average rate of poisoning (4.8/100 000) is higher among males than among females (4.1/100 000) (Table 2 and Figure 1). This is in contrast to an earlier study by the author, which found that hanging (82%) and shooting (89%) were the methods of choice among males, while females preferred poisoning (75%).¹⁸ Recently this trend has changed, and males prefer self-harm by poisoning rather than other methods. The emerging HIV infection and poor support system could be held partly responsible for several deaths, particularly in younger age groups.¹⁷ The rate of poisoning deaths has picked up from 2005 onwards. Among females it increased from 4.2 per 100 000 (2005) to 5.7 per 100 000 (2015), and among males from 4.7/100 000(2006) to 7.8/100 000 (2015) (Table 2 and Figure 1). The rate of HIV infection has also picked up in the same period in this region. A study of HIV seropositivity on victims of sexual assault in the Transkei region, carried out by the author (2005), showed that HIV seropositivity increased from 10.5% (2000) to 16.5% (2004).¹⁹

The highest percentage (32.78%) of deaths as a result of poisoning was recorded in people between 21 and 30 years of age (Table 3 and Figure 2). This is the most vulnerable group (21-30 years) and accounted for a high number of unnatural deaths.¹⁰ Young adult males are prone to more risk-taking behaviour and they do not want to be defeated in any circumstances. When they lose, they are heavily depressed and often attempt to take drastic measures, such as committing suicide. The incidence of suicide is increasing in the Transkei region of South Africa.¹⁸ Financial hardship is the main underlying reason, identified in 87% of victims of suicide.²⁰ A number of deaths were recorded among people with a history of aluminium phosphide poisoning, caused by what is commonly known as the ‘tank’ pill in this region. It is easily and cheaply available on the streets of Mthatha, and is deadly poisonous.²¹ Self-poisoning with agricultural pesticides is a major contributor to the global burden of suicide²² Alcohol and drug use is another contributing factor in deaths of young adults in this region of South Africa. Binge drinking, especially male binge drinking among 18-to-24-year-olds, is statistically related to offending behaviour.¹⁸

The history reveal that most deaths occurred because of deliberate ingestion of tank pills and organophosphate. Herbal poisoning is accidental, as herbal remedies are prescribed by traditional healers to

cure diseases. Furthermore, a large number of people suffer from mental illnesses in the Transkei region of South Africa. A study published by Chiumia et al in 2014 showed that a third of South Africans suffer from mental health disorders.²³ During his first address to Parliament in 1994, former President Mandela specifically singled out alcohol abuse as a major cause of crime, poverty, reduced productivity, unemployment, dysfunctional family life, political instability, the escalation of chronic diseases such as AIDS and TB, injury and premature death.²⁴

CONCLUSION

There has been an increasing trend of poisoning deaths in the Transkei sub-region of South Africa over a 20-year study period (1996-2015). More than two thirds (61.83%) were young adults between 11 and 30 years of age. Males and females were victims of poisoning in almost equal numbers (1.1:1) in this study. HIV/AIDS, alcoholism and poverty could be considered underlying factors. Education in this respect for both traditional healers and the community is necessary.

Acknowledgments and ethical approval

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Declaration of conflict of interests

The author declared no potential conflicts of interest with respect to the research, authorship and /or publication of this article.

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Informed consent

There is no scope of informed consent as data were collected from the post-mortem register.

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Bestiality in Mthatha Region of South Africa: A Case Report

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ABSTRACT

The objective of this case report is highlight the problem of bestiality in the Mthatha region of South Africa. This is a retrospective report of a case that was referred from a veterinary doctor in Mthatha, 2009. A 25-year-old adult male was mentally unstable. He was also suffering from HIV infection and looking for a cure. A blood sample from the sheep was brought to Sinawe Centre for HIV testing. It was rejected for HIV testing, as the test is not meant for animal blood. The sheep was later killed by community members and the meat was discarded, as it was considered unfit for human consumption. There is a misconception and misbelief regarding bestiality and cure of HIV infection in the Mthatha region of South Africa.

Keywords: *bestiality, mental disorder, sexual assault.*

INTRODUCTION

Bestiality is an infrequent form of animal cruelty among young adults who live mainly in rural areas of the former Transkei. The incidence of bestiality cases is difficult to estimate, as they are underreported, and therefore remain unrecognised. The history of zoophilia (also known as bestiality) begins in the prehistoric era; depictions of humans and animals in a sexual context appear not frequently in European rock art.¹ The Hebrew Bible imposes the death penalty on both the person and animal involved in an act of bestiality.² Bestiality remains illegal in most countries and is condoned in none. It is argued that sex with animals is inherently abusive.³ Approximately 30 states have enacted laws that prohibit sexual contact between humans and animals.⁴ In a society where homosexuals and adulterers are stoned to death for “sexual immorality”, one would expect a similar outcome for someone caught having sex with an animal. Surprisingly, this is not the case.⁴ Only one published article is available in literature discussing paraphilia in the Bible, and that is in French.⁵ For readers of English, nothing is available on this interesting topic. The main forms of paraphilia, abnormal sexual behaviour and sexual crimes explicitly alluded to in the Holy Bible are adultery, homosexuality and bestiality.⁵

The Criminal Law (Sexual Offences and Related Matters) Amendment Act, 2007 is an act of parliament of

South Africa that reformed and codified the law relating to sex offences. It repealed various common law crimes (including rape and indecent assault) and replaced them with statutory crimes defined on a gender-neutral basis.⁶ Bestiality is also prohibited by the Act (section 13).⁶ In recent years a case occurred in the Transkei of a man who was sentenced to 12 months’ jail, without the option of a fine, for having sex with a sheep.⁷ It is very traumatic to write such a case report, but it is important to bring these issues to the notice of the academic community and professionals to prevent such incidents from happening. A published study showed that psychiatric patients were found to have a statistically significantly higher prevalence rate (55%) of bestiality than control groups (10%).⁸ The purpose of this case report is to bring the issues of misconception and misbelief regarding the problem of bestiality in the Mthatha region of South Africa.

CASE HISTORY

Mr B is a 25-year-old mentally unstable young man who was caught by a community man as he was engaged in a sexual assault on a sheep. This was reported to the police. The police registered a case of sexual assault against him and asked a veterinarian to examine the sheep. This young man was suspected of having HIV infection (not tested by a doctor) and looking for a cure by having a sex with an animal. This was advised by a

sangoma practitioner. The doctor examined the sheep, collected two vaginal samples for seminal fluid and blood for an HIV test. On genital examination he found superficial lacerations on the lips of the vagina, along with signs of inflammation. The doctor referred the case to Sinawe Centre (a centre providing a service in cases of sexual assault and rape) and sought an opinion on the sexual assault on the sheep. A blood sample from the sheep was also brought to Sinawe Centre for HIV testing. It was sent to the laboratory. The laboratory could not conduct the test, as it was not meant to test animal blood. The veterinary surgeon concluded that all the findings were consistent with forced vaginal penetration, leading to trauma to the vaginal orifice. Later on the sheep was killed by community members and the meat was discarded because sheep was considered as unholly. Police has registered the case against the perpetrator.

DISCUSSION

There are only few countries in the world without laws against bestiality. There is no specific law in South Africa on bestiality, but it is covered by common law offences. Bestiality violates the Animals Protection Act, which makes it an offence to ill-treat, torture or terrify animals and inflict unnecessary suffering on them. The Animal Protection Act (No. 11) of 1962 and Animal Matters Amendment Act (No. 42) of 1993 both deal with cruelty against animals, but are silent on sexual offences against animals. The National Council of the Society for the Protection of Animals is against bestiality and believes that a culprit must be punished, since it is wrong to force an animal into an unnatural act.⁷ Transkei is a poverty-stricken former black homeland with a high rate of unemployment and illiteracy. There is a strong belief in witchcraft and sangomas.⁹ Most of the people will take advice from traditional healers. Mr B was also advised by a traditional healer to have sex with animals to cure his HIV infection. The myth of the 'HIV/AIDS virgin cure' is prevalent in the community. A case was reported in which the perpetrator was an HIV-positive uncle of a 9-year-old girl, who was a victim of this misbelief.¹⁰ This incident could also ultimately be traced to the advice of a traditional practitioner in this region. It is a fact that those who are suffering from HIV are desperate to get some remedy. Mr B was also in search of a cure for his disease.

Homosexuality enjoys full protection under a post-1994 constitution that outlaws unfair discrimination

on the grounds of sexual orientation.⁷ No argument could be made for bestiality on the same grounds of sexual orientation. Both homosexuality and bestiality are unnatural, but homosexuality has been accepted especially in the western society. It is difficult to investigate the prevalence of bestiality in a community, but the veterinary surgeon concerned, in a telephonic interview stated that there were many cases of bestiality in this region, but they were unreported. The police are also not interested in pursuing cases such as that of Mr B. It is surprising that M. B was not punished in any way for the crime he committed. Bestiality is hardly seen in clinical practice, therefore the estimate of its prevalence is not possible in hospital-based studies.

The origin of HIV infection is suspected to be animals. There are several zoonotic diseases that are contracted either by eating meat of infected animals or coming into contact with animals. Sexual contact has greater chances of spreading infection from animals to humans and vice versa. The emergence of human immunodeficiency viruses HIV-1 and HIV-2 resulted from interspecies transmission from simian virus SIV.¹¹ Persistent habits of hunting and meat preparation in the bush still expose humans in Africa to SIV infection.¹¹ The AIDS epidemic is genetically most diverse where the prevalence of HIV reaches the highest levels. In view of the belief that HIV had its origins in cross-species transmission from non-human primates to man¹², Mr B, and many others who have sex with sheep or other animals, could also be exposed to some kind of cross-species infection. This may lead to other kinds of infection similar to HIV. Mr B could have transmitted infection to the sheep as well. Mittal et al (2000) reported a case of a 48-year-old male with a history of bestiality who presented with painful genital lesions.¹³ The patient was a known case of schizophrenia since he was 15 years old.¹³ Bestiality may be due to sex starvation, or the person could be suffering from some mental aberration.¹³ Mr B was mentally unstable, either because of his HIV infection or because he was suffering from some mental disorder. A case reported by the author has shown that HIV infection could lead to psychiatric disorders.¹⁴

Xhosa people strongly believe in superstitions.⁹ Traditional healers contribute significantly to the level of health-care systems in Africa. They could play an important role in the prevention and care of patients with HIV infection in the community.¹⁵ Superstitious belief is stronger in illiterate people than in educated ones.¹⁰

The practitioners of superstitions (witchcraft doctors, sangomas, and traditional healers) are earning their livelihoods by these practices. Some of these superstitions are very serious in nature, such as rape of a virgin to cure HIV infection.

CONCLUSION

There is a misconception and misbelief regarding bestiality and cure of HIV infection in the Mthatha region of South Africa. It is a serious problem that should be checked by educating people. Law enforcement agencies should play a role in enforcement of the law. The law must be amended to accommodate punishment for perpetrators of this kind of crime.

Ethical Issue: The author has ethical permission for collecting data and publication (approved project No. 4114/1999) from the Ethical Committee of the University.

Conflict of Interest: None

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Discrimination in the Payment of Occupational-Specific Dispensation (OSD) Scale and other Allowances in a Rural University of Eastern Cape's Human Resource Department Malicious or Ignorance?

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ABSTRACT

Background: When it was realised that South African medical specialists were getting much lower salaries than their foreign counterparts, the occupational-specific dispensation (OSD) scale was implemented as a retention policy from July 2009. This has had a significant impact on keeping doctors and medical specialists in South Africa. This case report is intended to highlight problems with the implementation of the OSD scale at a formerly disadvantaged university.

Case History: Mr X is a medical specialist registered with the Health Professions Council of South Africa, who works in a public hospital as well as in the university's medical school (joint establishment). He has received no annual increase in his basic salary. The OSD scale was implemented in 2009, but thereafter it has not been revised. Mr X's earnings have consequently dropped to 40% less than those of his professional colleagues. Mr X has written a number of letters to express his grievances to the human resource department of the university, but has received no satisfactory answer. The case history, salary scale and all other allowances are discussed in this case report.

Keywords: *occupation-specific dispensation, malicious, discrimination*

INTRODUCTION

The occupation-specific dispensation (OSD) scale has been regulated and implemented by way of collective agreements for health professionals, including medical specialists, since July 2009 to retain the expertise of health care service providers in South Africa. The aim of the OSD was to improve the conditions of service and remuneration of public service workers, including public sector health professionals.¹ The objective of the OSD was to improve the ability of the public service to attract and retain employees, to provide differentiated remuneration dispensations for the vast number of occupations in the public service, to cater for the unique needs of different occupations, to provide unique salary structures per occupation, to prescribe grading structures and job profiles to eliminate interprovincial variations and to provide adequate and clear salary progression and career path opportunities based on

competencies, experience and performance.² Medical and dental practitioners, specialists, pharmacists and emergency medical services (EMS) were identified for implementation, and the OSD was implemented in these fields in July 2009.³

The purpose of this report is to highlight problems with the OSD scale and other allowances at the Walter Sisulu University's (WSU) Medical School, and to determine whether underlying factors such as xenophobia in the human resource (HR) department of the university contribute to discrepancies.

RESULTS

The basic salary structure of Mr X from 2003 to 2018 at rural university is reflected (Table 1). The OSD scale was implemented in July 2009, but was subsequently not revised for four years (2010-2013) (Table 1). Again, there was an increase in basic salary in 2014, which

remained the same in 2015, without any increase (Table 1). There was an increase in salary in 2016 and 2017 (Table 1), but not in the part relating to OSD applicable to Mr. X.

Table 1. Non-payment of OSD scale in a rural university’s human resource department in Eastern Cape Province, South Africa.

Year	Basic salary received	Basic salary supposed to receive as per OSD scale	Remark
2009	R65682	R65682	Implemented & paid
2010	R65682	R89992	Not revised & not paid
2011	R65682	R111359	Not revised & not paid
2012	R65682	R123865	Not revised & not paid
2013	R65682	R132879	Not revised & not paid
2014	R72298	R143515	Not revised & not paid
2015	R72298	R153561	Not revised & not paid
2016	R88734	R165232	Not revised & not paid
2017	R95211	R177294	Not revised & not paid
2018	R95211	R188768	Not revised & not paid

DISCUSSION

South Africa has been liberated from apartheid, but there is a tough challenge in terms of transformation into a stable, equitable, and non-racial society. Universities are regarded as power houses regarding generation of knowledge, but are also victims of racism and xenophobia.⁴ Although only a few cases of racism and xenophobia have been reported, these constitute the tip of an iceberg.⁵ It is sad that racism and xenophobia are still prevalent in South African educational institutions. It may not involve physical attacks, but cause harm in the form of especially financial loss, such as discrimination in terms of salaries, non-payment of legitimate allowances, etc. This is no way less than physical harm as they are weakening your financial position. It is surprisingly that even when this is brought to the notice of higher management, they turn a blind eye. This has happened in the case of Mr. X. He has reported the matter repeatedly, but no action, and rather the perpetrators of injustice were promoted. Perpetrators of xenophobia in these institutions often get jittery and agitated when this topic of OSD scale is discussed. They started labelling that you are receiving the highest notch, without knowing the facts of OSD scale. It is not a matter of more or less. It is matter of legitimate claim of salaries. Unfortunately, the staff in university joint establishment are left only few, and those who are working are mostly foreigners

who borns out of south Africa. So they are vulnerable for this financial victimization. This has discouraged staff members to work to their full potential in tertiary institutes.

The University of Transkei (Unitra) was renamed WSU, but there were no changes in the policy of the joint establishment after this name change. Medical staff who are appointed by the Faculty of Health Sciences were obliged to work at both the university and the hospital. The university has incorporated an overtime allowance, which is part of the salary of those working for the joint establishment and providing services to the hospital. Mr X has always been paid less than his counterparts since his appointment at the university in 1996 as an acting head, but this matter became of more concern when his OSD payment was discontinued in 2010 after being implemented in 2009 (Table 1). Mr. X has received the report from a reliable sources that the HR staff received instruction from the faculty Dean, not to increase Mr. X salary. Salary implies not only monetary benefit, but also the pride of a human being among colleagues and peer groups. The HR department at WSU has always been the weakest link in this university.⁶ This was also pointed out by an independent assessor in a 2011 report. HR directorate is always worked as a ‘secretive society’, benefitting specific individuals and themselves. Unfortunately, the prevalence of xenophobia has

undermined even institutes of higher education, but it is probably more prevalent at WSU than at other universities. I have no hard proof to claim for this, but certainly need an investigation in the HR section of WSU. This has been requested from the present higher management, but has no response. An independent assessor has mentioned in his report that this university is like an Afghanistan.⁶ This resolution of this report still has not implemented despite the plea from an academic union (NTEU) repeatedly.

Since there is no way to access information on the matter, Mr. X only came to know of this fact in March 2012, when some staff members of the faculty received back pay and others were excluded. Mr. X wrote a letter to the HR department, which replied that it is the faculty that decides on his salary. It came as a surprise to Mr. X that colleagues of his rank decided on his OSD. When Mr. X asked HR who the specialist on salaries in the faculty was, they did not reply. Despite a dozen letters being written all levels, they did not reply. This year, the matter was also brought to the attention of the top management of the university, which took no action. Surprisingly, the HR has stopped the salary of Mr. X without informing him, on the instruction of the Dean, which was brought back after many weeks when union approached the HR.

Section 23(1) of the Constitution of the Republic of South Africa Act 108 of 1996 (“the Constitution”) states that everyone has the right to fair labour practice, and therefore medically qualified specialists who serve in hospitals must not be excluded from the OSD scale and equivalent overtime allowance. There has been clear discrimination in the approach of the faculty since 2010 regarding the differentiation in the salary and allowances paid to Mr X. An abstract accepted by the research Directorate in annual conference of WSU-UNIVES in 2016, was presented in East London has raised several questions during these three days meeting (WSU-Univest 2016), but again there was no response from the higher management of this university.

Mr. X is South African by naturalization, but this seems to make no difference in real terms. The reality seems to be that if one is different in look and colour, one is only South African in the eyes of the Home Affairs Department; outside that one will always be considered different. This was proved by the HR department of WSU in the case of Mr. X. People of

different nationalities work in different universities all over the world in almost all countries. They are assets rather than liabilities. They enrich the functioning and culture of the university. A single department in the faculty of health sciences produced 25% of all articles in the year between 2006 and 2009.⁶ Many times, health faculty was accounted as a flagship faculty by higher management of this university but its staff who made it flagship was downgraded financially and utilising services without implementing OSD scale. It is sad. This was the department of Mr. X where he worked almost all alone from 1996 to 2015. Despite of achievements, the university has treated differently in the HR office. Top management must understand that all over the world university employees are regarded as the best in their field, which is why they are appointed at universities. They carry huge responsibilities, not only in terms of teaching and research, but also in service delivery to communities. The least they can expect is not to be paid less than their counterparts who are employed in hospitals. Surprisingly, many of the hospital staff are even former students of the professor employed at the university, yet they are paid more than their better qualified teachers. When Mr. X wanted to have copy of his personal file in HR, they replied it as they lost the file. There were almost 20 years information in the file of Mr. X has lost, and there is nothing to trace it. Mr. X is hearing a lot of irregularity in the office of HR, regarding irregularities in salaries without any confirmation. But one thing is certain the salaries of an individual must be investigated.

Moreover, the HR department at WSU takes unilateral decisions without consultation. This also happened in the case of Mr. X’s reduction in salary and allowances, about which he was not even informed. The only conclusion is that malicious gross discrimination and inconsistency are evident in the payment of Mr X. Since labour laws were disregarded by the HR department in the case of Mr. X, this matter must receive urgent attention.

Limitations

This is a short case report with minor inconsistencies in salary calculations. The author has tried to keep confidentiality of the staff of HR, but if anything has revealed in it, is not considered personal to anyone. It is a failure of system, not any individual.

Ethical issue: This report was presented as a poster at WSU's annual conference in East London in 2016, and therefore ethical clearance was granted in this case presentation.

Conflict of Interest: None

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Development of Word Awareness Skills in Typically Developing English Language Learners During Early Primary Grades

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ABSTRACT

Background: The paucity of developmental data on phonological underpinnings in English Language learners in the Indian context poses a special concern to professionals in the identification of reading disabilities.

Aim: To explore the developmental trends of phonological awareness at word level amongst English language learners during the early years of schooling.

Method: 50 children each from Grade I, II and III attending English medium schools for typical learners were assessed for word awareness skills and the performance across the Grade was compared.

Results : The results showed a significant ($p < 0.05$) increase in the scores in all the tasks with Grade depicting an ascending trend. The performance of Grade I children was poorer, Grade III was better and Grade II remained intermediate.

Conclusion: Improved scores with the absence of floor and ceiling effect on all the tasks indicate an active development of word awareness skills in English language learners during the first three years of schooling and they mature beyond Grade III.

Keywords: *Word awareness, phonological awareness, English language learner (ELL)*

INTRODUCTION

Indian educational system constrained to consider bi/multilingual system. The language often used for the medium of instruction may or may not be the mother tongue. According to NCERT report in the year 2007, there is an upsurge in the number of schools offering English medium of instructions at primary, upper

primary and secondary school level over the past two decades and more importantly, the number is rapid for primary and secondary schools¹. Learning literacy skills in English signifies the better education, desirable employment, better culture and also superior intellect among Indian minds². In India, children lack in English language environment during preschool years at home, since the exposure is predominantly in the native language. Thus learning secondary linguistic skills in the English language in Indian educational context can be more challenging and enigmatic. In this context of literacy, the native speakers of given language learning to read and write English are called 'English language learners (ELL)'³. However, learning a language that is phonologically and orthographically different from the mother tongue with limited oral language proficiency poses an academic challenge and has direct implication to disability. In the homes of monolingual children, the studies have indicated a relationship existing between

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the quantity and quality language exposure to their oral language and literacy skills⁴. Snow, Burns and Griffin⁵ suggests that, teaching children to read in a language in which they are not yet proficient has been identified as an additional risk factor for reading problems. Without a clear understanding of developmental aspects of literacy related cognitive-linguistic underpinnings in ELL, professionals encounter challenges in identifying the learning disabilities in them. An insight into the development of literacy related skills helps to control the dropout rates in school and better be able to identify the children who are at-risk to develop reading disabilities and ensure adequate intervention.

Various researchers in monolingual English speaking countries considered the assessment of phonological awareness skills during the early years of schooling and provided fruitful results in the identification of children at-risk to develop reading disability. Phonological awareness refers to the awareness of and access to, the sound structure or the phonology of one’s language⁶. Research conducted so far repeatedly demonstrated the existence of an association between phonological awareness and learning to read in typically developing children,^{7,8} and also in children with reading disabilities⁹. Additionally, this understanding was extended to dyslexia and suggested that deficits in phonological awareness is a main etiological factor for poor word recognition abilities, thus validating the criticality of phonological awareness in reading acquisition¹⁰ each compared with two control groups matched for reading level (8 years).

In the developmental hierarchy, awareness of words in the spoken language is considered to be the most primitive level of phonological awareness development. Phonological awareness at word level refers to, one’s

awareness that spoken language consists of series of distinct words^{11,12}. The research findings suggest that at the point of school entry children are not explicitly aware of words as units of spoken language, and also the meaning of the term ‘word’^{13,14}. Although, there is limited evidence of shallower phonological awareness influencing word decoding skills, the studies have shown that, the rudimentary phonological awareness skills such as word, syllable and onset-rime awareness sets the stage for more advanced phonological awareness skills such as phoneme awareness, which is proven to be crucial for learning to decode the words than former levels of phonological unit size¹⁵.

An understanding of the developmental aspects and the role of word awareness is understood has been possible from the studies conducted on monolingual English speaking children learning to read English and studies in the Indian context is meagre. Hence, it is essential to develop insights into the development of word awareness in English, before drawing any conclusion regarding its influence on advanced levels of phonological awareness as well as the development of literacy skills.

METHOD

Participants

The study incorporated a cross-sectional study design, with a convenient method of sampling to select the children. The ethical clearance from the institutional ethical committee, Kasturba Medical College, Mangalore was obtained before initiating the research. The study involved a total 150 typically developing children, 50 each from Grade I, Grade, and Grade III. Table 1 depicts the demographic details of the participants.

Grades	Number of participants		Age range (Years)	Mean age (Years)	S.D (Months)
	Males	Females			
I	25	25	5.6 to 6.6	5.19	0.4
II	25	25	6.7 to 7.6	6.10	0.3
III	25	25	7.7 to 8.6	7.19	0.2

The children were selected from five English medium schools for typically developing children affiliated to Karnataka state board. The permission from school administrative authority was obtained following which informed consent was obtained from parents. All the children spoke Tulu language at home and were exposed to English language only after entering Kindergarten. The children had adequate oral language proficiency for Tulu and are said to be ELL, because the children learn to speak and read the English language simultaneously from kindergarten. All the children attended nursery school in English medium of instructions which was ascertained through the parental interview. Further, the class teachers were interviewed to ensure all the children have above average academic performance, attending school regularly, and also had no history of class retention. The children were screened for gross speech, language, sensory, emotional/behavioral, neurological and cognitive deficits using WHO ten question disability screening checklist¹⁶. Normal receptive and expressive language development was ensured using 'Assessment of language development'¹⁷.

Measures

There is a dearth of an assessment tool which targets word awareness in the Indian context. Thus, the assessment was carried out using a specifically developed and content validated assessment tool. An extensive literature review was done to select the appropriate tasks to assess word awareness skills. Later the instructions, stimuli and scoring methods were evolved. All the assessment tasks consisted of 10 sentences each. The length of the sentences was varied in terms of a number of a syllable, type of words (content vs functional words), the position of the target word depending up on the task.

Sentence segmentation task

In this task the children were instructed to listen carefully to the sentence and count the number of words in the sentence provided. An example of the stimuli is "*We had dinner*" and the expected response was 3 words.

Word identification in sentence task

In this task the children were asked to listen to the sentence carefully and answer the subsequent question by saying 'yes' or 'no'. An example of the stimuli is "*The monkey is sitting on the tree*" Did you hear '*monkey*' in

that sentence? The expected response is 'yes'.

Word deletion in sentence

Here children were again asked to listen to the sentence and repeat the sentence after deleting the specified word in it. An example of the stimuli is "*Give me a pen*" Now, say it again leaving '*me*' in it. The expected correct response is '*Give a pen*'.

Word substitution in sentence

In this task the children were instructed to repeat the sentence after substituting the target word from a specified word. An example of the stimuli is "*Where is the bat?*" Change '*bat*' to '*ball*'. The correct response would be '*Where is the ball?*'

The tasks and stimuli were initially subjected to content validation by five speech-language pathologists (SLP) who had ten years of research and clinical experience in the field. The SLP's rated tasks, stimulus items, instructions, and scoring procedures using a continuum of the 5-point rating scale, with 0 indicating lower chance, and 4 indicating higher chance to be retained in the assessment tool. The items with the rating of '3' or '4' were considered as the desired rating since they indicate the higher relevance. The developed material was subjected to pilot study, on a small group of children (N=10 from each grade) in order to determine floor and ceiling performance. The ICC for test-retest reliability was found to be as high as 94% for 'sentence segmentation' and as low as 86% for 'word substitution in the sentence.' Similarly, for inter-rater, the ICC was found to be as high as 92% for 'word identification in the sentence' and as low as 85% for 'word deletion in the sentence.'

In order to determine whether the tasks used in the present study assess the same construct of 'word awareness,' the relationship between the tasks were determined using Pearson's correlation co-efficient. The Pearson's correlations were significant and ranged from $r = .28$ to $r = .73$. The lowest correlation was between 'word identification in the sentence' and 'word deletion in the sentence,' whereas the highest correlation was between 'word deletion in the sentence' and 'word substitution in the sentence'. The moderate to high correlations between the tasks suggests that the four tasks included in the assessment of word awareness tapped the same underlying construct.

Procedure

All the children were assessed for word awareness skills during the second half of the academic year. The sentences were presented verbally using live voice monotonously at normal conversation rate by the researcher. The tasks were initially familiarized using trial items. Corrective feedback was provided during the trial attempts, and no such feedback was given during the actual assessment. The correct responses were scored ‘1’ and incorrect responses were scored ‘0’ for all the task.

RESULTS

Figure 1 summarizes the children’s performance based on the mean and standard deviation (SD) across the Grade and task. The descriptive statistics indicate improved scores with Grade. Precisely, Grade I children

performed lower, Grade III performed higher, whereas Grade II children performed intermediate of Grade I and Grade III. The mean score comparison using one-way ANOVA revealed a significant main effect of Grade on ‘sentence segmentation’ [F (2,147) = 44.15, p<0.001], ‘word identification in the sentence’ [F (2,147) = 5.06, p=0.007], ‘word deletion in the sentence’ [F (2,147) = 38.12, p<0.001], and ‘word substitution in the sentence’ [F (2,147) = 35.64, p<0.001]. The subsequent post-hoc pair-wise comparisons with Bonferroni’s adjustment indicated that the performance of Grade III children was significantly (p<0.05) higher than Grade I and Grade II for all the word awareness tasks, except ‘word identification in the sentence’ task of Grade II. Further, Grade II children performed significantly better than Grade I on all the word awareness tasks except ‘word identification in the sentence.’.

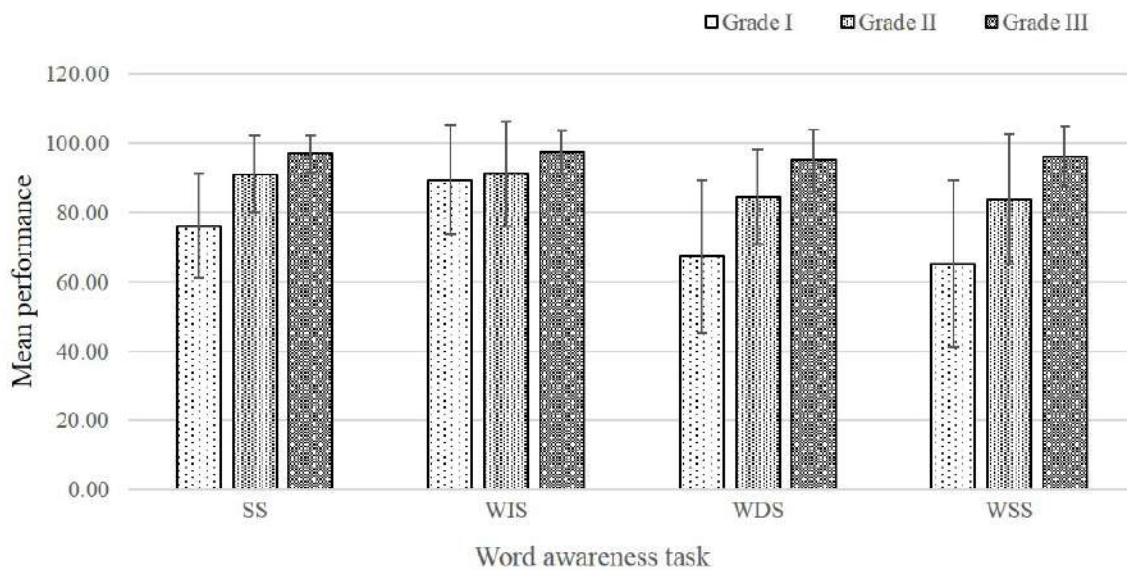


Figure 1 Mean and SD for word awareness tasks for Grade I, Grade II and Grade III.

Note. SS= Sentence segmentation, WIS=Word identification in the sentence, WDS=Word deletion in the sentence, WSS=Word substitution in the sentence.

DISCUSSION

A significant increase in the scores with the grades indicates a clear developmental progression of word awareness skills during the initial three years of formal schooling. The steady reduction in the standard deviation with the Grades suggests less variability in the performance of all the tasks, indicating increasing

stability in performance with advancing Grades. The effect of Grade on word awareness skills was also reported earlier in monolingual English speakers^{13,18}. Researchers have acknowledged that word awareness skills are the gate-way to the development of finer aspects of phonological awareness, and therefore, a beginning reader must develop an insight into the speech consisting of a sequence of word units, which is spoken and comprehended for many years¹⁹. Young children learn to recognize the arbitrary nature of the phonological realization of the word and also the

comprehension of the metalinguistic term ‘word’¹⁹. The same notion can be endorsed from the present results that, the children become increasingly aware of clear-cut boundaries of words in spoken language. The present findings support Chaney¹³ observation that, the performance improves with age due to exposure to print that heightens metalinguistic knowledge of word boundaries. This would be the possible explanation for the developmental progression and also a high variability in the performance at lower grades and greater stability at higher grades that were observed in the present study. The errors in sentence segmentation in Grade I children were characterized by accurate counting of content words, often ignoring functional words or combining with preceding or the following word to make it as a word unit. Otherwise, the multi-syllable words within the sentence were counted correctly than the mono-syllable words. However, these errors reduced with grades and found to be highest in Grade I and lowest in Grade III, indicating the gradual maturity of word awareness and increased reliance on the word concept irrespective of suprasegmental constraint. Similar findings were reported earlier in Russian preschool children between three and a half to seven years of age²⁰. In monolingual English group it is indicated that, since the words are salient compared to syllable and phonemes, children develop phonological awareness at sentence level much before the school entry²¹. A possible explanation for the continued development of word awareness skill evidenced in the present study could be due to limited oral language skills in English during the school entry, with the acquisition of phonological representations at word level which is underway for the alphabetic language besides home language. Thus, it signifies that the word awareness emerges much before Grade I and continues to develop beyond Grade III³.

CONCLUSION

Based on the findings of the present study, it can be concluded that there is a clear indication that, there is a significant increase in word awareness skills with Grade suggesting the prevalence of active development in ELL during the first three years of schooling.

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Twenty Years' (1996-2015) Trend in Lightning-related Deaths in the Transkei Sub-region of South Africa

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ABSTRACT

Background: Lightning is the number one cause of weather-related death in the Transkei region of South Africa. Endemic poverty and illiteracy are the important contributors to the incidence of these deaths.

Objective: To study 20 years' trend in lightning-related deaths in the Transkei sub-region of South Africa.

Method: A record review descriptive study was undertaken of all medico-legal autopsies performed from 1996 to 2015 at Mthatha Forensic Pathology Laboratory.

Results: In total, 22 952 medico-legal autopsies were conducted at Mthatha Forensic Pathology Laboratory from 1996 to 2015. Of these, 465 (2.02%) were caused by lightning. This gives an average of 0.39 lightning-related deaths per million of the population in this region every year. The highest rate was 0.8 per million recorded in 2007, and the lowest was 0.15 per million in 1997 and 2013. Males outnumbered females at a ratio of 1.4: 1. Thirteen percent (13%) of the victims of lightning were young children of 10 years old or below in this study.

Conclusion: The number of lightning-related deaths has increased by more than one and a half times in the last 20 years (1996-2015) in the Transkei sub-region of South Africa.

Keywords: *Lightning, unnatural, disability, death*

INTRODUCTION

Worldwide, approximately 2000 thunderstorms occur every second.¹ It is estimated that a lightning flash occurs approximately 8 million times per day throughout the world.² Africa, South America and Southeast Asia have as many as 4 billion people who are vulnerable to the threat of lightning, as people are living in unsafe structures. If the annual rate of six fatalities per million is used for four billion people, a total of 24 000 deaths caused by lightning per year is calculated.³ If there are 10 injuries for every death, then 240 000 injuries occur every year in these areas.⁴ Lightning injury is associated with a global mortality rate of 1000 deaths per year, and is the second most common cause of weather-related deaths in the United States.⁵

In the early 1900s, the lightning fatality rate in the United States was six per million.⁶ In recent years, the

fatality rate has dropped to under 0.3 per million.⁷ This has happened because of the population shifting to urban areas, industrialisation of agriculture and improvement of construction.⁷ A similar reduction has occurred in developed countries.⁷ In Europe lightning kills a tiny fraction of the population each year, about 0.2 people in every 1 million, whereas in parts of Asia and Africa the number of lightning deaths may be 100 times higher. In Zimbabwe it is around 20 per million. In Malawi it is 84 people per million. While lightning may seem to strike and kill at random, it is mostly a problem of the poor.⁸

In South Africa it is estimated that between 1.5 and 8.8 people per million of the population are killed by lightning every year. If the population size of South Africa is taken to be 50 million, this means that between 75 and 440 people are killed by lightning annually.⁹ Lightning kills more people than other natural disasters such as floods, hurricanes and tornadoes, but

because lightning usually kills people one at a time, it tends to be an underrated hazard.¹⁰New research determining the impact of climate change on the world's lightning and thunderstorm patterns has found that for every one degree Celsius of long-term warming there will be a near 10 percent increase in lightning activity.¹¹ Lightning strikes are also a leading cause of wildfires and have been responsible in the past for some of the most devastating blazes in the south-west.¹²The purpose of this study is to highlight the problem of deaths related to lightning strikes in the Transkei sub-region of South Africa, and to relate these findings to different age groups and genders.

Subjects and Method

The retrospective descriptive study was carried out from the records of the post-mortem register of Mthatha Forensic Pathology Laboratory from 1996 to 2015. In total 22 952 autopsies were conducted between 1996 and 2015 and recorded in the post-mortem register at this laboratory. Between 1996 and 2015 the laboratory dealt with 465 victims of death as a result of lightning. In one case no age could be found in the post-mortem register, therefore this case was ignored and not taken into account in the age group study. Abortion cases (165) were also omitted in the category of unnatural deaths. In 2005 there were five police stations to be taken into account. Therefore, the population in the area of this study has increased. Population statistics were calculated with the help of the South African Statistics Department

in Mthatha. However, it is difficult to estimate the total population involved. The data were collected in hard copies designed to reflect post mortem number, year, gender and cause of death. These data were transferred to the Excel computer program and analysed with the help of the SPSS computer program.

RESULTS

In total 22 952 medico-legal autopsies were conducted at Mthatha Forensic Pathology Laboratory from 1996 to 2015. Of these, 465 (2.02%) followed deaths caused by lightning (Figure 1). This gives an average of four deaths (0.39) per million of the population annually in this region (Table 1). The highest rate of 0.8 per million was recorded in 2007, and the lowest, 0.15 per million, was observed in 1997 and 2013 (Table 1). Among males, the highest rate of 0.35 per million was recorded in 2005, and the lowest rate, 0.4 per million, occurred in 1997, while among females 0.39 per million was found in 2007 and 0.04 per million in 2013 in this study (Table 1). Males outnumbered females at a ratio of 1.4: 1 (Table 2). The highest percentage (31.46%) of deaths was recorded among young people between 11 and 20 years of age (Table 2). The number of lightning-related deaths was higher among males in all age groups, except above 80 years of age (Table 2). About 13% of victims were young children of 10 years old or below and only 0.86% were old people above the age of 90 years in this study (Table 2).

Table 1. Incidence of lightning related deaths in Transkei sub-region of South Africa by gender (1996-2015).

Year	Population estimated	Females (n= 192)		Males (n=273)		Total (n=465)	
		No. death	Death/million	No. death	Death/million	No. deaths	Death/million
1996	439 091	2	0.05	7	0.16	9	0.21
1997	452 264	5	0.11	2	0.04	7	0.15
1998	465 832	8	0.17	11	0.24	19	0.41
1999	479 807	11	0.23	11	0.23	22	0.46
2000	494 201	8	0.16	9	0.18	17	0.34
2001	509 027	2	0.04	6	0.12	8	0.16
2002	524 298	7	0.13	11	0.21	18	0.34
2003	540 027	4	0.07	7	0.13	11	0.2
2004	556 227	8	0.14	12	0.22	20	0.36
2005	572 914	14	0.24	20	0.35	34	0.59

2006	590 102	10	0.17	16	0.27	26	0.44
2007	607 805	24	0.39	25	0.41	49	0.80
2008	626 039	15	0.24	24	0.38	39	0.62
2009	644 820	12	0.19	22	0.34	34	0.53
2010	664 165	15	0.23	25	0.38	40	0.61
2011	684 089	21	0.31	13	0.19	34	0.5
2012	704 612	7	0.10	12	0.17	19	0.27
2013	725 751	3	0.04	8	0.11	11	0.15
2014	747 523	6	0.08	17	0.23	23	0.31
2015	769 949	10	0.13	15	0.19	25	0.32
Average	589 927	9.6	0.16	13.7	0.23	23.3	0.39

Table 2. Lightning-related deaths in different age groups among both genders in the Transkei sub-region of South Africa from 1996 to 2015 (n=464).

Age groups	No. of males (%)	No. of females (%)	Total (%)
1-10	37(7.97)	23(4.95)	60(12.93)
11-20	97(20.9)	49(10.56)	146(31.46)
21-30	42(9.05)	28(6.03)	70(15.08)
31-40	25(5.38)	23(4.95)	48(10.34)
41-50	20(4.31)	27(5.81)	47(10.12)
51-60	16(3.44)	16(3.44)	32(6.89)
61-70	16(3.44)	10(2.15)	26(5.6)
71-80	15(3.23)	10(2.15)	25(5.38)
81-90	3(0.64)	3(0.64)	6(1.29)
>90	3(0.43)	2(0.43)	4(0.86)
Total	273(58.83)	191 (41.16)	464 (100)

DISCUSSION

This is a second report by the author in order to a deeper analysis according to the pattern of the world rate of death by lightning. Lightning is one of the major forces behind shaping mountains such as the Drakensburg Mountains in South Africa.¹³ Lightning, at temperatures of up to 54 000°F (almost 30 000°C), can burst rocks in milliseconds.¹³ Lightning-related deaths affect poor Transkeian communities, as they are

living in hilly rural areas, where there is always a danger of lightning. Poor people are always at high risk of lightning deaths, as their houses are poorly constructed and therefore they are unsafe.⁷ Poor people, men, women and children, regularly move out of their shelters in search of wood for fire and drinking water from nearby rivers. The Transkei region is one of the poorest parts of South Africa. Seventy-three percent of the rural people in the Eastern Cape were living on less than R300 per month in 2005/2006, and more than half of them on less than R220 per month.¹⁴

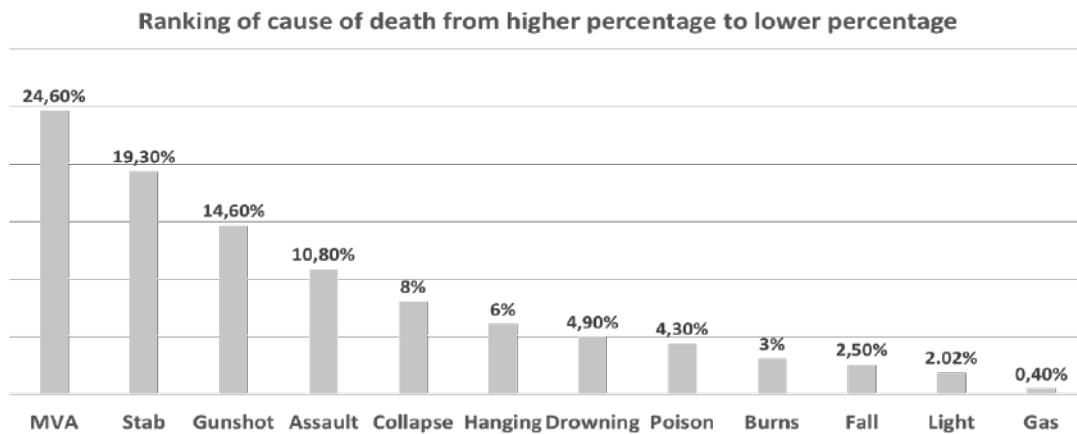


Figure 1. Ranking of percentage of cause of death in the Transkei sub-region of South Africa from 1996 to 2015 (n=22 952).

Lightning is the number one cause of weather-related death in the Transkei region of South Africa and ranks 11th in the list of causes of unnatural death in the Transkei sub-region of South Africa (Figure 1). About 24 000 people globally are killed by lightning every year.³ In this study 465 were killed over a period of 20 years, with an average of 23.3 deaths every year, contributing 0.97% of global deaths (Table 1). South Africa loses approximately 80 to 100 people per year due to lightning strikes.⁹ It means about a quarter (23.3%) of South African lightning deaths occur in the Transkei sub-region (Table 1). This indicates that the region is at high risk of lightning deaths. There is a need to explore the underlying factors contributing to these deaths. In developing countries, the incidence of lightning-related deaths is also higher, especially in rural areas, because of the lack of sufficient shelter against lightning.⁹ The Transkei region of South Africa is such a region where people are living in extreme poverty,¹⁴ and therefore cannot afford safe shelters.

The average rate of lightning deaths recorded was 0.39 deaths per million of the population per year in this study (Table 1). This figure is within range of the international average. Yearly worldwide death rates from lightning range between 0.2 and 1.7 per million of the population.¹⁵ In the United States, the reported rate is 0.42 deaths per million people per year, ranging from 0.3 to 2 per million people.³ The Australian death rate is 0.21 lightning-related deaths per million of the population.¹⁶ The highest rate of 0.8 per million of the population was recorded in 2007, and the lowest of 0.15 per million in 1997 and 2013 in this study (Table 1). It is difficult to explain this wide difference of 0.65 per million of the population in lightning fatalities in this

study (Table 1). Eriksson and Smith reported (1986) a mean rate of 1.5 deaths per million inhabitants among a largely urban population and 8.8 in a rural population during a four-year period.¹⁷ This is also difficult to compare, as there is a paucity of published data in South African medical literature on deaths related to lightning.¹⁸ Most reports come from the media without any authentication of data. Males are more frequently victims of lightning strikes than females in this region. For every three men involved, two women are struck by lightning, at a ratio of 1.4:1 in this study (Table 1). Males are more mobile, as they have to find food outside the home, and females generally cook it. In rural Xhosa communities, the women also work in fields and cook the food in open kitchen in rural area. Males are also more prone to risk-taking behaviour. This is consistent with most unnatural deaths, where males are more often victims than females.¹⁹ It is also consistent with the observation that young males between 11 and 30 years are more vulnerable to non-natural death.¹⁹

About one third (31.46%) of lightning-related deaths were recorded in the age group of 11 to 20 years in this study (Table 2). The reason is not known, but probably this age group is more likely to be outside in harsh weather than other age groups. It is surprising that in this age group (11-20 years), males were twice (20.9%) more often victims of lightning strikes than females (10.56%) (Table 2). Only 0.86 percent of lightning-related deaths were found among elderly age groups in this study (Table 2). It is understandable that this age group generally lives inside the house most of the time, and therefore they were relatively more protected from lightning deaths than the young age groups. Moreover, there is no gender difference in lightning deaths after

the age of 80 years, as an equal percentage of deaths occurred among both genders in this study (Table 2).

Several factors contribute to lightning deaths, but the main factors are poverty and illiteracy, which are entwined. There is also a misconception about lightning and witchcraft, which is caused by lack of education in this community. A few elderly women are killed every year on suspicion of witchcraft when there has been a lightning strike and somebody has been killed.²⁰ For any type of tragedy in the community, they immediately blame witchcraft activity. This belief is mainly propagated by the witchdoctors in that area, as they cannot explain the reason for tragedies such as lightning deaths.²⁰ The practice of witchcraft is mainly prevalent in rural areas, among the illiterate people of the region. Lightning has a great impact in the community. The most important societal impact from lightning is the annual deaths due to lightning. Lightning can also damage houses and livestock such as sheep and cattle, which in fact constitute the only wealth of the poor Xhosa community in this region. By 2009, the United States was experiencing damage due to lightning exceeding \$1 billion each year, while in 2008 South Africa reported damages of more than R500 million a year.⁹ Lightning will strike far more frequently in a world under climate change, but researchers can still not predict exactly where or when those strikes will occur.¹² One has to learn from countries such as the United States and Europe, where the incidence of deaths related to lightning was very high in 1900, but has come down to very low through providing safer houses and educating people on how to protect themselves from lightning strikes.⁸

CONCLUSION

The rate of lightning-related deaths has increased more than one and a half times in the last 20 years (1996-2015) in the Transkei sub-region of South Africa. About two-third (59.7%) of victims were young, 30 years of age or younger. Predominantly (37.92%) males were victims of lightning deaths in this study. Poverty and illiteracy among the people in this region are contributing factors in lightning deaths. Climatic changes could prompt more thunderstorms and therefore more frequent lightning strikes. Preventive steps must be taken to provide safer houses and particularly to educate the community, who hold traditional beliefs and are often completely unaware of what causes lightning and how they can protect themselves and their possessions.

Conflict of Interest: None

Source of Funding: Self

Ethical Issue: The author has ethical permission for collecting data and publication (approved project No. 4114/1999) from the Ethical Committee of the University of Transkei, South Africa.

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Effects of Ambient PM_{2.5} Exposure on Lung Function Disorder in Community around Construction Industry

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ABSTRACT

Background : Previous studies have reported adverse effects of fine particulate on lung function. However, there has not been much research conducted in the construction industry area.

Objective : The study was to determine the relationship between exposure of ambient PM_{2.5} concentrations to lung function disorders in the ready-mix industry area.

Material & Method : The research used a cross-sectional study on sample size of 100 respondents. It was divided into two regions which were determined based on the dominant wind direction. Ambient PM_{2.5} concentration was measured using gravimetric method, and pulmonary function used a portable spirometry.

Results : PM_{2.5} concentration was obtained above the average of NAAQS provision (0.041 mg/m³). There was no significant association between lung function disorder and the average PM_{2.5} concentration both site A (p=0.583) and B (p=0.321), but from smoking behavior, there was a significant association with lung function disorder. This study found no evidence to suggest that living in the area of ready-mix industry is a major determinant of lung function disorder. Further research is needed to see early indications of health effect using other chemical methods and parameters.

Keywords: PM_{2.5}, lung, particulate matter, ready-mix

INTRODUCTION

Air pollution is one of the global problems that occur in almost all countries in the world and tends to increase every year. WHO said around 92% of the world's population live in places with air quality levels that exceed the safe threshold¹. Air pollution is a major environmental risk factor affecting human health in both developed and developing countries². Exposure to air pollutants may cause various health effects depending on the composition of contaminants (various particles and gases), exposure levels, duration, and frequency of exposure, as well as the associated toxicity of specific pollutants³. Urban ambient air pollution is a complex

mixture of gases and particles. Although several gases are irritants, it is widely assumed that particles play the crucial role in cardio-respiratory health effects of air pollution⁴.

The construction industry is still considered an important source of atmospheric pollution due to particulate matter emissions, causing negative impacts on human health and the environment⁵. Besides that, it has been investigated the adverse effect of traffic-road-related particulate matter (PM) on human health⁶. Particulate matter less than 2.5 µm in diameter (PM_{2.5}) is an important concern because the particulate can freely enter the respiratory tract and settle in the alveoli.

Worldwide, it is estimated that air pollution caused by PM_{2.5} in the atmosphere is responsible for approximately 0.8 million premature deaths and 6.4 million years of life lost annually⁷. Another research in Cement industry, Padang City, Indonesia found that PM_{2.5} exposure showed that less than 2.5 km of location

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at risk to society⁸. The exposure of PM₁₀ in ready-mix industry area of PT. X Plant Kebon Nanas posed a risk to the industrial workers⁹. Lung function is a noninvasive measure of pulmonary health and has been frequently used in previous studies to assess the health effects of air pollution⁴.

According to Basic Health Research (RISKESDAS) 2013, it was found that the prevalence of upper respiratory tract infections (URI) cases in Indonesia was 25%¹⁰. URI and other respiratory tract disorders are caused by low biological, physical and chemical of home air quality both inside and outside. Based on Jagaraksa health center data period 2015-2016 states that cases of upper respiratory tract infections (URI) always occupy the top position compared to other cases (Puskesmas Jagaraksa, 2018). In this region, there is a ready-mix concrete industry that is large enough and adjacent to the residential population. The detrimental health impacts of PM emissions are not confined to the construction site, since fine particles (particulate matter smaller than 2.5 µm in diameter) can travel further than coarser dust (particulate matter between 2.5 µm and 10 µm in diameter), therefore it could affect the health of people living and work in the surrounding area⁵. High URI cases in Jagaraksa sub-district, one of which is suspected due to the contribution of PM_{2.5} exposure from ready-mix industry activities in Lenteng Agung area, South Jakarta. But not many studies that assess the risk of respiratory disorders in communities around the industry. Our study objective was to analyze the effect of PM_{2.5} exposure on lung function disorder in the community living in areas of the construction industry in Lenteng Agung, South Jakarta.

METHOD

Design and study participant

This study was an analytic observation with a cross-sectional design. It was conducted on 100 people who take daily activity around ready-mix industrial area, Lenteng Agung, South Jakarta in April - June 2018. The study participants were randomly selected, more than 17 years of age, having good health condition. We excluded people who have the history of respiratory disorder such as asthma and bronchitis. Anthropometry measurement, smoking status, family history of smoking, kitchen ventilation, and environmental tobacco smoking exposure were collected.

Ambient PM_{2.5} Concentration Measurement

PM_{2.5} concentration was measured using High Volume Air Sampler (HVAS) by gravimetric method¹¹ at 10 points in 1 hour at each observation point in the study area. Distribution of air sampling test results was grouped into location A and B. Location A was taken based on dominant wind direction from the data from the Climatology and Geophysics Meteorology Agency (BMKG) in May - June 2018, which comprised 4 points (point 1 to 4). Location B consisted of the points (point 5 to 10) which locations closest to the source of pollutants and the traffic road.

Pulmonary function test

Pulmonary function test was carried out in the participant's residence by using calibrated portable spirometry. Spirometry was used to measure the forced expiratory volume in 1 second (FEV₁), forced vital capacity (FVC), and FEV₁/FVC ratio. The respondent's body weight and height were measured using standard digital body scales and microtoise. Spirometry results were processed manually using the numerical data contained in the table of normal pulmonary values according to age and height of Indonesian¹², after the calculation it would result in the presentation of FEV₁ and FVC. Furthermore, the researcher categorized the final results where the ratio percentage of FEV₁/FVC ≤ 70% was included as a pulmonary disorder.

Data analysis

The data was processed and presented through a descriptive analysis, and chi-square test to identify the relationship between the dependent and independent variable. The relationship was considered as significant if the p-value was < 0.05.

RESULTS

Based on the monitoring of PM_{2.5} air quality test over 10 points, the highest concentration of 0.091 mg/m³ located at point 1, the value with the lowest concentration was point 3, which was 0.032 mg/m³ (Table 1). Point 1 was the location closest to the ready-mix industry so that the highest PM_{2.5} concentration was obtained compared to other measurement points. In addition, the area was the dominant wind direction from the data from the Climatology and Geophysics Meteorology Agency (BMKG).

Tabel 1. The concentration of ambient PM_{2.5} industrial area, Lenteng Agung, Jakarta

Air Sampling Site	PM 2.5 (mg/m ³)	Distance to Industry (m)	Wind direction
Sample 1	0.091	200	Northwest
Sample 2	0.037	600	Northwest
Sample 3	0.032	1000	Northwest
Sample 4	0.037	1400	Northwest
Sample 5	0.040	200	North
Sample 6	0.046	400	North
Sample 7	0.064	200	East
Sample 8	0.037	400	East
Sample 9	0.048	200	South
Sample 10	0.043	400	South

The overall distribution of data used for the calculation of risk analysis of PM_{2.5} concentration was the median value of 0.041 mg/m³. A median value of 0.037 mg/m³ was used to determined the level of concentration at location A and the average value of 0.0463 mg/m³ at location B. Based on age, people under the age of 45 years were at risk of lung function disorder by 4.48 times higher than people aged over 45 years. Women had 5.84 times higher risk of lung function disorder than men. According to the smoking status, people who smoked were 4.14 times more likely to experience lung function disorder compared to non-smokers. The effects related to body weight, height, family members who smoke, environmental tobacco exposure, and kitchen ventilation were weak or absent (Table 2).

Tabel 2. Characteristic of all study participants with pulmonary function disorder

	N	Lung Function Disorder (N)	Prevalence (%)	P Value	OR
Age, year					
≤ 45	60	16	26.7	0.03*	4.48
> 45	40	3	7.5		
Body weight, kg					
> 60.11	25	4	16.0	0.88	0.76
≤ 60.11	75	15	20.0		
Height, cm					
≤ 158.42	55	12	21.8	0.59	1.52
>158.42	45	7	15.6		
Sex					
Female	65	17	26.2	0.03*	5.84
Male	35	2	5.7		
Smoking status					
Yes	17	7	41.2	0.03*	4.14
No	83	12	14.5		
Family members who smoke					
Yes	55	12	21.8	0.59	1.51
No	45	7	15.5		
Kitchen ventilation					
Yes	64	13	20.3	0.86	0.78
No	36	6	16.7		
Environmental tobacco smoking exposure					
Yes	65	13	20.0	0.94	1.2
No	35	6	17.1		

OR= Odds ratio, * P-value < 0.05

The association of PM_{2.5} exposure with pulmonary function disorder showed that there was no relationship between ambient PM_{2.5} exposure between site A and B (p>0.05).

Table 3. Association of PM_{2.5} concentration with lung function disorder

Variable	Lung Function				Total	P Value	OR
	Disorder		Normal				
	N	%	N	%			
Site A							
PM2.5 Concentration							
> 0.037 mg/m ³	2	25.0	6	75.0	8	0.58	2.25
≤ 0.037 mg/m ³	4	12.9	27	87.1	31		
Site B							
PM2.5 Concentration							
> 0.046 mg/m ³	6	30	14	70	20	0.32	2.08
≤ 0.046 mg/m ³	7	17.1	34	82.9	41		

DISCUSSION

The measurement of PM_{2.5} concentration at 10 points in the study location resulted in various values. The observation point was getting closer to the ready-mix industrial location, so the concentration of PM_{2.5} was getting higher. When compared to the value of Ambient Air Quality Standard Indonesia Government Regulation this value has not passed the standard quality of 0.065 mg/m³, except point 1, but when we compared with National Ambient Air Quality Objectives Standard (NAAQOS), this value has exceeded the 0.035 mg/m³ quality standard¹³. According to WHO guidelines, this value also exceeds the threshold of 0.025 mg/m³¹⁴. The location of point 1 was the highest PM_{2.5} concentration compared to the others. It was because the location of the measurement point was quite sufficient with the ready-mix industry and it was dominant wind direction. This result was in line with research conducted in Nagasaki, Japan, which stated that meteorological conditions also influence the high concentration of PM_{2.5} in the environment, including wind direction and humidity¹⁵. In addition to its location at a radius of 200 m with ready-mix industry, this point was also adjacent to the main road with busy traffic. Particulate matter from road traffic comes from vehicle emission, tire wear, break-wear and vehicle-induced resuspension of road dust¹⁶.

Statistical analysis showed that age, sex, and smoking status were associated with the incidence of lung function disorder. Age, gender, body size, and ethnicity are strong predictors of lung function⁴. The result showed that under 45 years of age were found to have more lung function disorders. This finding is more because at the age more participants were found smoking. It is strengthened by smoking status, that the prevalence of people who smoke experienced pulmonary dysfunction was higher than those who did not smoke. Smokers have a higher prevalence of respiratory symptoms and lung function abnormalities than non-smokers^{17,18}. Some previous studies have demonstrated the effect of smoking on pulmonary function of adults^{18,19,20}. Gold et al. found in his research that the FEV1/FVC ratio decreased among adolescent smokers²¹. Female respondents were found more in the study area, and most experienced pulmonary function disorder as much as 26,2% compared to male respondents. It was probably due to housewives who were longer exposed to pollution in the neighborhood. Exposure to air pollutants that can cause various health effects is caused by levels, duration, and frequency of pollutant exposures³. Therefore, people who are longer and more often exposed to PM_{2.5} will be more at risk of developing lung function disorders.

In our analysis, the relationship between the concentration of PM_{2.5} exposure with lung function disorder was not found. We found no evidence that living closely to a ready-mix industry area was associated with an increased risk of lung function disorder. Based on the Indonesian Government Regulation concerning control of air pollution, the average value of concentration at the study site was still below the threshold. It is likely that the below-the-threshold concentration affects the absence of the relationship. We found similar results with Pujades-Rodríguez's study that there was no association between living closely to the main road or in an area of increased traffic-related pollution with an increased risk of asthma or COPD²². Another research found that the ambient exposure PM_{2.5} in Tangerang and Makasar was higher than the WHO recommended value limit, but there was also no significant relationship between air pollution and impaired lung function in both cities²³.

The limitations in our study were the measurement time of PM_{2.5} concentration was carried out for one hour so that it could not make the average concentration at 24 hours to observe the highest and also the lowest peak time of PM_{2.5} concentration. However, we have conducted a preliminary study before measuring air pollutant to determine the production time in the ready-mix industry, and measurements were taken when the ready-mix industry was operating. In addition, measurements in the outdoor only also did not represent all of the air inhaled by most participants, which were housewives who could have spent more time in the house or room than the outside.

CONCLUSIONS

In conclusion, we found no evidence to suggest that home proximity to ready-mix industry is a major determinant of the risk of lung function disorder. Further research is needed to see early indications of respiratory health problems using other chemical methods and parameters.

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competing interest.

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The Effect of Nutrition Counseling on Intake of Energy, Protein, and Nutritional Status of Chronic Kidney Disease with Haemodialysis

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ABSTRACT

Background: Haemodialysis patients must get sufficient food intake to remain in good nutritional status, nutrition. Nutrition Counselling is an effort to accelerate the healing process and achieve optimal nutritional status. This study aims to determine the effect of dietary counseling on energy, protein, and nutritional status of Chronic Kidney Disease (CKD) patients with hemodialysis.

Method: This study included analytical research with quasi-experimental research design, which was carried out at general hospital Dr. H Abdul Moeloek Lampung Province. The number of samples was 61 people, consisting of 33 treatment groups and 28 controls. The variables examined were nutritional counseling, energy intake, protein intake, and nutritional status Independent t-test and Mann-Whitney test was employed to investigate the relationship.

Results: In the group that received the nutritional counseling intervention (treatment), poor energy intake decreased by 21.2% compared to the control of only 7.2%. For protein intake, the treatment group of unfavorable protein intake decreased by 6.1%, while the control group did not reduce. Nutritional status is not right in the treatment group while in control it increases by 7.1%. Bivariate analysis showed no significant difference between nutritional counseling with calorie intake, protein intake and nutritional status in both the treatment and control groups.

Conclusion: It is recommended that nutritional counseling is carried out more often by nutritionists to increase the respondent's knowledge and need further research operating variables such as appetite, and the duration of hemodialysis.

Keywords-: Energy Intake, Protein Intake, Nutritional Status, Haemodialysis

INTRODUCTION

Haemodialysis is a process of separating or filtering or cleansing the blood through a semipermeable membrane that is carried out in patients with chronic renal dysfunction⁽¹⁾. Haemodialysis is still the main kidney replacement therapy in addition to kidney transplants in some countries in the world⁽²⁾. Haemodialysis patients

must get sufficient food intake to remain in proper nutrition. Poor nutrition is a significant predictor of death in hemodialysis patients⁽³⁾.

Patients with a chronic renal disease who suffer from malnutrition require higher protein and energy. So it is concluded that the provision of energy intake must be as needed so that the body's tissues do not need to be broken down to produce energy⁽³⁾ and a high-protein diet is intended to maintain nitrogen balance and replace the amino acids lost during hemodialysis therapy⁽⁴⁾.

The results of previous research⁽⁵⁾ in chronic kidney disease patients with obtained the inappropriateness in the energy intake, protein intake, and the nutritional

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status. Similarly the results ⁽⁶⁾ in another Indonesian general hospital, it is obtained the poor proportion of respondents who have poor energy intake and protein intake.

Based on the background above, researchers are interested in researching the effect of giving nutrition counseling on energy intake, protein intake and nutritional status of chronic kidney disease patients with hemodialysis in the hospital of Dr. H. Abdul Moeloek Lampung Province in 2017. The hospital was chosen as the location of the study because it was the highest referral hospital in Lampung Province, Indonesia.

METHODOLOGY

This research is analytical with the quasi-

experimental design of pre-post-test control group design. The population in this study were all chronic kidney disease patients who underwent hemodialysis therapy at Dr. H. Abdul Moeloek Lampung Province. The number of samples was proportionally designed by two populations and met the criteria obtained by the treatment group 33 people and control group 28 people. Univariate data displayed in percentage and to determine the effect of the intervention on the nutritional status of respondents; the Mann-Whitney test was used..

RESULTS

Sample characteristics consisting of gender, age, and education level are summarized in the following table.

Table 1. Sample Characteristics

Variables	Sample				N	%
	Treatment		Control			
	N	%	N	%		
Sex:						
Men	13	39.4	18	64.3	31	50.8
Women	20	60.6	10	35.7	30	49.2
Total	33	100	28	100	61	100
Ages:						
< 40 years	7	10.6	5	17.8	12	19.7
40 – 60 years	19	78.8	21	75.1	40	65.5
> 60 years	7	10.6	2	7.1	9	14.7
Total	33	100	28	100	61	100
Educational level:						
No School	0	0	1	3.6	1	1.6
Elementary	9	27.3	5	17.9	14	23
Junior High	3	9.1	6	21.4	9	14.8
Senior High	9	27.3	10	35.7	19	31.1
University	12	36.4	6	21.4	18	29.5
Total	33	100	28	100	61	100

The table shows that men sample is 50.8%, and the majority is in the age of 40-60 years (65.5%), and the highest education level is junior high (31.1%).

The result of univariate analysis of the variables of energy intake, protein intake, and nutritional status in the two sample groups before treatment and after treatment is depicted in Table 2. The table shows that the knowledge of energy intake in the treatment group increases by 21.2% while in the control group increases

by 7.2%. Also, the experience on good protein intake in the treatment group rises 6.1% while in the control group there is no increase.

Further, The nutritional status of the sample in the treatment group did not change after the intervention, while in the control group malnutrition increased 7.1%.

Table 2. Frequency Distribution of Research Variables Before and After Treatment

Research Variables			Respondents				N	%
			Treatment Group (n=33)		Control Group (n=28)			
			n	%	N	%		
Energy Intake	Before	Poor	31	93.9	25	89.3	56	91.8
		Good	2	6.1	3	10.7	5	8.2
	Total		33	100	28	100	61	100
	After	Poor	24	72.7	23	82.1	47	77
		Good	9	27.3	5	17.9	14	23
Total		33	100	28	100	61	100	
Protein Intake	Before	Poor	25	75.8	20	71.4	45	73.8
		Good	8	24.2	8	28.6	16	26.2
	Total		33	100	28	100	61	100
	After	Poor	23	69.7	20	71.4	43	70.5
		Good	10	30.3	8	28.6	18	29.5
Total		33	100	28	100	61	100	
Nutritional Status	Before	Poor	8	24.2	7	25	15	24.6
		Good	25	75.8	21	75	46	75.4
	Total		33	100	28	100	61	100
	After	Poor	8	24.2	9	32.1	17	27.9
		Good	25	75.8	19	67.9	44	72.1
Total		33	100	28	100	61	100	

The effect of nutritional consultation on energy intake, protein intake, and nutritional status of samples in the treatment group and the control is observable on Table 3.

The table shows that the level of adequacy of energy intake that there is no significant difference in the level of appropriateness of energy intake between the treatment and control groups after the intervention, with a p-value of 0.595. The average percentage of energy sufficiency level after the intervention was 72.5 + 24.21% in the treatment group and 69.1 + 25.19% in the control group.

The independent t-test shows that the level of protein adequacy consumed by the respondents after intervention in the treatment group and control group indicates no significant difference (p-value 0.948) with a mean percentage of protein adequacy level after the intervention was 75.6 + 30.03% in the group treatment and 76.1 + 28.40% in the control group.

Further, before and after the intervention using the Mann-Whitney test showed that there were no significant differences in the two groups, with p-value values p= 0.789 and p= 0.954.

Table 3. Differences in Energy Intake, Protein Intake, and Nutritional Status Before and After Intervention

Research Variables		Treatment (n = 33)	Control (n = 28)	P
		Mean ± SD	Mean ± SD	
Energy Intake	Before	56.3 ± 21.45	54.7 ± 15.42	0.740
	After	72.5 ± 24.21	69.1 ± 25.19	
Protein intake	Before	66.1 ± 32.36	68.6 ± 18.29	0.723
	After	75.6 ± 30.03	76.1 ± 28.40	
Nutritional Status	Before	21.84 ± 2.25	22.07 ± 2.77	0.789
	After	22.67 ± 3.87	22.62 ± 3.91	

DISCUSSIONS

Giving nutritional counseling to CKD patients with hemodialysis can increase the number of good energy intake because the CKD patients with hemodialysis must get sufficient food intake to remain in proper nutrition. Poor nutrition is a significant predictor of death in hemodialysis patients. The results of good protein intake where all samples can reach 29.5% indicate a better achievement compared to the effects of previous research^(5,6).

The sharp protein intake in 31 treatment respondents increased by 6.1% before treatment, while in the control group there was no increase or decrease in good protein intake. This way, giving nutritional counseling to patients with CKD with hemodialysis also can change the number of inadequate protein intake into a better one. So it is recommended that nutrition counseling is more often done by nutritionists to increase the knowledge of patients with the hope that the protein intake can become better.

After the research, the decline in good nutritional status occurred in the control group, while the treatment group did not change the nutritional status. Thus, it can be concluded that the provision of nutritional counseling can prevent the decline in the good dietary state of CKD patients with hemodialysis, considering that patients with CKD tend to experience weight loss due to complaints of nausea and no appetite (anorexia) that often occur in patients⁽⁷⁾.

The differences in the level of adequacy of energy intake and protein intake before and after treatment samples were analyzed by independent t-test obtaining no significant differences between treatment groups and control groups with values p-value of 0.595 for energy intake and a p-value of 0.948 at the level of protein intake. Further, the differences in the state of the nutritional status of the sample before treatment and after treatment were analyzed by test Mann-Whitney denoting there was no significant difference between treatment and control groups with p-value values $p = 0.789$ and 0.954 respectively.

Although the results of this study did not show a significant difference in the intervention in the form of providing nutritional counseling services to energy intake, protein intake, and nutritional status of respondents, based on univariate analysis, there

was a better condition in the treatment group than the control group. The increase in good energy intake in the treatment group was 21.2%, while the rise in good energy intake in the control group was 7.2%, as well as an increase in good protein intake in the treatment group at 6.1%, while in the control group there was no increase in intake percentage good protein. In the nutritional status, the treatment group did not change the nutritional status percentage, while in the control group there was a functional decline in nutritional status from 75% before the study, to 67.9% of respondents with good nutritional status.

The success of nutrition counseling service activities is strongly influenced by patient compliance in undergoing diet therapy⁽⁷⁾, but from various studies in Indonesia mainly, shows that adherence to treatment of chronic diseases is generally low^(8,9,10). Thus, further research is needed on the things that affect the success of nutritional counseling services in CKD patients with hemodialysis.

CONCLUSION

Nutrition counseling services by nutritionists for Chronic Kidney Disease (CKD) patients with hemodialysis must be improved in terms of quantity and quality of service. Considering that CKD patients with hemodialysis mostly experience the decrease in appetite, it is expected that the family will motivate and pay attention to the patient's food intake. Further research needs to be done on other factors such as appetite, duration in hemodialysis, adherence to diet and gender therapy with nutritional status in patients for CKD patients with hemodialysis.

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Conflict of Interest: Nil

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Association of Physical Workload with Salivary Cortisol in Clinical Pharmacist

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ABSTRACT

Objectives: Identify physical workload, identify salivary cortisol levels in clinical pharmacist, analyze physical workload and cortisol levels in clinical pharmacist **Method:** using calorimeter HR watch to measure physical workload specifically for work metabolic, and using ECLIA method to measure salivary cortisol **Results:** There was a 47.1% correlation between physical workload and cortisol levels.

Keywords : Pharmacist, Workload, Stress, And Salivary Cortisol.

BACKGROUND

Prolonged negative stress can affect physical and psychological health. Its called distress, can affects the intentions, appearance and daily behavior while working, if the level of distress increases in a company and industry, then there will be decreased performance and the emergence of several diseases caused by stress²⁷. Reaction to stress, in the defense mechanism of the body, physically and psychology known as General Adaptation Syndrome (GAS)²⁷. There are consist of, the first stage is the alarm stage, then the stage of survival and fatigue stage²⁷. At the alarm stage is notification to the body about events that are not in accordance with the expectations, it is necessary to adjust psychologically by physiological coping and adjustment mechanism, where this phase of the body began to secrete hormones for defense. In the autonomic nervous system there are two processes that must run simultaneously when the stress is approaching, the sympathetic nervous system that makes coping mechanisms and parasympathetic nervous system responsible for the increase of the hormone cortisol²⁷.

When stress comes, the kidney-parasympathetic kidney system (the adrenal cortex) secretes excessive hormones through the central nervous system of the pituitary gland. The hormone cortisol will affect the metabolism of proteins, carbohydrates and fats in the body. The protein synthesis is reduced and glucose production is enhanced by the mobilization of glycogen reserves, as well as the release of fatty acids into the blood. As a result of these changes, the body can adapt to stressful pressures that threaten it, and therefore cortisol plays an important role in the metabolism of carbohydrates. The effect of catabolism from cortisol causes the inhibition of protein formation of amino acids, whereas glucose conversion is accelerated, whereas potassium increases excretion by maintaining electrolyte and water balance.

Measurement of cortisol in the body especially in the salivary glands has been set as a bio indicator of individual stress response²⁰. There is a significant relationship between cortisol in saliva and the hormone cortisol in the body²⁸. Cortisol in saliva occurs as a result of activation by the adrenal cortex gland at the alarm stage of the general adaptation syndrome process. Therefore long-lasting stress will continuously increased with very different levels as normal cortisol as usual in the body. This will cause changes in function and hormones in the body that should be in a state of normal and down at night but levels remain high at night, especially the hormone cortisol¹¹.

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The greatest factor of job stress in the pharmaceutical worker is the result of much work to be done. That Caused also by a change of mindset and the times, of which initially only aimed for an increase in drug services turn out to be an increase in services to patients¹³. In Johnson et al (2014) study due to overworked workload and the large number of duties of pharmaceutical workers, the turn-over rate increased as well as the occurrence of burn-out syndrome due to the very defeat, causing illness to the pharmaceutical workers. Physiologically, when pharmaceutical workers, are required to work effectively and efficiently, the body will release hormones to match the workload. The hormone release cortisol that is needed in the metabolism of carbohydrates and fats for energy formation will soon be adjusted to the needs of the worker's body. This situation is abnormal if the load exceeds the limit that is given that could not be tolerated to cause mental and physical stress, and ultimately change concentrations several hormones in the body quickly¹¹. The level of salivary cortisol before work and after work can be a biomarker of stress level of physical and mental effort pharmacy so that mistakes in work such as medication errors, and achieve productivity with efficiency and effectiveness in working on the recipe and do not damage the health of workers .

MATERIALS AND METHOD

The study conducted in Pharmacy Installation of Bhakti Dharma Husada General Hospital, Surabaya, East Java province, Indonesia. Population of the study were clinical pharmacist under the pharmacy installation, and worked on emergency unit, outpatient unit, inpatient unit, and drug warehouse, with total population of 20 clinical pharmacist. The variables in this study were cortisol in saliva as dependent variable, and physical workload as independent variable. The physical workload is measured using calorimeter HR watch. The calorimeter used for 4 hours as long as they work. Levels of salivary cortisol were measured using the ECLIA method (electron chemo luminescent immune assay) taken during and before work.

RESULTS AND DISCUSSION

Pharmaceutical activity such as pharmaceutical preparation, medical devices and medical consumables and clinical pharmacy services demanding very heavy and exhausting physical and mental activity. As a result of physical and mental activity there is an imbalance between

the tasks that must be done by pharmaceutical personnel with physiological capacity owned by pharmaceutical workers. This imbalance causes adaptation mechanism. At the time of the adaptation mechanism the body will activate the HPA axis, by producing a large cortisol and channeled to several organs for use as a mechanism of body adaptation to workload. This is done so that the body can perform metabolic processes to produce enough energy to meet the physical and mental demands of pharmaceutical personnel.

Physical work is an activity to complete a job requiring physical energy in the human muscle that will serve as a source of energy. Physical work will be entirely dependent on human efforts that serve as a source of energy and work control. Physical demands on pharmaceutical workers such as work stations, workplace layouts, work tools and equipment, working conditions or workplace, work attitude. Physical demands require muscle work during the working period, and energy consumption is a major factor in making the benchmark determinants of weight / light of a job.

The physical work load measuring instrument uses the ultimate gear calorimeter watch. Pharmaceutical workers in pairs of these tools when they start to work and released after the respondents use these watches for 4 hours they work. This HR watch calorimeter works by keeping track of the calories released by the user's body, the calories in the can from the results of metabolism. Metabolism is a chemical process to change some substances especially carbohydrates out heat, that heat will be recorded by the calorimeter. The metabolic process is strongly influenced by the body area then height and weight data is required. If the metabolism process occurs then the activation of HPA axis also occurs, because HPA axis is the activating process of metabolism.

The results of measurements of 16 pharmaceutical workers to remove calories of 100 -200 calories and included in the category of light workload, while 4 people remove calories from 201 to 350 calories and included the category of medium workload. Pharmaceutical work is a category of light work, because pharmaceutical work does not require much muscle activity. The results of the observation of the respondents are more like entering patient data, preparing recipe and communication to fellow colleagues. Activities that are not in a sitting position are when taking drugs on shelves, in warehouses,

counseling with patients and distributing drugs to the spaces and visit with other colleagues.

The measurement of the physical workload using the calorimeter becomes less precise because the number recorded on the monitor is the heat released by the body due to metabolism, while the pharmaceutical work in the cold and moist heat, so that the release of body heat is hampered by cold room. The cold room is required to maintain the stability of drugs stored in the same room where the pharmacy works. Physical workload will produce fairly accurate results if measured not only calories, but calculate the overall energy needs¹⁰. Energy requirements are needed for basal metabolism, metabolism rest and metabolism work.

The result of statistical analysis, the correlation coefficient of kendall-tau obtained is 0.228, with the strength of the relationship of 47.1%. Correlation coefficient is a test to see how the relationship between independent and bounded variables. Coefficient is 0.228 can be said to be closer to the number 0 which means having a weak relationship, with the strength of the relationship is only 47.1%. The relationship between the variables is weak because the researchers only perform the measurement of 1 metabolism results alone, while for measure physical workload in need calculate the total metabolism. Levels of cortical have metabolic functions throughout the body so it needs to be measured overall as basal metabolism and rest should also be measured. The researchers did not make the measurements because of the limitations of pulse measuring devices, heart rate measurers, and health workers in hospitals unlike workers who have hours of rest because the service to patients is preferred if doing a complete measurement will disrupt the pharmaceutical job.

Results from the measurement of cortical levels 20 pharmaceutical population of 5 people had elevated levels of cortical after work. When viewed from the workload that tends to be mild and moderate, 5 pharmaceutical workers are producing excessive levels of cortical. This abnormal level of cortical may occur because the pharmaceutical worker must continue to perform all of the pharmaceutical work to serve the patient, other peers, while in the body continuously activates the HPA axis pressure, causing cortical levels that do not follow the rhythm diurnal with the level high because it always activates cortical secretion.

According to Manauba (2000), task demands in this case the task and material characteristics, organizational characteristics and environmental characteristics must be balanced with a person's work ability, if the demands of work are too low or too high will cause stress. Judging from the demands of pharmaceutical work is in need of speed and accuracy, while the physiological ability of the pharmaceutical workers is cortical levels in abnormal circumstances, there is an upside down situation. This situation is turning to prepare a work full of pressure so that the body is always vigilant. Jobs that are too low because of the work of pharmacy is a job that is not much use of muscle, so that energy is not much for physical activity but mental activity, so it needs to do a review related to the pharmaceutical task in do 5 people. Working efficiently is expected to increase the rest time so that it can be productive again, while not working for 1 month, it is necessary to reduce the task because the pharmaceutical worker is still in the process of adjusting the given task.

CONCLUSION

Physical workload for clinical pharmacist in pharmaceutical installations in hospitals account for 16 pharmaceutical workers have calories of 100 - 200 calories in the category of light workload, while 4 people have calories from 201 to 350 calories and in the category of medium workload There is a weak correlation between the physical workload is 0,228 with the strength of the relationship is only 47.1%.

Conflict of Interest: None

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Ethical Clearance: The research proposal has been approved by Health Research Ethical Commission of Public Health Faculty Airlangga University, number: 540-KEPK. All respondents were given explanation and information about the purposes and methods of the research, and also had signed informed consent forms.

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Knowledge and Attitudes of Nursing Staff in AL-Suwaira General Hospital about Cervical Cancer

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ABSTRACT

Objective(s): To assess level of knowledge and attitude to nursing staff about cervical cancer in Al-Suwaira general hospital.

Material and Method: A descriptive cross-sectional study using questionnaire include (150) female nursing staff selected from Al-Suwaira General Hospital. Sampling technique was simple random sampling. The data collection through direct interview by researcher with each sample lasted from 5th December 2017 to 1st March 2018. The study was approved by the Center Ethical Committee. The data analysis methods used in order to examine and evaluate the results of study by applied (SPSS) program: Frequency distributions, percent and mean of score were calculated to illustration nurse's knowledge and attitudes about cervical cancer.

Findings: This study indicated that (68.0%) of respondents recognized that Pap smear is used for recognition of cervical cancer. Only (31.3%) knew human papilloma virus infection as a risk factor, (60.7%) knew that cervical biopsy is used for diagnosis of cervical cancer, most of participants were (60.7%) knew the Pap smear test that can be used for prevention of cervical cancer. Approximately (70.0%) believed that cancer in cervix treated by Chemotherapy, (65.3%) were in absence of indication to responses for not screening patients and (65.3%) were no reason to reasons for not getting self-Pap smear. In all responses were inadequate knowledge of cervical cancer and negative attitude.

Conclusions: The majority of nursing staff in Al-Suwaira general hospital may have inadequate knowledge and their negative attitude about cervical cancer.

Recommendations: Emphasis on routine training through health education programs by seminars, lectures and courses about cervical cancer on a regular basis or as part of the orientation program for female nursing staff.

Keywords: Cervical cancer, knowledge, Nursing staff, Attitude.

INTRODUCTION

Cervical cancer is disease of public health concern world-wide. It's kind of cancer that arises in the cells of cervix that is inferior part of uterus that connect to vagina [1]. It's second greatest common cancer amongst women world-wide and appraised 530,232 new cases and 275,008 deaths, approximately 86% of cases arise in developing countries, representative 13% of female cancers [2,3]. Though, it's considered one of the most avoidable cancers. Population based cervical smear screening programs for cancer in cervix have shown the effectiveness of screening in decreasing mortality

[4]. Greatest woman with cervical cancer in countries existing with progressive disease, resultant in little cure rates. Numerous reasons contribute to great burden of disease and advanced phase at presentation including lowly knowledge about disease additionally there is an absence of screening amongst overall population [5].

Cervical cancer is essentially produced by persistent infection with certain kinds of human papillomavirus (HPV) are responsible for nearly 70% of cervical cancer cases in whole countries around the world [6,7]. Traditional hazard reasons for increasing cervical cancer such as numerous sexual partnerships, young

age at first pregnancy,oral-contraceptive use,smoking, immunosuppressive disease and sexually transmitted diseases [8].

Iraq have 10.74 million of population in women at the ages 15 years and older who may be danger of developing cervical cancer. Recent assessments that each year 291 women diagnosed with cervical cancer and die 142 from disease. Cervical cancer positions as 12th most recurrent cancer amongst women in Iraq and the 10th most recurrent cancer in women amongst (15) and (44) years of age [9].

Treatment of cervical cancer reliant on phase of disease, age and medical state of patient, features of tumor.Routes could be monotherapy or combined; they range from ionization of the cervix,simple hysterectomy with or without lymphadenectomy,radical hysterectomy with pelvic lymphadenectomy,pelvic exenteration, chemotherapy, radiotherapy, to palliative chemotherapy. Treatment in the early phase has the greatest prognosis with the maximum cure rates [10].

MATERIAL AND METHOD

A descriptive cross-sectional study carried out (150) female nursing staff selected from AL-Suwaira General Hospital, to study their knowledge and attitudes about cervical cancer. Selection of sampling Technique were simple random sampling were each member of a

population has the similar chance of being included within the sample.The data collection was through the direct interview by researcher with each sample lasted from 5th December 2017 to 1st March 2018.The study instrument (questionnaire) which contain three parts:**Part 1:** Socio-demographic characteristics,the questions in this module contains 4 items.**Part 2:** Nursing Staff knowledge,The knowledge question consist of (34) items, Correct response and incorrect response are distributed with (1, 2 and 3) scoring scale, answered know, not sure and don't know ,correct response were (know) while incorrect response were (not sure and don't know).**Part 3:** Nursing Staff Attitudes,The attitudes question consist of (11) items, assessment by scores scales (Yes, and No) in relative to (1 and 0) respectively.

The data analysis methods were used in order to examine and evaluate the results of the study under application of the statistical package (SPSS)ver. (21):Frequency distributions, percent and mean of score were calculated to display the knowledge and attitudes of nurses about cervical cancer. Knowledge scores ranged from 1–3 and the level of (1 – 2) was set for inadequate knowledge and (2.1–3) for adequate knowledge. The responses of participants over attitudes statement were measured on scores ranged from 1–3, Score of ≥ 1.5 was taken as positive attitude, while < 1.5 as negative attitude.

FINDINGS

Table (1): Distribution of the Socio-demographic Characteristics among samples

Socio-demographic characteristics		F	%
Age	19-23	69	46
	24-28	49	32.7
	≥ 29	32	21.3
	Total	150	100
Marital Status	Married	90	60
	Unmarried	51	34
	Widowed	4	2.7
	Divorced	5	3.3
	Total	150	100

Cont... Table (1): Distribution of the Socio-demographic Characteristics among samples

Educational Level	Nursing Secondary	75	50
	Nursing Institute	47	31.3
	Nursing Bachelors	25	16.7
	Nursing Master and above	3	2
	Total	150	100
Residence	Urban	113	75.3
	Rural	37	24.7
	Total	150	100

F = Frequency, % = Percentage.

Table (1) shows that the majority of sample at the age (19-23) years. The high percentage of participants were (60 %), (50 %) and (75.3 %) for married. "Education of level" at nursing secondary and "Residency" in urban respectively.

Table (2): Distribution the Knowledge of samples about Cervical Cancer

Items	Correct response		Incorrect response	
	F	%	F	%
Cervical cancer is a disease of public health concern	136	90.7	14	9.3
Pap smear used for detection of cervical cancer	102	68.0	48	32.0
If cervical changes are found early they are easily curable	61	40.7	89	59.3
Risk factors of cervical cancer				
The virus that causes the disease, Human Papilloma Virus	47	31.3	103	68.7
Early age marriage	51	34.0	99	66.0
Family history of cervical cancer	51	34.0	99	66.0
Use contraceptives (Intrauterine Device, pills)	50	33.3	100	66.7
Smoking	41	27.3	109	72.7
Poor hygiene	82	54.7	68	45.3
Immunocompromised women	47	31.3	103	68.7
Signs and symptoms of cervical cancer				
Asymptomatic	52	34.7	98	65.3
Foul smelling excessive vaginal discharge	41	27.3	109	72.7
Abnormal vaginal bleeding	46	30.7	104	69.3
Post-coital vaginal bleeding	38	25.3	112	74.7
Dyspareunia	32	21.3	118	78.7
Fever	81	54.0	69	46.0
Headache	84	56.0	66	44.0
Pelvic pain	36	24.0	114	76.0
Post-menopausal bleeding	35	23.3	115	76.7
Who should be screened for cervical cancer				
Married women	42	28.0	108	72.0
Women >= 30 years of age	35	23.3	115	76.7
Women < 30 years of age	42	28.0	108	72.0
Diagnosatic modalities other than pap smear				
Visual inspection after acetic acid application	34	22.7	116	77.3
Colposcopy	40	26.7	110	73.3

Cont.. Table (2): Distribution the Knowledge of samples about Cervical Cancer

Cervical biopsy	91	60.7	59	39.3
Prevention of cervical cancer				
Cervical cancer vaccine	71	47.3	79	52.7
Pap smear test	91	60.7	59	39.3
Hormonal medications	77	51.3	73	48.7
Exercise	82	54.7	68	45.3
Maintain a healthy lifestyle	86	57.3	64	42.7
Stop smoking	47	31.3	103	68.7
Treatment of cervical cancer				
Chemotherapy	105	70.0	45	30.0
Surgery	74	49.3	76	50.7
Radiation therapy	40	26.7	110	73.3

F = Frequency, % = Percentage.

Table (2) this table revealed that knowledge of nurses participants, the number that given a bold pattern illustrate the high percentage of correct and incorrect response.

Table (3):Distribution the Attitudes of samples about Cervical Cancer

Items	Yes		NO	
	F	%	F	%
Responses for not screening patients				
Absence of indication	98	65.3	52	34.7
Lack of vaginal speculum	67	44.7	83	55.3
Speculum examination and pap smear are doctors procedure	69	46.0	81	54.0
Not applicable	58	38.7	92	61.3
Reasons for not getting self pap smear				
No reason	98	65.3	52	34.7
Not feeling at risk	67	44.7	83	55.3
Lack of symptoms	70	46.6	80	53.4
If women is a virgin, pap smear test will affect virginity	74	49.3	76	50.7
Feeling shy to have pap smear	78	52.0	72	48.0
Afraid of outcome	86	57.3	64	42.7
Not applicable	64	42.7	86	57.3

F = Frequency, % = Percentage.

Table (3) shows that the responses for not screening patients, a (65.3%) of respondents thought absence of indication. Regarding to reasons for not getting self-pap smear, most (65.3%) of respondents cited “no reason” for not undertaking a Pap smear test.

Table (4): Measure the level of Knowledge and Attitudes to samples about Cervical Cancer

Knowledge			
Level	M.S	F.	%
Inadequate	1 – 2	118	78.6
Adequate	2.1 – 3	32	21.4
Total	1 – 3	150	100%
Attitudes			
Positive	≥ 1.5	65	43.3
Negative	< 1.5	85	56.7
Total	1 – 3	150	100%

F = Frequency, % = Percentage, M.S = mean of the score.

Table (4) this table indicate that the overall level of knowledge and attitudes to samples about cervical cancer was inadequate knowledge (78.6 %) and negative attitude (56.7 %).

DISCUSSION

Cervical Cancer is avoidable disease and key feature of its prevention is discovery of its premalignant form by screening at an early age [11]. The study showed that most of samples at age (19-23) years, were (46%). According to marital status the highest number of nurses were married (60%). These results were similar to study [12], showed (54.6 %) of participants were married. Relative to educational level a large percentage of nurses were (50.0 %) among nursing secondary. The study incompatible with result [5], suggested that the majority of nurses staff were (87.2%) among Bachelor. This difference may be due to presence of nursing secondary in the district of Al-Suwaira where graduated a number of nursing cadres be employed in the Al-Suwaira general hospital. Regarding to residency the majority of the participants were (75.3 %) in urban. These findings are consistent with previous study [13], found that highest percentage of nursing staff were (60.7%) in urban.

Regarding to knowledge of nursing staff about cervical cancer, from all participants, were (90.7%) knew cervical cancer is disease of public health concern. This result is agreement with results [14], mentioned that the high percentage were (63.2%) aware the cervical cancer is disease of public health concern, in all responses were (40.7 %) of them recognized that if cervical changes are found early they are easily curable. This results not

similar to study [14], found (75.9%) knew if cervical variations are establish early they are easily curable. This difference may be due to different educational level between countries.

Responses of nursing staff about risk factors of cervical cancer were (31.3%) correctly responses HPV infection as cause of cervical cancer and heredity (34.0%) as a risk factors for cervical cancer. This study result coincides with results [2], showed (38.6 %) and (31.0%) of participants knew that the HPV and heredity, respectively, as cause of cervical cancer.

A small proportion of the nurses had adequate knowledge of signs and symptoms of cervical cancer then were correct responses (27.3%), (30.7%) and (25.3%) as foul smelling excessive vaginal discharge, abnormal vaginal bleeding, post-coital vaginal bleeding respectively. The results of this study is compatible with study [5], found responses of nursing staff were small in excessive vaginal discharge, abnormal vaginal bleeding and post-coital vaginal bleeding as (20%), (40%) and (3%) respectively. This explained unaware the nursing staff about signs and symptoms of cervical cancer in countries.

According to who should be screened for cervical cancer, for each participants were low percentage gave correct response as (28.0%), (23.3%) and (28.0%) in married women, women \geq 30 years of age and women < 30 years of age respectively. This result is agree with finding [15], found small responses for who should be screened for cervical cancer then were (25.1%), (40.5%) and (34.3%) in married women, women \geq 30 years of

age and women < 30 years of age respectively.

Regarding to diagnostic modalities other than pap smear, were (22.7%) of participants knew around visual inspection after acetic acid application (VIA), (26.7%) knew about Colposcopy and the high proportion of respondents were (60.7%) knew about cervical biopsy used diagnosis of cervical cancer. These results are agreement with result ^[2], found (4.5%) knew around (VIA) and (19%) knew about Colposcopy. Also another studies were done by ^[14,15], showed a large number of participants were (89.5%) and (94.1%) respectively, knew about cervical biopsy used diagnosis of cervical cancer.

According to prevention of cervical cancer, a large proportion of participants were (60.7%) knew about Pap smear test can used to prevention of cervical cancer. This results is compatible with results ^[5], found the high response were (75%) knew about Pap smear test can used to prevention of cervical cancer.

The greatest common treatment of cervical cancer identified from all participants was chemotherapy (70.0%). The present study is consistent with results ^[13], showed chemotherapy was most common (77.2%) form of treatment recognized by the participants, another study is disagree with our results ^[10], found a high percentage of participants were (70.8%) gave correct response about radiation therapy. This difference may be due to the belief of the majority of nursing staff in Iraq that the treatment of most cancers is using chemotherapy.

Regarding to attitudes of nursing staff about cervical cancer, responses for not screening patients, a (65.3%) of participants thought absence of indication, followed by speculum examination and pap smear are doctors procedure (46.0%), lack of vaginal speculum (44.7%) and (38.7%) were response for not applicable. This study is incompatible with results ^[14], found most responses were (79%) in speculum examination and Pap smear are doctors procedure, followed by not applicable (53.4%), absence of indication (16.1%) and (8%) were in lack of vaginal speculum. This difference may be due to the different belief of the respondents between countries, as well as the reason, according to the examination conducted in each country.

Responses of participants about reasons for not getting self-pap smear were (65.3%) to no reason for concern a Pap smear test. This result is similar to study

^[15], showed a large number of participants were (43.5%) gave answered for no reason to Pap smear test. This means that in every country there is not enough reason not to have self-examination or a Pap smear test.

Regarding to overall level of knowledge to nursing staff about cervical cancer was inadequate knowledge (78.6 %). This study is consistent with result ^[15], found the level of knowledge to nursing staff about cervical cancer were inadequate (73.3%) of respondents, also another study done by ^[12], showed the nursing staff have a moderate level of knowledge regarding cervical cancer. This may explain the lack of understanding of the nursing staff about importance and severity of cervical cancer, and also may be due to similar educational level between countries. According to the overall level of attitudes to nursing staff about cervical cancer was negative. This result is similar to results ^[14], found attitudes to nursing staff about cervical cancer were negative of all responses. This may illustrate due to comparable education level between countries.

CONCLUSIONS

The majority participants were nursing staff at the age of 19-23 years, most of them were married and have completed their nursing secondary. The overall level of knowledge and attitudes were inadequate knowledge and their negative attitudes about cervical cancer.

RECOMMENDATIONS

Emphasis on routine training through health education programs by seminars, lectures and courses about cervical cancer on a regular basis or as part of the orientation program for female nursing staff. Furthermore, if nurses themselves undertake screening test repeatedly, they can be part models for the other females.

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Physical Environment of Houses as Determinants of Pneumonia among Children in Country Sides

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ABSTRACT

Background: Pneumonia is an acute infection of the lung tissue (*alveoli*) most prevalent in infants. Home physical environment that does not meet the health requirements is to trigger the occurrence of the disease. This study aims to determine the relationship between the home physical environment with pneumonia in infants.

Method: The method used is a case-control with an analytical approach. 60 respondents are selected where 30 respondents serve as a treatment group, and the rest is as a control one. The research was conducted in Baturaden, Banyumas Regency, Central Java, Indonesia. The variables studied are living room ventilation width, window width, wall type, floor types, and room occupation density. The research employs Chi-Square test to find the relationship between variables.

Results: The results showed the physical environment of the house that has a significant relationship with the incidence of pneumonia among children.

Conclusion: Since the physical environment of the house still risk factors for pneumonia ignored by the community, the community health center must play more active roles in disseminating the information to the society about the importance of proper physical environment condition.

Keywords: *Physical environment, house, pneumonia, children, window*

INTRODUCTION

Factors affecting the health of both the individual and the public are an environment, behavior, services, and descent ⁽¹⁾. Environmental factors are the most prominent factor to do with the transmission of diseases, especially infectious diseases. The closest environment to the human being is housing as people spend time sitting at home making the house as a residence must always consider the aspects of health.

Pneumonia kills more children than any other disease, covering nearly 1 in 5 deaths of children and infants, killing more than 2 million children under five each year and the majority occur in developing countries ⁽²⁾. World Health Organization (WHO) estimates that the incidence rates of pneumonia in countries with infant mortality rates above 40 per 1,000 live births are 15% -20% per year in the toddler age group. The incidence of

pneumonia in Indonesia in infants is estimated between 10% - 20% per year.

Central Java Province ranks the fifth in the number of pneumonia of children under five around 18, 477 cases, and when seen from the case fatality rate (CFR)'s infants, the province is ranked the 16th with numbers of CFR approximately 10% ⁽³⁾.

Banyumas District as one of the regencies in Central Java displays the of cases of pneumonia with were 860 where the highest position was found in the area of Baturaden with the prevalence of 87 cases. Previous research ⁽⁴⁾ showed that the physical environment of the house that has a relationship with the incidence of acute respiratory infections are the humidity, ventilation, types of floor, and occupant density but the temperature and lighting of the house that does not have a significant relationship but risky. As such, this research would like to expand the previous study by identifying factors

related to pneumonia in children by observing the physical condition of the houses.

METHODOLOGY

This research is an analytic observational study using a design of *case-control* comparing the physical environment of respondents homes or patients with non-cases ones. The research was conducted with the physical condition of houses regarding the total area of ventilation, spacious windows, type of wall, floor types and density of occupants with children under five years of age. The population in this study were all toddlers in Health Community Service or *Pusat Kesehatan Masyarakat* Baturaden II with the sample size of 30 infants diagnosed suffering from pneumonia and the control as many as 30 healthy infants. Data collected then tabulated and analyzed descriptively with a frequency distribution table as well as Chi-Square to see the relationship between the dependent and independent variables.

RESULTS

Ventilation of family room in case group showed 27 respondents (90%) include the category of not eligible (<10% of floor area) and three respondents (10%) include the suitable (floor area \geq 10%). Further, 30 measurements in the control group showed 16 respondents (53.3%) including ineligible categories (<10% of floor area) and nine respondents (15%) including in the category of meeting the requirements (\geq 10% of floor area). Further, the results of chi-square test showed p-value 0.004 less than $\alpha = 0.05$, revealed the significant association between the family room ventilation with the incidence of pneumonia in young children. Besides, the calculation of odds ratios indicates the value of 7.875 meaning toddlers in the family room ventilation conditions that do not meet the requirement will have 7.875 times (rounded to 8) higher risk for pneumonia than the family room ventilation conditions complying to the health requirement.

Window size in the case group showed 29 respondents' (96.7%) property were in ineligible (< 20% of floor area) and only one respondent (3.3%) meeting the requirement of health standard (\geq 20% of floor area). In the other hand, in the control group, there were 25 respondents (83.3%) included into ineligible categories (<20% of the floor area) and five respondents (16.7%) included in the group of eligible (\geq 20% of floor area).

The results of chi-square test showed p-value 0.001 smaller than $\alpha = 0.05$ indicating there is a significant relationship between the window size with pneumonia in young children. The calculation of odds ratios report the value of 5.800 meaning toddlers with an odd volume of windows are risky 5.800 (rounded to 6) times higher to be infected with pneumonia.

The wall condition in a case group indicated four respondents' (13.3%) walls are not eligible and 26 respondents (86.7%) had suitable family room walls (waterproof). Besides, in control group there were three respondents (10%) had ineligible family room walls and 27 respondents (90%) had waterproof wall room. The results of chi-square test showed p-value 0.001 smaller than $\alpha = 0.05$ indicating there is the significant relationship between the condition of living room wall with the incidence of pneumonia in young children. The calculation of odds ratios indicate the value of 1.385 meaning toddler with improper living room wall will be at risk 1.385 (rounded to 1) time greater than those in the waterproof living room.

The conditions of the floor in case group revealed two respondents (6.7%) had a property floor that is not waterproof and 28 respondents (93.3%) had the waterproof floor. In control group only one respondent (3.3%) with the non-waterproof floor. The results indicates that both control and case groups have been in compliant with the requirement. Chi-square test showed p-value= 0.001 smaller than $\alpha = 0.05$ suggesting there is a significant relationship between the type of living room floor with the incidence of pneumonia in young children. The calculation of odds ratios indicate the value of 2.071 meaning toddlers with the non-waterproof floor will be at risk 2.071 (rounded to 2) times greater to be affected by pneumonia.

The room occupation density refers to the number of people sleeping in the bedroom (maximum 3). In case of the group, there are 28 respondents (93.3%) whose bedroom was crowded and only two respondents (6.7%) included in the category of eligible occupant density. In the control group, there were 27 respondents (90%) fall into not qualified occupant density, and three respondents (10%) fall into the category of eligible occupant density. Results categorization generally indicate that bedroom in both control and case groups are occupied by many people which is typically in rural areas due to big family members. Chi-square test shows the p-value 0.000 less

than $\alpha = 0.05$, revealing the significant relationship between the density of occupancy with the incidence of pneumonia in young children. The calculation of odds ratios indicate the value of 1.556 meaning the toddler sleeping with many family members are at risk 1.556 (rounded to 2) times greater to be affected by pneumonia.

DISCUSSION

Spacious living room ventilation has a significant relationship with the incidence of pneumonia in infants. The result of the study is in line ⁽⁵⁾ which shows that large family room ventilation associated with acute respiratory infection in infants.

Spacious house ventilation function for setting the air, because the condition of the walls of the house can contribute to the creation of humidity and temperature that allows germs will die or multiply. Spacious house ventilation air circulation is beneficial for the entry of ultraviolet light to reduce evaporation in the room. High humidity can be caused by moisture from human sweat and breathing which is dangerous to health if there is a cause of pneumonia ⁽⁶⁾.

Size of living room window has a significant relationship with the incidence of pneumonia in infants. The results are consistent ⁽⁷⁾ that the window size has an association with the occurrence of pneumonia in infants. Lack / insufficient ventilation (<10% of the floor area of the room) would make the pollutants in the room are longer and will add to the risk of exposure to contaminants in the place ⁽⁸⁾. The window would not function properly if kept closed or are permanently made of glass that can not be opened. The window that cannot be opened would make the bedroom becomes stuffy and humid enabling the development of pathogenic microorganisms, one of the organisms that cause pneumonia. Therefore, the windows should also be impermanent to be open every day so that air can flow out smoothly ⁽⁹⁾.

Wall function is a supporting the roof to protect the house against rain, heat, and wind from outside. Type of wall has a significant association with the incidence of pneumonia in infants. The magnitude of the risk of suffering from pneumonia could be seen from OR = 2.9 means children under five living in the house with the condition of the wall, did not qualify with a risk of pneumonia was three times greater than toddlers who stay at home with the state of the house walls meet requirements. The results of this study differ ⁽¹⁰⁾ which

showed that no significant relationship between the type of wall with acute respiratory infection in infants.

The house with an earthen floor will cause home space hot, dusty, and more humid. Warm temperatures can increase evaporation in the room, so it's not just the humidity increased, but also the content of pollutants coming from home building materials. High humidity (> 80%) is a good condition for the growth and survival of bacteria cells (pneumococcus) so that the bacteria can multiply. State of the floor has a significant relationship with the occurrence of pneumonia. The magnitude of the risk of suffering from pneumonia could be seen from OR = 3.9, which means children under five living in the house with this type of flooring is not eligible with a risk of pneumonia was four times greater than toddlers who stay at home with this type of flooring qualifies. The risk of pneumonia would be higher if the toddlers often play on the floor that is not eligible ⁽⁶⁾.

House floor construction must be watertight and always dry so it can be easily cleaned of dirt and dust, but it can avoid the rising groundwater that can increase the humidity in the room. To prevent the ingress of water into the house, the floor should be raised approximately 20 cm from the ground. The floor made of the soil should not be used anymore because during the rainy season, this floor will be moist and can cause diseases to occupants. Therefore it is necessary to install tiles or waterproof coating ⁽¹¹⁾.

There is a significant correlation between the density of occupant with the incidence of pneumonia in infants. More and more residents are gathered in one room is a potential risk for the transmission of a disease, especially for children who are relatively vulnerable to disease transmission ⁽¹²⁾. The solution that can be given if the family really can not afford the room economically is to arrange the items in the room and not too much stuff in the places. Crowded house occupants allow transmission of bacteria, viruses that cause respiratory illnesses from pneumonia through which the occupants of the house to the other occupants of the house easily and quickly.

CONCLUSION

The results of house physical condition relationship with the incidence of hepatitis A in children under five in Community Health Center or *Puskesmas* I Baturraden in Central Java, Indonesia are summed up as follows:

There is a connection between family room ventilation with the incidence of pneumonia in young children. The odd ratios indicate that toddlers in the family room ventilation conditions that do not meet the requirement will have eight times greater risk for pneumonia than the family room ventilation conditions complying with the health requirement.

There is a significant relationship between the window size with the pneumonia in young children. The odds ratio indicate that toddlers with an odd size of windows are risky six times greater to be infected with pneumonia.

Type of wall has a significant association with the incidence of pneumonia in infants. The odds ratio indicate children under five living in the house with the condition of the wall did not meet the health requirement will have a risk of pneumonia three times greater.

There is a significant relationship between the type of living room floor with the incidence of pneumonia in young children. The odds ratios indicate that toddlers with the non-waterproof floor will be at risk two times greater to be affected by pneumonia.

There is the significant relationship between the density of occupancy with the incidence of pneumonia in young children. The odds ratios indicate that the toddler sleeping with many family members are at risk two times greater to be affected by pneumonia

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Efficacy and Safety of Mirabegron in Treatment of Overactive Bladder (Dose Range Study)

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ABSTRACT

Overactive bladder (OAB) is a condition characterized by urinary urgency, usually accompanied by frequency and nocturia, with or without urge urinary incontinence. This prospective study aimed to discuss the pharmacotherapeutic aspects of mirabegron in treatment of overactive bladder. Hence a total of 71 patients with diagnosis of overactive bladder were enrolled and randomly assigned into two groups; mirabegron 50 and 100 mg who received 50 and 100 mg mirabegron, respectively and patients were followed for 8 weeks.

Only 66 patients completed the study. Mirabegron at doses of 50 and 100 mg once daily demonstrated improvement from baseline to final visit in reducing the mean number of micturitions per 24 hours which increased with mirabegron dose but no significant improvement between mirabegron groups. There's significant improvement between mirabegron groups in mean baseline to end-of-treatment for urgency episodes ($p < 0.001$) and level of urgency incontinence ($p < 0.01$). In conclusion, Mirabegron at doses of 50 and 100 mg once-daily over 8 weeks demonstrated satisfactory balance between efficacy and tolerability in Overactive Bladder patients.

Keywords: Overactive Bladder, Mirabegron, urinary urgency, nocturia, urinary incontinence

INTRODUCTION

Overactive bladder (OAB) is a condition characterized by urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence¹. Urgency with at least one other symptom is essential to diagnose OAB. Thus urgency is the pivotal symptom. In many OAB patients, urge incontinence occurs, defined as involuntary leakage of urine, accompanied or immediately preceded by urgency². Overactive bladder affects 10-16% of the population in the world³. Rates were similar in men & women, increasing with age in both sexes, but, OAB wet is more prevalent in women and OAB dry is more prevalent in men⁴. Chronic, bothersome OAB-associated

symptoms significantly impact quality of life (QOL) and increase the likelihood of sleep deprivation, depression, falls, and fractures⁵⁻⁸. There are three main hypotheses proposed for etiological pathogenesis of OAB, the first is the Neurogenic, myogenic and integrative hypotheses^{2,9}. Unfortunately, many OAB patients remain undiagnosed and untreated. Successful treatment of OAB depends on a detailed evaluation and treatment in a timely fashion with vigilant follow up. There are many facets of management of the OAB, including pharmacotherapy^{2,10}.

Pharmacotherapy

The Currently available oral agents for therapy of the OAB are summarized in table 1

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Table 1. Currently available oral agents for therapy of the OAB¹¹⁻¹³

Drug	Special consideration
Antimuscarinics Oxybutynin Tolterodine Solifenacin Darifenacin	Increased CNS effects and dry mouth/constipation Renally cleared
Beta -3 AR Agonist Mirabegron	May elevate Blood pressure
Antidepressants Imipramine Duloxetine	Elderly patients are susceptible to many side-effects ,should be used, with close monitoring, particularly for psychiatric and cardiac side-effects. Tricyclic antidepressant drugs have antimuscarinic activity

Mirabegron

Mirabegron is an oral medication that actively selects beta3 adrenoreceptors. It is a lipophilic compound .it is metabolized in the liver by cytochrome P450 3A4 (CYP3A4)and 2D6 (CYP2D6) to form its active compound¹⁴. Stimulation of b3-adrenoceptors elicits direct relaxation of detrusor smooth muscle¹⁵; Mirabegron is rapidly absorbed after oral administration and circulates in plasma in its unchanged form, its glucuronic acid conjugates, and other metabolites, which are pharmacologically inactive. Mirabegron is metabolized in the liver via multiple pathways^{14,16}. Mirabegron indicated in Urinary frequency, urgency, and urge incontinence. Cautions when history of QT-interval prolongation and use with drugs that prolong the QT interval its contraindication is severe hypertension¹⁷ . It is administered in 25,50,100mg once daily in adults¹⁸ .

MATERIAL AND METHOD

This was a prospective comparative study including 71 patients diagnosed with overactive bladder ,on follow-up in urology consultation unit and department in Ghazi AL Hariri surgical specialty hospital in Baghdad medical city complex, during the period from October 2013 to October 2015 , only 66 patients completed the study 34 in mirabegron 50 (received 50 mg) Mirabegron and 32 patients in mirabegron 100 (received 100 mg) Mirabegron . Patients with Clinically significant bladder outflow obstruction, significant postvoid residual (PVR) volume (>200 ml). Stress urinary incontinence , Indwelling catheters or intermittent self-catheterization, diabetic neuropathy, symptomatic urinary tract infection, interstitial cystitis, bladder stones, malignancy, previous pelvic radiation , Known or suspected hypersensitivity to

mirabegron, or any ingredient and clinically significant cardiovascular or cerebrovascular disease, were excluded. Patients in both groups followed for 10 weeks. Patients asked to rate the degree of associated urgency on the five-point of Patient Perception of Intensity of Urgency Scale (PPIUS) at each micturition or incontinence episode. Then the scale evaluated according to the scores where zero indicated no urgency, one for mild, two for moderate and 3 for severe urgency score of 4 indicated urge incontinence. At each visit the PPIUS score was assessed and Blood and urine samples tested to monitor the safety. Statistical analysis: with the statistical package for social sciences version 20 and appropriate statistical tests and procedures were applied, level of significance set at 0.05.

FINDINGS

Only 66 out of 71 patients (93%) completed the follow up period and they were 34 in mirabegron 50 and 32 in mirabegron 100 . The baseline demographic characteristics are summarized in (Table 2). Mirabegron 50 and100 mg resulted in a mean baseline to end-of treatment reduction of 2.3 and 2.25 micturitions per 24 h, respectively. Responders at the endpoint were 26.4 % for mirabegron 50 and 31.2 % for the mirabegron 100. There's no significant difference in improvement between both groups but a significant difference in urgency episodes and level of urgency incontinence ($p < 0.05$). Responders for urgency incontinence episodes (patients who became dry) were 41.1% for mirabegron 50 mg; and 46.8% for mirabegron 100 mg. Responders for urgency episodes (grade ≥ 3) were 14.7% for mirabegron 50 mg; and 21.8% for mirabegron 100 mg and for nocturia episodes was 20.5 % for mirabegron 50 mg; and 18.7% for mirabegron 100 mg. (Table 3

and 4).The overall incidence of Treatment-emergent adverse events (TEAEs) was almost similar across treatment groups and there was no evidence of a dose–response relationship. The overall incidence of TEAEs in Mirabegron 50 mg was (47%), and in mirabegron 100 mg group it was (43.7%), (Table 5). In terms of vital signs seemed to increase in a dose-related manner. No differences between treatment groups were observed with respect to ECG parameters. (Table 4) There was no significant change in mean PVR volume at 4 , 8 ml for mirabegron 50, and100 mg, respectively. There were no clinically significant changes in laboratory parameters.

Table 2: Demographic and baseline characteristics.

Characteristic		Mirabegron 50 mg (n=34)	Mirabegron 100 mg (n=32)
Age (years) mean ± SD		52.24 ± 7.78	50.63 ± 8.62
Sex, n (%)	Male	12 (35.3)	14 (43.8)
	Female	22 (64.7)	18 (56.3)
Type of OAB, n (%)	Urge incontinence only	16 (47.1)	12 (37.5)
	Mixed incontinence	8 (23.5)	10 (31.3)
	Without incontinence	10 (29.4)	10 (31.3)
Duration of OAB symptom(months) mean ± SD		41.24 ± 26.12	45.38±25.35

SD: standard deviation

Table 3. Adjusted changes from baseline to endpoint and estimated differences for efficacy variables by treatment group (full analysis set).

Characteristic	Mirabegron 50 mg (n = 34)	Mirabegron 100mg (n = 32)	P value
Micturitions/24hr after treatment	2.3	2.25	0.374
Mean volume voided/micturition(ml)	26.7	25.9	0.348
Urge Incontinence episodes/24hr after treatment	1.055	1.034	0.795
Urgencyepisodesper24hr after treatment	-1.57	-2.23	<0.001
Nocturia episodes/24hr after treatment	0.551	0.582	0.418
Level of urgency / 24 hrs	-0.17	-0.28	< 0.001

Table 4. Proportions of responders for selected efficacy variables at the study endpoint.

Variable	Mirabegron 50 mg (n=34)	Mirabegron100 mg (n=32)	P. value
Micturitions / 24 h	26.4%	31.2%	NS
Incontinence episodes/24	41.1%	46.8%	NS
Urgency episodes (grade ≥3)/24 h	14.7%	21.8%	Sig
Nocturia episodes/24 h	20.5%	18.7%	NS

*Responder definitions: micturitions, <8 micturitions/24 h; no incontinence episodes, no episodes of either urgency and nocturia.
NS: not significant (P.value > 0.05), sig: significant (P.value < 0.05)

Table 5. Treatment-emergent adverse events (TEAEs)

TEAEs	Mirabegron 50 mg (n=34)	Mirabegron100 mg (n=32)
Overall	47%	43.7%
Dry mouth	5.8%	5.9%
Constipation	5.8%	3.1%
Headache	5.8%	5.9%
Eye disorder (blurred vision)	2.9%	3.1%
HT	8.8%	6.2%
Tachycardia	2.9%	5.9%
Urinary retention	0%	0%
Liver function (GGT)	0%	3.1%
Others*	29.4%	28.1%

* Others TEAEs: nausea ,dyspepsia ,dizziness, fatigue, pruritus and skin rash.

DISCUSSION

Mirabegron at different doses demonstrated improvement from baseline to final visit in reducing the mean number of micturition per 24 h which increased with mirabegron dose but no significant improvement between mirabegron groups, which disagreed findings of Scorpio and Aries ^{12,19}

In the dose-ranging Dragon study, the primary efficacy results showed dose dependent decreases in mean number of micturition in 24 hours, which were statistically significant improvement compared with placebo ²⁰. In TAURUS study, the 50- and 100-mg mirabegron groups showed numerical improvements in mean number of micturition in 24 hours ²¹.

The responders for micturition frequency were 26.4 % for mirabegron 50 mg, and 31.2 % for the mirabegron 100-mg group. In Dragon study, it was 27.5% for mirabegron 50 mg, and 32.7% for the mirabegron 100-mg group ²⁰. For Secondary efficacy outcomes ,there's significant improvement between mirabegron groups in urgency episodes (p<0.001) and level of urgency incontinence (p<0.01), but there's no significant improvement in volume voided per micturition, urgency incontinence episodes and nocturia episodes . For Scorpio and Aries studies ^{12,19}, a significant improvements were found for both doses of mirabegron compared with placebo in all secondary efficacy outcomes. In the Dragon study, there's a dose-dependent increase in the mean volume voided/micturition, and a decrease in the number of incontinence episodes, number of UII and

urgency episodes ²⁰. The TAURUS study was demonstrate a numerical improvements from Month 1 to Month 12 in incontinence episodes in 24 hours, and MVV/micturition in the 50- and 100-mg mirabegron groups²¹ . For urgency incontinence episodes , the responders were 41.1 % for mirabegron 50 mg; and 46.8% for mirabegron 100 mg ,for urgency episodes (grade ≥3) were 14.7% for mirabegron 50 mg; and 21.8% for mirabegron 100 mg and for nocturia episodes were 20.5 % for mirabegron 50 mg; and 18.7% for mirabegron 100 mg. At the final visit, the percentage of responders for zero incontinence episodes was 43.4% and 45.8% in the 50- and100-mg mirabegron groups, respectively in The TAURUS study ²¹, responder analyses showed a significant improvement with mirabegron 50 and 100 mg in terms of dry rates, > 50% reduction in mean number of incontinence episodes/24 h at final visit In Nitti V W study ²². Dragon study, showed 41.7 % for mirabegron 50 mg; and 55.9% for mirabegron 100 mg ,for urgency episodes (grade ≥3) was 14.5% for mirabegron 50 mg; and 19.6% for mirabegron 100 mg and for nocturia episodes was 23.9 % for mirabegron 50 mg; and 14.2% for mirabegron 100 mg ²⁰. The TEAEs with an incidence of (47%), and (43.7%) in the 50- and 100-mg mirabegron groups, respectively. There was no evidence of a dose–response relationship . Safety data from Scorpio and Aries studies showed that the overall incidence of TEAEs was similar across treatment groups ^{12,19} . In the 12-month TAURUS study, the incidence of TEAEs was similar across the 50-mg mirabegron (59.7%), 100-mg mirabegron

(61.3%).The most frequent TEAEs included hypertension, dry mouth, constipation, and headache,

occurring at similar incidence rates across the treatment groups²¹. In Dragon, the incidence of TEAEs was (43.8–47.9%) across the mirabegron treatment groups. The most common drug-related TEAEs were gastrointestinal disorders, occurring at (8.3%) and (9.5%) across the 50-mg mirabegron and 100-mg mirabegron treatment groups, respectively. While dry mouth about (1.8%) and (3%) across the 50-mg mirabegron and 100-mg mirabegron treatment groups, respectively²⁰. No significant drug effect on systolic or diastolic blood pressure was observed; the net changes blood pressure from baseline in both mirabegron groups, were <2 mm Hg. The adjusted mean change in morning pulse rate from baseline was 2.6 bpm for mirabegron 50 mg and 4.9 bpm for mirabegron 100 mg, pulse rate was seen to increase in a dose-related manner. In Nitti VW, study, mirabegron was associated with approximate increases of < 1 mmHg in blood pressure and >1 bpm in pulse rate. The incidence of hypertension was similar among the total mirabegron group²². In Novara G, et al study, data show a mirabegron-related dose response elevation in heart rates of 6.7 bpm and 11 bpm for the 50- and 100-mg dose groups, respectively, and 24-hour mean increases in systolic blood pressure of 3.0 mmHg and 5.5 mmHg, respectively²³. In the SCORPIO, ARIES and 12-month TAURUS studies, mirabegron was associated with an increase of <1 mmHg in blood pressure compared with placebo^{12,19,21}. There was no significant change in mean PVR volume, at 4, 8 ml for mirabegron 50, and 100 mg, respectively with no episodes of acute urinary retention. Safety data from SCORPIO and ARIES studies showed that the mean change from baseline to final visit in PVR volume was unremarkable across treatment groups^{12,19}. In the Dragon study, no episodes of acute urinary retention were reported²⁰. In the BLOSSOM study, no clinically relevant effects on post void residual (PVR) volume were reported²⁴.

CONCLUSIONS

Mirabegron at doses of 50 and 100 mg once-daily over 8 weeks demonstrated satisfactory balance between efficacy and tolerability in OAB patients, there's symptomatic improvement in the micturition frequency, urgency and urge incontinence in adult patients with OAB. However, There is the potential for interactions with other (CYP3A4) and (CYP2D6) substrates as well as a potential effect on the cardiovascular system.

Ethical clearance:

The participants' data were collected in accordance with the World Medical Association Declaration of Helsinki 2013, and each participant was informed about the nature and the main objective of the study and signed an informed consent. All official agreements were obtained prior to patients enrollment

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Analysis of Factors Associated with Blood Sugar Levels in Type 2 Diabetes Mellitus Patients

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ABSTRACT

Background: The prevalence of diabetes mellitus in Indonesia ranks 7 under Russia and Mexico with diabetes rates as much as 10.0 million (8.7% -10.9%), Lampung Province ranks 8th. The purpose of this study was to determine the risk factors for blood sugar levels in type II diabetes mellitus patients.

Methods: This type of research was analytic with cross-sectional design in Persadia Bandar Lampung Hospital patients using a sample of 30 people. The research variables were blood glucose levels, knowledge, nutritional intake (carbohydrates, fiber, and vitamin C), physical activity, and dietary compliance. Chi-Square test was employed to examine the relationship.

Results: The results showed there was a relationship between simple carbohydrate intake ($p = 0.002$), fiber ($p = 0.000$) and vitamin C ($p = 0.002$), physical activity ($p = 0.000$), compliance between types of food consumed with blood sugar level ($p = 0.026$). There was no correlation between total adherence ($p = 4.48$), schedule compliance ($p = 1,000$), diet compliance with blood sugar levels. .

Conclusion: Hospital should be able to increase education about nutrition as well as encourage eating fiber and vitamin C food as recommended and motivate patients to be more adherent to the diet. Further research with different methods is necessary to explore what factors cause low levels of compliance.

Keywords-: *Diabetes Mellitus, Nutritional Intake, Physical Activity, Diet Compliance, Blood Sugar Levels.*

INTRODUCTION

Diabetes eruptions (DM) is a metabolic disease which is a collection of symptoms that arise in a person due to an increase in blood glucose levels above average values. The prevalence of DM in Indonesia is based on the answer that the doctor had diagnosed at 1.5%, whereas DM based on symptoms was 2.1%. The prevalence of DM in women is based on a doctor's diagnosis of 1.7% while signs based on DM are 2.3%. Meanwhile, the determination of DM based on a doctor's diagnosis was 1.4% while DM based on symptoms was 2.0%, so based on this it is concluded that female sufferers of DM were

higher than men ⁽¹⁾.

Fiber can improve the response of blood glucose and insulin indices. The fiber can inhibit the passage of glucose through the walls of the digestive tract to the blood vessels so that levels in the blood are not excessive. The previous study showed a significant relationship between fiber intake and blood sugar levels in diabetic patients ⁽²⁾. Other studies have also demonstrated a link between fiber intake and blood sugar levels that the lower the fiber intake, the higher blood sugar levels ⁽³⁾.

In people with diabetes, it is essential to emphasize the importance of regularity of eating regarding meal schedule, type and amount of food, especially for those who use blood glucose-lowering drugs or insulin ⁽⁴⁾. Physical exercise in people with diabetes mellitus has a critical role in controlling blood sugar levels. Increased physical activity such as physical exercise (aerobics, casual cycling, jogging, swimming, and diabetes

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exercise) regularly results in increased use of glucose by active muscles⁽⁵⁾.

In Pesadia Hospital Lampung Province, out of 100 patients, 30 people were suffering from diabetes mellitus. Based on the description of data above, the authors wish to examine the analysis of risk factors for blood sugar levels in type II diabetes mellitus patients in the respective hospital.

METHODOLOGY

This study is an analytical study using a cross-sectional examines the risk factors for blood sugar levels in type II diabetes mellitus patients in Persadia Adventist Hospital Bandar Lampung Unit. The population in this study were all patients with type II diabetes mellitus who were members of PERSADIA Bandar Lampung Adventist Hospital Unit in 2017 obtained as many as 30 people. The sample of this study is the total population. Data analysis was carried out with univariate analysis carried out descriptively with a frequency distribution. Bivariate analysis was performed by Chi-square test using computerization.

RESULTS

Respondents mostly were aged > 60 years of the 22 respondents (73.3%), and respondents whose aged between 41-60 years were eight respondents (26.7%). The sex of the respondents was 7 male respondents (23.3%), and as many as 23 respondents were female (76.7%). The education level of the most respondents was tertiary institutions with a total of 11 respondents (36.7%).

Most respondents work as housewives or do not work as many as 13 respondents (43.3%), while the least jobs are other jobs as many as 4 respondents (13.3%), which are included in different positions of the cook, housemaid, and foreman.

As many as 14 respondents (46.7%) had bad blood sugar, and as many as 16 respondents had good blood sugar with a percentage of 53.3%. Distribution of respondents based on knowledge showed that those with fewer categories were 12 people (40.0%) and good as many as 18 people (60%). The simple carbohydrate intake of respondents was obtained which was not good (high) which was 15 people (50.0%), while the simple carbohydrate intake of respondents was good was found in 15 people (50.0%). Besides, most of the respondents' fiber intake is in quite a category was as many as 17 respondents (56.7%), while respondents who have less fiber intake are 13 respondents (43.3%). For consumption of vitamin C intake with less intake, there were 14 respondents (46.7%), while respondents who had good vitamin C intake were 16 respondents (53.3%). Physical activity of respondent inactive was found in 12 people (40.0%), whereas the physical movement of the respondent in the good category was in 18 people (60.0%). Distribution of respondents based on the type of food obtained results from 30 respondents whose intake of non-compliant foods was 16 people (53.3%), and respondents who obeyed 14 people (46.7%). Distribution of respondents based on the meal schedule obtained the results that the respondents whose eating schedule was not obedient as many as 16 people (53.3%), while respondents who obeyed 14 people (46.7%).

Table 1. Relationship of Knowledge with Blood Sugar Levels

Variables	Blood Sugar Levels				Total		P value
	Poor		Good		N	%	
	N	%	N	%			
1. Knowledge							
Less	9	75	3	25	12	100	0.030
Good	5	27.8	13	72.2	18	100	
Total	14	46.7	16	53.3	30	100	
2. Fibers							
Less	11	84.6	2	15.4	13	100	0.001
Adequate	3	17.6	14	82.4	17	100	
Total	14	46.7	16	53.3	30	100	

Cont... Table 1. Relationship of Knowledge with Blood Sugar Levels

3. Vitamin C							
Less	12	85.7	2	14.3	14	100	0.000
Good	2	12.5	14	87.5	16	100	
Total	14	46.7	16	53.3	30	100	
4. Carbohydrate Intake							
Poor	13	86.7	2	13.3	15	100	0.000
Good	1	6.7	14	93.3	15	100	
Total	14	46.7	16	53.3	30	100	
5. Physical Activity							
Active	10	83.3	2	16.7	12	100	0.004
Inactive	4	22.2	14	77.8	18	100	
Total	14	43.3	16	56.7	30	100	
6. Compliance to portion							
Compliance	12	46.2	14	53.8	26	100	1.000
Non-compliance	2	50.0	2	50.0	4	100	
Total	14	46.7	16	53.3	30	100	
7. Compliance to types							
Compliance	11	68.8	5	31.2	16	100	0.026
Non-compliance	3	21.4	11	78.6	14	100	
Total	14	46.7	16	53.3	30	100	
8. Compliance to Schedule							
Compliance	9	56.2	7	43.8	16	100	4.48
Non-compliance	5	35.7	9	64.3	14	100	
Total	14	46.7	16	53.3	30	100	
9. Compliance to Diet							
Compliance	13	48.1	14	51.9	27	100	1.00
Non-compliance	1	33.3	2	66.7	3	100	
Total	14	46.7	16	53.3	30	100	

Respondents with insufficient knowledge revealed 75% had poor blood sugar levels and those with good knowledge indicated 27.8% with poor blood sugar levels. Based on the results of statistical tests, it is obtained a p-value of 0.030 ($p < 0.05$) indicating that H_0 is rejected. Thus, it is concluded that there is a meaningful relationship between knowledge and blood sugar levels.

Respondents with less fiber intake displayed 84.6% had poor blood sugar levels and respondents with adequate fiber intake indicated 17.6% had poor blood sugar levels. Based on the results of statistical tests, it is obtained a p-value of 0.001 ($p < 0.05$). This means that H_0 is rejected, so it is concluded that there is a significant relationship between fiber intake and blood sugar levels.

Respondents with less vitamin C intake were 12 (85.7%) with poor blood sugar levels, and respondents with good vitamin C intake were 2 (12.5%) whose poor blood sugar levels. The statistical test results displayed the p-value of 0.000 ($p < 0.05$). This confirms that H_0 is rejected showing the relationship between vitamin C intake and blood sugar levels.

There was 10 (83.3%) respondents who had activity inactive physical, not good (high) blood sugar while those who had operation 4 people active physical (22.2%) had bad blood sugar. Statistical test results obtained p-value 0.004 ($p < 0.05$) shows that there is a significant relationship between physical activity with blood sugar levels at the time.

12 (46.2%) respondents who did not adhere to the amount of food consumed had high blood sugar. Statistical test results obtained p-value 1.000 ($p > 0,05$) indicating that there is no significant relationship between compliance with the amount of food consumed with blood sugar levels.

11 (68.8%) respondents who did not comply with the type of food consumed had high blood sugar. Statistical test results obtained p-value 0.026 ($p < 0.05$) indicating that there is a significant relationship between adherence to the type of food with blood sugar levels.

9 (56.2%) respondents who did not adhere to the meal schedule, have poor blood sugar, while those who were obedient 4 (35.7%) had bad blood sugar. Statistical test results obtained p-value 4.48 ($p > 0.05$) showed that there was no significant relationship between adherence to the meal schedule and blood sugar levels.

13 (48.1%) respondents who did not comply with their diets, did not have good (high) blood sugar. Statistical test results obtained p-value 1.00 ($p > 0.05$) showed that there was no significant relationship between dietary compliance with blood sugar levels.

DISCUSSIONS

Based on the results of the study, there was a significant relationship between knowledge and blood sugar levels. This research is also not much different from the results that patients with a good level of knowledge are fully compliant with the DM diet ⁽⁶⁾. The results showed that there was a significant relationship between simple carbohydrate intake (sucrose) and blood sugar levels ⁽⁷⁾. The consumption of sugar (simple carbohydrates) in excessive amounts encourages the neurotransmitter system to try to find sugar as continuous dopamine (sugar opium) satisfaction ⁽⁸⁾. Therefore should the respondents with diabetes mellitus need to control the intake of sugar (sucrose), and use the alternative sugar or sweetening drinks or foods such as sugar diabetes, diabetes honey.

Based on the results of the study, it was found that there was a significant relationship between fiber intake and blood sugar levels confirming the previous research that there is a substantial relationship between fiber intake and blood sugar in patients with type 2 diabetes mellitus ⁽²⁾. Fiber can improve the response of blood glucose and insulin index. These fibers can inhibit the

passage of glucose through the walls of the digestive tract to the blood vessels so that levels in the blood are not excessive. Patients with type 2 diabetes must eat food following the conditions set in their diet therapy so that patients can remain productive because their sugar levels are always controlled within reasonable limits.

The study found that there was a significant relationship between intake of vitamin C and blood sugar levels. For diabetic patients, vitamin C is useful as an antioxidant. Antioxidants are helpful in reducing oxidative damage to prevent complications in patients with type 2 diabetes. Vitamin C helps prevent complications of type 2 DM by inhibiting sorbitol production. Sorbitol is a by-product of sugar metabolism that will be accumulated in cells. It is recommended for people with diabetes to consume a lot of foods containing high levels of vitamin C, including oranges, guava, green peppers, sprouts, and broccoli because high doses of vitamin C can prevent various complications of diabetes ⁽⁹⁾.

The significant relationship between physical activity with blood sugar levels supports the previous research ⁽¹⁰⁾ where the researchers explained if someone with a pattern of mild physical activity can lead to an increase in blood sugar levels in the body.

In contrary, the results showed no significant relationship between adherence to the amount of food consumed with blood sugar levels. Diet management in DM patients is to maintain blood glucose levels so that they are close to normal by balancing food intake with insulin with oral glucose medication and physical activity, achieving and maintaining serum lipid levels, preventing complications, and providing enough energy to keep or produce normal body weight ⁽¹¹⁾. Under this notion, it is sensible that the patients do not really with the amount of food consumed as long as they can maintain the close to average blood sugar level.

The results further showed that there was a relationship between patient adherence to the type of food consumed with blood sugar levels. Here the role of family is essential to becoming the supervisor to ensure the family members suffering from diabetes adhering to food consumed ⁽¹¹⁾. The family plays a role in reducing patient ignorance in the face of illness and disobedience caused by temptations from outside ⁽¹²⁾.

CONCLUSION

The hospital should be able to improve the education program through counseling and nutritional counseling and encourage eating fiber and vitamin C foods as recommended, and motivate patients to be in compliant with the amount and type food consumed as well as the schedule to consume the food. Also, the family members must be motivated to be more active in participating in monitoring food consumed by family members suffering from Diabetes Mellitus. Since the level of compliance is low, it is necessary to conduct further research with different methods to explore what factors cause low levels of compliance.

Ethical Clearance: Ethical clearance was obtained from The Ministry of Health Polytechnic Tanjungkarang, Indonesia. We also wish to thank all the participants who contributed to this study.

Conflict of Interest: Nil

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Physical Environment of Home Affecting the Infection of Helminthiasis among Toddlers in Rural Areas

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ABSTRACT

Background: Helminthiasis in Indonesia are still public health problems because the prevalence is still very high between 45% -65%. Even in certain areas with poor sanitation, the prevalence can reach 80%. This study aims to determine the relationship between the variables of the physical environment of the house with the incidence of infection of worm eggs in toddlers.

Method: This type of research uses a cross-sectional design. The location of this study was in Sumbang District, Banyumas Regency, Central Java, Indonesia. The size of the research sample was 237 toddlers (age 12 months to <60 months). The process of data analysis uses univariate and bivariate analysis. Chi-Square test was employed to examine the relationship.

Results: The results of this study indicate that there is a correlation between several variables of the physical environment of the house with the incidence of worm infections in the toddler including the home yard cleanliness ($p = 0.003$), house floor type ($p = 0.017$), wastewater disposal ($p = 0.000$), ownership of healthy latrines ($p = 0.042$), and house density ($p = 0.000$).

Conclusion: People can experience improved environmental sanitation conditions where toddlers have daily activities including having healthy latrines and improving access to sanitary restrooms for each family.

Keywords-: Home, Physical environment, Helminthiasis, Infection, Toddler

INTRODUCTION

In the village of Indonesia, worming attacks more children because their activities are more related to the soil where there are a number of species that are transmitted through the soil including roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*) and hookworms (*Necator americanus* and *Ancylostoma duodenale*) that infect humans the most⁽¹⁾. Indonesia is one of the endemic countries of *Soil-Transmitted Helminths (STH)* with the third largest number of children aged 1-14 years in the world after India and

Nigeria which is around 7%⁽²⁾ as in certain areas with poor sanitation; worm prevalence can reach 80%^(3,4). Given this, the approach to prevention of worm disease through the improvement of sound environmental quality and healthy behavior is needed, so that the health risks for humans to be infected with worms can be suppressed.

Research on helminthiasis in rural areas of Central Java Province showed high rates of morbidity due to worms intestine^(5,6).

Though worm disease is widespread in all rural and urban areas with a high prevalence and has the impact mainly on the quality of human resources, this is still a small concern for the community. Thus, this study aims to determine the relationship between the variables of the physical environment of the house with the incidence of infection with worm eggs in toddlers.

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METHODOLOGY

This type of research was observational with a cross-sectional approach. The location of this study was carried out in Sumbang sub district randomly in one sub-district from five sub-districts under the coverage of Banyumas Regency, Central Java Province.

The population in this study were all to toddlers (aged 12 months to <60 months) in the Banyumas Regency with the number of 237 samples in Sumbang District.

The data collected was then tabulated and analyzed by univariate descriptively from each variable with a frequency distribution table, and bivariate analysis to see the relationship between variables with statistical tests of Chi-square.

RESULTS

The results of the univariate analysis of the house physical environment are summarized in the following table.

Table 1. Frequency Distribution of the House Physical Environment

No	Variables	Category	Total	%
1	Yard	Partially and wholly available	191	80.6
		No yard	46	19.4
		Total	237	100
2	Yard cleanliness	Dirty	125	52.7
		Clean	112	47.3
		Total	237	100
3	Floor type	Partially and wholly covered	137	57.8
		No floor	100	42.2
		Total	237	100
4	Water sources	Vulnerable	145	61.2
		Safe	92	38.8
		Total	237	100
5	Water disposal	Yard/garden	88	37.1
		River/pond	149	62.9
		Total	237	100
6	Sanitary toilet possession	No	203	85.7
		Yes	34	14.3
		Total	237	100
7	House density	< 10 m ²	63	26.6
		> 10 m ²	174	73.4
		Total	237	100

Most houses have yards in the form of soil, rocky and sandy (80.6%) and the rest is yard made from cement as much as 19.4%. The cleanliness of the yard observed from the presence of puddles, garbage, and the absence of sunlight is as much as 52.7% indicating the clean home yard is only 47.3%. The household floor in this study was found as much as 57.8% still made of soil and 42.2% of the floor of the house was made of

water-resistant material. Clean water sources are used for everyday purposes in the category of risky as it is taken from river or pond (61.2%) while the one in the class of safe is the source of water taken from dug wells, hand-pumped wells, springs and running water company (38.8%). The study showed that 62.9% of waste water was discharged into rivers/ponds, and 37.1% discharged it in the yard/garden around the house. Ownership of

sanitary latrines is 14.3% while 85.7% do not have ones and to make it worse, still many families that do not have latrines. Average house density is 14.82 m² with the category of occupant density <10 m² is 26.6%, and house density > 10 m² is 73.4%.

Table 2. Cross Tabulation of Physical Environment of The House and Helminthiasis

No	Variables	Category	Helminthiasis in toddlers				Total	
			Positive		Negative		Total	%
			Total	%	Total	%		
1	Yard	Partially and wholly	117	61.26	74	38.74	191	100
		No yard	25	54.35	21	45.65	46	100
		P = 0.391		OR = 1.33; CI (95%) = 0.79-2.54				
2	Yard cleanliness	Dirty	86	68.8	39	31.2	125	100
		Clean	56	50	56	50	100	100
		P = 0.003		OR = 2.205 ; CI (95%) = 1.298-3.744				
3	Floor type	Partially and wholly	91	66.42	46	33.58	137	100
		No floor	51	51	49	49	100	100
		P = 0.017		OR = 1.90 ; CI (95%) = 1.12-3.335				
4	Water sources	Vulnerable	86	59.31	59	40.69	145	100
		Safe	56	60.87	36	39.13	92	100
		P = 0.811		OR = 0.940 ; CI (95%) = 0.55-1.60				
5	Water disposal	Yard/ garden	78	88.64	10	11.36	88	100
		River/ pond	64	42.95	85	57.05	149	100
		P = 0.000		OR = 10.359 ; CI (95%) = 4.973-21.581				
6	Sanitary toilet possession	No	127	62.56	76	37.44	203	100
		Yes	15	44.12	19	55.88	34	100
		P = 0.042		OR = 2.117 ; CI (95%) = 1.016-4.411				
7	House density	< 10 m ²	48	76.19	15	23.81	63	100
		> 10 m ²	94	54.02	80	45.98	174	100
		P = 0.002		OR = 2.723 ; CI (95%) = 1.419-5.227				

The statistical test results for yard type obtained p = 0.391 indicating there is no difference in the proportion of toddler positively infected by worm eggs between houses that are partially or wholly having a yard or no yard. The results of statistical tests for yard cleanliness obtained p = 0.003 denoting there is a difference in the proportion of incidence toddler positive of worm egg infection between homes that do not clean the yard and a house with a clean yard. Oddity Value Ratio (OR) = 2.205 means that the dirty house has a chance of 2.205 times for toddlers to be infected by worm's eggs

compared to the home with a clean yard. Similarly, a positive relationship is found between floor types of the house with the incidence of infection of worm's eggs in the toddler with the OR = 1.90. The same trends also found in waste water disposal with OR = 10,359, sanitary latrine ownership with OR = 2.117, and house density with OR = 2.723. However, statistical test results for the water source obtained p = 0.811 meaning that there is no difference between the proportion of homes that have vulnerable water sources to the homes that have safe water sources.

DISCUSSIONS

Based on statistical tests on the variables of the physical environment of the house, seven variables allegedly related to the incidence of infection of the eggs flatulent there were five variables that were statistically significant, namely the cleanliness of the yard, type of floor of the house, ownership of sanitary latrines, disposal of liquid waste and density of homes. This is possible because the family's habit of defecating (toddler and family) is not in the toilet and has an impact on the presence of worm eggs on the ground, as a result of not having sanitary latrines as well as house density.

In planning to make latrines, attention must be paid to efforts to prevent breeding. The nature of positive phototropic flies, which are attracted to light and avoid darkness and dark surfaces, can be used for prevention efforts. The best latrine is a toilet where the fist immediately flushes into a hole or underground tank. Besides, all parts that are open to feces, including seating or squatting, must be kept clean and closed if not used⁽⁷⁾.

The existence of worm eggs on the ground is more optimal if the atmosphere of the surrounding environment is conducive to support. This happens as the yard is poorly maintained and the disposal of liquid waste is still to the yard/garden. Wastewater disposal facilities must meet the requirements of not contaminating drinking water sources, not contaminating surface water, not infecting disease-causing insects, closed, odorless and having disposal at the end of the channel⁽⁸⁾. Water can be a significant factor in various diseases such as *typhus*, *dysentery*, diarrhea, cholera, and worms⁽⁹⁾.

While the type of floor houses are still made from the soil extending worm breeding ground, thus increasing the contact of toddlers with contaminated soil worm eggs. Floor requirements of a clean house have a type of floor that is not dusty in the dry season and not wet in the rainy season. The kind of floor of the house that meets the requirements, namely: (1) plastered, tile, ceramic, board, or stilt house, (2) not dusty, and (3) kept clean. The type of floor of the house from the soil can cause worm disease because the ground is a factor in the spread of the disease⁽¹⁰⁾.

Several supporting studies^(11, 12) show that the condition of home sanitation (water source, water quality, the place to wash hands and cutlery, bowel movements, house floor, and house density) are related

to the incidence of helminthiasis. Also, poor sanitation conditions can worsen the prevalence of worm egg infection.

House density allows facilitating pollution and decreasing the ratio between the number of occupants and home sanitation facilities so that it supports the possibility of infection with worm eggs. Further, other environmental variables exacerbate soil pollution conditions making worm eggs will be more optimal in the soil which then provides an excellent opportunity for the infection of worm eggs in a toddler which is also supported by habits that are not good from the toddler and mother. Efforts need to be made to improve the physical environment of the house in general and to counsel on the prevention of worm disease.

CONCLUSION

For the community, it is expected to maintain the cleanliness of the surrounding house yard that is used to play toddlers and repair the floor of the house by using waterproof flooring material to reduce the risk of infection with worm eggs in a toddler in the home. Also, the community must make a means of storing wastewater that is closed and safe for the environment and does not pollute the environment. And the most important thing is for every family to have and be able to access a sanitary latrine to secure their dirt so as not to pollute the environment and not cause infection with worm eggs.

Ethical Clearance: Ethical clearance was obtained from The Ministry of Health Polytechnic Semarang, Indonesia. We also wish to thank all the participants who contributed to this study.

Conflict of Interest: Nil.

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Knowledge and Attitudes of Academic Instructor Toward First Aid at the Technical Institute-Suwaira

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ABSTRACT

Objective(s): To assess the level of knowledge and attitude of academic Instructor toward first aid and to identify the relationship between the level of knowledge and attitudes of academic Instructor toward first aid and their socio demographic characteristic.

Material and Method: A descriptive study design was carried out to assess the level of knowledge and attitude of academic Instructor toward first aid and to identify the association between the level of knowledge and attitudes of academic Instructor toward first aid and their socio demographic characteristic. The study was started from March 5th, 2018 to September 4th, 2018. The sample was Non - probability (purposive) sample of (50) academic Instructor are selected according to the criteria of the study and its purpose who working Technical Institute-Suwaira. The study was approved by the Center Ethical Committee. The data were collected by direct interview using specific questionnaire. Data was analyzed by (SPSS) package version 20.

Descriptive data used to describe study variable: frequencies, percentages and mean of score. **Inferential statistical data analysis approach:** used by application of the **Chi –square test** used for determining the association between Socio-demographic characteristics and knowledge, attitude. Testing the significant of the contingency coefficient for this study the significant P-value ≤ 0.05 .

Findings: (28%) from them were 40-49 years old, (78%) were male, (88%) were married, the overall level of knowledge was poor (66%), highly statistical significant association between items which is related to knowledge and academic Instructor' educational level and highly statistical significant association between items which is related to attitudes and academic Instructor' department.

Recommendations: The study recommends that Academic Instructor need regular training about first aid. Establish of mandatory courses for academic Instructor on first aid and attention for quality of this courses and provide first aid box at each department and classrooms.

Keywords: *Knowledge, Attitude, Academic Instructor, First aid, Technical Institute*

INTRODUCTION

Sudden illnesses and injuries are an essential issue in public health and usually occurring at any times of daily life ⁽¹⁾.

Accidental injuries are usually categorized based on their happening, for example: poisoning, burns,

drowning and falls ,...etc ⁽²⁾.

First aid is an urgent attention delivered to victims of injury until medical helps arrive. Early procedures of such emergencies decreases morbidity and deaths ⁽³⁾.

Healthy environment is very vital to avoid these hazards besides competent teachers who can identify any health problem and able to provide first aid for commonly happening emergencies ⁽⁴⁾.

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Primary purpose of first aid to reduce suffering, make healing process possible and decrease damage. First action taken to deal with injuries and sudden

illnesses decide the upcoming sequences of illness and complication rates ⁽⁵⁾.

National First aid Science Advisory Board clarified, everybody can and must learn first aid, i.e. education and training in first aid should be worldwide. This is recognized by the fact that correctly directed first aid means the difference among life and death, early versus late rescue, and momentary versus long-lasting disability ⁽⁶⁾.

Teachers must know the basic rules for first aid and the students must be instructed on first aid ⁽⁷⁾.

First aid is complex and specific situation, so that more informed and better trained, first aid are more eligible to deal with unexpected sudden injury ⁽⁸⁾.

Identification of urgent situation and calling for help is an important issue in first aid, particularly in case of lack or insufficient basic knowledge about first aid measures for complex situations to be sure that the students will have a professional medical help ⁽⁹⁾.

Thus first aid must be medically sound and based on scientific knowledge, and when the knowledge is absence, consult the expert. First aid can be obtained by everyone and comprises self-care, first aider can be any person exist in the scene of emergency and provides such care like parents, teachers, policeman, fireman, first responder and professional medic, etc ⁽¹⁰⁾.

There are three main objectives for first aid, firstly: preserve life, not merely life of victims, but first aider's life as well. Because if first aiders put their life in danger might ends up struggling for his own life instead of the victim. Secondly: avoid worsening of condition. Thirdly: encourage recovery, which means first aider actions should assist injured person toward improvement, certainly after preventing situation from getting worse⁽¹¹⁾.

MATERIAL AND METHOD

A descriptive study design was carried out to assess the level of knowledge and attitude of academic Instructor toward first aid and to identify the association between the level of knowledge and attitudes of academic Instructor toward first aid and their socio demographic characteristic. The study was started from March 5th, 2018 to September 4th, 2018. The sample was Non - probability (purposive) sample of (50) academic Instructor are selected according to the criteria of the study and its purpose who working Technical Institute-Suwaira. The study was approved by the Center Ethical Committee. Content validity for the early develops instrument is determine through a panel of (7) experts who have more than 5 years of experience in their specialties to review the questionnaire clarity, relevance, and adequacy. The determination of reliability of the questionnaire is base on Split-half reliability; the correlation coefficient is (0.817). The data were collected by direct interview using specific questionnaire that composed of three parts (28) items which: **Part (1)** Socio-demographic characteristics were included (8) items (age, gender, marital status, department, educational level, scientific title, get information about first aid, experience of teaching). **Part (2)** which dealing with knowledge about first aid including (10) items and **Part (3)** which dealing with attitude about first aid including (10) items.

Data was analyzed by (SPSS) package version 20. **Descriptive data** used to describe study variable: frequencies, percentages and mean of score. **Inferential statistical data analysis approach:** used by application of the **Chi –square test** used for determining the association between Socio-demographic characteristics and knowledge, attitude. Testing the significant of the contingency coefficient for this study the significant P-value ≤ 0.05 ⁽¹²⁾.

\leq = Equal or Less than

FINDINGS

Table (1): Distribution of the study sample according to Socio-Demographic characteristics of academic Instructor

Age	F.	%	Department	F.	%
20-29	7	14%	Technical Nursing	9	18%
30-39	13	26%	Technical Computer system	3	6%
40-49	14	28%	Technical Machinery and equipment	8	16%
50-59	4	8%	Technical Accounting	12	24%
60- and more	12	24%	Technical Electrical	7	14%
Total	50	100%	Technical Plant production	6	12%
			Technical Mechanical Technology	5	10%
			Total	50	100%
Gender	F.	%	Marital status	F.	%
Male	39	78%	Single	6	12%
Female	11	22%	Married	44	88%
Total	50	100%	Total	50	100%
Education level	F.	%	Scientific title	F.	%
Bachelor	7	14%	assistant lecturer	31	62%
Master	34	68%	Lecturer	16	32%
Doctorate	9	18%	assistant professor	3	6%
Total	50	100%	Total	50	100%
Information about first aid	F.	%	Experience	F.	%
Yes	28	56%	1-10 years	22	44%
No	22	44%	11-20 years	14	28%
Total	50	100%	21-30 years	8	16%
			31 years -and more	6	12%
			Total	50	100%

F = Frequency, % = Percentage.

Results out of this table reveal the socio-demographic characteristic of (50) academic Instructor(28%) from them were 40-49 years old, (78%) were male, (88%) were married, (24%) from technical accounting department , (68%) were master degree, (62%) scientific title of them were assistant lecturer , (44%) the experience of them were 1-10 years, (56%) of them have information about first aid.

Table (2): Assess the level of knowledge to academic Instructor about first aid

Knowledge			
Level	M.S	F.	%
Poor	1 - 1.66	33	66%
Immediate	1.67 - 2.33	11	22%
Good	2.34 - 3	6	12%
Total	1 - 3	50	100%

F = Frequency, % = Percentage, M.S = mean of the score.

Results out of this table indicate that the overall level of knowledge was poor.

Table (3): Assess the level of attitudes to academic Instructor about first aid

Attitudes	M.S	F.	%
Negative	1 - < 1.5	30	60%
Positive	≥ 1.5 - 3	20	40%
Total	1-3	50	100%

F = Frequency, % = Percentage, M.S = mean of the score.

Results out of this table indicate that the overall level of attitudes was negative.

Table (4): Association between the Knowledge, Attitudes and Socio- Demographic characteristics of Academic Instructor

Socio-Demographic characteristics	Knowledge		Attitudes	
	P-value	C.S	P-value	C.S
Age	0.10	NS	0.08	NS
Gender	0.03	S	0.42	NS
Marital status	0.47	NS	0.78	NS
Department	0.50	NS	0.000	HS
Educational level	0.009	HS	0.33	NS
Scientific title	0.06	NS	0.01	HS
Get information about first aid	0.000	HS	0.26	NS
Experience of teaching	0.49	NS	0.35	NS

P: probability level, S: Significant at P < 0.05, HS: Highly Significant at P < 0.05, NS: Non-significant at P > 0.05, C.S: Comparative Significant

Results out of this table reveal highly statistical significant association between items which is related to knowledge and academic Instructor' educational level and get information about first aid, and highly statistical significant association between items which is related to attitudes and academic Instructor' department and scientific title

DISCUSSION

1: Socio-demographic characteristic of academic Instructor

In regard to socio-demographic characteristic of (50) academic Instructor according to age, the most (28%) were 40-49 years old; this result is agreed in this study⁽¹³⁾,

which reported that majority of participants were above 40 years of age. (78%) male were the dominant gender. (88%) were married; this result is agreed in this study⁽¹⁴⁾, that higher proportion of participants were married (more than four-fifth of participants), in addition, about 79.8% of teachers had children which reflects the nature of Iraqi society and its traditions, especially as confirmed by statistics of the Central Organization for Statistics of the Ministry of Planning. (24%) from technical accounting department. Educational level (68%) were master degree, (62%) scientific title of them were assistant lecturer; because the most of participants were have master degree. (44%) the experience of them were 1-10 years. (56%) of them have information about first aid; this result is agreed in this study⁽¹⁴⁾ [table 1].

2: Discussion of the knowledge of academic Instructor about first aid

The results of this table revealed that the overall level of knowledge was poor (66%), because the most of academic Instructor have information about first aid but this information is incorrect and not in standard level; this result is agreed in this study⁽¹⁵⁾, of the 100 participants, 4% had good knowledge, 19% had fair knowledge and 77% had poor knowledge [table 2].

3: Discussion of the attitudes of academic Instructor about first aid

The results of this table revealed that the overall level of attitudes was negative (60%), because when the information about first aid is incorrect that lead to the attitudes toward negative and the academic Instructor don't participate in first aid courses to learn practice at good way; this result is not agreed in this study⁽¹⁴⁾, the present study found that overall attitude of vast majority of teachers was positive [table 3].

4: Discussion of the Association between socio-demographic characteristic of academic Instructor and their knowledge and attitudes

The results of the present study reveal that statistical significant association between the knowledge with gender; this result is agreed in this study⁽¹⁶⁾, there is a significant difference between male and female ($p = .001$). While shows highly statistical significant association between the knowledge with educational level and information about first aid; in front of researcher view this is because the educational level

effect the knowledge and most of academic Instructor have high level education (master degree) and while shows highly statistical significant association between the knowledge with information about first aid; this result is agreed in this study⁽¹⁶⁾, there is a significant difference in information about first aid ($p = .014$) [table 4].

The findings of the present study shows that highly statistical significant association between attitudes with department; in front of researcher view this is because the some department give information about first aid to lecturer to deal with accident happened in training procedure and while shows highly statistical significant association between the attitudes with scientific title; in front of researcher view this is because associate with educational level of participants.

CONCLUSION

The most age of academic Instructor 28% in 40-49, 68% from them level of education was master, (56%) of them have information about first aid, the academic Instructor with poor level of knowledge about first aid, there is significant association between training and knowledge and significant association between gender and knowledge of academic Instructor about first aid.

Recommendations:

The study recommends that:

1. Academic Instructor need regular training about first aid.
2. Add first aid training to the curriculum of the institute.
3. Establish of mandatory courses for academic Instructor on first aid and attention for quality of this courses.
4. provide first aid box at each department and classrooms.

Source of Funding: Self funding

Conflict of Interest: no any conflict of interest

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The Effects *Lactobacillus Crispatus* Probiotics on Proliferation and Metastasis of Cervical Cancer Cell Line using 3D Cell Culture

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ABSTRACT

Objective: Probiotics has been tried as an adjuvant therapy for malignant tumors through their abilities to modulate intestinal microbiota, host immune response and gene expression. Further, there are emerging data supporting the role of probiotic lactic acid bacteria in prevention of early stages colon cancer development but data on their effect on advanced colorectal cancer and cervical cancer are limited. Therefore, the aim of this study was to evaluate the impact of *Lactobacillus crispatus* supernatant (LCS) on the human cervical cell lines (HeLa) proliferation and metastasis.

Materials and Method: Effects of *Lactobacillus* supernatant on cell invasion in vitro was assessed by Transwell migration and invasion assays (3-D culture). The cytotoxic activity of *Lactobacillus crispatus* supernatant were determined by MTT assay and compared to controls, De Man Rogosa Sharpe (MRS) media and MRS + lactic acid groups. Expression of Matrix Metalloproteinase-2 (MMP2) and -9 (MMP9) genes was performed by quantitative reverse transcriptase-polymerase chain reaction (qRT-PCR) following the cell synchronization.

Results: *Lactobacillus crispatus* supernatant had cytotoxic and anti-metastatic effect on HeLa but not on normal cells. Down-regulation of MMP2 and MMP9 genes expression was also observed post-LCS treatment as compared to controls, De Man Rogosa Sharpe (MRS) media and MRS + lactic acid groups ($P < 0.05$).

Conclusion: *Lactobacillus crispatus* Supernatant could be a potential therapeutic agent for the treatment of advanced human cervical cancer through cytotoxic and anti-metastatic mechanisms

Keywords: Cervical cancer, *Lactobacillus crispatus* supernatant, Cell Line, Metastasis.

INTRODUCTION

Probiotics are defined as live bacteria (microorganisms) that provide health benefits to the human body when consumed and may reduce potentially harmful bacteria in the intestine¹. Probiotics are used by women in the perinatal period and may improve balance of microbiota with possible health benefits for both mother and baby. Not only probiotics play an important role in immunological, digestive and respiratory functions, but they could have a significant effect on the alleviation of infectious diseases in children and other high-risk groups². Most probiotics belong to the

genus *Lactobacillus* which are part of the normal flora in healthy human vagina and have an important function in protecting the host from urogenital infections³. Further, probiotic bacteria have shown anti-tumor activities, leading to cancer risk reduction, by several mechanisms including production of anti-mutagenic compounds and degradation of carcinogenic compounds⁴.

Cervical cancer is the most frequently diagnosed cancer among women in developing countries and the second most frequent cancer affecting women worldwide⁵. There is considerable evidence supporting the potential role of probiotic lactic acid bacteria (LAB)

in prevention of early stages colon cancer development but data on their role in advanced stages of colorectal cancer and cervical cancer and specifically on metastasis are limited. Tissue invasion and metastasis is dependent on cell invasion through the extracellular matrix (ECM) and involves matrix metalloproteinase (MMPs) that degrade the ECM during the metastatic process⁶. Human Papilloma Virus (HPV) infection is a well-established risk factor for cervical cancer. However, HPV infection, environmental and host factor such as in vivo microbial environment collectively contribute for the pathogenesis of cervical cancer⁷. Several lactobacillus species produce compounds that kill or inhibit the growth of vaginally acquired pathogens⁸.

Lactobacillus crispatus (*L. crispatus*) and *Lactobacillus rhamnosus* (*L. rhamnosus*) are among the most abundant species in healthy women's vagina⁹. In addition, an inhibitory effect for probiotics on colorectal carcinogenesis was observed but there are limited data regarding their prophylactic capacity in the final stages of colorectal cancer, specifically in metastasis. That study has that cell-free supernatants (CFS) from two type of probiotics (*L. casei* and *L. rhamnosus*) inhibit colon cancer cell invasion by influencing MMP9 activity in cultured metastatic human colorectal carcinoma cell and the treatment with (CFS) from both lactobacillus species decrease MMP9 and colorectal cell invasion¹⁰. Therefore, the aim of this study was to evaluate the impact of lactobacillus crispatus supernatant (LCS) on the human cervical cell lines (HeLa) proliferation and metastasis.

MATERIAL AND METHOD

Cell culture

In this experimental work, human cervical cancer cell line (HeLa), were purchased from Pasture Institute, National Cell Bank of Iran. The cells were cultured for 24 hours in Roswell Park Memorial Institute (RPMI) medium containing 10% fetal bovine serum (FBS), and 1% penicillin/streptomycin (all provided from Invitrogen, USA) in a humidified 37°C atmosphere containing 5% CO₂.

Lactobacillus supernatant preparation

De Man Rogosa Sharpe (MRS) broth (pH=6.5, Merck, Germany) was used to grow *L. crispatus* strain SJ-3C-US at 37°C for 24 hours under microaerophilic conditions. Bacterial cultures (2×10^8 c.f.u./ml), which have been incubated for overnight, were centrifuged at 7000 rpm for 7 minutes. To remove remaining bacteria and debris the lactobacilli supernatants (LS) were filtered through a 0.2 mm membrane filter. In order to differentiate the effect of lactate produced by *L. crispatus* supernatant (LCS) with pH change impact, the pH in MRS (6.5) broth was adjusted to pH in LS (4.2 ± 0.1) with lactate, this control is called MRS. In this experiment, the following conditions were tested: LCS, pH=4.2; MRS, pH=6.5; in HeLa cells⁴.

Migration/invasion assay (3-D culture)

Migration assays were performed in 24-well Falcon tissue culture plate with non-coated membrane Transwells (pore size, 8.0 µm, Merck Millipore)¹¹. The migration and invasion abilities cells in four groups: HeLa cells without any treatment (group 1), treated by *Lactobacillus* supernatant (group 2), MRS media (group 3); MRS and HCL (group 4) for 12 h were assessed using the Transwell assay. Subsequently, cells were stained with crystal violet solution, and the numbers of cells that migrated were quantified by counting the cells in 3 fields under a phase-contrast microscope

Cell synchronization for RNA extraction

HeLa cells were seeded in RPMI medium containing 10% FBS, and 1% penicillin/streptomycin for 24 hours. Subsequently, each cell line was counted and equal number of the cells were sub-cultured in four 25-cm³ flasks and synchronized, three of which were selected to be treated with LS, MRS and MRS+ lactic acid (HCL) for 4 hours. The last flask was used as control, without any treatment⁴.

RNA isolation, cDNA synthesis and quantitative reverse transcriptase-polymerase chain reaction

These were performed according to method described by Nouri et. al., 2015⁴

Table1. Sequence of the primers applied for qRT-PCR used in this study

Primer	Primer sequences	Product size (bp)	References
<i>MMP2</i>	F: GGCAGTGCAATACCTGAACACC R: GTCTGGGGCAGTCCAAAGAACT	111	¹²
<i>MMP9</i>	F: GCACGACGTCTTCCAGTACC R: CAGGATGTCATAGGTCACGTAGC	124	¹³

Statistical analysis:

Statistical analysis was performed using ImageJ software (NIH, USA). Data were expressed as mean ± SD or proportions and ANOVA test was used to compare mean among groups. P < 0.05 was considered as statistically significant

invasion in vitro

Figure 1 shows the effects of *Lactobacillus* supernatant on cell invasion in vitro in HeLa cells without any treatment(A), treated by *Lactobacillus* supernatant (B), MRS media (C), MRS and HCL (D). *Lactobacillus* supernatant suppressed HeLa invasion abilities more than MRS and lactic acid (HCL) individually.

RESULTS

Effects of *Lactobacillus* supernatant on cell

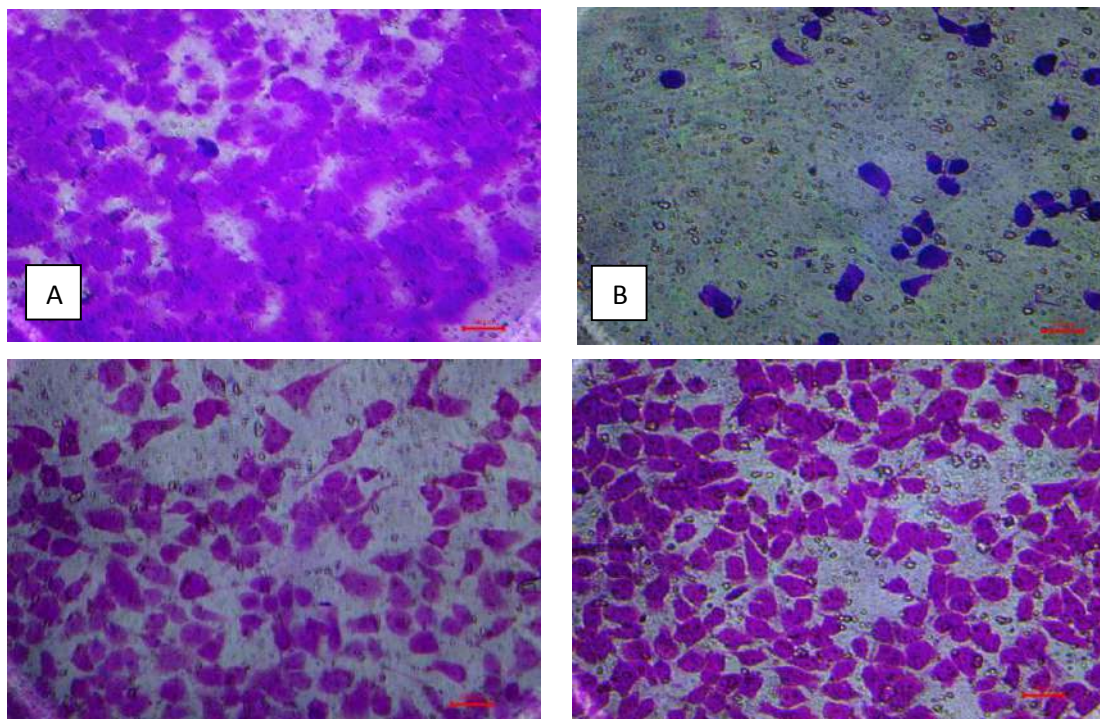


Figure1: Effects of *Lactobacillus* supernatant (LS) on cell invasion in vitro. The invasion abilities of HeLa cells without any treatment (A) and treated by *Lactobacillus* supernatant (B), MRS media (C), MRS and lactic acid (HCL) (D) for 12 h were assessed using the Transwell assay. LS suppressed HeLa invasion abilities more than MRS and lactic acid (HCL) individually.

Invasion percent of HeLa cell by MRS, MRS+HCL and LCS are demonstrated in figure 2. Invasion inhibition of HeLa cell was higher for *Lactobacillus* supernatant as compared to controls, MRS and MRS+ lactic acid (HCL) groups (P<0.05).

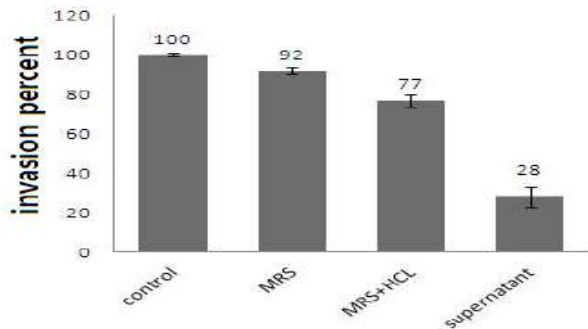


Figure 2: Graph of Invasion percent of HeLa cell by MRS, MRS+HCL and LCS. Invasion inhibition of HeLa cell was higher for *Lactobacillus* supernatant as compared to controls, MRS and MRS+ lactic acid (HCL) groups (P<0.05) MRS, MRL and LCS.

The cytotoxic effect of *L.crispatus* strain SJ-3C-US culture supernatant on HeLa cell growth

Lactobacillus supernatant had a significant cell growth inhibitory effect on HeLa cell growth in comparison with the cells treated with MRS solutions indicating that the acidity was not the main cause of HeLa cell growth inhibition. In addition, the IC50 value of LCS against HeLa cells was 11% (v/v), suggesting that a substance, other than lactate, in LCS could only affect the cervical tumor cells (HeLa) but not the normal cells (Fig3).

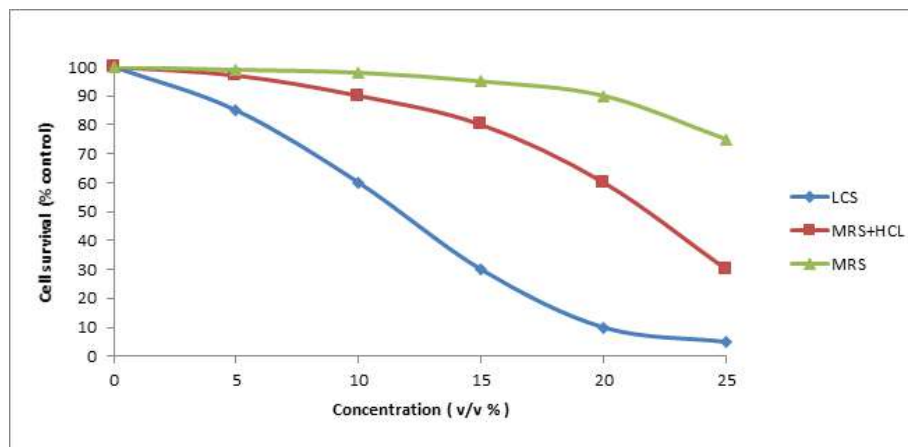


Figure3: Cytotoxicity effects of LCS, MRS+ lactic acid (HCL) and MRS with different concentrations on HeLa cell line measured by MTT assay. The mean value is represented with three separate experiments for each point. MRS, MRS+HCL and LCS.

MMP2 and MMP9 genes expression in HeLa cells treated with LCS

mRNA expression levels of *MMP2* and *MMP9* genes were quantified by qRT-PCR after 4 hours treatment with LCS, MRL or MRS are shown in figure 4. mRNA level of *MMP2* and *MMP9* genes were down-regulated in the HeLa cells treated with LCS, compared to those cells treated with MRS+HCL or MRS. LCS, MRS+HCL and MRS for MMP2 (* P < 0.05), while for MMP9 the LCS is significantly deferent from the other 2 group, so there was no statistically significant deference between MRS+HCL and MRS in MMP9.

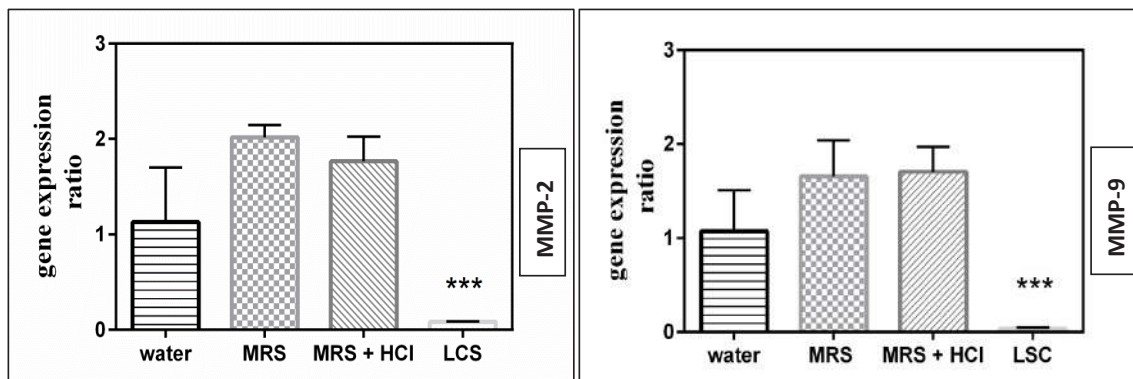


Figure 4: The effect of lactobacilli supernatant on mRNA expression level of MMP-2and MMP-9 genes in the treated HeLa cells with LCS, MRS and MRS+HCL ***; P<0.05, MRS; De Man Rogosa Sharpe, MRS+HCL and LCS; *Lactobacillus crispatus* supernatant.

DISCUSSION

It has been proven that probiotics could play anti-cancer roles by presenting several mechanisms, including induction of immune responses as well as anti-proliferative, anti-apoptotic or anti-microbial activities. Evidences shown that cervical cancer cells could reach to the other organs such as liver, lung and brain^{14,15} by activating MMP2 and MMP9 and subsequently degradation of the ECM¹⁶. In this study, different in vitro procedures were used to characterize the antagonistic and anticancer properties of vaginal *L. acidophilus* 36YL strain. This strain revealed the inhibition of the growth of potential human pathogens and other undesirable bacteria. The results showed that this strain can be considered as a probiotic that possesses the best antagonistic and anticancer properties¹⁷.

Previously we proved that *lactobacilli* culture supernatants caused valuable cytotoxic effect on cervical cancer cells¹⁸. In this study, we have examined the effects of *L. crispatus* culture supernatant treatment on HeLa and MRC-5 cell growth, using MTT assay and transcriptional analysis of some metastatic genes including MMP-2, MMP-9 genes and relevant inhibitors. We specified down-regulation of MMP2 and MMP9 genes expression in HeLa cell lines by treatment with LCS, submitting the inhibitory effect of this probiotic on cervical cell line. In accordance with our findings, *L. crispatus* were previously shown to have an inhibitory effect on MMP2 and MMP9 enzymatic activity¹⁰. In this study LCS indicated anti-proliferative effect on HeLa cell growth. Previously reported results¹⁸. Thus far, several studies marked that probiotic lactic acid bacteria, including *L. acidophilus*, *L. casei*, and *L. rhamnosus* supernatants, are able to prevent colorectal cancer progressions^{19,20}. Stimulating autophagy pathway is the other proposed anti-proliferative mechanism of probiotics while as we shown several genes with crucial autophagy roles were down-regulated in HeLa cells, due to treatment with LCS or LRS²¹. A recent study has examined *L. acidophilus* 36YL strain metabolites secretion on different cancerous cell lines including HeLa, AGS and HT-29 compared to the normal cells (HUVEC). The metabolites of these bacteria reduced viability in all of the cancerous cell lines with no toxic effect on the normal cells¹⁷. A study on the effect of LS on HeLa revealed that downregulation of CASP3 rather than lactate acidity plays a critical roles in cytotoxicity against HeLa¹⁸. Another study, however,

reported that probiotic activity is induced by alteration of pH of culture²². Interestingly, MRS+HCL showed a more potent inhibiting effect on cell lines than MRS despite having similar pH. Therefore, our study findings point to altered lactate production irrespective of pH range suggesting that lactate production is a crucial and independent inhibitory factor for cancerous cells.

CONCLUSION

Probiotics include the major normal flora of cervix. It can open a new way toward prevention or even suppression of cervical cancer cell invasions. Further investigations are required to focus on supernatant fraction and assess the effect of these fractions on different cancer cells. *L. crispatus* inhibits proliferation of HeLa cervical cancer cells. The underlying mechanism is unknown but could be partially attributed to down-regulation of HPV oncogenes. Our study findings suggest that lactobacillus is a potential therapeutic agent for the treatment of cervical cancer. Further studies are warranted to consolidate the evidence provided by this study.

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Comparison between Echocardiography and Computerized Tomography Pulmonary Angiography in Detection of Pulmonary Hypertension in Advanced Chronic Lung Diseases

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ABSTRACT

Objective: To compare between echocardiography and CT pulmonary angiography (CTPA) in the detection of pulmonary hypertension in patients with chronic advanced lung diseases.

Method: 45 patients with diagnosis of chronic advanced lung diseases were recruited in the study. Data of all patients were collected including patients' demographic characteristics, and the results of investigations which were performed for each patient which includes echocardiography and computerized tomography pulmonary angiography.

Results: mean age of patients 53.4 ± 8.3 years, with two thirds of patients aged >50 years. Males were relatively dominant than females; 24 (53.3%) vs. 21 (46.7%) respectively. Majority of the cases (75.6%) were smokers, 13 cases (28.9%) were employed. 71.1% of the cases had COPD. The mean pulmonary artery diameter of all cases was 26.3 ± 3.8 mm. The main pulmonary artery (MPA) to aorta (AO) ratio was elevated $> 1:1$ in 48.9% of cases. Right ventricle wall thickness ≥ 4 mm in 16 cases (35.6%).

Conclusion: This study has shown that although CT and echocardiographic measurements are both moderately strong correlates of mPAP in patients with a spectrum of underlying disorders, using these tests in combination is considerably more powerful in determining increased pulmonary arterial pressure than either test in isolation.

Keywords: *Computerized Tomography, Pulmonary Angiography, Echocardiography, Pulmonary Hypertension*

INTRODUCTION

Pulmonary Arterial hypertension (PAH) is a debilitating condition of the pulmonary vasculature that was first described in 1891 by a German physician E. Romberg⁽¹⁾. PAH is a hemodynamic state defined by a resting mean pulmonary artery pressure at or above 25 mm Hg⁽²⁾ and characterized by elevations in the pulmonary arterial pressure and pulmonary vascular resistance (PVR) leading to right ventricular failure and premature death⁽³⁾. While PAH remains a rare disease, it is being increasingly recognized. The estimates prevalence of category 1 PAH was 15.0 cases/millions of adult and incidence of 2.4 cases/millions of adult per year in France⁽⁴⁾, and 10.6 and 2.0, respectively in

the United States⁽⁵⁾. The age and gender distribution of the disease appears to have evolved over time. While the French registry confirmed the female-to-male ratio of 1.6⁽⁴⁾, the US registry depicts a much higher female preponderance, with a female to male ratio of 3.9⁽⁶⁾.

Chest scans have largely supplanted chest x-rays in patients with PAH, partly due to its ability to detect thromboembolism in some cases and to identify any diffuse parenchymal lung diseases that may not be evident in 15% of chest x-rays^(7,8). With advances in CT technology and its wide availability, there have been attempts to address the utility of CT to predict the presence of PAH; it is useful in delineating the anatomic detail of the pulmonary vasculature. Contrast-enhanced images

may show intraluminal abnormalities in the arteries and veins, which are useful for confirming etiologies such as thromboembolic disease^(9, 10). High-resolution CT may be helpful for the diagnosis of pulmonary hypertension in patients with suspected diffuse lung disease⁽¹¹⁾. It had been reported that a main pulmonary artery of 29 mm or larger, as shown on a CT scan, has a sensitivity of 69% and a specificity of 100% for predicting pulmonary hypertension^(7, 12).

The Doppler echocardiogram can simultaneously provide an estimate of right ventricular (RV) systolic pressure, functional and morphologic cardiac sequelae of PAH, and identification of possible cardiac causes of PAH⁽¹³⁾. Echocardiography facilitates the estimation of pulmonary artery systolic pressure, assessment of cardiac cause of PAH, assessment of severity of RV dysfunction, assessment of prognostic variables⁽¹³⁾. We aimed in the current study to compare between CT pulmonary angiography (CTPA) and echocardiography in detection of pulmonary hypertension in patients with advanced chronic lung diseases.

METHOD

A prospective study conducted at the Radiology department of Baghdad Teaching Hospital during the period from the 1st of February 2016 to the end of November 2016. A 45 adult patients with age range (37—70) years, male to female ratio (24:21), who were with approved diagnosis of advance chronic lung diseases by chest physician which is based on 2015 ESC/ERS guideline⁽¹⁴⁾. The following were excluded from the study: patients with acute lung disease, patients with diagnosed primary pulmonary hypertension, and patient's allergic to contrast media. All patients were referred from out-patients clinic in Baghdad teaching hospital.

Written informed consent obtained from all patients and the following information were recorded in a specially designed questionnaire paper: Socio-demographic Information: age, occupation, gender, smoking habit, detailed medical history about the type of chronic lung disease clinical data (ECG, Oxymetry) were obtained from all patients.

All patients enrolled in this study were examined by: echocardiography using (Phillips enviser), CTA pulmonary angiography using (Toshiba Aquilion 128 slice) multidetector with following parameters (kVp.

120), (mAs. 300) and 0.9 mm slid thickness. All the patients were examined in supine position and 90 cc of intravenous contrast media (Iohexol 755mg) injected through the cannula in anti-cubital vein with rate (4 ml/sec). Patients were scanned after predetermined period using a bolus tracking software and the following signs were reviewed; using electronic crosser pulmonary artery diameter was measured (3 mm) from the bifurcation in axial image in a mediastinal window, the diameter of the ascending aorta was measured at the same level, PA/Ao ratio was calculated (figure 1), right ventricular wall thickness measured at the mid wall of the Rt. Ventricle in 4 chambers view in axial image. the position of inter ventricular septum (normal, straitening or bowing to left) figure 2, the diameter of segmental PA equal or more to the adjacent bronchi in lung lobes, the patient or the absent of reflex of contrast media in Inferior vena cava (IVC) and hepatic veins, rericardial effusion if present or absent also reviewed, and lung and parenchymal changes reviewed in lung window (ground glass, emphysematous bullae, identical finding as cavitary lesion and Bronchiectatic changes) as illustrated in figure 1 and 2.

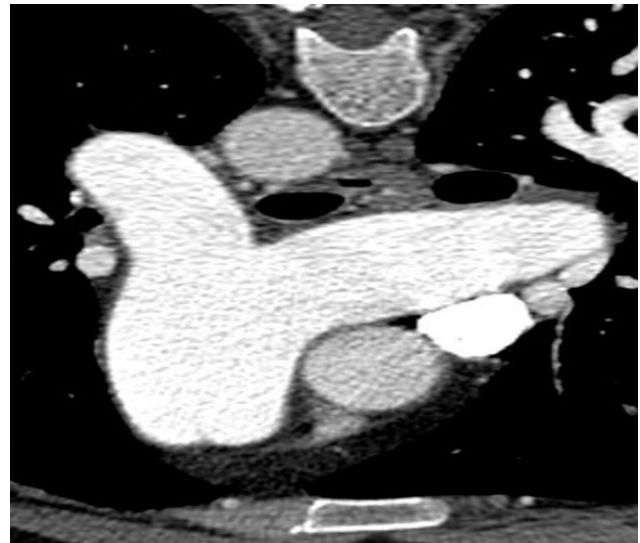


Figure 1: Show pulmonary artery diameter <29mm and increase Pa/Ao ratio at the level of PA bifurcation



Figure 2: Image show straightening of interventricular septum

STATISTICAL ANALYSIS

Data of the 45 cases were entered and analyzed by using the statistical package for social sciences (SPSS) software version 22, IBM, Chicago, US, for windows. Descriptive statistics were presented as mean, standard deviation (SD), frequencies (No.) and proportion (%). As we did not have a gold standard for the diagnosis of PAH, kappa statistics was used for the analysis and assessment of the agreement between CT and Echo results. Where the CT signs of PAH compared to the Echo results ⁽¹⁵⁾. Level of significance, P.value was set at 0.05. Finally, results were presented in tables and or figures with an explanatory paragraph.

RESULTS

There were 45 patients enrolled in this study with a mean age of 53.4 ± 8.3 (range: 37-70) years, moreover, about two thirds of the studied group aged more than 50 years. Males were relatively dominant than females; 24 (53.3%) vs. 21 (46.7%) respectively. Majority of the cases (75.6%) were smokers and only 13 cases (28.9%) were employed. Chronic obstructive lung disease (COPD) was the dominant type of chronic lung diseases among the cases, reported in 32 cases (71.1%), followed by bronchiectasis (20%) and the least frequent was interstitial lung diseases (ILD) in only 4 cases (8.9%). The clinical and radiological findings are illustrated in table 1.

Table 1: clinical and radiological findings

Variables	Value
Main pulmonary artery diameter (mm), mean \pm SD	26.3 \pm 3.8
≥ 29 mm	26 (57.8%)
< 29 mm	19 (42.2%)
Main pulmonary artery diameter by gender (mm), mean \pm SD	
In male (mm), mean \pm SD	27.2 \pm 1.9
In female (mm), mean \pm SD	25.3 \pm 2.4
Ratio of segmental pulmonary arteries to adjacent bronchi	
$> 1:1$	21 (46.7%)
Normal	24 (53.3%)
Ratio of MPA to AO	
Increased ($> 1:1$)	22 (48.9%)
Normal ($\leq 1:1$)	23 (51.1%)
Parenchymal changes detected by CT	
Ground glass	26 (57.8%)
Emphysematous bullae scattered throughout the lung	25 (55.6%)
Bronchiectatic changes	12 (26.7%)
Cavity lesion	8 (17.8%)
Parenchymal consolidation	4 (8.9%)
Thick interlobular septa	3 (6.7%)
PAH by echocardiography	27 (60.0%)
Right ventricle wall thickness (mm), mean \pm SD	3.42 \pm 1.56
≥ 4	16 (35.6%)
< 4	29 (64.4%)
Inter-ventricular septum left ward bowing or strained	15 (33.3%)
Right ventricle dilatation	16 (35.6%)
ECG finding	
RAD	21 (46.7%)
RAD + RVH	4 (8.9%)
Normal	20 (44.4%)
MPA: Main pulmonary artery, AO: Aorta, RAD: right axis deviation, RVH: right ventricular hypertrophy	

There was substantial agreement between echocardiography findings of PAH with main pulmonary artery diameter, MPA to adjacent AO, Right ventricle wall thickness, right ventricle wall thickness, and

Parenchymal changes, but there was poor agreement with PA to adjacent bronchi ratio, as illustrated in table 2. Figure 3 illustrate the different lung diseases compared by PAH diagnosed using echo.

Table 2: agreement between echocardiography results and CT findings

CT scene findings	Echocardiographic findings		Kappa	p-value
	PAH	No PAH		
	27	18		
Main pulmonary artery diameter			0.680	0.003
≥ 29	23 (85.2%)	3 (16.7%)		
< 29	4 (14.8%)	15 (83.3%)		
MPA to adjacent AO			0.780	0.002
Increased	22 (81.5%)	0 (0%)		
Normal	5 (18.5%)	18 (100%)		
PA to adjacent bronchi ratio			0.130	0.392
> 1: 1	14 (51.9%)	7 (38.9%)		
Normal	13 (48.1%)	11 (61.1%)		
Right ventricle wall thickness			0.620	0.001
≥ 4 mm	16 (59.3%)	0 (0%)		
< 4 mm	11 (40.7%)	18 (100%)		
Parenchymal changes			0.610	0.001
Present	26 (96.3%)	7 (38.9%)		
Absent	1 (3.7%)	11 (61.1%)		

AO: Aorta, OA: pulmonary artery

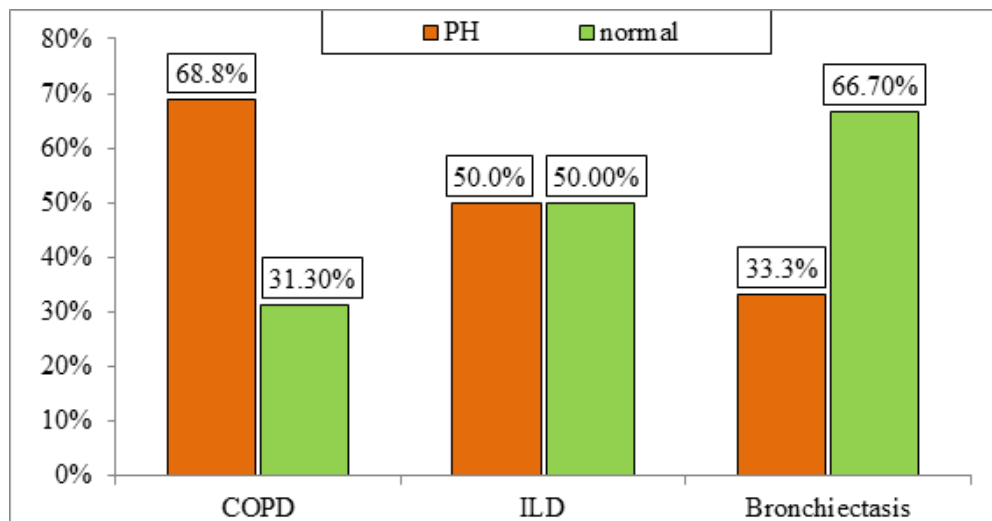


Figure 3: Comparison of pulmonary hypertension according to Echo findings in patients with different lung diseases

DISCUSSION

Pulmonary hypertension may be suspected based on the clinical history, physical examination and electrocardiogram findings but imaging is usually

central to confirming the diagnosis, establishing a cause and guiding therapy. The diagnostic pathway of PAH involves a variety of complimentary investigations (16). Computed tomography pulmonary angiography (CTPA)

and Echocardiography are important modalities in the assessment of PH and have established a central role both in helping identify an underlying cause for pulmonary hypertension and assessing resulting functional compromise. Echocardiography (ECHO) is an important noninvasive tool in assessment of PH and has been used to screen for the disease, determine right and left heart structure and function, and assess response to therapy in persons with PH^(2, 16, 17). Despite that Echocardiography and right heart catheterization are the main diagnostic method in PAH⁽¹⁷⁾, the main role of the CT scan to evaluate for any associated underlying diseases, however, there have been attempts to address the utility of CT to predict the presence of PAH⁽⁷⁾. Reliability of noninvasive estimation of pulmonary arterial pressure (PAP) and of PAH diagnosis with echocardiography was discussed extensively, nonetheless, Doppler estimates of systolic and particularly mPAP are imprecise in individual patients, this is likely because of the intrinsic limitations of echocardiography and its operator dependency⁽¹⁸⁾.

The current study tried to compare between CTA and echocardiography in detection of pulmonary hypertension in patients with advanced chronic lung diseases, therefore (45) patients were clinically assessed and examined using both Echo and CT scanning.

Regarding the demographic characteristics, the mean age of the studied group was 53.4 ± 8.3 (range: 37-70) years and (68.9%) aged more than 50 years. Males were relatively dominant than females; (53.3%) and (46.7%), respectively these findings go with the clinical picture of chronic lung diseases where pulmonary disease prevalence increases with age and contributes to morbidity and mortality in older patient^(19, 20). On the other hand, the gender differences in advanced lung disease are yet not well documented⁽²⁰⁻²²⁾.

The present study found that majority of the cases (75.6%) were smokers, this was not unexpected, because smoking is widely postulated as the main causal agent and cessation of smoking is the only method currently known to slow lung function decline^(23, 24). From Other point of view, smoking is a major risk factor of PAH, and PAH is common in smokers with COPD and thereby not correlated with the degree of airway obstruction⁽²⁵⁾, in a previous study from Switzerland in 2010 Schiess et al. documented that smoking is one of the major risk factors of PAH⁽²⁵⁾.

In the present study COPD was the dominant chronic lung diseases among the cases, it was reported in (71.1%), followed by bronchiectasis (20%) and the least frequent was interstitial lung disease (ILD) (in only 8.9%) of the cases, these findings supported by that documented by Akgün et al in 2012⁽¹⁹⁾. From other aspect of view, Shujaat et al.⁽²⁶⁾ found that PAH is more frequent in COPD and varies from 20 to 91% depending on the cut point of PAP used for the definition of PAH.

In the current study according to the echocardiography results (60%) of the cases had pulmonary artery hypertension (PAH) this finding is close to that reported by Iyer et al. study in 2014 in USA⁽²⁷⁾. However, estimates of the prevalence of PAH is vary widely from as low as 10% to as high as 85% depending on the severity of the underlying lung disease and the diagnostic criteria as well as approach used⁽²⁸⁻³⁰⁾, moreover, a previous study was conducted by Arcasoy et al⁽²⁹⁾ reported that the prevalence of PAH in patients with obstructive lung diseases compared with those with interstitial lung diseases or pulmonary vascular disease was 38%, 54%, and 67%, respectively, depend on the estimation of PAP⁽²⁹⁾. The variation among studies in the prevalence of PAH attributed to the population heterogeneity and the differences in the cutoff points of mPAP used for the diagnosis of PAH, where higher prevalence reported with the lower cutoff points⁽²⁹⁾, in addition to the method of diagnosis.

With regard to the main pulmonary artery diameter, the current study found that the mean main pulmonary artery diameter was (26.3 ± 3.8 mm) which was very close to the finding of Ussavarungsi et al.⁽⁷⁾ study which documented a mean of (26.6 ± 2.9 mm). From other point of view, our study with a cut-off point of 29 mm as of the mPA diameter was used. This cut-off was widely used in previous studies and documented to have good specificity value^(7, 31, 32). According to this cutoff point, out of the 27 patients with PH on echo, 85.2% had a mPA diameter of ≥ 29 mm giving good agreement of (84.4%) between the CT measurement of the mPA diameter and the Echo finding, this indicate that mPA measured by CT could predict PH and this sign is helpful in diagnosis of PAH. Moreover, our finding of the mean mPA diameter lower than (27.2 ± 0.6 mm) that reported in an earlier study by Edward et al⁽³²⁾. Nonetheless, many studies have tried to determine the normal range of the main PA size and found that the mPA diameter is easy to be defined anatomically and is highly reproducible,

in addition, the ascending aorta can also be measured to calculate the ratio of main PA to the aortic diameter (PA/Ao) (7, 12, 29, 32). Some authors used different cut-off point of PHT according to their clinical evaluation and studied population and different mean values of the mPA diameter were concluded; Kuriyama et al. reported a somewhat smaller mean PA size of 24.2 mm and used this value as a predictor for PH (12). The possible discrepancy may be due to the differences in CT techniques, race and patients characteristics (7, 12, 29, 32).

CONCLUSIONS

CT has the potential to provide the first pointer toward the diagnosis of the PAH in the patient with advance chronic lung disease, also CT and echocardiography are providing complementary information about increased pulmonary arterial pressure: CT offers anatomic information about the size of the pulmonary arterial tree, and echocardiography identifies the functional consequences of PH.

Conflict of Interest : None

Ethical Clearance: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. approved by the scientific council of diagnostic radiology of the Arab board for Health specialization

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Angiotensinogen II Type I Receptor A1166C is Associated with Serum Sodium Level and Essential Hypertension in Javanese Population

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ABSTRACT

Background and Objective: Genetic risk factors associated with essential hypertension includes the polymorphism of AGTR1 A1166C. AGTR1, a gene of *Renin-Angiotensin-Aldosteron-System* has also been associated with dysfunctions in sodium absorption and natriuretic hormone. Therefore, the aim of this study was to investigate the correlation of AGTR1 A1166C and serum sodium level with essential hypertension within the specific ethnic group of Javanese in Sidoarjo - Indonesia.

Method: This case-control study was designed as a cross-sectional study, with 106 Javanese subjects. Genotyping for AGTR1 A1166C polymorphism was done using real-time PCR and DNA sequencing, while serum sodium level, blood glucose and lipid levels were determined by standard clinical laboratory methods.

Results: Our observations showed that AGTR1 A1166C, in particular the genotype AC, significantly correlated with high serum sodium level ($p = 0.001$) and appeared to be a risk factor for hypertension with OR 4.66 (95% CI = 1.065–21.51, $p = 0.0445$). Moreover, the serum sodium level was positively correlated with systolic blood pressure (SBP) or diastolic blood pressure (DBP) ($r = 0.3981$, $r = 0.4342$, respectively, $p < 0.0001$).

Conclusion: This study demonstrates that AGTR1 A1166C along with increased serum sodium level are major risk factors for essential hypertension in the Javanese population residing in Sidoarjo province in Indonesia.

Keywords: AGTR1, serum sodium, hypertension, genetic factors

INTRODUCTION

Hypertension is a significant health problem in Indonesia. The national data from 2007 to 2013 shows a 5.9% decrease in the average prevalence of hypertension, from 31.7% to 25.8%, suggesting that approximately 65,048,110 individuals are currently afflicted with hypertension.¹ However, the prevalence varies across

Indonesia, from as low as 16.8% in Papua to as high as 30.9% in Bangka-Belitung.¹ There are many elements that could contribute to this variation, including genetic factors and lifestyle.² Although genetic factors are hardly modifiable, studies have shown that lifestyle adjustment relevant to a specific pathway associated with a particular genetic factor may reduce the overall risk of hypertension.²⁻⁴ Therefore, it is essential to uncover potential genetic risk factors associated with populations afflicted with hypertension.

Angiotensinogen II Type 1 Receptor (AGTR1), in particular the allele A1166C genotype AC/CC (rs15186), has been shown as a predisposition factor for

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hypertension in Asian and Caucasian populations in a meta-analysis study.⁵ AGTR1 is one of the major receptor protein in *Renin-Angiotensin-Aldosteron-System* (RAAS). By association with G proteins that activate a phosphatidylinositol-calcium second messenger system, AGTR1 mediates the classical biological actions of angiotensin.⁶ AGTR1 has been associated with dysfunctions in sodium absorption and natriuretic hormone function.⁷ It has also been associated with thickening of arterial walls, renal sodium reabsorption and retention.⁸⁻¹⁰

Certain lifestyle combined with a specific genotype may pose as a risk to promote, prevent, or at least modify hypertension severity.¹¹ If a specific variant of AGTR1 associated with high serum sodium level, it would be helpful to advise the individuals carrying that specific variant to adopt a low-sodium diet, thus, effectively lowering the risk for hypertension. With this in mind, we sought to identify AGTR1 A1166C allele frequencies and the risk conferred by specific genetic variants and associated biochemical factors for essential hypertension. As similar population genetic studies may reveal different, even conflicting conclusions, we conducted ours to see whether A1166C is a predisposition factor for hypertension in Sidoarjo, East Java Province, which has a reported hypertension prevalence of ~26%. We recruited specific ethnic Javanese patients that came to the Primary Health Centers, the lowest tiered health care provided by the government. A similar genetic population study has been reported,¹² although the subjects were from Central Java region, presented a rather different life style profile (e.g. consumption of sweet, instead of salty cooking habit), and were recruited from referral hospitals with higher level of health care facilities intended for more severe diseases.

MATERIALS AND METHOD

Participants

A cross-sectional study was conducted in unrelated adult individuals who had visited the Primary Health Centre of Sukodono, Sidoarjo, Indonesia. Participants were classified into two groups – hypertensive patients, if systolic and/or diastolic blood pressure (SBP and DBP, respectively) were ≥ 140 mmHg and ≥ 90 mmHg, respectively, and not hypertensive if SBP and DBP were < 140 mmHg and < 90 mmHg, respectively. A medical doctor diagnosed newly hypertensive patients

based on International Society of Hypertension Writing Group (ISWG, 2003). All participants were residents of Sidoarjo, Indonesia for at least three generations. Patients showing kidney or thyroid dysfunction, pregnancy, and those using contraceptive pills or other medications affecting blood pressure were excluded.

Interviews

All participants were interviewed using a questionnaire with regard to their lifestyle, smoking, alcohol consumption, food intake, and their family history of hypertension as part of demographic data collection.

Sample collection and assays

Five milliliter (5 mL) of peripheral venous blood was collected from all the participants in an ethylene diamine-tetra acetic acid (EDTA) vial after 12 h of fasting. One milliliter of whole blood was used for DNA extraction and the remaining for biochemical analyses related to hypertension risk factors, namely serum sodium, blood glucose and lipid level measurements. Serum sodium was determined using Ion Selective Electrodes (ISE), blood glucose using Glucose oxidase-Phenol Aminophenazone (GOD-PAP), and lipids using Cholesterol Oxidase-Phenol Aminophenazone (CHOD-PAP) standard methods.

Genotyping for AGTR1 A1166C polymorphism was performed by real-time PCR (ABI 7300 Real Time PCR System, Applied Biosystems, Foster City, CA) with SYBR green probe (Eurogentec, Seraing, Belgium) PCR Core reagents. The primers used were: Forward 5'-AGCCTGCACCAT GTTTTGAG-3' and Reverse 5'-TACCAGGTGCAAGTGTAGCA-3' (rs5186 flanking bases 1104-1610, SNP at probe 1218, or NM_032049.3 flanking bases 1314-1820 with SNP at 1428). Genotypes were classified into two groups i.e. wild type (AA) or mutant (AC/CC). Confirmation of the A1166C allele was accomplished using a DNA-sequencing kit (ABI Prism Big Dye Sequencing kit), according to the manufacturer's instructions. DNA sequences were aligned using BLAST-NCBI program against reference sequence NM_032049.3 to detect A1428C (A1166C).

Statistical analyses

The data were analyzed for differences by multiple *t*-test or One-way ANOVA, and comparisons were

made using Mann-Whitney or Kruskal-Wallis tests, as appropriate. Association among variables was tested by Pearson's *r*, linear regression, or Spearman correlation test, as appropriate. Fisher exact was used to test association of AGTR1 A1166C genotypes (A/C alleles) with hypertension. An odds ratio at [95% confidence intervals (CI)] was calculated as an index of the association of the gene with the disease. Data are presented as mean \pm SD or median \pm CI 95% (lower confidence limit; upper confidence limit). Statistical significance was defined as *p*-value $<$ 0.05. All statistical analysis was performed using GraphPad Prism version 7 (GraphPad Software, La Jolla, CA, USA).

Ethical Considerations: The study was conducted in accordance with the guidelines of the Helsinki Declaration. The study protocol was approved by the Ethical Committee for Health Research, Faculty of Medicine, Wijaya Kusuma University, Surabaya (No. 101109/SLE/FK/UWKS/2016). Written informed consent was also obtained from all the participants prior to the study.

RESULTS AND DISCUSSION

Baseline characteristics

From 306 individuals that were interviewed, 206 fulfilled the inclusion and exclusion criteria; however, during the study some individuals dropped out, leaving a total of 106 subjects in the current study. Of these, 66 individuals presented with essential hypertension and were slightly older than the remaining 40 normotension individuals (Table 1). The number of female subjects was higher as compared with the number of male subjects in both groups (*p*=0.302). SBP in hypertensive patients were significantly higher (157 ± 15 mm Hg) than that of normotensive controls (118 ± 9 mm Hg), *p* $<$ 1×10^{-11} . Similarly, DBP in patients were higher (93.79 ± 10 mm Hg) than in controls (76.9 ± 8 mm Hg), *p* = 5.1×10^{-14} (Table 1). Concomitantly, the serum sodium levels were also higher in hypertensive patients (141.6 ± 2.79 mg/dL) than in normotensive individuals (138.2 ± 2.56 mg/dL). Blood glucose, lipids, BMI, and smoking status were not different between patient and control groups, except for levels of low density lipoproteins (LDL), which was high in the hypertensive group (Table 1). Consumption of salt was statistically different between both groups, with a higher consumption seen among the hypertensive individuals.

Genotypes

Using real-time PCR and DNA sequencing we detected the polymorphic variant A1166C. In our sample population, the genotypes at 1166 were predominantly AA (85.8%), and AC (14.2%), whereas genotype CC was not detected. Others have reported similar results, with AA as the major genotype and AC as the minor one; CC was not detected in Malaysia (0/151) and Indonesia (0/60; 0/113).¹²⁻¹⁴ It is not clear why CC genotype was not detected. However, it is likely that due to a very small frequency, a larger sample size (more participants) may be required to detect it, or the CC genotype could be undergoing negative selection.¹⁵

Association of serum sodium, blood pressure and AC genotype with essential hypertension

Correlation of serum sodium level with SBP or DBP was analyzed using Pearson's *r* test. As shown in the scatter plots, a positive correlation was observed between serum sodium levels and SBP, with the Pearson *r* being 0.3981 (CI 0.2244–0.5473), *p* $<$ 0.0001, and equation of linear regression $y = 2.929x - 268.4$. A positive correlation was also seen with DBP, where the Pearson *r* was 0.4342 (CI 0.2644–0.5772, *p* $<$ 0.0001, and equation of linear regression $y = 1.778x - 162.1$. Correlation between polymorphism and serum sodium level was analyzed using the Spearman test, which showed a Spearman *r* of 0.5309 and *p* $<$ 0.0001. Genotype AC associated with higher levels of serum sodium, albeit still within normal range (*p* $<$ 0.001). Genotype AC was also associated with relatively higher mean of DBP (*p* = 0.0326). However, the SBP range did not differ between the AA and AC genotypes (*p* = 0.1296).

Although our observations are in line with majority of previous reports from Asian populations, they are contradictory to another Javanese-Indonesian study.¹² Our study showed that individuals carrying genotype AC have higher serum sodium level and blood pressure, in comparison with those carrying AA. In contrast, Irijanto et al. indicated that the genotype AA presented a risk factor for hypertension.¹² Such discrepancy may be due to the profile of the recruited patients, which may be complicated by organ dysfunctions and/or medications affecting blood pressure.

AGTR1 protein expression was positively correlated with SBP and DBP and negatively correlated with miR-155 expression level.¹⁶ Allele C has been functionally

associated with hypertension, where its presence impairs downregulation of AGTR1 by hsa-miR-155, thus elevating AGTR1 protein levels.¹⁷ The miR-155 expression was significantly decreased in subjects with CC genotype; however, the AGTR1 mRNA and protein expression were not significantly different in AA and AC genotypes.¹⁶

The level of serum sodium may be a result of salt consumption by an individual. Our study showed that

proportion of individuals with high salt consumption was higher in the hypertensive group than in the normotensive group. Furthermore, the AC genotype associated with high level of serum sodium and relatively higher mean of DBP. Thus, dietary salt consumption and/or genetic variation may predispose an individual to hypertension. Intervention such as low-sodium diet for individuals with genotype AC could lessen serum sodium and thus decrease hypertension risk.

Table 1: Average characteristics of the subjects.

Variables	Hypertension (n = 66)	Normotension (n = 40)	p value
Age (years)	55.61 ± 10.59	50.42 ± 11.13	0.018
Sex (n (%))			0.302
Male	21 (19.8)	9 (8.5)	
Female	45 (68.2)	31(77.5)	
Blood pressure			
SBP (mmHg)	157 ± 15	118 ± 9	< 1×10 ⁻¹¹
DBP (mmHg)	93.79 ± 10	76.9 ± 8	5.1×10 ⁻¹⁴
Salt consumption [n (%)]			0.0194
Low: < 4 g/d	6 (9)	9 (22)	
Moderate 4–8 g/d	40 (61)	27 (68)	
High: > 8 g/d	20 (30)	4 (10)	
Serum sodium (mmol/L)	141.6 ± 2.79	138.2 ± 2.56	< 0.0001
Polymorphism A1166C			0.0045
AA [n (%)]	53 (80.3)	37 (93)	
AC [n (%)]	13 (19.7)	3 (7.5)	
BMI [n (%)]			> 0.999
Underweight	5 (7.6)	6 (15)	
Normal	26 (39.4)	18 (45)	
Overweight, obese	35 (53.9)	16 (40)	
Blood glucose (mg/dL)	128 ± 69	104 ± 38	0.132
Lipids (mg/dL)			
Total cholesterol	194 ± 41	193 ± 30	0.893
Triglycerides	145 ± 68	124 ± 55	0.192
HDL	41.6 ± 8	45.8 ± 9	0.058
LDL	139 ± 24	117 ± 21	0.00003
Smoking [n (%)]			> 0.999
Not at all	44 (66.7)	27 (67.5)	
Smoking (passive, active)	22 (33.3)	13 (32.5)	

Table 2. Association between AGTR1 A1166C and hypertension

Variables	Hypertension n (%)	Normotension n (%)	OR	95%CI Upper-Lower	p value
Genotype			4.66	1.065-21.51	0.0445
AC (mutant)	13 (12.3 %)	2 (1.9 %)			
AA	53 (50.0 %)	38 (35.8 %)			
Allele			4.261	1.059-19.33	0.0531
C (mutant)	13 (6.1%)	2 (0.9%)			
A	119 (56.1%)	78(36.8%)			

CONCLUSIONS

The present study demonstrated that AGTR1 A1166C, genotype AC, significantly correlates with high serum sodium level and DBP. In addition, serum sodium level also presented a positive correlation with blood pressure. Thus, the genotype AC, along with high serum sodium levels may pose a major risk for hypertension. Further studies are needed to see whether low-sodium diet for individuals with genotype AC could lessen serum sodium and blood pressure and thereby decrease the prevalence of hypertension among the Javanese population in the Sidoarjo province of Indonesia.

Data Availability

Data underlying the findings of the present study are available upon request.

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Conflict of Interest: Nil

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Analysis on Quality of Food Sanitation Hygiene and Escherichia Coli (*E. Coli*) Contamination at Restaurants around Commuter Line Stations in Central Jakarta, 2018

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ABSTRACT

Background A person's health condition and nutrition status is affected by the quality of food they eat. Therefore, everyone should be protected from any food that does not qualify food hygiene and sanitation requirements so it won't affect health. This research is to analyze the correlation between food sanitation hygiene according to standard for bacteriological quality of food at restaurants around commuter line stations in Central Jakarta. **Materials and Method.** A cross sectional study was conducted among 51 food handlers in Central Jakarta. Research data were analyzed using bivariate analysis with chi square test and multivariate analysis with logistic regression. **Results.** Bivariate analysis showed significant correlation between food ingredients ($p=0,019$: OR = 5,600: CI 95% 1,487-21,096), food ingredients storage ($p=0,006$: OR = 7,000: CI 95% 1,859-26,365), and cooked food storage ($p=0,008$: OR = 6,250: CI 95% 1,768-22,092) with *E. coli* contamination in foods. In addition, multivariate analysis indicated that food ingredients (OR=7,915) and cooked foods storage (OR=8,402) affected *E. coli* contamination in foods. **Conclusion** Authors suggest the restaurant owners should also improve their restaurant facilities such as kitchen renovation and washstand provision as the supporting elements to improve the quality of foods.

Keywords: hygiene sanitation, *E. coli* bacteria quality, restaurants

INTRODUCTION

People's lifestyle is shifting as the urbanization and industrialization develop. It includes the habit to buy food from the restaurants or street foods.¹ Unhygienic food processing in such places may cause food contamination by the bacteria which could lead to foodborne disease.²

Foodborne disease is a global public health problem with high morbidity and mortality rate.³ Foodborne disease might be caused by unhygienic food handling practices.⁴ The standard of hygienic foods can be measured based on the evaluation of *E.coli* bacteria contamination in food.³

E. coli bacteria is a normal microflora inhabiting the digestive tract of humans and warm-blooded animals which is usually non-pathogenic to humans.⁵ However, several types of *E. coli* could be pathogenic and its presence in foods indicating that the foods are contaminated by feces. *E.coli* bacteria in foods indicates the poor hygiene during food production or processing.⁶

KA Commuter line is a commuter rail system for Jakarta Metropolitan Area in Indonesia. Commuter train station is one of the popular public spots with average number of users per day reaching 993,804 passenger on weekdays, and the the largest number of users served in a single day recorded is 1,065,522.⁷ Based on the assessment result conducted by the Directorate of Environmental Health and Indonesian Railways Company in June 2017, 23% of food outlets at the station did not qualify the hygiene and sanitation requirements.⁸

According to the survey conducted at all commuter line stations in Jakarta, restaurants are the most dominant type of food, especially in Central Jakarta.

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Central Jakarta is a strategic area where the National and Provincial Government runs. In addition, Central Jakarta also serves as a center of services, business, trade activities; which causes high activities in that area.⁹

The risk of foodborne disease is increasing as the people frequently eat and buy foods at the restaurants around the commuter line stations that did not properly follow the regulation to maintain the food hygiene or cook the foods in places with poor hygiene. Knowing that a research on the restaurants around commuter line station of Central Jakarta has never been conducted, the researchers are intended to identify *E. coli* contamination at the restaurants around commuter line train stations of Central Jakarta and its correlation with food hygiene and sanitation.

MATERIALS AND METHOD

The research design was cross-sectional with quantitative approach. The quality of *E. coli* bacteria on foods at the restaurants was determined through a direct food sampling and laboratory test using Total Plate Count (TPC) method with CCA (Chromocult Coliform Agar) as the medium. The data related to sanitary hygiene knowledge of the handlers was conducted through interview using questionnaires. While the data containing personal hygiene of the handlers, sanitation facilities, kitchen sanitation, utensils sanitation, food ingredients, food ingredients storage, food processing,

cooked food storage and serving was conducted using checklist instrument according to the observations.

The Research used total sampling technique with inclusion is restaurants around Central Jakarta commuter line stations that had high risk contamination foods including *E. coli*, that is the food with high protein and water rate. The samples of this research were 51 food handlers and 51 food samples.

The data were analyzed using univariate, bivariate, and multivariate analysis with SPSS Statistic 19 software. Univariate and bivariate tests were performed to obtain the frequency distribution of each research variable and to determine the correlation between independent and dependent variables in 95% confidence interval. In addition, a multivariate test was performed to determine the most dominant independent variable that affect dependent variable.

FINDINGS

Based on the results of *E. coli* examination in the laboratory, 18 (35.3%) of the food was positively contaminated with *E. coli*.

This research shows that from 51 interviewed food handlers, there were 9 (17.6%) food handlers having poor knowledge and 34 (66.7%) food handlers having poor personal hygiene. The results show that 14 (27.5%) restaurants had unqualified food ingredients.

	Knowledge	Personal Hygiene	Ingredients	Ingredients Storage	Food Processing	Food Storage	Food Serving	Kitchen	Sanitation Facilities	Utensils Sanitation
Qualified	42 (82.4%)	17 (33.3%)	37 (72.5%)	26 (51%)	21 (41.2%)	31 (60.8%)	33 (64.7%)	16 (31.4%)	23 (45.1%)	26 (51%)
Unqualified	9 (17.6%)	34 (66.7%)	14 (27.5%)	25 (49%)	30 (58.8%)	20 (39.2%)	18 (35.3%)	35 (68.6%)	28 (54.9%)	25 (49%)

From the univariate test results of hygiene sanitation of food ingredients storage, there were 25 (49.0%) restaurants that did not qualify the hygiene sanitation standard. For food processing variable, 30 (58.8%) were not qualified the standard and 20 (39.2%) of food storage were not qualified the standard.

As much as 18 (35.3%) restaurants did not qualify the hygiene sanitation requirements for serving foods. There were 35 restaurants (68.6%) that did not qualify the kitchen sanitation hygiene. While as much as 28

restaurants (54.9%) had poor sanitation facilities and 25 (49.0%) restaurants did not qualify hygiene standards for utensils sanitation (Fig.1).

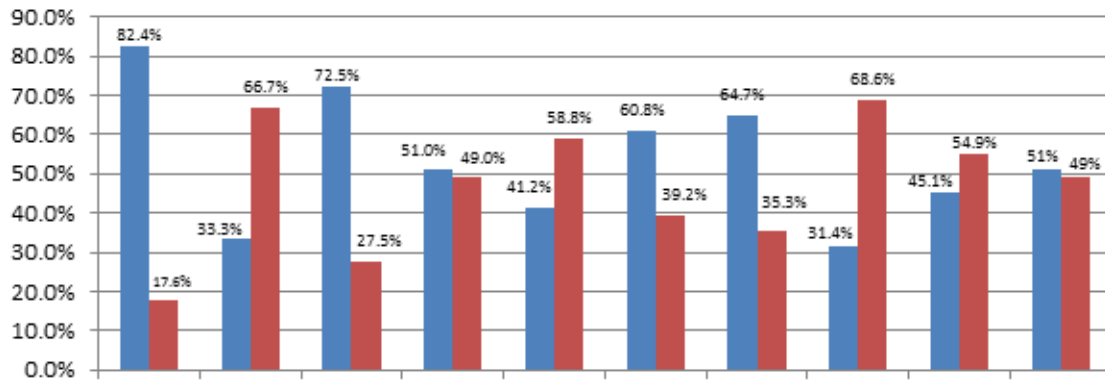


Fig 1. Univariate Analysis on Food Hygiene Sanitation Variables at the Restaurants around Commuter line of Central Jakarta, 2018

Bivariate analysis was conducted to assess the correlation between hygiene sanitation of foods variables and *E. coli* contamination at the restaurants. From the results of chi-square test, the correlation among both variables can be examined by looking at the *p* value and Odd Ratio (OR). If the value of $p < 0.05$ and $OR > 1$, then both variables have a significant correlation. Based on Chi-square test results, there is a significant correlation

between food ingredients ($p = 0,019$: $OR = 5,600$: $CI 95\% 1,487-21,096$), food ingredients storage ($p = 0,006$: $OR = 7,000$: $CI 95\% 1,859-26,365$), and food storage ($p = 0,008$: $OR = 6,250$: $CI 95\% 1.768-22.092$) with *E. coli* contamination. Multivariate analysis was conducted to determine the most dominant variable. The variables included in the multivariate analysis were variables that having $p < 0,25$ based on the bivariate test.

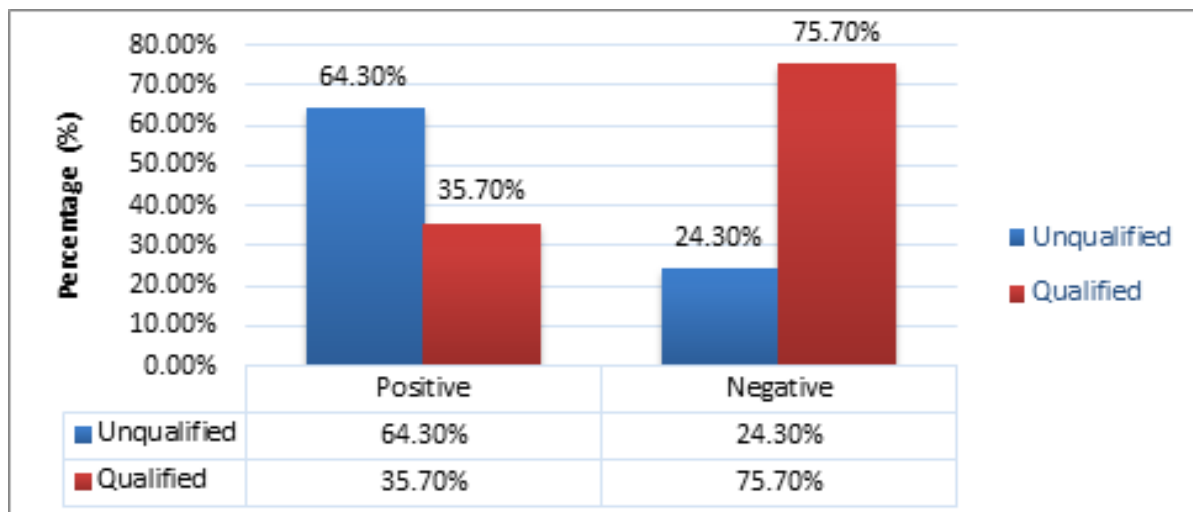


Fig 2. Correlation between Food Ingredients and *E. coli* Contamination at the Restaurants around Commuter line of Central Jakarta, 2018

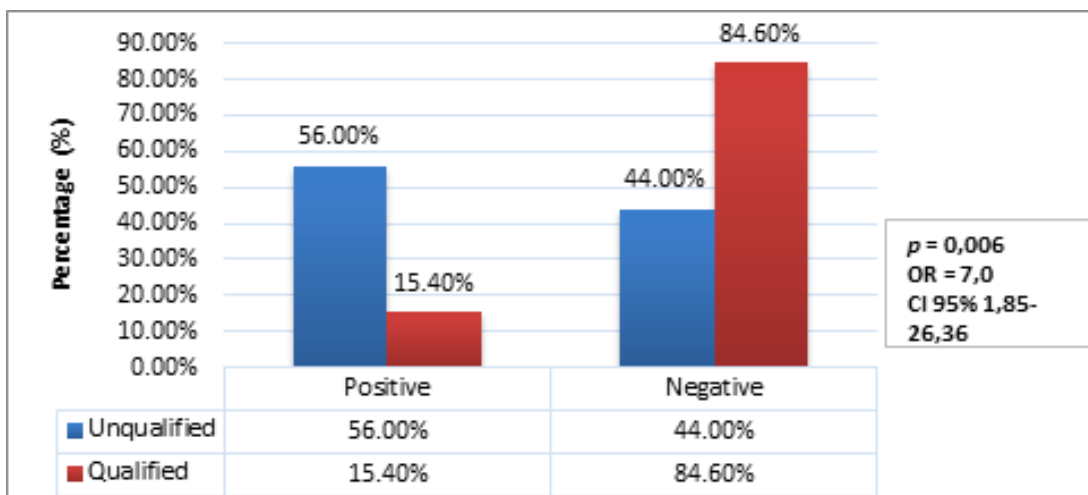


Fig 3. Correlation between Food Ingredients Storage and *E. coli* Contamination at the Restaurants around Commuter line of Central Jakarta, 2018

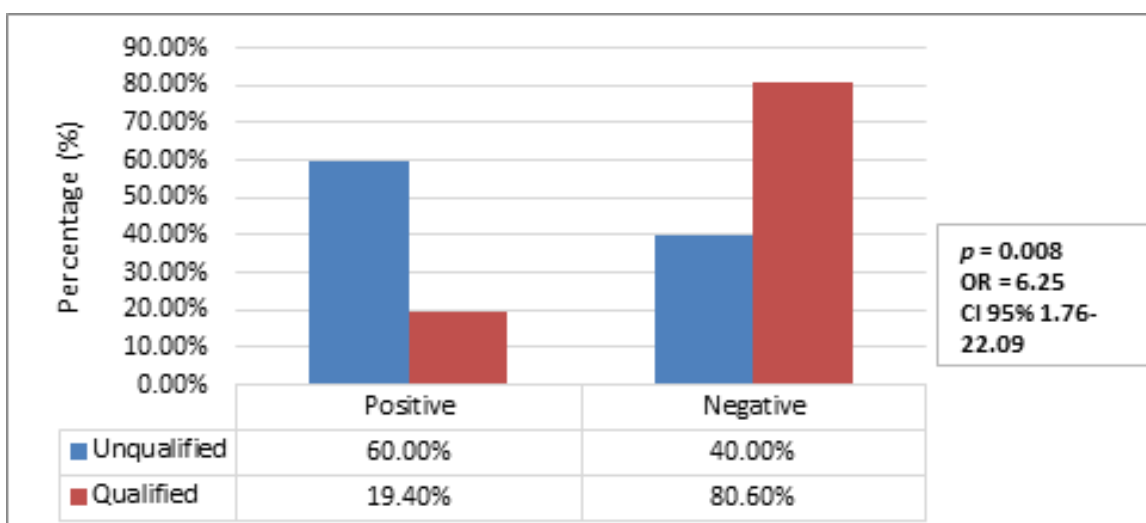


Fig 4. . Correlation between Food Storage and *E. coli* Contamination at the Restaurants around Commuter line of Central Jakarta, 2018

From the final result of multivariate analysis using logistic regression by removing the variable with $p > 0.05$, it is known the variables that having correlation with *E. coli* contamination at the restaurant are food ingredients ($p = 0.010$: $OR = 7,915$: $CI\ 95\% 1,638-38,591$) and cooked food storage ($p = 0,005$: $OR = 8,402$: $CI\ 95\% 1,929-36,591$). Food storage variable is the most

significant factor since it has the largest OR value. From the logistic regression result, the equation of regression logistic model is as follows :

B value on food ingredients (b_1x_1), cooked food storage (b_2x_2) variables, and Constant (a), so that the equation is as follows (**Equation 1**)

$$\text{Logit (y)} = a + b_1x_1 + b_2x_2$$

B value on food ingredients (b_1x_1), cooked food storage (b_2x_2) variables, and Constant (a), so that the equation is as follows (**Equation 1**)

$$\text{Logit (E. coli bacteria quality)} = - 2,208 + 2,096 (\text{food ingredients}) + 2,128 (\text{cooked food storage})$$

After the logistic regression test, the next step was interaction test. Interaction test was conducted to determine whether or not there is a substantial interaction among the independent variables. From the test, there is no interaction among independent variable.

The research results show that 18 food samples (35.3 %) are positively contaminated with *E. coli* bacteria. The Government has regulated about restaurant hygiene sanitation on the Regulation of Minister Health 1098/MENKES/SK/VII/2003 listed the level of *E. coli* bacteria on food is 0/gr.¹⁰ Referring to it, this research indicates that 35.3% of food samples are not safe to eat since they are contaminated with *E. coli* bacteria.

E. coli bacteria on foods can be prevented by conducting good hygiene sanitation practices and the implementation of HACCP (Hazard Analysis and Critical Control Points).⁵ HACCP is one of the systematic approaches to identify and assess the hazards and risks that may arise during the production process.¹¹ A good hygiene and sanitation of food can be implemented by always maintaining personal hygiene, separating the food ingredients with the cooked one, cooking properly and maintaining the appropriate temperature for each type of foods as well as using clean water for cooking purpose.¹²

The quality of food ingredients has an important role in determining the food quality to be produced.¹³ There are 14 (27.4%) unqualified food ingredients and 9 (64.2%) of them are caused by *E. coli* bacteria contamination. Based on the analysis result, food ingredients are correlated with *E. coli* bacteria contamination in foods at the restaurants. Unsafe food ingredients are 5.6 times higher to be contaminated by *E. coli* compared to safe ingredients.

The food ingredients should be purchased from trusted suppliers, which are registered and licensed.¹⁴ In this research, it was found that 3 (5.9%) restaurants did not purchase their ingredients from licensed suppliers. In addition, the physical conditions of the ingredients should be also considered by selecting the fresh ingredients and having no sign of rot, as well as no color and shape changing. If the ingredients are in packaging form such as ketchup and soy sauce, the costumers should check the label registered on MoH RI.¹⁰ The research also found 6 (11.8%) packaged food ingredients are unregistered on MoH RI and did not have labels and brands.

The results show that there are 25 (49%) cases of improper ingredients storage and 14 (56%) of them resulting foods contaminated with *E. coli* bacteria. Based on analysis result, food ingredients storage are correlated with *E. coli* bacteria contamination on foods at the restaurants. Improper food ingredients storage has 7 times risks higher to be contaminated with *E. coli* compared to the one qualifying the standard.

Based on the observation, the restaurant owners purchase their food ingredients every day. However, not all of the ingredients were used at that day, so there are several types of ingredients stored up to the next day. The system of FIFO (First In First Out) can be implemented by writing up the purchasing date of each item and use it according to the purchase date.¹⁵

Temperature control is also important in food storage because bacteria can grow faster at critical temperatures or inappropriate temperatures.¹⁴ Based on the observation, there were 14 (27.5%) restaurants that did not have refrigerator for storing the foods that are easily spoiled. It led to the finding of several types of spoiled ingredients such as rotten chillies and moldy vegetables. Therefore, the control to the usage period of ingredients should be taken into account, especially for the restaurants that do not have refrigerator.¹⁶

Food ingredients storage should be protected from contamination sources such as insects and rodents, while the placement should be separated from the cooked foods. However, it was found that 16 (31.4%) restaurants storing their ingredients together with the cooked food.

The results show that there were 20 (39.2%) restaurants having poor food storage and 12 (60%) of them are contaminated with *E. coli* bacteria. Based on analysis result, foods storage is correlated with *E. coli* contamination on foods at the restaurants. Inappropriate food storages can increase the risk of *E. coli* bacteria contamination on foods, 6.25 higher than the good food storage.

In addition, cooked food storage also require a proper handling to prevent food contamination.⁶ Proper food storage can control the bacterial growth.¹⁷ Based on the observation result, 27 (52.9%) restaurants did not store their foods in a closed food display. Consequently, the foods were not protected from vermin such as cockroaches, flies, and rats.

In this research, the samples were foods with high protein and water content which is favored by the bacteria and also known as fast spoiled foods. Therefore, the storage needs to be considered importantly as well as the storage period.¹⁸ The longer food is stored, the higher the risk of spoiled foods occurrence. If the foods are stored for more than 4-6 hours, then it should be kept in cold temperature and reheated for serving.¹⁶

CONCLUSION

Based on the research results, 18 (35.3%) types of food are positively contaminated with *E. coli*. Research also shows that there is a statistically significant correlation between food ingredients, food ingredients storage, and cooked food storage variables with *E. coli* bacteria food contamination at the restaurants. Multivariate analysis shows that there are two factors affecting *E. coli* contamination on foods, i.e. factors of food ingredients and shared food storage.

Efforts to improve hygiene and sanitation in restaurants can be performed by the cooperation of related parties such as Public Health Office and Health Department with the restaurant owners by conducting training and counseling for food handlers regarding good hygiene sanitation practices by implementing HACCP system. In addition, sticker attachments program may also be implemented to restaurants that meet the requirements on sanitary hygiene inspection and monitoring. Moreover, the restaurant owners should also improve their restaurant facilities such as kitchen renovation and washstand provision as the supporting elements to improve the quality of foods.

Conflict of Interest: There is no conflict of interest for this research.

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Ethical Clearance: This research's number of ethical approval from the Ethical Research Committee is 184/UN2.F10/PPM.00.02/2018 dated March 19th 2018.

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Focal Interictal Epileptiform Discharges in Idiopathic Generalized Epilepsies

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ABSTRACT

Background and Objective: Idiopathic Generalized epilepsies (IGE) constitutes 15-20% of all epilepsies in adult and children. IGEs are electroclinical syndromes sharing specific clinical and EEG features, with their seizure phenotypes indicate the involvement of both hemispheres from the onset, both clinically and electrographically. Their EEG expression consists of initially generalized, bilaterally symmetrical discharges, whereas the background patterns are normal for age. We aimed to look at the presence of focal interictal EEG abnormalities in idiopathic generalized epilepsies and further analyze their characteristics, obviating misdiagnosis of focal epilepsy because of their presence.

Method: about 109 patient diagnosed as IGE enrolled in prolonged EEG. Focal EEG discharged were defined IEDs according to "The American Clinical Neurophysiology Society's Standardized Critical Care EEG terminology", further analyzed and correlated with different IGE subtypes, and with other clinical and EEG variables.

Results: About one third (34.8%) of the patients had focal IEDs, most of them were JME subtype. Location of most (65.8%) was frontal, the pattern of occurrence was frequent in (50.0%), (81.4%) were affected by provocative manoeuvres.

Conclusion: Focal interictal epileptiform discharges found in one third in EEG of idiopathic generalized epilepsies, they are frequent, and there is a high possibility of their appearance in routine EEGs.

Keywords: *Epileptiform, Epilepsy, Focal, Idiopathic, Interictal*

INTRODUCTION

A seizure is defined as "a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain⁽¹⁾. The seizures are either generalized or focal. Generalized epileptic seizures are conceptualized as originating at some point within, and rapidly engaging, bilaterally distributed networks. They can include cortical and subcortical structures but do not necessarily include

the entire cortex. Whereas, focal epileptic seizures are conceptualized as originating within networks limited to one hemisphere. These may be discretely localized or more widely distributed⁽²⁾.

Idiopathic generalized epilepsies (IGEs) are electroclinical syndromes sharing specific clinical and electroencephalographic (EEG) features, with their seizure phenotypes indicate the involvement of both hemispheres from the onset, both clinically and electrographically⁽³⁾. Focal clinical, electroencephalographic, and neuropathological features of IGE have been reported. The study of these focal electroencephalographic abnormalities is not devoted of clinical importance. Focal abnormalities especially focal interictal epileptiform discharge (IED) could potentially

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lead to delayed diagnosis and misdiagnosis of IGE as focal epilepsy resulting in inappropriate antiepileptic drugs (AEDs) Choice and it may be a predictor of the clinical behaviour of the IGE syndrome^(4, 5). The IGE show no evidence of structural brain lesions, in contrast to the secondarily generalized group of epilepsies, and no known or suspected aetiology other than the contributions of polygenic factors. Their EEG expression (ictally or interictally) consists of initially generalized, bilaterally symmetrical discharges, whereas the background patterns are normal for age⁽²⁾. IGE constitutes 15-20% of all epilepsies in adult and children cohorts⁽⁶⁾. We aimed in this study to look over the presence of focal interictal EEG abnormalities in idiopathic generalized epilepsies and further analyze their characteristics, obviating misdiagnosis of focal epilepsy because of their presence.

METHOD

A cross-sectional observational study conducted at the epilepsy clinic of Baghdad Teaching Hospital for the period from Oct 2016 to Oct 2017, the study involved One hundred and nine patients who were diagnosed as IGE in the epilepsy clinic of Baghdad Teaching hospital, and they were classified as IGE according to the ILAE 2001⁽⁷⁾. Clinical history and examination, MRI (epilepsy protocol with 3 Tesla techniques), biochemical investigation, the neuropsychological assessment were all reviewed when available. The study received institutional approval from the Iraqi Council of Medical specialization and was done in accordance with Helinesky Declaration.

Patients included if they have seizure phenotypes according to ILAE2001 classification, EEGS with interictal bilateral, synchronous S/W polyspike wave normal background, normal neurologic examination and normal 3-Tesla brain MRI. The exclusion criteria were history of complex febrile convulsions, subjects with status or convulsions (>15 min) If those occurred before or during the study, previous history of CNS infection, patients with abnormal neurological examination, clear evidence of cognitive dysfunction (however no specific test was, performed only depending on routine clinical history and examination), patients with aura or any focal features in seizure semiology, brain structural abnormality on MRI.

Long-term EEG recording (3 hours) was done for all patients in video EEG unit using, Nicollet™

VikingQuest Desktop, (code: NCM12503, CareFusion v32 channel), Silver disc electrodes “sPes media (SA)” – Italy, were used. According to the modified 10-20 international system of electrode placement by the addition of 10 extra electrodes, 6 in the inferior temporal areas, inferior temporal chains, left side F9T9P9 on right side F10T10P10 electrodes), 2 anterior temporal electrodes T1T2 in some patients and 2 EKG electrodes⁽⁸⁾. Scalp skin prepared, using Nuprep skin preparation gel (Weaver and Company, A0006 rev.07 .USA) and electrode attached using Ten20 EEG paste (Wavear and Company: A0002 rev.06: USA) for all patients.



Figure 1: Headbox

The electrode impedance was kept below 5 K ohm. All EEGs were carried out under normal standard conditions, i.e., with the patient relaxed, awake with eyes closed, eye-opening and eye closure during which lying supine in a quiet room. All patients were partially sleep deprived, the usual dose of their anti-epileptic drugs (AEDs) was regularly taken.

Provocation manoeuvres include:

Hyperventilation: By asking the patient to breathe deeply at a rate of 20 breath / min for 3 min; sometimes even for 5 min patient sitting; the procedure was done for age older than 3 years⁽⁹⁾, when needed the hyperventilation was repeated after 20 min from sleep at the moment of arousal (HV in drowsiness)⁽¹⁰⁾.

Intermittent photic stimulation: Awake with dim room light simultaneous video record was recruited. Lump intensity of 1 joule a distance of 30 cm. patient instructed to look at the centre of the lump, IPS sensitivity was determined in three eye conditions with separate trains of flashes of 5 sec duration each during

eye closure, eyes closed, and eyes open. The following flash frequencies used separately and in this order – 2 – 8 – 10 – 15 – 18 – 20 – 25 – 40 – 50 – 60 Hz. If there was a generalized response at a certain frequency the lower and upper threshold for the response was defined⁽⁸⁾.

The patients were categorized into two groups; one with focal IEDs and the other does not have focal IEDs. Both groups were compared regarding the syndrome, clinical data including age, age at disease onset, disease duration, family history of epilepsy, syndrome type, frequency and timing and no of AEDs.

Statistical analysis

Data tabulation, input and coding, were done by the use of IBM® SPSS® (Statistical Package for the Social Sciences) Statistics Version 22 (Chicago, IL) and Epi Info™ 7. For descriptive statistics, the percentage was applied, Chi-square was used, and non-parametric test (Mann-Whitney) test was used for numerical data that did not follow a normal distribution and T-test for normally distributed data. Z-score; the difference between two samples proportions was used. A p-value less than 0.05 was considered significant throughout data analysis.

RESULTS

This study enrolled 109 patients; their mean age was 22.78 ± 10.24 years, with 43 (39.4%) male versus 66 (60.6%) females, as illustrated in table 1.

From total 38 patients, 11 had focal IEDs without provocative tests. In The rest 27 patients focal IEDS enhanced by the propagative tests 27 (27.55%), and the difference between the two proportions was found to be statistically significant (p -value < 0.001), which meant that propagative tests was an important tool to show focal IEDS Most patients showed focal IEDS on REM sleep 22 (81.47%), 2 (7.40%) on HV, and 3 (11.12%) on IPS, as illustrated in table 2.

Mixed SWD had 5.7 folds increase the risk of having focal Epileptiform Discharge compared to symmetrical SWD, and it was statistically significant, while asymmetrical SWD had a slight increase in the risk of focal Epileptiform Discharge compared to symmetrical SWD but it not statistically significant, as illustrated in table 2.

This study did not show the statistically significant difference between IGE subtypes and focal IEDS presence (see table 3).

Table 1: Relationship between Focal Epileptiform Discharge and various predictors

Variables	Focal IEDS		p-value
	Positive (38)	Negative (71)	
Age (years), mean \pm SD	20.55 \pm 8.35	23.97 \pm 11.00	0.072 ^a
Male, number (%)	15 (39.4%)	28 (39.4%)	0.997 ^b
Positive family history, number (%)	13 (34.2%)	18 (25.3%)	0.329 ^b
Age of Onset (years), mean \pm SD	13.58 \pm 5.89	13.16 \pm 5.93	0.727 ^a
Duration (years), mean \pm SD	7.05 \pm 6.35	7.05 \pm 6.35	0.275 ^c
Seizure frequency, mean \pm SD	2.20 \pm 2.37	4.32 \pm 5.84	0.123 ^c
AED number, mean \pm SD	1.45 \pm 0.60	1.21 \pm 0.41	0.016 ^a

^aIndependent t-test, ^bchi-square test, ^cMann Whitney U test

Table 2: Effect of propagative tests on focal IEDS in IGE

Predictors	Focal IEDS (38)	p-value
Provocative tests		<0.001
Without	11 (28.9%)	
With	27 (71.1%)	
REM sleep 22 (57.9%), HV 2 (5.2%), and IPS 3 (7.9%) Z-test used (= -3.24)		

Table 3: association between Focal Epileptiform Discharge and its possible predictors

Predictors	Focal IEDS		OR (95%CI)	p-value
	Positive (38)	Negative (71)		
SWD				
Symmetrical	17 (44.7%)	49 (69.0%)	5.765 (1.994-16.670)	0.001
Asymmetrical	7 (18.4%)	15 (21.1%)	1.345 (0.469-3.856)	0.581
Mixed	14 (36.8%)	7 (9.9%)	1.0	-
Type of ICE				
CAE	5 (13.2%)	8 (11.3%)	1.193 (0.405-3.587)	0.765
JME	13 (34.2%)	28 (39.4%)	0.799 (0.341-1.869)	0.680
JAE	9 (23.7%)	22 (31.0%)	0.507 (0.296-1.675)	0.420
GTCS alone	9 (23.7%)	8 (11.3%)	2.444 (0.868-7.294)	0.088
EMA	0 (0.0%)	3 (4.2%)	-	0.550
Binary logistic regression analysis				

DISCUSSION

In the current study the overall incidence of focal IEDS was 38.4%, which was quite comparable to a large number of studies on this topic; on the other hand, it was higher than, and lower than some others. Focal IEDs was 34% in a study of adults with proven absences⁽¹¹⁾, and 35% in another study in IGEs⁽³⁾, and 30-35% in a study done on JME patient. Other work is done showing 38% the rate of focal IEDs in EEG of IGE Patients. The rate of 16 -37% of patients with absence had focal IEDS⁽¹²⁾. Even though higher per cent's, 56% was observed in a study done on patients with primary generalized epilepsy monitored for two decades⁽¹³⁾, while a study detected 91% of 11 children with CAE had Focal EEG features⁽¹⁴⁾, another study showed 47% of 41 patients had focal interictal epileptiform discharges⁽¹⁵⁾. The dissimilarity between the studies highly related to patients character, sample size, a period of the study, protocol and time of recording, inclusions and exclusion criteria and syndrome vs seizure choice.

Results maybe anecdotal if criteria of patient's selection were not harsh, as for previous CNS infections, head trauma, or patients with coexistence of clinical focal seizure elements. The elimination of frontal absences and EEGs with the phenomena of secondary bilateral synchrony in this study affected the no of records with focal IEDSs, but Focal IEDs the selection and allowed to confidently address the sample as idiopathic Standards of our work in nominating the activity as focal keeps out the asymmetrical SWDs and lateralized SWDs, this is in distinctions to other studies⁽¹³⁾, who allowed for those to be labeled as focal EEG features.

In the current study age, the age of onset and family history failed to elicit differences between focal IEDS presence and absence; this is compatible with studies done on the same points^(11, 15).

This study established the statistically important difference between patients with focal IEDS in the record, having more number of AEDs than patients with no focal IEDS. This detailed information about the type

of medication and possible interaction with their impact on the EEG may be needed to be studied to doubtlessly decide basis of the relation between focal IEDS and no. of AEDs. Studies pointed to the relation of the existence of focal IEDS and polytherapy in JME patient^(16,17). The difference between these studies and our work is the IGE subtypes which included. In which we employed ILAE task force classification 2001, which included updates in some syndromes in IGE phenotypes than ILAE 1989, e.g., EGTCS- alone which allow the studying of GTCS not necessarily at waking, to establish that focal discharges results in appropriate AED choice leading to poor seizure control and hence polytherapy.

Focal IEDS in IGE is highly state-dependent, and it affected by provocative tests in distinguished degree. The effect was in the form of increased amplitude and frequency, not affecting its field. Only 11 patients out of 38 their FOCAL IEDS was found regardless of provocative tests. Effect of sleep and HV were studied by S Koutroumanidis, M showing similar results⁽¹⁴⁾.

Patients with asymmetrical GSWD associated with focal IEDs than patient with symmetrical GSWD, voltage asymmetry between both hemispheres regional in well-known feature of GSWD of IGEs. Usually, occur during non-REM sleep and called fragmented SWD, drawback on our work was that state of each patient with asymmetrical GSWD was not labelled to analyze the information we observed. Could this focal IEDSs especially when are focal spike slow wave complexes are fragmented GSWD.

Studying focal feature in different IGE domain showed JME to be the most subtype with focal IEDS, (34.2%). Followed by JAE (23.7%), GTA (23.7%), CAE (13.2%), EMEA (5.3%). Results might be different from the only few studies which investigated each IGE subtype separately. A study on patients with absence seizure found JAE most common IGE subtype with focal IEDS⁽¹¹⁾. Another found GTCSA the most common IGE subtype with focal IEDS⁽¹⁵⁾. However, this difference could be explained by that their small sample size which compared ours and that not all IGE subtypes were included. In general focal IEDS in IGE studied as a whole category⁽¹²⁾ or taking only one syndrome like^(14,18) or selecting patients with IGE with specific seizure semiology⁽¹¹⁾.

CONCLUSIONS & RECOMMENDATIONS

Focal IEDs are almost present in one-third of the records of IGE's EEG. They are frequent, and there is a high possibility of their appearance in routine EEG. Further studies on the correlation of the presence of these focal discharges with the clinical behaviour in the setting of seizure frequency in each sub-syndrome and responses to AEDs.

Conflict of Interest: None

Ethical Clearance: Informed written consent obtained from all the participants in the study, and the study and all its procedure were done by the Helsinki Declaration of 1975, as revised in 2000. The Iraqi Council of Medical specialization approved the study.

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Quantitative Fire and Explosion Risk Assessment of Fuel Tanker Truck: Preliminary Case Study at Fuel Terminal X Jakarta

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ABSTRACT

The distributions of fuel using tanker truck have been increasing in terms of complex risks related to the potential of fire and explosion. Various studies and case reports have proven that the level of accidents or fire and explosions of fuel tanker trucks is rising. The objective of this study is to calculate personal and societal risk levels. Preliminary case study was conducted in filling shed of the Fuel Terminal X Jakarta. Data on locations, materials, meteorology hazard identification, activities and process, case reports, and installation were collected from measurements, observations, or interviews processes, as well as provided by the company and from existing literatures. Individual Risk per Annum (IRPA) for individual risk and Potential Loss of Life (PLL) for societal risk were calculated from frequency analysis using Event Tree Analysis (ETA). Furthermore, the consequences were analyzed using Areal Location of Hazardous Atmosphere (ALOHA® 5.4.4) software of fire and explosion based on a worst-case scenario modeling. The individual risk per year for office workers, field workers, society and road users were 4.16E-09; 6.99E-09; 1.73E-08 and 6.59E-13, respectively. The societal risk was 1.49×10^{-5} per year. Compared to the UK HSE Risk Criteria, the findings showed that the individual and societal risks of each category were still acceptable and tolerable.

Keywords: *Quantitative Risk Assessment (QRA); fire; explosion; tanker truck; fuel.*

INTRODUCTION

Dangerous chemicals, including oil and gas products, are distributed in enormous number daily. Center for Chemical Process Safety (CCPS), the transportation systems have the high potential to release the dangerous chemical material which has the effects for the society, property, and the environment¹. In 2004, Major Hazard Incident Data Services/MHIDAS report states that 43% of 12,179 accidents occurred during the transportation process². The hazardous chemical transportation volume in Europe between 1990-1998 show that its number reach 35 % of land transportation number. Cars are the main dangerous chemical transportation in Europe, and its number is expected to increase every year³.

The number of traffic accidents is seven times higher than railway or water accidents. Brenck and Mondry (1998) states that the accidents often happened to the transportation modes with the capacity exceeding 10,000 L⁴. German Federal Statistic Office (2000) reported that the traffic accident involving dangerous chemical transportation with or without the release's effects had caused injury and serious property damage. The study conducted in 1999 shows that most of the accidents involving dangerous chemical release (34 of 52 cases, or 65 %) occurred while transporting the materials under category 3 (combustible liquid)⁵.

On 2011, crude oil uses amounted to 32.7 % of the total energy use in Indonesia. Those number increased by 4.04 % from 2010 and it is expected to increase every year⁶. Fire can cause an explosion and vice versa⁷. Fire, explosion, and environmental pollution are relevant with hydrocarbon industry, and they may cause financial loss and other damages^{8,9}.

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Fuel oil transportation activities use various modes of transportation, including tanker trucks. In 2012, an explosion of a tanker truck killed 22 people and injured 111 people in Riyadh¹⁰. Similar to that case, on 29 August 1998, a tanker truck transporting 23,000 L of gasoline got into an accident in Zurich, causing fire and many injuries¹¹. Unfortunately, there is no adequate relevant statistical data in Indonesia yet.

Center for Chemical Process Safety (CCPS) has created the guidelines for hazardous chemical transportation risk assessment. The assessment process includes determining the scenario and its incident potential, the consequence evaluation, the accident estimation, the accident's effects estimation, and the risk level estimation^{1,12}. Fuel Terminal X is one of national company's fuel terminals involved in upstream and downstream oil and gas industries. Furthermore, the company is one of the largest companies with high frequency of fuel oil transportation activities.

Therefore, Quantitative Fire and Explosion Risk Assessment (*QFERA*) must be implemented as a proper precaution to determine and control the hazard and risk of fire and explosion in tanker trucks. The purpose of the study is to perform a fire and explosion quantitative risk assessment on fuel tankers to decide the most appropriate risks in one of the Fuel Terminal X Jakarta's case study.

METHOD

The preliminary case study was conducted at the Jakarta Fuel Terminal from April to July 2015. The object of research was in the form of a fuel tank with the largest capacity (40000 liters) transporting the premium fuel. Data concerning locations were collected using GPS. Meteorological data were generated from the Indonesian Agency for Meteorological, Climatological and Geophysics. Data concerning hazard identifications, chemical materials, tanker truck specifications, activities and process, case or accidents reports, employees record and company assets were collected from observation, and interview. Data were evaluated then analyzed using Quantitative Risk Assessment (QRA) method to determine the individual and societal risk levels. The data analysis was done by identifying the risks of fire and explosion, and then verifying the field to set a fire and explosion scenarios. Individual Risk per Annum (IRPA) of individual risk and Potential Loss of Life (PLL) of societal risk were calculated from frequency

analysis using Event Tree Analysis (ETA). Furthermore, the consequences were analyzed using Areal Location of Hazardous Atmosphere (ALOHA® 5.4.4) software of fire and explosion based on a worst-case scenario modelling.

RESULTS

The tanker trucks in company X were managed by a third party with 13 subcontractors. The tanker trucks activities including loading, distributing and unloading. Every day, 240 units of tanker trucks distribute 6,000 KL of fuel. The distribution route covers Jakarta, Bogor, Depok, Tangerang, and Bekasi.

The fuel leakage from the tankers in the filling shed area is considered having a high-risk danger level. In fact, there has been a fire accident in the area. The filling process itself takes 1 hour. Fuel Terminal X Jakarta have 12 filling sheds, each of which can accommodate 3-6 tanker trucks. Therefore, every hour, almost 72 tanker trucks stand by in the area. Every tanker truck was operated by 1 driver and 1 crew who filled the tanker with fuel during loading process in the filling shed new gentry.

According to OSHA and NIOSH, Pentane density is 2.48 times higher than the air^{13,14}. The baseline event is in accordance with the risk identification result, which is the leakage from the bottom loading valve in the tank with the rate of 4×10^{-5} per hour which is then converted to 6.08×10^{-4} per year. The immediate ignition probability is determined according to Purple Book (2005) for road tanker continuous, which is 0.1. The delayed ignition probability is 0.9 because it happened in the chemical plant area or oil refinery¹⁵. Another probability is determined in accordance with the observation result toward the existing fire safety system. The ETA result can happen if the scenario preconditions are fulfilled. The ETA frequency calculation can be used to calculate the risk level.

Table 1. The Summary of Risk Level Calculation According to Scenario

Scenario	Frequency	Type
Fire Ball	5,490E-05	Immediate Fire
BLEVE	2,890E-06	Immediate Fire
UVCE	4,213E-04	Explosion
Dispersion	4,928E-05	Dispersion
Flash Fire	2,341E-06	Delayed Fire

The fire and explosion risks calculation can be used to determine the worst-case scenario. The failure scenarios which are most likely to occur are: fire from the spreading flammable vapor cloud, thermal radiation from the flammable area, BLEVE, and vapor cloud explosion (VCE) (Table 1). The scenario modeling results are shown on Table 2.

The simulation results from some of the fire and explosion scenarios show that there is hazard potential

that threaten the safety of the society around Fuel Terminal X Jakarta. Fuel Terminal X Jakarta, which is located at Koja District, North Jakarta, occupies 483,520,000 m² of land area. Individual and societal risks assessments using population data from the area show that the population density is 10,811.78 people/km² in 2013. The assumed numbers of daily public transportation users in the area in 2013 amounted to 20,971 people/day¹⁶.

Table 2. The Consequences Modeling Result

Scenario	Threat Zone	Reach	Effects	Affected Area
Flammable vapor Cloud	Red	38.405 m	8400 ppm =60% LEL= Flame Pockets, fire if ignition sources present	Filling shed 1
	Yellow	119.786 m	1400 ppm = 10% LEL, no fire potential	All filling shed area, tanker truck queue
Fire with thermal radiation	Red	24.689 m	10 kW/m ² = may cause death in 60 seconds	Filling shed 1-4
	Orange	34.747 m	5 kW/m ² = may cause 2 degree burn level in 60 seconds	Filling shed 5-6
	Yellow	53.035 m	2 kW/m ² = may cause injuries in 60 seconds	Until filling shed 9
BLEVE	Red	311.81 m	10 kW/m ² = may cause death in 60 seconds	Control room, filling shed, 13 storage tanks, buildings, society, traffic user
	Orange	440.741 m	5 kW/m ² = may cause 2 degree burn level in 60 seconds	4 storage tanks, buildings, society, traffic user
	Yellow	686.714 m	2 kW/m ² = may cause injuries in 60 seconds	5 storage tanks, buildings, society, traffic user
Explosion/VCE	Red	37.490 m	> 8.0 psi = may cause the damage of the car and surrounding building	Filling shed 1-6
	Orange	55.778 m	> 3.5 psi = may cause serious wound	Filling shed 6-7
	Yellow	128.016 m	> 1 psi = may cause the glasses shattered	Filling shed, 3 storage tanks, buildings

Quantitatively, the risks are calculated based on the individual and societal risks. Risk actions calculated from the quantitative risk assessment are: Potential Loss of Life (PLL); Individual Risk Per Annum (IRPA); and Societal Risk Criteria. The risk calculation are compared with the risk criteria from HSE UK¹⁷. The individual risk calculation result shows that all of the workers and tanker truck crews are in the acceptable level based on

Table 3. The individual risks for society and traffic users are in the acceptable level as well. However, the society individual risk level is higher than that of the workers. It is supported by the estimation that the society members stay at home for 24 hours for the worst-case scenario. Therefore, continuous dissemination to workers and society members must be performed to make their safety, especially related to fire and explosion, as a priority.

Table 3. Potential Loss of Life. Individual Risk, and Societal Risk Calculation

No	Category	Amount (person)	IR for Immediate Fire	IR for Delayed Fire	IR for Explosion	IRPA	PLL (per year)
1	Office employees	72	4,160E-09	0,000E+00	0,000E+00	4,160E-09	2,995E-07
2	Shift employees	1071	5,719E-09	1,849E-12	1,269E-09	6,990E-09	7,487E-06
3	Societies	409	1,733E-08	0,000E+00	0,000E+00	1,733E-08	7,089E-06
4	Traffic users	292	6,595E-13	0,000E+00	0,000E+00	6,595E-13	1,926E-10
	Total	1844					1,487E-05

The cumulative risk has to be below the tolerable individual risk that has been approved (Societal Risk Criteria) showed in Figure 1. The cumulative risk which is over the Societal Risk Criteria can be categorized as unacceptable and must be reported. The mitigation plan must be initiated as well to reduce the risks in the tolerable area. However, it is important that the activities' risks between the tolerable and the avoidable must be reduced in accordance with the 'As Low As Reasonably Practicable' (ALARP) concept.

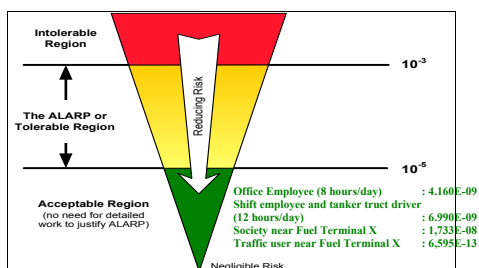


Figure 1. Individual Risk Criteria Fuel Terminal X Jakarta

Societal risk can be compared between every employees' group, namely the workers with office hour and the workers working under shift system. The societal risk for employees with 8 working hours a day is 2.995×10^{-7} per year, which is still considered acceptable. The societal risk for employees with 12 working hours a day is 7.487×10^{-6} per year, which is also considered acceptable. The fire and explosion training and dissemination program must be continuously well maintained.

Overall PLL with the frequency of 1.487×10^{-5} per year is within ALARP risk or tolerable area according to the worst-case scenario. Although it is within the

ALARP category, even the smallest fire and explosion risks must be considered.

DISCUSSION

The tanker trucks have also been supplied with safety standard system and emergency response equipment for any accidents, such as in the cases of fire and explosion. In the filling process, there is a high risk of fuel leaking or overflowing during the filling process, especially at the filling sheds which have not implemented the automatic system. Besides the interlock system, the tankers must be equipped with a tank to contain the fuel overspill to reduce the risks.

According to the simulation system on the effects of tanker leakage, an emergency response system and an evacuation route in the area must be considered. The worst case that can happen is the failure of the detection and control systems. An advanced detection system must be installed at the filling shed area to reduce the effects. The main detector that must be installed is flame detector, so the flame source can be easily found and controlled.

The existing administrative control in the Fuel Terminal X is a limitation to the filling shed entry area. In addition, Fuel Terminal X also implements various procedures and actions in their emergency response, inspection, maintenance, and other activities. The company holds fire and explosion trainings in collaboration with third parties and disseminates information to the workers and tanker trucks crews.

The company documents show that there are some factors affecting the transportation safety, especially tanker truck crews' behavior. The tanker truck staff,

especially the driver, must be healthy both physically and psychologically and must have adequate understandings on occupational health and safety, fuel distribution and handling, the use of Protective Personal Equipment and tanker truck installation, and emergency response.

Implementing proper dissemination to surrounding community and the traffic users must also be considered. The surrounding community must know about the safe zones from fire and explosion incidents. The restriction beyond the safe zone must be considered as well to minimize any possible external threat. The company must improve the cooperation with the relevant organizations, such as the Fire Agency, the Police Department, the Ministry of Transportation, Jasa Marga, and the society members. This cooperation will ease the evacuation and mitigation process.

The findings of this study are expected to serve as an initial assessment and a consideration for the improvement of fire safety related to tanker trucks. Further study can be conducted to understand the fire and explosion risk levels in the distribution route. However, if the emergency conditions do present, the company is expected to give an adequate response and run a rehabilitation and reconstruction program after the incident.

CONCLUSION

The risk assessment results show that the individual risk for the company workers and the society around Fuel Terminal X Jakarta are in the Acceptable category according to Risk Acceptance Criteria HSE UK. The overall societal risks for the individual and the society are at the 'Tolerable' level or ALARP. Existing fire safety system involving fire and explosion preventions and controls that the company already implemented must be well maintained. Further risk assessment along distribution route must be implemented as well.

Conflict of Interest: None

Ethical Clearance: Completed

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Smile Card as a Breakthrough to Increase Dental and Oral Hygiene Level in Primary School Students in Jakarta

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ABSTRACT

School dental health services are implemented in an integrated manner through primary dental and oral health activities at the Public Health Center with the activities in the form of the School Dental Health Unit (UKGS) program. Various methods are used to achieve maximum dental and oral health, such as promotion and demonstration of toothbrushes for elementary school children. One way to improve children's behavior in maintaining dental and oral hygiene is by providing dental health education on how to brush teeth properly and correctly by using appropriate and appropriate aids or media. A Smile Card is one of the right methods to change children's behavior in maintaining dental and oral hygiene. This study aims to determine the effect of Smile Card on the oral and dental health of children. The sample were 150 people divided into groups of intervention and control. The results showed that there were differences in the influence of knowledge and the role of parents in improving dental and oral hygiene between the groups given the Smile Card intervention with the group not given the Smile Card, where $p = 0.001 < 0.05$. It can be concluded that the knowledge and role of parents influence the improvement of children's oral and dental hygiene.

Keywords: Smile cards, Oral and dental hygiene, Elementary school students

INTRODUCTION

School Dental Health Unit (UKGS) activities are part of the activities of the School Health Unit (UKS) which are routinely carried out in schools with the aim of fostering and realizing student independence for healthy living that enables the realization of optimal community health.

The presentation of the population who had dental and oral problems according to Basic Health Research (Riskesdas) in 2007 and 2013 increased from 23.2% to 25.9%. Among people who have dental and oral health problems, the percentage of the population who received dental medical care increased from 29.7% in 2007 to 31.1% in 2013. Similar to the Effective Medical Demand (EMD) which is defined as the percentage of the problematic population with teeth and mouth

in the last 12 months multiplied by the percentage of residents who received dental care or treatment from dental medical personnel increased from 6.9% in 2007 to 8.1% in 2013. Most of the population aged ≥ 10 years (93.8%) brush their teeth every day. Most residents also brush their teeth during an afternoon shower, which is 79.7%. Most residents brush their teeth every day during a morning shower or an afternoon bath. The true habit of brushing the Indonesian population is only 2.3%⁽¹⁾. The proportion of people who brush their teeth every day after breakfast is only 12.6% and before going to bed at night only 28.7%. This may be due to a lack of knowledge and awareness of the teeth-mouth hygiene, as well as areas that are still difficult to reach information due to varying geographical conditions. Three provinces that had the highest percentage in brushing their teeth were DKI Jakarta Province (98.5%), West Java Province (95.8%), and East Kalimantan Province (95.5%), while the lowest was in NTT Province (74.7%) and Papua Province (58.4%)⁽¹⁾. Factors of economic and income levels, as well as knowledge, show that low socioeconomic conditions have little awareness and knowledge of the importance of maintaining dental health compared to people who have a higher socioeconomic life. Other

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factors are attitudes and behavior towards dental health maintenance such as oral hygiene related to the frequency and habits of brushing teeth, the number and frequency of cariogenic foods that cause caries (2).

MATERIALS AND METHOD

This research was an attempt to create a new method by using a Smile Card to improve the degree of dental and oral hygiene in elementary school students in Jakarta. This research was conducted in Elementary School in Jakarta in 2016 with a total sample of 150 people. The first group was the intervention group that was given dental health education with a demonstration of brushing their teeth with a jaw model aids and accompanied by a Smile Card and the control group was given a tooth brushing education using a jaw model without Smile Card. The main sources needed in this study are 1) toothbrush, 2) students, 3) parents of students, and 4) Smile Cards.

The making of this new method was carried out in several steps: 1) promotion by demonstration and giving a Smile Card, 2) improving the family’s ability in early prevention of cavities, 3) monitoring brushing teeth with the Smile Card, 4) testing methods through field research, 5) conclusion and submission of recommendations.

FINDINGS

The Role of Smile Card to Knowledge of Dental and Oral Care

The choice of method is based on the theory that dental health care by brushing teeth using a jaw model, as well as mentoring using a Smile Card has better results than without mentoring. Parental participation is very necessary for caring for, educating, encouraging and supervising. Mother plays an important role in maintaining the health of the child’s teeth in underlying the formation of positive behaviors that support children’s dental health. The attitude and behavior of parents in maintaining dental health has a significant influence on children’s behavior(3). Giving a Smile Card will help in monitoring the child’s brushing habits by the teacher and parents. Children’s oral and dental health depends on children’s adherence and mentoring parents in caring for them(4). With the willingness of parents to start treatment on the child’s teeth, a better child’s oral and dental health will be obtained(5). For more details, see Table 1.

Table 1. Distribution of knowledge of respondents given smile cards with control group respondents against dental and oral health elementary school children in Jakarta

Variable	Mean	SD	p-value	n
Knowledge				
Treatment	14.2800	1.0042	0.001	75
Control	13.4733	1.6777		75

The Table 1 shows that there was a significant difference of knowledge between the respondents given the Smile Card intervention with the respondents who are not given the Smile Card (control), namely $p = 0.001$. The mean score of knowledge of the respondents given the smiling card $14.2800 + 1.0042$ and control group $13.4733 + 1.6777$. Thus granting a Smile Card can increase elementary students’ knowledge about dental and oral health.

Effect of Smile Cards on the Role of Parents in the Dental and Oral Care

With the health promotion intervention program by demonstrating and giving a Smile Card, as well as improving the ability of families to make early prevention of cavities with the habit of brushing their teeth regularly, will improve the ability of the community, especially elementary school students and can be observed the habit of brushing their teeth. Health promotion intervention program with the resulting Smile Card can be used as dental and oral health services in order to carry out various promotive and preventive activities in dental and oral health. This intervention will be strongly related to family empowerment as the smallest group in society, as an effort to improve the quality of dental and oral health in various dental and oral health services, both in rural and urban areas. Therefore, knowledge, especially of the mother’s knowledge of dental and oral hygiene, greatly determines the cleanliness of the child’s teeth and mouth(6),(7). For more details can be seen in Table 2.

Table 2. Distribution of parent roles in children given a smile card with control group on dental and oral health of primary school children in Jakarta

Variable	Mean	SD	p-value	n
The role of parents				
Treatment	6.63	0.700	0.001	75
Control	5.84	0.883		75

The results of the analysis showed that there were significant differences in the role of parents between students who were given a Smile Card intervention and those who were not given a Smile Card (control), namely $p = 0.001$. The mean score of role of parents was given Smile Card $6.63 + 0.700$ and control group $5.84 + 0.883$. Thus giving Smile Card can improve the role of parents in maintaining oral hygiene.

Recommendations

From the results of the analysis, it was concluded that the Smile Card accompanied by a demonstration of brushing teeth proven to improve the dental and oral hygiene of elementary school students in Jakarta. The most powerful influence in improving oral hygiene is the sole factor of parents and is shown to interact strongly with knowledge in efforts to improve dental hygiene of primary school students in Jakarta. It is recommended that educators or extension workers, both dental health workers and dental health cadres, conduct dental and oral health promotions and demonstrations to be accompanied by a Smile Card so that optimal goals can be obtained for improving the level of dental and oral hygiene of elementary school children.

DISCUSSION

This study presents the use of smile cards as a method to improve the dental and oral health of elementary school students. Child and parent knowledge about dental and oral health is very important in shaping behaviors that support oral and dental hygiene of parents' children with low knowledge of dental and oral health are predisposing factors for behavior that does not support children's oral and dental health^{(4),(8)}. This can happen because parents are the main social force that influences children's development, including dental and oral health care for children^{(3),(9),(10)}. Knowledge is influenced by education, especially promotion and demonstration of dental and oral hygiene care. Health education is the simplest and

most cost-effective approach^{(11),(12)}. Extension education in the form of promotions and demonstrations equipped with a smile card will make it easier for children and parents, especially mothers, to adhere to children's oral and dental health care. Health education increases awareness of the importance of dental and oral health⁽⁶⁾. Therefore the existence of a smile card will help children and mothers to care for the health of their teeth and mouth. The attention of parents, especially mothers, to the health of the teeth and mouth of children begins early so that a habit is obtained to obtain general health.

Likewise, the role of parents has an influence on the cleanliness of the teeth and mouth of children. Family, that is, the attitude of parents to the importance of oral hygiene, plays a major role in the preservation of healthy children's teeth. The family creates the environment necessary for a healthy lifestyle, increases self-confidence, and helps shape habits⁽⁷⁾. This can occur because the behavior and health practices of parents generally have an influence on the dental health of children⁽⁵⁾. The role of parents has a big influence because children also learn from what they see, hear, and from experience about an event. Children learn through their observations of an activity carried out by their mother-father or teacher. Children learn from what they hear from parents and people around them and their environment. Children will imitate mother-father activities so that they gain experience about an event⁽¹³⁾. The more active the role of parents towards their children, the better the behavior of children. In this case, parents not only play a role but also act. Dental health status is influenced by health behavioral factors which include factors of knowledge, attitude, and action (practice). Therefore, the role of parents is very important in guiding, understanding, reminding and setting an example so that children are able to develop their personal growth, parental responsibilities, and loving care and provide facilities for children so that children can maintain the health of their teeth and

mouth. Parents, especially the mother, are the closest figure to the child since the child was born, besides that the child's behavior also plays a role in maintaining the health of his teeth and mouth⁽¹⁴⁾.

CONCLUSION

This study has recommended the Smile Card method as a breakthrough in improving dental and oral hygiene in elementary school students. This method can be used in promotions accompanied by tooth brushing demonstrations to improve the degree of dental and oral hygiene of elementary school students. The results of the study prove that the knowledge and role of parents have an influence on improving children's oral hygiene.

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Analysis of Determinant Factors of Exclusive Breastfeeding in Indonesia: A Case of Ulakan Tapakis District

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ABSTRACT

Background and Aim: Infant's nutritional needs for optimal growth and development up to of 6 months can be supplied by exclusive breastfeeding because it contains all the nutrients as the infant needs. However, the exclusive breastfeeding practice has been relatively low in Indonesia, including Tapakis District in West Sumatera Province. The study aimed to explore the determinant factors related to this practice.

Method: A cross sectional study was conducted in Uakan Tapakis District, on 88 mothers who have a child aged 0-12 months. To understand the determinant factors, the data was analyzed both using bivariate and multivariate analysis.

Result: The result shows that exclusive breastfeeding is associated to knowledge ($p=0.025$), attitude ($p=0.038$), motivation ($p=0.044$), occupational status ($p=0,025$), health resource availability ($p=0,028$), health officer role ($p = 0,013$) and family support ($p= 0,038$). Moreover, the most dominant variable is the role of health workers in supporting the breastfeeding practice ($p= 0.013$, $OR=8.772$).

Conclusion: The health workers, especially midwife plays significant role in supporting breastfeeding practice. It is necessary to have good communication and health education from health workers for the succeed implementation.

Keywords: *Exclusive breastfeeding, determinants, health workers*

BACKGROUNDS

The standard of health in a country can be seen from Infant Mortality Rate (IMR) and the life expectancy of its population.¹ Globally, the World Health Organization (WHO) states that the number of infant deaths is about 1 million stillbirths and 2.7 million deaths in the first week of life. More than 63 countries in the world, including in the Asian region, are in dire need of efforts to reduce the infant mortality in order to achieve the Suitable Development Goals (SDGs) target, namely 12 deaths per 1,000 live births in 2030.²

In Indonesia especially, the IMR is also relatively higher than neighboring countries. The data of Indonesian Demographic and Health Survey (IDHS) has shown that the IMR dropped from 68 to 32 deaths per 1,000 live births in 1991 and 2012 respectively.³ In West Sumatra Province especially, the cases of infant mortality was found 392 cases in 2014.⁴

WHO and the United Nations Children's Fund (UNICEF) lead global breastfeeding advocacy initiatives to ensure that exclusive breastfeeding rates increase by at least 50% by 2025.⁵ WHO and UNICEF in Infant and Young Child Feeding, recommend the gold standard for feeding infants and children are (1) early breastfeeding initiation at 1 hour of birth, (2) Exclusive breastfeeding in the first 6 months, and (3) introduction to complementary solid food with adequate and safe nutrition at 6 months together with continuing breastfeeding for up to 2 years or more.⁶ World Breastfeeding Week Guide in

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2016 states that exclusive breastfeeding has a large contribution to growth and endurance. Children who are given exclusive breastfeeding will have optimal growth and development and are not easily get ill. This is in accordance with several global studies and facts.⁷

The coverage of exclusive breastfeeding in West Sumatra Province was relatively low, and did not reach the target, such as 60.0% in 2011 from the target of 67.0%, and 75.1% in 2015 from the target of 83.0%.⁸ The exclusive breastfeeding practice in Padang Pariaman Regency was even lower, which was only 56% and 57.4% in 2014 and 2015 respectively. Among all districts in Padang Pariaman, Ulakan Tapakis Districts was the lowest with exclusive breastfeeding rate 29.8% in 2015.⁹ Therefore, the study aimed to explore the determinant factors related to exclusive breastfeeding in this district as a case study, that can be inferable data for Indonesia.

METHOD

A cross sectional study was conducted in Ulakan Tapakis District, with the data collection between June and November 2017. The participants of the study was 88 mothers who had a baby 06-12 months, which selected randomly.

The instrument was developed by using Ministry of Health of Indonesia guidelines on breastfeeding practice. Later the data analyzed quantitatively both using bivariate and multivariate analyses.

RESULT

The result shows that there are 21.6% participants who do an exclusive breastfeeding. The distribution of knowledge, attitude, education and other variables are comparable between high and low (as can be seen in table 1).

Tabel 1. Distribution The Implementation of Exclusive Breastfeeding and Related Factors

Variable	f (n = 88)	%
Implementation of Exclusive Breastfeeding		
Exclusive	19	21,6
Not Exclusive	69	78,4
Knowledge		
Low Knowledge	50	56,8
High Knowledge	38	43,2

Cont... Tabel 1. Distribution The Implementation of Exclusive Breastfeeding and Related Factors

Attitude		
Negative Attitude	44	50,0
Positive Attitude	44	50,0
Motivation		
Not Good	48	54,5
Good	40	45,5
Education		
Low	49	55,7
High	39	44,3
Occupation		
Unemployed	66	75,0
Employed	22	25,0
Availability of Health Resources		
Not Available	58	65,9
Available	30	34,1
Affordability of Health Resources		
Unreachable	47	53,4
Affordable	41	46,6
Health Worker Skills		
Unskilled	47	53,4
Skilled	41	46,6
The Role of Health Workers		
Do Not Play a Role	33	37,5
Play a Role	55	62,5
The Role of Non-Health Workers		
Do Not Play a Role	71	80,7
Play a Role	17	19,3
Family Role		
Do Not Play a Role	44	50,0
Play a Role	44	50,0
Myth		
Believes	51	58,0
Do Not Believe	37	42,0
Formula Milk Promotion		
Interested	35	39,8
Not Interested	53	60,2
Health Problem		
No Health Problem	83	94,3
There are Health Problem	5	5,7

The exclusive breastfeeding practice associated to knowledge (p=0.025), attitude (p=0.038), motivation (p=0.044), occupational status (p=0.025), health resource availability (p=0.028), health officer role (p = 0,013), and family support (p=0.038) (see table 2).

Tabel 2. Variables relations with the implementation of exclusive breastfeeding

Variable		Implementation of Exclusive Breastfeeding				p
		Exclusive (n = 19)	%	Not Exclusive (n = 69)	%	
Knowledge	High	13	34,2	25	65,8	0,025
	Low	6	12,0	44	88,0	
Attitude	Positive	14	31,8	30	68,2	0,038
	Negative	5	11,4	39	88,6	
Motivation	Good	13	32,5	27	67,5	0,044
	Not Good	6	12,5	42	87,5	
Education	High	11	28,2	28	71,8	0,278
	Low	8	16,3	41	83,7	
Occupational Status	Unemployed	10	15,2	56	84,8	0,025
	Employed	9	40,9	13	59,1	
Availability of Health Resources	Available	11	36,7	19	63,3	0,028
	Not Available	8	13,8	50	86,2	
Affordability of Health Resources	Affordable	8	19,5	33	76,6	0,855
	Not Affordable	11	23,4	36	80,5	
Health Worker Skills	Unskilled	9	22,0	32	78,7	1,000
	Skilled	10	21,3	37	78	
The Role of Health Workers	Play a Role	17	30,9	38	69,1	0,013
	Do Not Play a Role	2	6,1	31	93,9	
The Role of Non-Health Workers	Play a Role	3	17,6	14	82,4	1,000
	Do Not Play a Role	16	22,5	55	77,5	
Family Support	Play a Role	14	31,8	30	68,2	0,038
	Do Not Play a Role	5	11,4	39	88,6	
Myth	Do Not Believe	6	16,2	31	83,8	0,435
	Believes	13	25,5	38	74,5	
Formula Milk Promotion	Not Interested	9	17,0	44	84,0	0,304
	Interested	10	28,6	25	71,4	
Health Problem	No Health Problem	18	21,7	65	78,3	1,000
	There are Health Problem	1	20,0	4	80,0	

Table 3 Dominant Factor The Implementation of Exclusive Breastfeeding

	Variable	p value	OR	95 % CI
Last Step	Motivation	0,004	8,560	1,978 – 37,054
	Availability of health resources	0,998	1,778	0,000
	Affordability of health resources	0,998	0,000	0,000
	The role of health workers	0,013	8,772	1,584 – 48,596

Multivariate analysis shows that the most dominant variable is the role of the health worker, with p value 0.013 and OR of 8.772 (CI=1.584 – 48,596).

DISCUSSIONS

Based on the results of the study, it is found that only a small proportion (21.6%) of respondents who carry out exclusive breastfeeding on their babies. This result is very far from the achievement target of exclusive breastfeeding which is supposed to be 83.0%. According to research conducted by Rhokliana¹⁰ mother, family, and community have little understanding about exclusive breastfeeding. Not a few mothers who still throw colostrum away because it is considered dirty. In addition, the habit of giving food and drinks early to baby in community also cause unsuccessful exclusive breastfeeding. Some mothers also lack of confidence to be able to breastfeed their babies. This encourages mothers to easily stop breastfeeding and replace it with formula milk.

The study it reveals that the knowledge of mother is associated to the implementation of exclusive breastfeeding. Another research conducted by Kusumaningrum¹¹ states that the poor knowledge is thought to be due to lack of information, lack of clarity of information, and lack of ability to understand the information received. The research conducted by Kusumaningtyas¹² states that poor knowledge in Exclusive breastfeeding can be caused by other factors that influence knowledge, including non-supporting environmental factors that can prevent a person from having poor knowledge.

The study also shows that there is a significant relationship between the attitudes of respondents and the implementation of exclusive breastfeeding. This is in accordance with Haryati's¹³ opinion, that a mother who has never received advice or experience, breastfeeding counseling and the ins and outs of others, as well as from reading books, the mother will have less knowledge and influencing her attitude so that it becomes negative

towards exclusive breastfeeding.

The motivation is also significantly associated to the implementation of exclusive breastfeeding. Sopiyan's study¹⁴ in Klaten District found a very significant positive relationship between social support and motivation to provide exclusive breastfeeding. That is, the higher (stronger) the social support, the higher the motivation for giving exclusive breastfeeding.

Level of education is also associated to implementation of exclusive breastfeeding significantly. The results of this study are not in line with Atabik¹⁵ in his research, which states that there is a significant relationship between the level of maternal education and the implementation of exclusive breastfeeding in the Pamotan village of Rembang Regency. Mothers who have higher education generally also have better nutrition knowledge and have greater attention to the nutritional needs of children.

Meanwhile occupational status is also associated to exclusive breastfeeding practice. It means that good environment very much influence the mother in their feeding baby practice. As Satino's research¹⁶ in Surakarta City, explained that environmental factors support exclusive breastfeeding and the environment did not support exclusive breastfeeding.

The study also shows that the availability and access to health resources very much associated to the implementation of exclusive breastfeeding. Likely due to lack of information about exclusive breastfeeding from childbirth helper in the place of the mother giving birth. It can be expected that the combination of these two components is the key to the success of the lactation process.¹⁷ In order to be able to achieve a wider community health service, a Health Center (Puskesmas) was established *Posyandu* (Integrated service post). Particularly in the field of midwifery with the aim

of accelerating the reduction of maternal and infant mortality, the idea of a midwife in the village.¹⁸

The role and support of health workers is significantly associated to implementation of exclusive breastfeeding. The results of this study are in line with Tesy Mamonto's research¹⁹ in the work area of Kotobangun Public Health Center, West Kotamobagu Subdistrict, Kotamobagu City, where the results of the study stated that there was a relationship between the role of health workers and exclusive breastfeeding, where most respondents did not exclusively breastfeed because of the lack of role/ support from health workers. Based on the results of research conducted by Josefa²⁰ in the District of West Semarang, it turns out that the support of health workers in the period before and after childbirth, such as education and counseling, has not been as expected.

Moreover, the family support, including husband and relatives who stay at the same house with participants is very much influenced them to have exclusive breastfeeding practice. Research conducted by Hedianti²¹ states that family members who play the most role in providing support in terms of informational support and assessment support are husbands, while family members who play the most role in instrumental support and emotional support are husbands and parents. From all of aspects of support, the family members who have the most role in providing support are husband and parents (67.9%).

About myth and false beliefs variables about baby food, based on the results of the study concluded that there was a significant relationship between the myths with the implementation of exclusive breastfeeding. One of the obstacles for breastfeeding mothers is their belief in myth. In fact, the myth cannot be proven true.²² Myth is the fruit of ancient thought where analysis of a certain condition is still very limited. In line with the term 'not all myths are wrong', then not all myths can be held true.²³ Formula milk promotion variable, based on the results of the study concluded that there was no relationship between the promotion of formula milk with the implementation of exclusive breastfeeding. This study is in line with the research conducted by Isnaini²⁴, in which the mothers with poor education is at risk giving formula milk. Maternal education, in addition as the main asset in the household economy, also plays a role in the initial feeding of the baby.

Multivariate analysis result shows that the most dominant variable related to the implementation of exclusive breastfeeding is the role of health workers. In contrast to the research conducted by Tesy Mamonto¹⁹ in the work area of Kotobangun Health Center, Kotamobagu Timur District, Kotamobagu City, stated that the most dominant variable is respondent attitude towards exclusive breastfeeding. And research conducted by Astuti²⁵ in the work area Serpong Health Center, said that the most dominant variable is the parent role related to the behavior of giving exclusive breastfeeding.

CONCLUSIONS

Based on the results of the research and discussion that refers to the research objectives, it can be concluded that the factors related to the implementation of exclusive breastfeeding are including predisposing factors (knowledge, attitudes, motivation, and work), enabling factors (the availability of health resources), and reinforcing factors (the role of health workers and the role of the family). The most dominant variable is the role of health workers, which implies that good communication and health education from health workers is necessary for the succeed implementation of exclusive breastfeeding practice.

Ethical Clearance: Research approval was taken from Medical and Health Research Ethics Committee of Faculty of Medicine of Andalas University. The formal permission was also obtained from the Department of Health of Padang Pariaman Regency of Indonesia.

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Effect of Strategic Foresight on the Success of Healthcare Marketing

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ABSTRACT

After a decade of war, Iraqi government embarks in the strengthening of private firms after years of sanctions. The government of Iraq for the preceding period after the international war and a series of several sanctions that negatively affected medical system focused on the development of the old medical system. Studies show that strategic foresight contributes to the success of organizations. Hence, this study aims to identify the impact of strategic foresight on the success of healthcare marketing in Iraq. A total of 171 respondents collected from private hospitals and clinics. The results revealed that strategic foresight with customer, market, competitive and technology foresight has a positive impact on healthcare marketing.

Keywords: *Iraq Healthcare, Customer Foresight, Market Foresight, Competitive Foresight, Technology Foresight.*

INTRODUCTION

Iraqi economy and general healthcare system are emerging from a long term conflict that dwelled for many decades. The government has the role of providing medical services to its citizens through government-owned hospitals or facilitation of the private hospitals and healthcare firms¹. The marketing of the private medical firms in Iraq was put on course after the subsidence of the 2003 US invasion². The medical system of Iraq is run by the Iraqi government, but the more substantial portion is left to the private sector³. The growth of the private health sector in Iraq depends on the invitation of the private investors who will facilitate the growth and development of the customer-driven medical system⁴.

Many authors and researchers have written articles and journals regarding Iraqi future medical system. The researchers have focused on the independent topics of patient's foresight, market prediction and competition⁵. Others have significantly focused on the needs of the technology and the roles it plays in impacting needs of the Iraqi medical market amid the rising number of private hospitals⁶. Private hospitals market themselves with three different purposes. First, they want to

understand their patients well. The hospital search to have a deeper insight into their customers and buyers⁷. Marketing helps in identifying the needs of customers and finding a suitable fit for the need. Marketing ought to communicate in a clear way that provides enough information and customers decide to make purchases by been convinced that the product will fulfill their needs. There is a need to improve the marketing of private hospitals in Iraq. The reason has been that most of them have been ineffective for various reasons⁸. This includes lack of cohesion between business strategy and the marketing strategy employed, and failure to establish a marketing strategy that is unique⁹. The purpose of this study is to show how a private hospital can use strategic foresight to improve its marketing¹⁰. The private hospitals market their services with an aim of increasing their revenues. These hospitals have not done all there is to do in there marketing¹¹. Thus, there is a need to improve the current marketing models by applying appropriate strategic tools.

LITERATURE REVIEW

Strategic Foresight

According to (Rohrbeck et al., 2013)¹², they voiced

out that strategic foresight originates from the two words strategy and foresight. Foresight is the ability of an institution or a firm to judge and predict correctly what is going to happen in the future and so as to plan its actions based on this knowledge¹³. In studies, termed strategic foresight as a strategy tool that gives a clear picture of the true nature of something of product. He went ahead and explained that strategic insight entailed the act of carrying out product testing sessions to clearly evaluate and get a clear insight of a type of product. According to (David,2012)¹⁴ Strategic foresight includes four dimensions (Customer (CUF),Market (MAF),Competitive (COF),Technology (TEF)) as it shown in figure 1.



Figure 1. Strategic Foresight Dimensions

The aspect of customer foresight can be observed from a different perspective, but for marketing purposes, private medical firms are driven by a single agenda of profitability. A private hospital in Iraq partners with international pharmaceutical firms in the provision of medical services¹⁵. Market foresight is one of the key factors in the formulation of the organization's strategy. It varies with the nature of the organization and its needs when it comes to strategy but the essence of any strategy must be about building the future. Thus, strategic planning should always include consideration of potential and potential scenarios in the relevant business environment; hence the market foresight must be systematic and planned¹⁶. Technology is a significant component of the medical facility. As an independent variable, technology influences the growth of medical and healthcare growth. For instance, communication plays a significant role in connecting people and medical facilities. The awareness's need for private hospitals to reach people depends on the level of technology. Competitive foresight is an important tool for developing the strategic vision required by analyzing competitors and developing future solutions that can represent a future competitive advantage that contributes to improving the competitive position of the organization¹⁷.

Healthcare Marketing

Some scholar has an opinion that the marketing strategy model is not adequate to market both goods and services¹⁸. Goods and services have different characteristics like goods are tangible whereas services are intangible¹⁹. According to Hill & Alexander (2017)²⁰, strategic priorities are concerned with long-term goals and highly rank customers satisfaction. Organizations have their vital focus on the customer and provide the goods and services which will satisfy their needs so as to create customer loyalty²¹. To achieve this. The marketing manager is at the pivot to ensure a proper marketing is conducted to convince customers that the product will satisfy their needs.

Private hospitals market themselves with three different purposes. First, they want to understand their patients well. The hospital search to have a deeper insight into their customers and buyers⁷. Marketing helps in identifying the needs of customers and finding a suitable fit for the need.

MATERIAL AND METHOD

Instrument

The instrument of this study was the survey it was used and conducted in private hospitals and clinics, the population for this study comprises of the physicians, random sample has been selected among them, the sample size is 171. The first section deals with demographic sample. the second section deals with strategic foresight and its dimensions (CUF ,MAF,COF,TEF), depending on the scale was developed and standardized by (David,2012)¹⁴, the third section deals with healthcare marketing, depending on the scale was developed and standardized by (Kumar et al.,2014)²². Cronbach's Alpha coefficient was used to determine the internal consistency and it is refer to a good value of all the items and the value of Cronbach's Alpha was 0.952 in general which insures the reliability of the instrument.

Normality

The normality test used to deciding use parametric or non-parametric tests, for this purpose Kolmogorov-Smirnov test is used for normality test, and when data is normal distribution, non-parametric statistical tests can be used to analyze and verse versa if distribution is not normal, parametric tests can be used. Results in Table 1 refer to that the data are normally distributed.

Table 1: Normality Test

Variable	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SF	0.096	171	0.060	0.935	171	0.064
HM	0.115	171	0.063	0.936	171	0.057

Factor Analysis

The questionnaire items of SF for each of dimensions were factor analyzed to establish the dimensions of the responses, as it shown from Table 3 the confirmatory factor analysis exceed 0.5 and refer to that the items relating to each of SF factors loaded onto the anticipated factors as it shown in Table 2.

Table 2: Factor Loadings

Item	Path	Factor	Loading	Item	Path	Factor	Loading
CUF 1	<---	CUF	0.647	COF 11	<---	COF	0.786
CUF 2	<---	CUF	0.741	COF 12	<---	COF	0.835
CUF 3	<---	CUF	0.726	COF 13	<---	COF	0.635
CUF 4	<---	CUF	0.766	COF 14	<---	COF	0.758
CUF 5	<---	CUF	0.676	COF 15	<---	COF	0.575
MAF 6	<---	MAF	0.703	TEF 16	<---	TEF	0.654
MAF 7	<---	MAF	0.630	TEF 17	<---	TEF	0.621
MAF 8	<---	MAF	0.778	TEF 18	<---	TEF	0.705
MAF 9	<---	MAF	0.716	TEF 19	<---	TEF	0.725
MAF 10	<---	MAF	0.621	TEF 20	<---	TEF	0.697

Conceptual Framework

The Conceptual framework developed shall further conceptualize the impact of SF dimensions on HM, and it developed according to the literatures and scales, as it is presented in Figure 2.



Figure 2: Conceptual Framework

FINDINGS

The results of Table 3 show that there is a positive significant relationship between SF and HM ($r=0.795$, $t=17.050$, $P<0.05$). This result is consistent with (David,2012)¹⁴ study where SF has been considered as a success factor to improve the performance. Regarding the dimensions the results show that there is a positive significant relationship between CUF and HM ($r=0.620$, $t=10.272$, $P<0.05$). This result is consistent with (Rohrbeck et al., 2013)¹² study where CUF has been considered as critical success factor of HM. Moreover, the obtained results point out that there is significant association between MAF and HM ($r=0.732$, $t=13.970$, $P<0.05$), and this result is compatible with (David,2012)¹⁴ recommendation where it stressed that MAF has a high effect on HM. Regarding COF the results show that there is a positive significant relationship between COF and HM ($r=0.691$, $t=12.416$, $P<0.05$). This result is consistent with (Rohrbeck et al., 2013)¹² study where COF has been considered as critical success factor of HM. Moreover, the obtained results point out that there is significant association between TEF and HM ($r=0.685$, $t=12.217$, $P<0.05$), and this result is compatible with (David,2012)¹⁴ recommendation where it stressed that TEF has a high effect on HM.

Table 3: Correlation Coefficient Results

IV	r	T	sig	DV
SF	0.795	17.050	P<0.05	HM
CUF	0.620	10.272	P<0.05	
MAF	0.732	13.970	P<0.05	
COF	0.691	12.416	P<0.05	
TEF	0.685	12.217	P<0.05	

Table 4: Regression Analysis Results

IV	β_0	β_1	R ²	Adj-R ²	F	sig	SE
SF	0.874	0.805	0.632	0.630	290.686	0.000	0.315
CUF	1.738	0.591	0.384	0.381	105.509	0.000	0.408
MAF	1.765	0.609	0.536	0.533	195.166	0.000	0.354
COF	1.826	0.583	0.477	0.474	154.155	0.000	0.376
TEF	1.822	0.590	0.469	0.466	149.263	0.000	0.379

Table 4 results show that SF has a positive impact on HM, SF explains 63.2% of the variance and predict 0.805 increase in HM, the significant level is <0.05 and ($F=290.686$), and the regression equation is ($HM=0.874+0.805 SF$) therefore the results support the hypothesis 1. Regarding the dimensions the results show that there is a positive impact of CUF on HM, CUF explains 38.4% of the variance in HM and predict 0.591 increase in HM, the significant level is <0.05 and ($F=105.509$), and the regression equation is ($HM=1.738+0.591 CUF$) therefore the result support the hypothesis 2 there is statistically significant impact of CUF on HM. Moreover, the obtained results point out that there is a positive impact of MAF on HM, MAF explains 53.6% of the variance in HM and predict 0.609 increase in HM, the significant level is <0.05 and ($F=195.166$), and the regression equation is ($HM=1.765+0.609 MAF$) therefore the result support the hypothesis 3 : there is statistically significant impact of MAF on HM. Also results refer to positive impact of COF on HM, COF explains 47.7% of the variance in HM and predict 0.583 increase in HM, the significant level is <0.05 and ($F=154.155$), and the regression equation is ($HM=1.826+0.583 COF$), therefore the result support the hypothesis 4 : there is statistically significant impact of COF on HM. Finally, the results show that there is a positive impact of TEF on HM, TEF explains 49.9% of the variance in HM and predict 0.590 increase in HM, the significant level is <0.05 and ($F=149.263$), and the regression equation is ($HM=1.822+0.590 TEF$) therefore the result support the hypothesis 5 there is statistically significant impact of TEF on HM. Accordingly, the results support the study hypothesis and sub hypothesis.

DISCUSSION AND CONCLUSION

In recent years, the public healthcare sector in Iraq has suffered from the conditions of the war on terror, which have affected the provision of logistical and financial capabilities; Therefore, the private healthcare sector has emerged as a competitive alternative, requiring effective strategic tools²³. Many studies ensure that it is beyond doubt that there is indeed a need to bridge the knowledge gaps by examining the relation between SF and HM . as such this study aims to identify the relationships that are significant for SF and HM , including the notion of how such this relationship can enhance HM. Iraq has undergone decades of war and unwavering sanctions from the United Nations. For example, Power failure grids as a result of the Gulf War in the 1990s and a decade of sanctions²⁴ were among the side effects on the hospitals and water; sanitary installations on which it depends on sufficient electricity supply.

Iraq is in the middle of the desert and therefore, traveling for most households and families in search for medical services is a huge challenge. The future of the Iraqi population is heavily dependent on the out of the pocket medical services which is provided by private firms²⁵. Therefore having a medical system that is regulated by the government through subsidies and the provision of necessary facility promotes the growth of private sectors. The re-emergence of the medical facilities of Iraq is faced by many challenges among them is inadequate medical personnel⁶. The future of the Iraq medical system and marketing of private firms is positively modified by the factor of technology, competition, and clients. The results indicate that customer and market foresight have a positive impact on the success of healthcare marketing. Paying attention to the customer, providing good service, with a true vision of marketing positively affects the success of healthcare marketing. In addition to employing technology and enhancing competitiveness. Consequently, It is pretty clear that these tools play a vital role in healthcare marketing and therefore the health institutions should try all means available to invest on these four tools.

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Study of the Organic Pollution in Euphrates River, Southern of Iraq

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ABSTRACT

Water pollution is one of the main problems that cause harm to man and his environment. In order to evaluate the quality of our inland water and the extent of its contamination with organic matter, this study was conducted.

Water samples were collected monthly from six selected stations on Euphrates river, three of them in Nasiriya city are Al-Sindinawiya, Al-Fadhliya and Souk Al-Shuyuk district. The other three were in Abu Al-Shulan, Al-Medana city center and Qurna district for the period from October 2017 to May 2018. Samples collected in 500 ml polyethylene bottles. The biological oxygen demand (BOD) was determined by the BOD Sensor after calibration and processing.

The results of the study showed that the values of BOD₅ had recorded the highest concentration in the first site of the study and amounted 47.5 mg/l either the lowest value was recorded in the fourth site (4.87) mg/l, as well as the values in the other four stations were 6 in S2, 7.12 mg/l in S3, 7.62 in S5, and 6.75 mg/l in S6, respectively. The values of BOD₅ during the months of the study ranged from 2 to 54 mg /l as lowest and highest value during the months of March 2018 and May 2018, respectively. The river water classified according to Hynes scale as doubtful clean in the fourth station, bad in the second, third, fifth and sixth stations, and very bad at the first station. In general, all study sites assessed as very bad (13.31) mg/l.

Statistically, there were significant differences between the values of the BOD₅ between stations at the probability level ($p \leq 0.05$), these significant differences not showed between the months.

Keyword: Organic pollution, BOD₅, Euphrates river, Iraq.

INTRODUCTION

Pollution is the contamination of the Earth components environment with materials that interfere with human health ⁽¹⁾, either water pollution maybe it can be said that any undesirable change in the physical, chemical or biological properties of water lead to loss of favorite water qualities for living organisms ⁽²⁾. Sewage is the main water pollution, which can be defined as a mixture of organic waste from several human activities such as food preparation, washing dishes, latrines, baths, laundry, house cleaning and bathing ⁽³⁾, and when discharged to water systems show a lot of problems in the water body.

Biochemical oxygen demand (BOD) forms the key indicator of organic load in any wastewater system. This

property is expressed as the amount of dissolved oxygen required by aerobic biological organisms for degrading organic materials present in a given water sample at certain temperature over a specific time period ⁽⁴⁾. When any type of organic material reaches the water body, the living organisms begin to break down and analyze this material. During this process, oxygen amount in the water is consumed through the breathing of aerobic organisms. The amount of consumption depends on the concentration of the organic load in the water. Thus a low BOD is an indicator of good quality while high BOD indicates polluted water ⁽⁵⁾. Water quality classified depending on BOD₅ values to five class were very clean, clean, fairly clean, doubtful clean and bad ⁽⁶⁾.

As a result of the absence of any previous

environmental study on Euphrates river at Nasiriyah and Basra cities, this indicator has been used to determine the water quality and organic pollution, and our current idea was selected.

MATERIALS AND METHOD

Description of study sites

Euphrates river is one of the main rivers in Iraq. The importance of Euphrates river has been highlighted since ancient times due to its varied uses in agriculture, fishing, water transport and trade. It penetrates most of Iraq's provinces. It has a length about 3000 km and penetrates the Iraqi cities with a length of 1160 km, equivalent to about 38.7% of the total length of the river.

Six sampling stations were identified along the river in Nasiriyah and Basra governorates (Figure 1). Three sites were selected within the geographical area of Dhi Qar, including the sample S1, this sample was taken from the area of Al-Sindinaoui near the center of Nasiriyah and this area is contaminated with sewage, there was a sewage station in the center of Nasiriyah, whose waste is drained into the river water. This area is characterized

as an agricultural area. The sample site (S2) was taken from the center of Fadhliya area. This area is dominated by the agricultural character, where the sugarcane plant is abundant on the river, there are also cages for raising fish. Third sample (S3) was in the center of the Souk al-Shuyuk district near (Al-Sabra Bridge). This area is characterized by occurred a large number of human activities and large quantities of city waste discharged to the river.

In Basra province, three sites were selected within this geographical area. The site of sample (S4) was within between Chabaish and Medina district in an area called Abu Shulan, this area is an extension of the marshes in Dhi Qar and Basra provinces. The location of the sample S5 was at Medina district center (below the bridge). This area is characterized by many sources of pollution from sewage, waste accumulated as well as operations water from oil companies located near the river and its waste. Finally, the location of sample S6 was in Qurna district in Oujan Pasha area, about 4 km from the confluence of the Tigris River in the Euphrates in the Shatt al-Arab and This area is characterized mostly as agricultural areas free from sources of pollution, both civil and industrial.

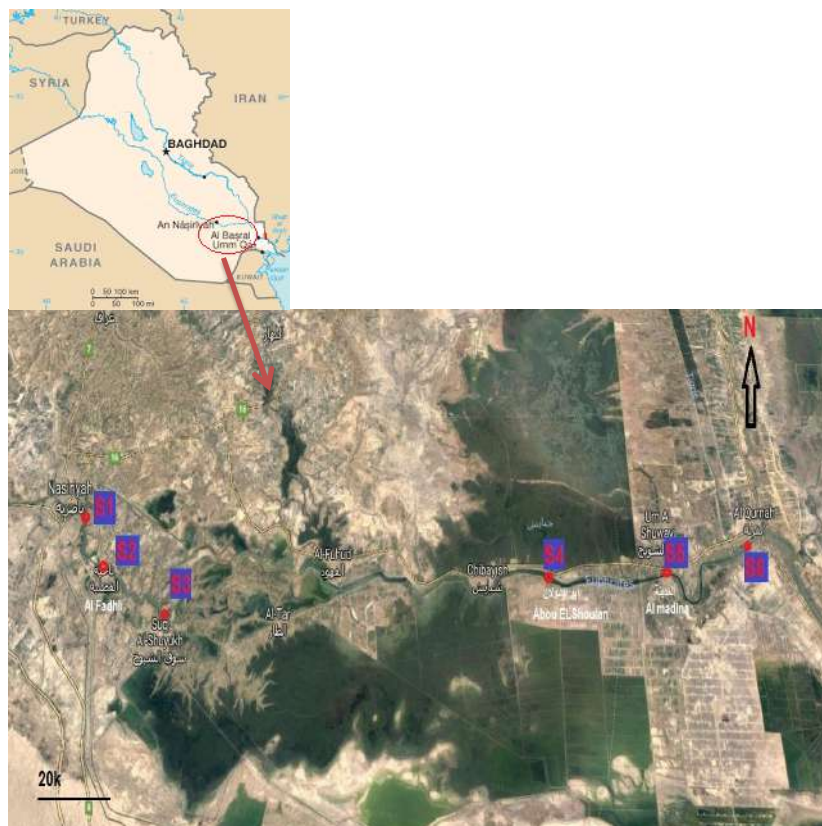


Figure (1): Study sites on Euphrates river in Nasiriyah and Basra provinces.

MATERIALS AND DEVICES

In the present study, the BOD sensor method, which includes a set of substances and tools such as nitrification inhibitor, NaOH, bottle for setting sample size, dark sample bottle, magnetic stripe, rubber cover, the base of carrying the bottles, specific incubator and sensor, was used to determine the biological oxygen demand in the water of Euphrates river.

Procedures

The test is conducted in airtight bottles 500ml capacity in the absence of light and under a controlled temperature ($20 \pm 1^\circ\text{C}$) for 5 days by take 432ml from water samples, the results take directly from sensor display and multiplying suitable factor, were expressed as (mg/l).

Statistical analysis

The significance of the differences, whether study site differences or monthly differences, were determined by variance analysis method, using the Statistical Package for the Social Sciences (SPSS) version 20 at the probability level ($p \leq 0.05$)⁽⁷⁾.

RESULTS AND DISCUSSION

The results of the study showed a difference in the values of the biological oxygen demand between stations (4.87-47.5 mg/l) (Fig. 2). Statistical analysis results indicate that there were significant differences between the stations ($p \leq 0.05$), and the values varied within the study months and recorded the highest in May 2018 in S1 (54 mg/l), and the lowest in March 2018 at the second sites (2 mg/l) (Fig. 3).

The results of S1 recorded clearly changed compare with other sites, BOD₅ values in this site was 47.5 mg/l as mean (Fig. 2), and the water quality was very poor according to Hynes due to its proximity to the wastewater treatment plant in Nasiriya about 200 meters from the treatment plant and this shows not found true treatment processing or may exist but inefficient, as well as increasing the concentration of phosphates causes appearance eutrophication phenomenon which adversely effects on the values of oxygen in river water and this was confirmed by⁽⁸⁾.

Second site results indicated that the value of BOD₅ was bad (6 mg/l) as mean (Fig. 2), although this area was free from human activities and industrial pollutants, but agricultural pollutants which discharge to river water may contribute significantly to organic pollution, which effects on the value of BOD₅ in the waters, this is consistent with⁽⁹⁾ which show in his study that spread of fish ponds in water body contribute significantly to the growth of neighborhoods that causes deplete dissolved oxygen in the water and that's appearing during the study period.

The third site recorded relatively high BOD₅ values compare with S2, the value was 7.12 mg/l (Fig. 2) and this value is classified as bad water may be the reason was characterize the study area with increasing human activity and discharge large amounts of city waste to the river water. Research showed that population and industrial activities to contribute significantly in the emergence of organic pollution in nearby water bodies on such activities⁽¹⁰⁾, and this is consistent with the current study results.

The fourth site recorded the lowest rate of BOD₅ values (4.6 mg/l) (Fig.3), this may be caused by dilution factor as this region was extension for marsh area and low organic contamination which may result from the activities of the same organisms that live in the study area⁽¹¹⁾.

BOD₅ values in S5 was 7.62 mg/l as mean (Fig. 2), this due to the sources diversity of pollution which arrived to the river water such as sewage and waste accumulated as a result of population activities, may be the main reason for organic pollution increasing⁽¹²⁾, as well as, the high proportion of salt and the oil companies remnants up to river water which may directly affect the percentage of oxygen dissolved in water through the formation of oily layers that act as soundproofing affects BOD₅ and dissolved oxygen values in river water.

The results mean of BOD₅ in the sixth site was 6.75 mg/l (Fig. 2), the study area was marked as agricultural area, fertilizers and pesticides were used in it and near the banks of the river, which leads to high concentration of organic substances and various nutrients. As results indirectly organic pollution leads to an increase in the values of BOD₅.

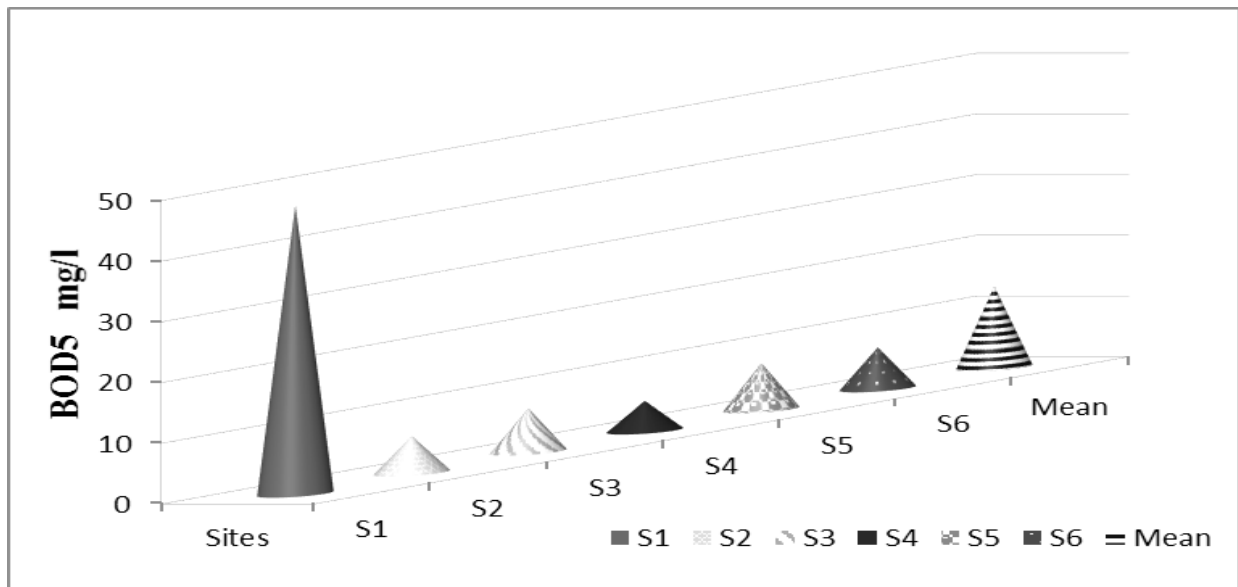


Figure 2: Variations in BOD₅ values between sites during the study period on Euphrates river.

The result of BOD₅ values during the months of October 2017, November, December, January 2018, February, March, April and May were 12.66, 14, 14.83, 13.16, 11.33, 10.66, 12.83 and 17 mg/l, respectively. BOD₅ values results during the months of study were fairly close together (Fig. 3, 4) and did not show any significant differences ($p \leq 0.05$) and were generally tend to decline in values during winter season (Fig. 4). These decreasing may be related with water temperature which recorded low degrees when moving from autumn to winter months, beside an increase in dissolved oxygen concentrations, which in turn effect on the BOD₅. In March month, the decline may be linked to increased rainfall which worked as dilution factor although high temperature resulting a significant increase in water levels which in turn led to a decrease in the BOD₅ values, this pointed out by ⁽¹³⁾ in his study.

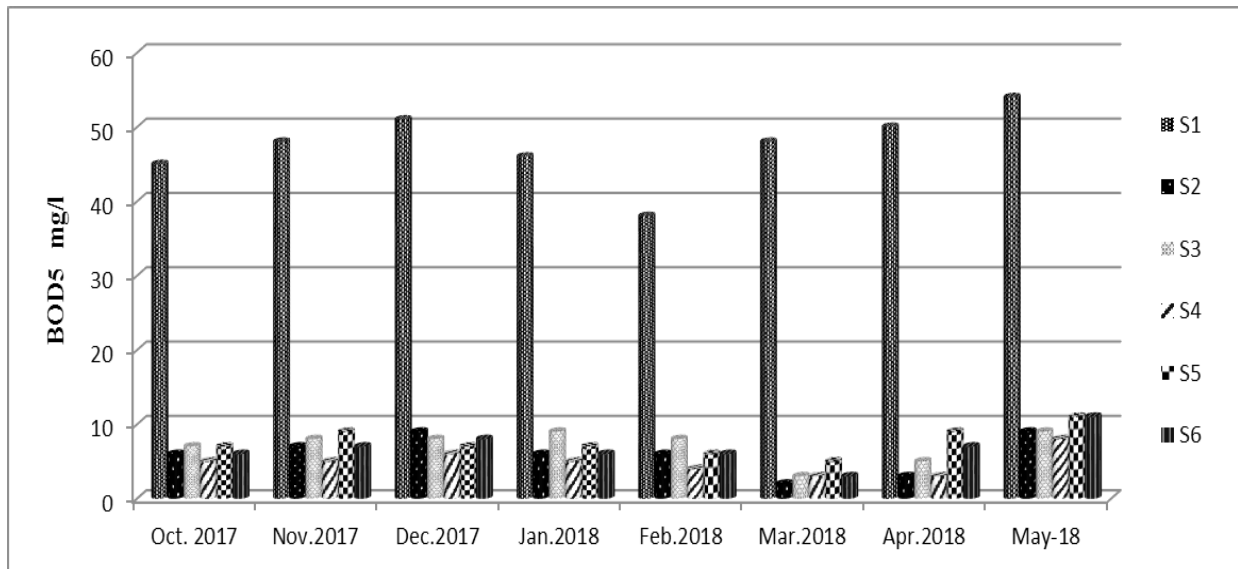


Figure 3: Variations in BOD₅ values between months during the study period on Euphrates river.

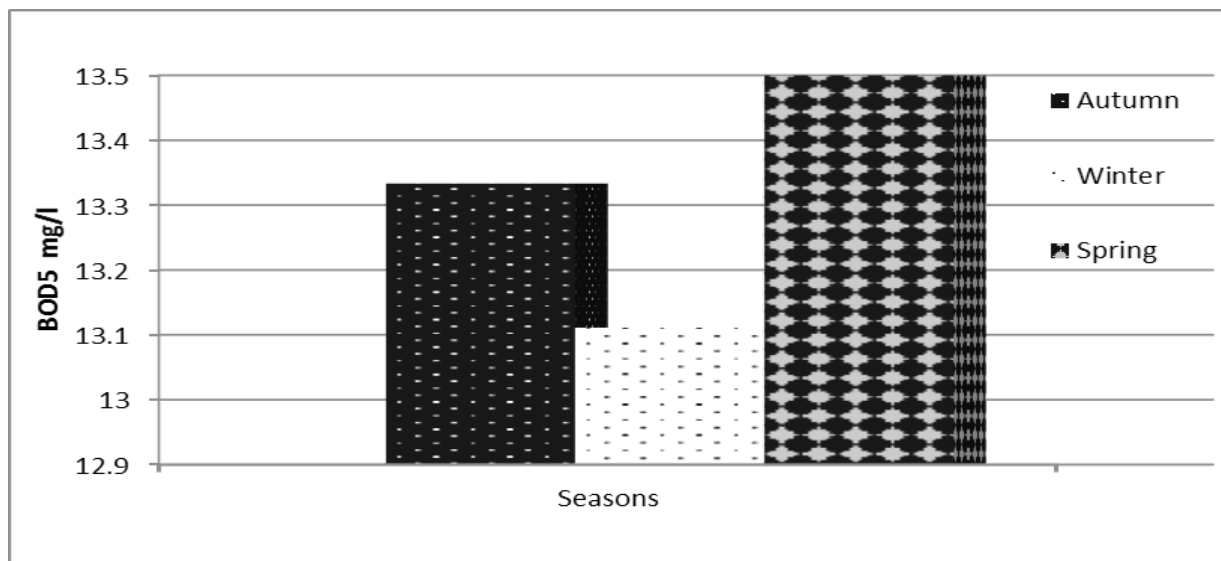


Figure 4: Variations in BOD₅ values between seasons during the study period on Euphrates river.

CONCLUSIONS

The water of the Euphrates River in the studied area is questionable in terms of its organic content and the quality of water in some stations is very bad.

The results showed significant differences between the studied stations, while the climatic conditions had no significant effect on BOD₅ values.

The river has high energy through self-purification and disposal of pollutants.

Conflict of Interest: Nil

Source of Funding: Self-funding.

Ethical Clearance: The current research aims to assess the quality of the Euphrates river and determine the level of organic pollution within the study areas and during the research period to identify the state of the river health and protecting the human from the damage that may be caused by the consumption of contaminated water. If you have additional questions or clarifications, please contact us by e-mail: alialfanharawi@mu.edu.iq

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International Patients Safety Goals (IPSG) based on Knowledge Management of SECI (Socialization, Externalization, Combination and Internalization) on Adverse Events at Jakarta Islamic Hospital

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ABSTRACT

Introduction: The performance of nurses determines patient safety and also a contribution of the knowledge possessed by nurses. Proper Knowledge Management will improve nurse performance. There have been many types of research about nurses' work, but research on the performance of knowledge management nurses: Socialization, Externalization, Combination and Internalization (SECI), does not yet exist. The purpose of this study was to determine the effect of performance on the goal of patient safety based on *knowledge management of SECI* on the adverse events in Jakarta Islamic Hospital. **Method:** The research design used a *quasi experiment pre post-test with the control group*. The number of samples in the intervention group was 24 respondents and the control group was 37 respondents. Instruments that are used for patient safety and adverse events with performance interventions based on *knowledge management of SECI* patient safety goals. The analysis used the *Mann Whitney* and *Willcoxon* statistical tests. **Result:** the study showed that work duration was a factor that affected patient safety, there were changes in patient safety before and after the intervention in the intervention group compared to the control group. There is a difference between the intervention group and the control group after being given performance interventions in *Knowledge Management: SECI* patient safety goals. **Conclusion:** this study recommends regular training for nurses about performance in patient safety: *SECI*-based patient safety goals and further research for different control groups of hospitals with the intervention group.

Keywords: Target of patient safety, knowledge management: SECI, performance, nurse

INTRODUCTION

The quality of hospital health services is largely determined by the quality of nursing services as a determining factor in the image of health care institutions. As nurses are the most number of professional groups, the foremost, closest and longest with patients and their families⁽¹⁾ in the process of achieving their health. One indicator of the quality of nursing services is patient satisfaction. Satisfaction is a comparison between the quality of service obtained with the desires, needs

and expectations⁽²⁾. In addition, satisfaction Indicators of service quality can also be seen in efforts to achieve *patient safety*.

The high quality of nursing services can be achieved by increasing nursing services⁽³⁾, namely providing health services efficiently and effectively in accordance with professional standards, carried out service standards comprehensively in accordance with patient needs, utilising appropriate technology and research results in the development of health services so that an optimal level of health is achieved⁽⁴⁾. The final results that will be measured are patient satisfaction and safety efforts of patients conducted by a nurse at the hospital, and these efforts demonstrate the achievement of the work in line with expectations, known as performance.

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Nurses performance will provide high results of work achievement that is strongly influenced by various factors, including the work system that is applied to the hospital⁽⁵⁻⁷⁾, adequate employment resources and the characteristics of nurses in the form of *knowledge*, skills, abilities to act, motivation, attitudes, norms and values adopted. Nurse knowledge is the main element of nurse characteristics in achieving performance explain that service quality is related to effectiveness, timeliness, benefits, efficiency, sustainability and consistency of nursing services provided to patients, families and society^(8,9). This shows that the quality of nursing services is influenced by the performance of nurses. Nurse performance is based on guidelines and standards that have become a reference in nursing services. As a reference, performance can also be seen from the aspects of *patient safety*, which is the achievement of *patient safety* goals.

The concept of managing knowledge (*Knowledge Management*) is currently getting much attention from researchers as a new study to find other models in solving nursing management problems⁽¹⁰⁾. Knowledge of the nurses in *patient safety* regarding the six goals of patient safety will be a positive impact for nursing services in general⁽¹¹⁾.

Previous study in patients with elective surgery in the operating room ward of the Central General Hospital found the error of commission at 60% prophylactic antibiotics and 90.5% error of omission⁽¹²⁾. Previous study in 2011 found a unexpected incident of 26.3% and a near-injury incident of 73.7%. The forms of those incidents are non-conformity of patient identification, errors in drug administration (wrong patients, types of drugs), blood samples of patients exchanged and patients falling⁽¹³⁾. Based on the preliminary study in December 2015 obtained the number of patient safety indicators based on patient safety reports in 2014 that there were Potential Injury Incidence of two events (18%), for Events of Near Injury were two events (18%), Non-Injury Events were three events (27%), there were four Unexpected Events (36%), and Sentinel was 0%.

Based on the background, to improve the performance of nurses so that the quality of nursing services is better, there have been many studies on the performance of nurses, but research on the effect of nurses' performance in *Knowledge Management*-based Patient Safety: SECI on the Quality of Nurse Nursing

Services, does not yet exist.

MATERIAL AND METHOD

This study is aimed to answer specific objectives: analysis of the effect of nurses' performance in the *Knowledge Management*-based Patient Safety Goals: SECI on Nursing Service Quality (patient safety, unexpected events), after being given intervention.

Research design

The design of the research is a *quasi-experiment* with *pre- and post-test with control group* research design which aims to test the effect of nurses' performance in patient safety goals based on *knowledge management*: SECI on service quality in nursing by measuring the quality of nursing services before (*pre-test*) and after (*post-test*) giving intervention (14,15).

Data Collection

The preparation stage was then developed to prepare a training module in the form of nurse performance in patient safety goals and *knowledge management* based on patient safety goals: SECI. Furthermore, at the implementation stage, training was held for two (2) days in providing knowledge of nurses' performance in the goals of patient safety and patient safety goals based on *knowledge management*: SECI. After getting the training this was followed by an independent learning process, in the form of the application of the training results on their own for one week in order to apply the knowledge gained about the performance of nurses in the patient safety goals based on *knowledge management*: SECI. After the independent application is carried out, an evaluation of the knowledge about the results that have been obtained can be found by looking at the patients' safety and unexpected incident index.

RESULT

The results of the study are based on the characteristics of respondents, which include age, income and length of work, as described in Table 1.

Table 1. Respondent equality test based on age, income and length of work at Jakarta Islamic Hospital Pondok Kopi (n1 = 24, n2 = 37)

Based on the results of the analysis of Table 1, it was found that the average age of the intervention group

and the control group were in the early adult range and entered middle adulthood; the average income of the intervention group is greater (Rp. 5,529,166.67) compared to the control group (Rp 4,313,514,51) and the duration of the intervention group was longer (15.88 years) than the control group (11.08 years). Equivalence statistical test results of the intervention group and control group are equivalent to $p\text{-value} > 0.05$.

The results of research based on patient safety include the accuracy of patient identification, effective communication improvement, increased drug safety monitoring, precise location (side), proper procedure and right patient surgery, reduction of risk of infection through the six steps of hand washing, and reduction of risk of patients falling before getting intervention in Jakarta Islamic Hospital ($n_1 = 24$, $n_2 = 37$) as described in Table 2.

Table 2. Respondents distribution of Patients Safety Performance ($n_1 = 24$, $n_2 = 37$)

Variable	Intervention group		Control group	
	F	%	F	%
The accuracy of patient identification				
Less precise	6	25	6	16.2
Right	18	75	31	83.8
Improved effective communication				
Less precise	13	54.2	9	24.3
Right	11	45.8	28	75.7
Improved drug safety that needs to be monitored				
Less effective	14	58.3	3	8.1
Effective	10	41.7	34	91.9
The certainty of exact location (side), proper procedure and right patient surgery				
Less precise	0	0	1	2.7
Right	24	100	36	97.3
Reducing the risk of infection through the six steps of hand washing				
Less risk of infection	0	0	2	5.4
Risk of infection	24	100	35	94.6
Reducing the risk of patients falling				
Less risk of falling	4	16.7	8	21.6
Risk of falling	20	83.3	29	78.4

Based on the results of Table 2, statistical tests obtained the highest value of the intervention group and the control group close to the same as regard to exact location (side), proper procedure and right patient surgery, reduction of risk of infection through the six steps of hand washing and reducing the risk of patients falling. The aspects that are still lacking are in the accuracy of patient identification, improved

effective communication, improved drug safety that needs to be monitored in the intervention group, and are perceived to be less than in the control group. *The cut off points* use the median due to abnormal distribution For the relationship between characteristics of patient safety and the interaction between characteristics, see Table 3.

Table 3. Analysis of the relationship of characteristics with patient safety in Jakarta Islamic Hospital (n1 = 24, n2 = 37)

Variable	p value
Patient safety in the intervention group - Age - Length of working - Income - Education - Work - Gender	0.863 0.953 0.869 0.692 0.625 0.620
Control group patient safety - Age - Length of working - Income - Education - Work - Gender	0.159 0.129 0.563 0.380 0.692 0.225
Intervention group - Age with work duration - Age with income	0,000 0,000
Control group - Age with work duration - Age with income	0,000 0,000

Based on the results of the statistical test shown in Table 3. it was found that, in both the intervention group and the control group, with patient safety there was no

significant relationship ($p > 0.05$). While the results of the interaction test between age and length of work and income have a significant relationship ($p = 0,000$) both in the intervention group and the control group.

Table 4. Statistical test changes in patient safety before and after being given intervention (n1 = 24, n2 = 37); n1 = intervention group, n2 = control group

Variable	Positive differences	Negative differences	Elementary school error	SD test statistics	p value
Patient safety before and after the intervention in the intervention group	18	6	26,091	3.53	0,000
Patient safety before and after giving intervention to the control group	12	25	26,384	1.57	0.116

Based on the statistical test results in Table 4 it was found that the change in positive understanding of patient safety in the intervention group after the intervention was increased compared to the control group, with the standard deviation error approaching the same. The results of the analysis showed that there were changes in

patient safety before and after the intervention of nurses' performance in the *knowledge management* target of patient safety: SECI in the intervention group ($p = 0.000$), whereas in the control group there was no change in changes in patient safety before and after the nurse performance intervention in the patient safety goals based on *knowledge management*: SECI ($p = 0.116$).

Table 5. A statistical test of differences in patient safety in the intervention group and control group after being given intervention (n1 = 24, n2 = 37) n1 = intervention group, n2 = control group

Variable	Mean rank	Statistical test	Elementary school error	SD test statistics	p value
Patient safety after giving intervention to the intervention group and control group					
- Less	16.28				
- Good	10.23	33.5	14.67	-2.32	0.021

Based on the results of statistical test shown in Table 5, it was found that the difference in understanding patient safety in the intervention group was better than the control group after being given intervention in the performance of nurses in patient safety goals based on *knowledge management*: SECI, with a standard deviation error of 14.67. The results of the analysis showed that there were differences in patient safety in the intervention group and the control group after

being given intervention in the performance of nurses in patient safety goals based on *knowledge management*: SECI ($p = 0.021$).

The results of statistical tests about events were not expected in the intervention group and the control group after being given intervention in the performance of nurses in the patient safety goals based on *knowledge management*: SECI.

Variable	percentage
Drug safety that needs to be monitored	100
The certainty of location, procedure and patient surgery	100
Infection prevention and control	0.08
The accuracy of patient identification	0
Risk of infection	0
Risk of falling	0
Decubitus event number	0
Restrain injury incidence rate	Not monitored
Phlebitis event figures	0
Near injury events (KNC)	0

Table 6 Unexpected event statistical tests after being given intervention in the performance of nurses in the patient safety goals based on *knowledge management*: SECI in Jakarta Islamic Hospital. Based on the results of the statistical test in Table 6, it was found that only 0.08% of infection prevention and control about unexpected events was still found after the intervention, while others were not found

CONCLUSIONS

The conclusion of the study is that the initial knowledge about the target of patient safety in the intervention group and the control group is less different. The factor that most influences patient safety is the length of work, whereby the longer they work the respondent is expected to understand more about patient safety. Changes in patient safety before and after giving intervention to the performance of nurses in the Patient Safety Target based on *knowledge management*: SECI in the intervention group was better and more significant than the control group. The difference in understanding patient safety in the intervention group was better than the control group after being given intervention in the performance of nurses in the patient safety goals based on *knowledge management*: SECI. The results of the analysis found that there were differences in patient safety in the intervention group and the control group after being given intervention in the performance of nurses in patient safety goals based on *knowledge management*: SECI. Concern is still found in unexpected events about infection prevention and control that needs to be corrected

RECOMMENDATIONS

Nurse Performance in Patient Safety Goals based on *knowledge management*: SECI, can be suggested as follows:

- Nurses' knowledge through scientific activities in the form of training, learning from literature sources, discussions of abilities that have been carried out related to the performance of patient safety goals

- Nurse leaders to hold regular training on the performance of nurses in the Patient Safety Goals based on *knowledge management*: SECI

- Education can develop educational applications in the form of subjects that teach about nurses in the Patient

Safety Goals based on *knowledge management*: SECI

- Nurse Ability in Patient Safety Goals based on *knowledge management*: SECI can improve with effective communication and teach the six steps of hygiene

Conflict of Interest: No conflict of interest during the study.

Ethical Clearance: This study has been accepted for ethical clearance from Universitas Muhammadiyah Jakarta with no: 591/PMK-UMJ/VI/2017.

Source of Funding: This study was not receive funding. This study was self funding.

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Factors Affecting the Side Effects of Anti-Tuberculosis Drugs

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ABSTRACT

Side effects of Anti-Tuberculosis Drugs is a problem in the treatment of tuberculosis patients. In Barru Regency, the number of pulmonary TB patient visits in the outpatient and inpatient units in 2014-2016 was still high. Based on these data, it is deemed necessary to conduct research on the causes of cure rates in only 73% of the total users of pulmonary TB drugs, in terms of the side effects of anti-tuberculosis drugs, pulmonary disorders and gastric disorders. This study was conducted on Agustus, 2017 to January, 2018; using cross sectional approach. Subject of this study were 75 tuberculosis patients with BTA+ and side effects of Anti-Tuberculosis Drugs on the lungs and stomach, selected by total sampling. Data were obtained through interview, then analyzed by using path analysis. It is known that the pathways of influence were significant ($T\text{-value} > 1.96$) were knowledge on immune system, type of drug on immune system, knowledge on side effect of drug and type of drug on side effect of drug. Thus, the level of knowledge and types of drugs directly affect the immune system, as well as the side effects of drugs. Several factors that directly affect the side effects of anti-tuberculosis drugs are the level of knowledge and type of drug. Increased knowledge will reduce the side effects of the drug, because the patient makes an effort to neutralize the effect.

Keywords: Side effects, Anti-tuberculosis drug, Tuberculosis, Knowledge

INTRODUCTION

Tuberculosis (TB) is a chronic granulomatous infectious disease caused by the bacillus *Mycobacterium tuberculosis bacilli* (Mtb) which was discovered by Robert Koch in 1882.^{(1),(2)} TB is an age old dreadful disease and globally, there were an estimated 10.4 million new TB cases with 1.8 million TB deaths in 2015.⁽¹⁾ Twenty five percent of all deaths caused by pulmonary tuberculosis disease and it has become the leading cause of death on infectious diseases.³

The high incidence of pulmonary TB is a major problem for many countries in the world. WHO (2015) explains that 9.6 million of the world's population

are infected with TB bacteria and the most cases of pulmonary TB are in Africa (37%), Southeast Asia (28%), and the Eastern Mediterranean (17%). Indonesia ranks fifth in the world as a contributor to TB sufferers after India, China, Nigeria and Pakistan⁽⁴⁾.

TB prevalence in Indonesia in 2013 (297 / 100,000 population) was higher than in 2010 (289 / 100,000 population). regions with the highest TB cases were West Java, East Java and Central Java, with smear positive cases of almost 40% of the total cases in Indonesia⁽⁵⁾. Morbidity and mortality due to TB are serious problems, especially due to the emergence of side effects of anti-tuberculosis drugs and most The patient felt unable to resist the side effects of the drug⁽⁶⁻⁸⁾. It was noted that 69.01% of patients experienced side effects of the drug⁽⁸⁾. Side effects that often arise are stomach disorders (loss of appetite, nausea, stomach ache). Other disorders include joint pain, tingling and burning in the legs and redness of the urine. More severe side effects include tightness, severe hemoptysis, collapse, bronchiectasis, pneumothorax, and cardio pulmonary insufficiency,

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itching and redness of the skin, deafness, balance disorders, visual disturbances, confusion and vomiting, purpura and shock⁽⁹⁾.

The number of TB patients with smear + is 8.470%, the Case Notification Rate (CNR) of new cases of TB with smear + per 100,000 population is 97.98%, while the total number of TB cases in South Sulawesi is 12.625%⁽¹⁰⁾. The partnership effort to reduce TB prevalence is an effort to eliminate pulmonary TB. Pulmonary TB prevention strategy is Directly Observed Treatment Shortcourse (DOTS) and has been implemented thoroughly in Indonesia since March 24, 1999. The impact or side effects of anti-tuberculosis drugs is one of the risk factors for default⁽¹¹⁻¹²⁾.

Pulmonary TB treatment aims to cure patients and improve productivity and quality of life, prevent death, prevent recurrence, break the chain of transmission and prevent the transmission of drug-resistant pulmonary TB. Handling of the high prevalence of pulmonary TB must be done to control this disease, one of which is treatment. Drug therapy problems in pulmonary TB patients require special attention because patients consume a lot of drugs and in large doses. In one study, the incidence of drug therapy problems in the category of unwanted drug reactions or adverse drug reaction (ADR) was quite high⁽¹³⁾.

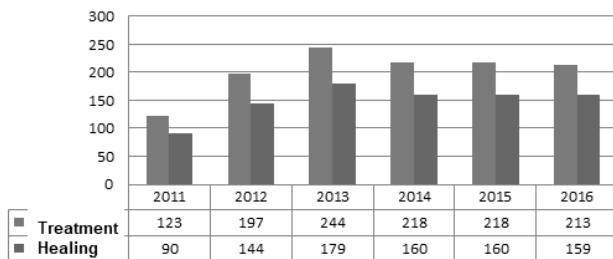


Figure 1. Trend of New Pulmonary TB Patient in Barru Regency 2011-2016⁽¹⁴⁾

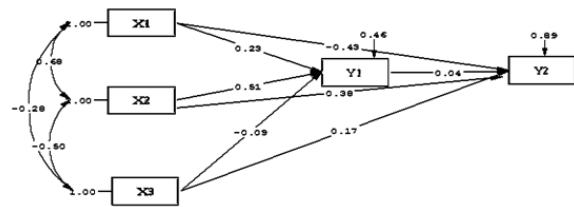
The number of pulmonary TB patient visits in the outpatient and inpatient units in 2014-2016 was still high. Based on these data, it is deemed necessary to conduct research on the causes of cure rates in only 73% of the total users of pulmonary TB drugs, in terms of the side effects of anti-tuberculosis drugs, pulmonary disorders and gastric disorders.

METHOD

This study was conducted on Agustus, 2017 to January, 2018; using cross sectional approach. Subject of this study were 75 tuberculosis patients with BTA+ and

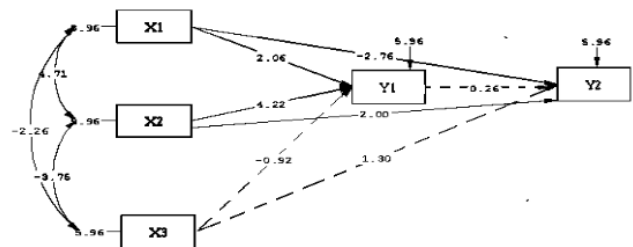
side effects of Anti-Tuberculosis Drugs on the lungs and stomach, selected by total sampling. Data were obtained through interview, then analyzed by using path analysis.

RESULTS



Note: X1 = knowledge, X2 = type of drug, X3 = dose of drug, Y1 = immune system, Y2 = drug side effects

Figure 2. Path coefficient of path analysis



Note: X1 = knowledge, X2 = type of drug, X3 = dose of drug, Y1 = immune system, Y2 = drug side effects

Figure 3. T-value of path analysis

Based on Figures 2 and Figure 3 it is known that the pathways of influence were significant (T-value > 1.96) were X1→Y1, X2→Y1, X1→Y2 and X2→Y2. Thus, the level of knowledge and types of drugs directly affect the immune system, as well as the side effects of drugs.

DISCUSSION

The results of data analysis showed that the level of knowledge directly affects the side effects of TB drugs on the lungs and stomach. The effect given is a negative influence, which means that if the level of knowledge increases then the side effects of the drug will decrease. In this regard, Handarini reports that respondents with good knowledge are more likely to be more obedient to taking medication⁽¹⁵⁾.

This research is also in accordance with Notoatmodjo's (2010) statement that one's actions about a health problem will basically be influenced by one's knowledge of the problem. In this case, the higher the level of knowledge possessed by TB patients, the higher the patient's compliance with treatment⁽¹⁶⁾.

The results showed that the type of drug did not affect the side effects of the drug. This is because most patients stop taking the drug because they cannot stand the side effects of the drug.

The anti-TB drug exhibits greater level of efficacy with a satisfactory degree of toxicity; however combination treatment, especially during the intensive phase of therapy may produce severe adverse events⁽¹⁷⁾. There may be considerable morbidity, even mortality, particularly with drug-induced hepatitis. These events may include substantial costs due to added visits, tests, and in more serious instances of hospitalizations⁽¹⁸⁾.

Standard anti-TB therapy typically continues for six months. For the first 2 months, three to four drugs receive patients, namely rifampin (R), isoniazid (H), pyrazinamide (Z), and, in some cases, ethambutol (E). During the final 4 months, they continue with rifampin and isoniazid⁽¹⁹⁾.

Tuberculosis is considered a serious disease, it can even be fatal if not treated properly. The treatment step given is the administration of antibiotics that must be spent by tuberculosis patients for a certain period of time according to a doctor's prescription. Common types of antibiotics are isoniazid, rifampicin, pyrazinamide and ethambutol. Like other antibiotics, antibiotics for tuberculosis also have side effects, especially rifampicin, isoniazid, and ethambutol. Rifampicin can reduce the effectiveness of hormonal contraceptives, ethambutol can interfere with the function of vision and isoniazid has the potential to damage nerves. A number of other side effects of anti-tuberculosis drugs are nausea, vomiting, decreased appetite, jaundice, dark urine, fever, rash, and skin itching^(9,20).

The healing period for tuberculosis varies depending on the patient's health condition and the severity of the disease. The condition of the patient generally starts to improve and stop contagious after taking antibiotics for 2 weeks. To ensure complete recovery, TB patients must use antibiotics given by doctors for 6 months. If the patient does not take the medicine as recommended or stops taking it before the recommended time, the bacteria may not be able to completely disappear, even though the patient feels that his condition has improved. Patients with tuberculosis have the potential to become resistant to antibiotics. If this happens, the condition becomes more dangerous and difficult to treat. Thus, the

healing period also becomes much longer.

The results showed that the dose of the drug had no effect on the side effects of the drug, either directly or indirectly, because the number of tuberculosis patients who stopped taking the drug due to the occurrence of disturbing side effects, so that many patients felt that they did not fit the drug⁽²¹⁻²²⁾. This causes a healing failure so the patient must repeat the treatment. Another thing that causes no side effects of drugs when taking anti-tuberculosis drugs is because the dosage of tuberculosis medication is adjusted to the patient's weight, and there is prevention to using a single drug. The immune system does not play a role in resistance and side effects of anti-tuberculosis drugs⁽²¹⁻²⁴⁾.

Treatment with anti-tuberculosis drugs also concerns the suitability of the number of tablets swallowed by the patient's body weight, which consists of 4 groups, namely 30-37 kg, 38-54 kg, 55-70 kg, and ≥ 71 kg. The more weight the patient has, the more tablets must be swallowed and the higher the dose. The administration of anti-tuberculosis drug dosage is seen from the presence or absence of the patient's physiological and pathological conditions that prevent the use of drugs (contraindications)⁽²⁵⁻²⁶⁾.

The results showed that the immune system had no effect on the side effects of the drug. The results of this study are different from the results of research conducted by Inez Clarasanti, Marthen CP Wongkar, Bradley J. Waleleng (2016) that in the use of anti-tuberculosis drugs (rifampicin, isoniazid, pyrazinamide and ethambutol / streptomycin) side effects complicate treatment targets. Common liver function tests include aspartate transaminase (AST) or more commonly referred to as serum glutamic-oxaloacetic transaminase (SGOT), and alanine transaminase (ALT) which is usually referred to as serum glutamic-pyruvic transaminase (SGPT). SGOT and SGPT show improvement if damage or inflammation occurs in liver tissue. SGPT is more specific to liver damage than SGOT. A slight increase (up to twice the normal rate) of SGOT and SGPT concentrations is often found. If the concentration of SGOT and SGPT is more than twice the normal number, it is considered meaningful and requires further examination. If there is an increase in transaminase enzyme concentration, there is an indication of malnutrition⁽²⁷⁾.

CONCLUSION

Several factors that directly affect the side effects of anti-tuberculosis drugs are the level of knowledge and type of drug. Increased knowledge will reduce the side effects of the drug, because the patient makes an effort to neutralize the effect.

ADDITIONAL INFORMATIONS

Ethical Clearance: from Ethics Committee of Institute of Health Science “Maluku Husada”

Funding Source: authors

Conflict of Interest: None

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The Effects of Cold Compress and Warm Compress on β -Endorphin Levels, IL-6 and TNF α among Adolescent with Dysmenorrhea

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ABSTRACT

Non-pharmacological efforts to treat dysmenorrhoea are include cold compresses and warm compresses. The aim of this study was to determine the differences effect of cold compresses and warm compresses to β -Endorphin levels, IL-6 and TNF α among adolescents with dysmenorrhoea. The research was Post Test Only with Control Group. β endorphin, IL-6 and TNF α were measured by ELISA, then analyzed by Independent Sample T-Test. The average β level of Endorphin in cold compress group was 143.03 pg/ml, in warm compress group was 171.43 pg/ml; the average IL6 level in cold compress group was 1352.60 pg/ml, in warm compress group was 961.14 pg/ml and the average TNF α level in cold compress group was 345.75 pg/ml, in warm compress group was 262.50 pg/ml. The results of Independent Sample T-Test showed that there was no difference in β levels of Endorphin IL-6 and TNF α in both of the warm and cold compresses group. Cold compress and warm compress can stimulate loose of Endorphin β levels and regulate uterine hypercontractility during menstrual pain. Cold compress and warm compress can be used as an alternative to treat dysmenorrhoea.

Keywords: Cold compress, Warm compress, β -Endorphin levels, IL-6 levels, TNF α levels

INTRODUCTION

Dysmenorrhoea is a painful sensation with cramps sensation in the lower abdomen, and commonly followed by sweating, tachycardia, headache, nausea, vomiting, diarrhea, and back pain before or during menstruation⁽¹⁻³⁾. The intensity of menstrual pain was varies from mild, moderate and severe⁽⁴⁾. Severe of dysmenorrhea give affects physical, psychological and social consequences⁽⁵⁾.

The prevalence of dysmenorrhoea in the world was varies from 37% to 90.1%, in China there were 37%⁽⁶⁾, 55.5%-70% in adolescents and young adults in Turkey⁽⁷⁻⁸⁾, 60.9% of female medical students in King Abdulaziz University⁽⁹⁾, 74.4% in teenage girls in

Ghana⁽¹⁰⁾, 74%-86.1% in Iran, 77.6% among University of Gondar Students, Northwestern Ethiopia⁽¹¹⁾, 90.1% among Jordanian University students⁽¹²⁾. In Indonesia an estimated 55% of women in productive age were experienced menstrual pain⁽¹³⁾. In East Java, the number of reproductive young women aged 10-24 is 56,598 and about 11565 (1.31%) of those experienced dysmenorrhea and come to the obstetrics⁽¹⁴⁾.

Factors that can increase the risk of dysmenorrhoea are include age and age of younger menarche, longer duration of menstruation, menstrual volume⁽¹⁵⁻¹⁷⁾, low of BMI, smoking and alcoholism^(16,18-19), low social support, family history of dysmenorrhoea, high caffeine consumsion⁽²⁰⁾, depression, anxiety and stress^(7,21). Primary dysmenorrhoea has a biochemical basis and doe to prostaglandin loose during menstruation. During the luteal and menstrual phases, prostaglandin F2-alpha (PGF2- α) were excretion. Excessive release of PGF2- α will increase the amplitude and frequency of uterine contractions and causes vasospasm of the uterine arterioles, causing lower abdominal ischemia

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and cramps⁽²²⁾ and back pain⁽²³⁾. Psychiatric factors also play a role in the occurrence of primary dysmenorrhea. Stress can increase the levels of vasopressin and catecholamines and it will make vasoconstriction and ischemia in cells⁽²⁴⁾. Peripheral blood analysis in women with dysmenorrhoea shows excessive synthesis and concentration of oxytocin, PGF2-a, vasopressin, IL-6 and TNF⁽²⁵⁻²⁸⁾. Dysmenorrhoea is a major cause of activities problem⁽²⁹⁾ such as absent from work or school⁽³⁰⁻³¹⁾ and decreased quality of life^(8,32-33).

Pharmacological interventions for dysmenorrhoea use nonsteroidal anti-inflammatory drugs (NSAIDs) and oral contraceptive. The side effects including dependence⁽³⁴⁻³⁵⁾, diarrhea, abdominal pain, nausea⁽³⁶⁾, kidney and liver complications, sleep disorders⁽³⁷⁾, digestive disorders⁽³⁸⁾. The failure rate of pharmacological treatment is 20-25%⁽³⁹⁾. Non-pharmacological interventions include cold and warm compress. Cold compress is ice therapy that can reduce prostaglandins which strengthens pain sensation and other subcutaneous at the injury place by inhibiting the inflammatory process. This is because cold compress can reduce blood flow to a part and reduce bleeding edema which is it cause analgesic effects by slowing the speed of nerve delivery so the pain impulses will less reach to the brain⁽⁴⁰⁾. Warm compresses with hot jars cause conduction, where there is transfer of heat from the bladder into the body and it giving dilation for blood vessels and decreased muscle tension so that dysmenorrhoea pain will be reduced⁽⁴¹⁾. Skin stimulation causes the release of endorphins, thus blocking the transmission of pain stimuli⁽⁴¹⁾. The results of previous studies showed that Moxibustion can reduce

the levels of PGF2 α , oxytocin, vWF and increasing the levels of β -EP. The effect of cold and warm compress on β -Endorphin, IL-6 and TNF α has not been clearly known, so the researchers are interested to conducting the research about The Effects of Cold Compress and Warm Compress on β - Endorphin levels, IL-6 and TNF α among Adolescents with Dysmenorrhoea.

MATERIALS AND METHOD

The design of this research was Pretest-Postest. The population were all students at FIK-Unipdu Jombang who experienced dysmenorrhoea. Sample size was 40, selected by purposive sampling, then divided into cold compress group (n=20) and warm compress group (n=20). The instrument of data collection were thermometer, a hot jar and ice bag. Numeric Rating Scale used to measure pain level. ELISA indirect method to measure the levels of β Endorphin, IL-6 and TNF α using the. Data were analyzed by T-Test.

FINDINGS

The intensity of dysmenorrhoea before giving cold compress were mostly at moderate. However, in warm compresses group were more than half of participant at severe level. Intensity of dysmenorrhoea after giving treatment in cold compresses group were mostly at mild, while in warm compresses group were mostly at moderate level. Homogeneity of variances test results showed that the intensity of dysmenorrhoea before and after giving treatment in both of groups were not have a significant difference.

Table 1. The differences of β -Endorphin levels, IL-6 and TNF α after giving intervention

Variable	Cold compress Mean-(SD)	Warm compress Mean-(SD)	Mean Difference (95%-CI)	P
β -Endorphin	143.03(3.97)	171.43(2.59)	-28.40(-59.88=3.08)	0.074
IL-6	1352.60(3.57)	961.14(3.79)	39.46(-38.15-821.01)	0.070
TNF α	345.75(1.55)	262.50(6.14)	83.25(-42.85-209.35)	0.179

There were no have significant differences levels of β Endorphin, IL-6 and TNF α after giving treatment

β -endorphin levels after giving cold and warm compress had no significant differences. Cold and warm compress are the techniques for cutaneous stimulation. Cutaneous stimulation is skin stimulation carried out to relieve pain, works by encouraging the release of endorphins, so it will block the transmission of pain stimuli⁽⁴¹⁾. Changes in β -Endorphin levels can be explain on the basis of Opiate Endogenous theory, where opiate receptors in the brain and spinal cord were determine the central nervous system to activate morphine substances called endorphins and enkephalin when pain is received. This endogenous opiate can be stimulated by skin stimulation and muscles. These opioid receptors are located on peripheral sensory nerve extremity⁽⁴²⁾.

Cold compress was given by using an ice bag filled with ice, compressed to the abdominal area for 20 minutes and a warm compress was given by using a bag filled with warm water at a temperature of 40-45 C $^{\circ}$ and compressed to the abdominal area for 20 minutes. The average β -endorphin level at cold compress group was 143.03 pg/ml, the warm compress group was 171.43 pg/ml. Giving cold and warm compresses can increase β -endorphin levels to relieve pain production. The higher of endorphins level make the level of pain at mild⁽⁴³⁾. Endorphins inhibit fiber C in pre and post synapses and A δ fibers in the dorsal horn and activate the larger of A β (A-beta) sensory nerve fibers, thus blocking the pain signals when enter to spinal cord so the pain perception will decreases⁽⁴⁴⁾. After intervention, the intensity of dysmenorrhea among respondents will decreased. This because of the release of β -endorphins levels that inhibit C fiber and activate A β sensory nerve fibers so it will inhibits the pain signals to spinal cord and decreased perception of pain. The result was in accordance with previous studies which showed that β -endorphin levels in primary dysmenorrhoea increased after moxibustion therapy. Moxibustion therapy is a warm moxa stimulation at Guanyuan, Shenque and Sanyinjiao acupuncture points, the treatment giving for 10-15 minutes a day during 7 days before menstruation in 3 menstrual cycles⁽⁴⁵⁾.

IL-6 and TNF α levels had no difference. In primary dysmenorrhea, the level of genes expression of cytokine pro-inflammatory (IL1B, TNF, IL6 and IL8) at the first

day of menstruation will significantly increases⁽²⁸⁾. IL-6 functions to increase oxytocin secretion at the first day of menstruation⁽⁴⁶⁾, where TNF α functions to increase prostaglandin and oxytocin at the first day of menstruation⁽⁴⁷⁻⁴⁸⁾. Increased prostaglandins and oxytocin have an impact to excessive uterine contractions, decrease endometrial blood flow and cause pain during menstruation⁽²⁸⁾.

Cold compresses provide physiological effects to reduce the inflammatory response, blood flow and edema, local pain⁽⁴⁹⁾. Heat will stimulates the vascular reaction by increasing blood flow, resulting in delusions of prostaglandins, bradykinin and histamine. Increasing blood flow also can increase oxygenation⁽³⁹⁾. Local heat will give the abdomen to increasing gastrointestinal motility and relaxation to the uterus. Local heat is as effective as NSAIDs⁽⁵⁰⁾. NSAIDs can reduce the accumulation of prostaglandins and reduce spasmodic contractions caused by prostaglandins and inhibit the activity of COX-2 and COX-1 enzymes⁽⁵¹⁾.

The results of previous studies showed that the giving of warm stimuli (moxibustion) can regulate uterine hypercontractility during menstrual pain by set of the mediator pain level serum where occur the decreasing levels of PGF2 α serum and oxytocin⁽⁴⁵⁾. The effect of moxibustion treatment works like electroakupunctur⁽⁵²⁾. Several studies have shown that electroacupuncture can reduce the expression of prostaglandin levels⁽⁵³⁾, peripheral blood lymphocytes among rat as the samples with primary dysmenorrhoea⁽⁵⁴⁾. T-cells are the main source of cytokine secretion (TNF, Interleukin, interferons)⁽⁵⁵⁾. Thus the cold compresses and warm compresses interventions can reduce pro-inflammatory cytokines IL-6 and TNF α .

CONCLUSION AND RECOMMENDATION

The results of this study showed that after giving warm and cold compresses in both group there were no differences in levels of β Endorphin, IL-6 and TNF α among adolescents with dysmenorrhoea. Cold compresses and warm compresses can be used as an alternative treatment to dysmenorrhoea.

Ethical Clearance: Ethics Committee of Nursing Faculty, Airlangga University

Conflict of Interest: No

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Mediating Effects of Wisdom in the relation between Lifestyle Habits (LH) and Health Conservation (HC) of Middle-aged Men

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ABSTRACT

Purpose: The purpose of this study was to identify the mediating effect of wisdom in relation between LH and HC of middle-aged men. **Methods:** The design of this study was secondary analysis research using the data of Kim's research. Subjects in the primary study were 134 middle-aged men residing in C and M city. Data were analyzed using descriptive statistics, Pearson's correlation coefficients, and multiple regression analysis. **Results:** There were statistically significant relationship between HC and the following independent variables: LH ($r=.30$, $p=.001$) and wisdom ($r=.71$, $p<.001$). Wisdom affected relation between lifestyles habits and HC of middle-aged men as a complete mediation effect variable, and the variable's explanation power was 50.3%. LH, which is independent variables, are not directly effective in HC. It works only through the mediating variable of wisdom. It was confirmed that in relation between LH and HC, wisdom was a significant mediating variable ($Z=6.40$, $p<.001$). **Conclusion:** This study showed that wisdom has a mediating effect. LH was not directly effective in preserving health, but only through wisdom. Wisdom has a complete mediation effect on the HC of middle-aged men. Therefore, in order for middle-aged men to preserve their health, nursing intervention is needed to make LH right and to increase wisdom.

Keywords: Mediating effect, Middle-aged men, Health conservation, Lifestyle habits, Wisdom.

INTRODUCTION

Health conservation (HC) is the act of maintaining a state of balance and well-being as a being that has physical, mental and psychological capacities.¹ When HC is achieved, the individual can achieve harmony and adjustment from the perspective of uniformity and integration. As such, health needs to be well preserved in order to improve the quality of life as one adjusts to life. However, middle-aged men in Korea experience a higher rate of sudden death compared to those in other age groups and are at risk to their health due to an unhealthy lifestyle, a heavy burden of responsibility at home and work, and excessive stress, lack of rest or exercise. A study conducted on middle-aged men to identify the factors affecting HC showed that the variables of stress, life style habits, self-concept, self-efficacy and wisdom

are correlated with HC, with wisdom in particular being an important factor affecting HC.² Wisdom has already been identified as an important factor that improves the quality of life or preserves health in middle-aged adults, women or the elderly.³⁻⁶ Throughout life, wisdom serves as a function that includes the understanding of the principles of things, the good and bad, judgment, interpersonal skills and a thorough grasp of life. As such, it is often considered as a key to successful human development.⁶ In addition, wisdom is associated with health habits. The elderly with wisdom did not smoke or drink alcohol, had a high satisfaction with sleep and practiced appropriate exercise.⁷ But studies that reviewed the effect of life style habits and wisdom on HC in middle-aged men are rare, and this is especially the case for studies that reviewed the mediating effects of wisdom.

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As there is a need for nurses to provide nursing that can help middle-aged men promote health, prevent illness and preserve health throughout the course of their daily life³, this researcher plans to analyze the mediating

effects of wisdom in the association between daily life style habits and HC of middle-aged men, using the data from the primary study conducted by Kim⁸, and thus provide a basic set of data for the development of an intervention program on wisdom.

MATERIALS AND METHOD

Research design

This study is a secondary analysis research conducted to identify mediating effect of wisdom in relation between LH and HC of middle-aged men using data of Kim's research.⁸

Subjects

The data on the subjects of the primary study were used. The subjects of primary study data⁸ were convenience extraction of middle-aged men who live or work in Gyeongbuk C and M cities. It was approved by the K University Institutional Research Board. The sample size was 134 people.

Instruments

The instruments used in the primary study⁸ were as follows.

LH

LH instrument which was an adaptation by Ro⁹ from the health promotion behavior evaluation index by Wilson and Ciliska¹⁰ was used. It was composed of a total of 25 questions. It was composed of a Likert five-point scale from 1 to 5 and higher points represent healthier LH. At the time of development, also in the research by Wilson and Ciliska,¹⁰ reliability Cronbach's α was .88. In this study, reliability was .74.

Wisdom

To measure the wisdom of middle-aged men, this study measured it with the 'wisdom scale of Korean elderly people' developed by Sung, Lee and Park.¹¹ The tool was consisted of a total of 27 questions. The scale ranged from 1 point of 'very unlikely' to 4 points of 'very likely'. A higher score indicates that the degree of wisdom perceived by the middle-aged men were higher. Cronbach's α was .80 at the time of the development of tool. In this study, it was .90.

HC

HC is a physically, mentally, socially and psychologically integrated object that maintains the

balance.¹² To measure the HC of elderly people, this study measured it with the HC scale developed by Sung¹. This tool was consisted of a total of 37 questions. Each question was based on a 4-point scale. The scale ranged from 1 point of 'very unlikely' to 4 points of 'very likely.' A higher score indicates that the degree of HC was higher. Cronbach's α was .94 at the time of the development of tool. In this study, it was .85.

Data collection

The data collection in the primary study⁸ was as follows.

The data for the primary study were collected from May to June in 2018. We visited the parks and sports facilities located in C and M city in Gyeongbuk to explain the purpose of the research to the people who met the standards of the targets of the survey and received written agreement from them. After that, we distributed the structured questionnaires and had the respondents fill them out on their own.

Ethical Consideration

This study obtained an approval from the IRB of K University on the content and methodology (IRB No. KNU_IRB_2018-64).

Data analysis

Data were analyzed using IBM SPSS Statistics 23 program as follows. The general characteristics of the subject were analyzed with frequency and percentage. HC and related variables of the subjects were analyzed with descriptive statistics. The correlation among the wisdom, LH and HC was analyzed with Pearson's correlation coefficient. To identify the mediating effect of wisdom in relation between LH and HC of the subject, the multiple regression analysis was used.

FINDINGS

The General Characteristics of Subjects

In the primary research, the general characteristics of the subjects were shown in Table 1.

The subjects participated in this study were 134 and the person of 50-59 years old were 82 persons (61.2%), the persons of under 49 years old or over 60 years were 52 persons and the average age was 52.17(5.22) years old. The education level of the subjects was 70 (52.2%)

in the case of having a university or higher education level. Most had jobs, and 89 people (66.4%) exercised regularly. The number of respondents who answered that the economic status was bad was 89 (66.4%).

Table 1: The General Characteristics of the Subjects (N=134)

Variables	Categories	N (%)
Age	Under 49 years	40(29.9)
	50~59	82(61.2)
	Over 60 years	12(9.0)
Educational level	Below primary school graduate	2(1.5)
	Middle-High School graduate	62(46.3)
	College graduate or higher	70(52.2)
Job	Yes	123(91.79)
	No	11(8.21)
Regular exercise	Regular	89(66.4)
	None	45(33.6)
Economic status	Good	45(33.6)
	Bad	89(66.4)

Degree of LH, Wisdom and HC of Subjects

In the primary paper, degree of LH, wisdom and HC of subjects were as shown in Table 2. LH was 3.49 out of 5 points. Wisdom was 3.00 out of 4 points. HC was 2.78 out of 4 points.

Table 2: Degree of LH, Wisdom and HC of Subjects (N=134)

Variables	Possible range	M(SD)
LH	1-5	3.49 (0.39)
Wisdom	1-4	3.00 (0.28)
HC	1-4	2.78 (0.25)

Correlation of LH, Wisdom and HC of Subjects

The correlation of lifestyles habit, wisdom and degree of HC of subjects was as shown in Table 3.

HC in middle-aged men, LH ($r=.30$, $p=.001$), and wisdom ($r=.71$, $p<.001$) were statistically relevant at a significant level. Wisdom and LH were statistically relevant at significant level ($r=.42$, $p=.001$). The better

the LH, the higher the wisdom, the higher the HC of them.

Table 3: Correlation of LH, Wisdom and HC of Subjects (N=134)

Variables	LH r(p)	Wisdom r(p)	HC r(p)
LH	1		
Wisdom	.42 (.001)	1	
HC	.30 (.001)	.71 (<.001)	1

Mediating effects of wisdom in the relation between LH and HC

To find the mediating variable of wisdom in the process of LH of subject affecting HC, the study used 3-step regression equation. Before confirming the mediating effect of wisdom, the assumption of regression analysis was confirmed, and the Durbin-Watson index regarding autocorrelation was 1.570~1.838, which indicated no autocorrelation of outlier. As for the

multicollinearity among independent variables, the VIF index was 1.00~1.216 which is less than 10, confirming no multicollinearity, indicating this data was appropriate for regression analysis.

At first step regression analysis, LH, the independent variable significantly affected wisdom, the mediating variable ($p<.001$). Thus, this study suggests mediating effect of wisdom in relation between LH and HC. According to first step regression analysis, LH, the independent variable significantly affected wisdom, the mediating variable ($\beta=.42, p<.001$), the explanation power of wisdom was 17.1%. At second step regression analysis, the independent variable significantly affected LH, the mediating variable ($\beta=.30, p=.001$), and explanation power of HC was 8.0%. To verify the influence of wisdom, the mediating variable to HC, the independent variable in third step, the study conducted regression analysis with LH and wisdom as predictor and HC as dependent variable, it was confirmed that the LH ($\beta=-.007, p=.916$) and wisdom ($\beta=.72, p<.001$) were significant predictors of HC.

In other words, the direct influence of LH of middle-aged men to HC was $\beta=-.007$. And multiplication of influence of LH to wisdom ($\beta=.42$) and influence of wisdom to HC ($\beta=.72$), the value 0.302 refers to indirect influence of LH to HC via wisdom. At this point, β value $-.007$ of LH, the independent variable which is the direct influence was fewer than entire influence β value (.30) of first step, indicating the mediating effect of wisdom. Thus, wisdom affected relation between lifestyles habits and HC of middle-aged men as a complete mediation effect variable, and the variable's explanation power was 50.3%. LH, which are independent variables, are not directly effective in HC. It works only through the mediating variable of wisdom. For significance verification regarding the size of mediating effect of wisdom, the study conducted Sobel test. As the result, it was confirmed that in relation between LH and HC, wisdom was a significant mediating variable ($Z=6.40, p<.001$). [Table 4]

Table 4: Mediating effects of Wisdom in the relation between LH and HC

Step	Variables	B	β	t	p	Adj. R ²	F	p
Step 1	Lifestyle habits → Wisdom	.30	.42	5.34	<.001	.171	28.47	<.001
Step 2	Lifestyle habits → Health conservation	.18	.30	3.55	.001	.080	12.60	.001
Step 3	Lifestyle habits, Wisdom → Health conservation					.503	68.32	<.001
	Lifestyle habits → Health conservation	-.004	-.007	-.11	.916			
	Wisdom → Health conservation	.63	.72	10.65	<.001			
Sobel test : Z=6.40, p<.001								

DISCUSSION

The purpose of this study was to analyze the mediating effects of wisdom in the relation between LH and HC of middle-aged men, and to find an integrated nursing approach to preserve the healthy life of them.

First, in the association between life style habits, wisdom and health, HC had a positive correlation with life style habits and with wisdom, indicating that those with better life style habits and greater wisdom were more likely to preserve health well. Life style habits include diet,

weight management, smoking, caffeine and alcohol intake, safety awareness, sleep, stress management, character management, anxiety, depression management, satisfaction and relationships with family or friends.⁹ When these aspects of life style habits are well managed, health and quality of life can be improved. Middle-aged adults who exercise also had a higher quality of life.¹³ This is similar to the study that showed that the elderly who are wise can achieve successful aging⁷ and that wisdom is an important preceding factor for successful aging¹⁴. In addition, successful aging has the same meaning as lack of disease or disorder, maintenance of physical and cognitive function, and proactive participation in life¹⁵ and is a similar concept to HC. According to the principles of preservation by Levine, human beings must achieve an integration of structural, personal, social energies and can preserve health while maintaining uniformity and integration.¹⁶ As such, it is recommended that an iteration of this study be conducted by adopting the concept of life style habits and wisdom for HC of middle-aged men.

Wisdom includes the positive elements of self-preservation, completion, judgment, interpersonal skills and understanding of life, and allows for an integrated and comprehensive approach to life's challenges and issues. Such elements require life experience as an important element and take time to develop⁶, which means it is likely to increase as one ages. The scales for wisdom developed to best fit Korean culture consist of items on empathy, self-reflection and overcoming life's challenges. While these tools were developed for the elderly, but it was confirmed that the items are key concepts associated with health in middle-aged men, too.¹⁷ In Eastern philosophy, meditation and observation of wise people or teachers are ways to improve one's own wisdom.¹⁸ As such, it is appropriate to use wisdom as a variable to measure whether middle-aged men maintain their life with wisdom and manage their mental and social health. Wisdom had a mediating effect in the association between the health status and HC of the elderly¹⁹ as well as in the association between health improvement behaviors and HC of middle-aged adults.²⁰ As wisdom has an important mediating effect on the association between health status, health improvement behaviors, daily life style habits and HC in men and women in their middle ages and in their advanced years, a program related to a wise life that takes into account aspects of Korean culture must be developed to

encourage them to lead a wise life.

CONCLUSION

In this study, HC of middle-aged men had a positive correlation with life style habits and with wisdom. In addition, wisdom was found to have a complete mediating effect in the association between life style habits and HC in middle-aged men. Therefore, in order to encourage middle-aged men to take more interest in health and develop a healthy habit in daily life, local communities and healthcare experts such as nurses must develop and apply a program for healthy life style habits. This researcher hopes that continued studies on middle-aged men will be conducted using wisdom and HC as concepts.

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Source of Funding: Self

Ethical Clearance: The data of this study was analyzed after review and approval of IRB in K University. (IRB No: KNU_IRB_2018-64)

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Association of Helicobacter Pylori and Irritable Bowel Syndrome

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ABSTRACT

Background: As a bacteria specialized in inhabiting the gastric mucosa, *H. pylori* is notorious as the chief cause of variable intestinal and extra-intestinal conditions. Yet, the link between *H. pylori* infection with IBS is still debatable. This has provoked us to execute a case-control study searching into the association between *H. pylori* status and IBS.

Objective: This study is designed to explore the association of *H. pylori* and the development of IBS, along with revealing if there is any association between this infection and the development IBS.

Methods: A descriptive case-control study of 135 individuals was conducted. We select (60) patients from inpatient and outpatient clinic (38 females, 22 males) and were diagnosed as IBS with respect to Rome 4 criteria. Another 75 (42 females, 33 males) seem to be healthy individuals without significant past medical history were assigned as control group. The two groups were subjected to stool antigen for *H. pylori* and the results were compared between the two clusters.

Results: There was no statistically significant association between HP infection and IBS ($p= 0.7$). The analysis explored higher prevalence of IBS in younger age group ($p= 0.6$) with overall female preponderance ($p=0.02$) and more common in married than single patients ($p=0.4$, $p=0.8$; respectively). The most common presentation was diarrhea predominance subtype ($p= 0.56$).

Conclusion: There is no significant association between *H. pylori* infection and occurrence of IBS in the general population.

Keyword: *H.Pylori*, IBS, Gastric Mucosa.

INTRODUCTION

IBS is considered to be the most dominant health issues experienced in the family practice, with a global prevalence of (1% - 20%). It classically emerges in early adulthood, even though it could develop in adolescents and in individuals around the age of 45 years; those older than 50 years with symptoms of IBS must have a complete assessment regarding any underlying conditions⁽¹⁾. The

disease has significant impact on patients' quality of life^(2,3) and socioeconomic status⁽⁴⁾. Prior studies proposed that abnormal brain-gut interactions, change of intestinal flora, chronic mucosal inflammation, and psychological disorders can be implicated in the pathophysiology of IBS⁽⁵⁻⁸⁾. As a bacteria specialized colonizing on the gastric mucosa, *H. pylori* is well-known as the chief cause of chronic gastritis, peptic ulceration, gastric carcinoma, and gastric MALT lymphoma⁽⁹⁻¹¹⁾. Moreover, *H. pylori* may have a part in extra-gastric syndromes, perhaps by prompting systemic inflammatory responses^(12,13). However, the link between *H. pylori* infection with lower GI disorders chiefly IBS remains unsettled⁽¹⁴⁻¹⁶⁾.

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MATERIALS AND METHOD

A descriptive case-control study was carried out in Al-Diwaniyah Teaching Hospital and outpatient clinic in Al-Diwaniyah city from January to June 2018. TO achieve this goal, we select (60) patients from inpatient and outpatient clinic (38 females, 22 males) and were diagnosed as IBS with respect to Rome 4 criteria and by complete history and physical examination and investigated with various set of tests. Another 75 (42 females, 33 males) seem to be healthy individuals without significant past medical history were assigned as control group.

Inclusion Criteria

All patients were selected according to Rome 4 criteria (published in 2016) which are the latest criteria for the diagnosis of IBS. These include: Recurring abdominal pain at least 1 day/week in the last 3 months, accompanied by two or more of the following criteria:

- Related to defecation
- Associated with a change in frequency of stool
- Associated with a change in form of stool.

Criteria achieved for the last 3 months with symptom onset at least 6 months before diagnosis (17).

Exclusion Criteria:

These involve any alarming symptoms, which make the diagnosis of IBS unlikely:

- Rectal bleeding
- Anemia
- Nocturnal symptoms
- Weight loss
- Recent antibiotic use
- Onset after 50 years of age
- Abnormal abdominal examination (organomegally, lump)
- Family history of colorectal cancer or ovarian cancer.
- Family history of inflammatory bowel disease, or celiac disease.

METHODOLOGY

For the purpose of the study, initially we select (67) individuals from inpatient and outpatient clinic who had suggestive symptoms. Both groups underwent full

history and physical examination and were investigated regarding the risk of organic diseases in form of complete blood count, ESR, blood glucose level, liver function test, general stool examination, celiac serology, thyroid function test, abdominal ultrasonography. Additional 3 patients were also omitted as they appeared to have some red flag symptoms like rectal bleeding, antibiotic related diarrhea, and abdominal mass by abdominal ultrasonography. Further 2 patients who had Typical Rome 4 criteria refuse to participate in the study. Consequently we assemble 60 patients with characteristic Rome 4 criteria for IBS and willing to continue in the study, 38 were females and 22 were males. In the light of the purpose of our study, both groups were investigated with *H. pylori* stool antigen test.

Statistical analysis: Information was collected and included in a data-based system and analyzed by statistical package of social sciences (SPSS, Inc., Chicago, IL, USA) version 20. Parametric data were expressed as mean \pm standard deviation (SD) such as age. It was evaluated statistically by means of student t-test while non-parametric data were expressed as proportions like male and female were analyzed using chi square.

RESULT

A case-control study enrolled 135 person; 60 patients with IBS as a case group and 75 healthy individuals as a control group (Figure 1). The mean age of cases is 33.5 ± 2.5 and the mean age of control group is 34.8 ± 3.1 , sixty five percent of patients in age group of 20-39 years and sixty percent of control is in same age group, while age group 40-59 is 26% in case group and 28% in control as in shown (Table 1):

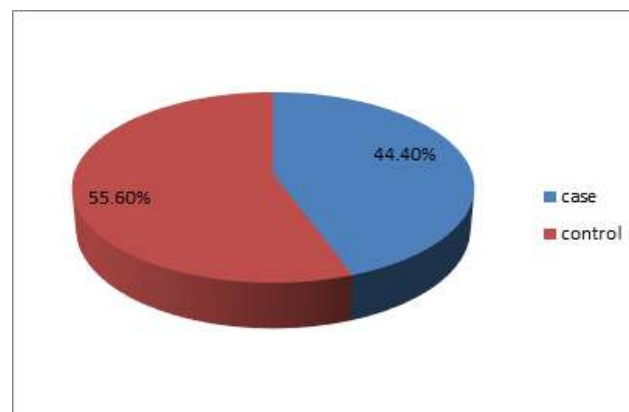


Figure 1: Case-control distribution.

Table 2 shows gender distribution, 63% of cases were female and 37% male, while in control 44% were

female and 56% were male.

Table 1: Age distribution in both groups.

Age group	case	Control	p-value
< 20 year	4(6.6%)	6(8%)	0.91
20-39 year	39(65%)	45(60%)	0.6
40-59 year	16(26%)	21(28%)	0.3
≥ 60year	1(1.4%)	3(4%)	0.5
Total	60	75	

Table 2: Gender distribution in both groups.

Gender	case	Control	p-value
female	38(63%)	33(44%)	0.02
Male	22(37%)	42(56%)	
Total	60	75	

Out 60 cases, there were 35% positive H pylori and 65% negative, and in control there were 30.6% positive H. pylori, and 69.3% were negative for H. pylori, as in (Table 3).

Table 3: The prevalence of H. pylori in case group and control group.

H pylori	case	Control	p-value
Positive	21 (35%) Female(15)	23 (30.6%) Female (11)	0.7
Negative	39 (65%) Female (23)	52 (69.3%) Female (22)	
Total	60 Female (38)	75 Female (33)	

In case group, there were 36.65% had IBS-D, 25% had IBS-C, 21.6% had IBS-A, 16.8% had IBS-U. Regarding H. pylori positive patients, there were 38% of them had IBS-D, 23.8% had IBS-C, 19.1% were positive for both IBS-A and IBS-U as (Table 4) shows.

Table 4: Show predominant symptoms in cases.

Type of IBS	H.pylori positive	H.pylori negative	Total	p-value
Diarrhea predominant	8 (38%)	14(35.8%)	22(36.6%)	0.56
Constipation predominant	5 (23.8%)	10(25.6%)	15(25%)	0.4
Alternating predominant	4 (19.1%)	9(23%)	13(21.6%)	0.1
Unclassified predominant	4 (19.1%)	6(15.6%)	10(16.8%)	0.21
Total	21	39	60	

With reference to prevalence gender, age, and residency in IBS patients, as (Table 5) shows, there were 39.5% of female had IBS-D, 29% had IBS-C, 18.5% had IBS-A, and 13% had IBS-U. As for age-group of 20-39 years, there were 33.3% had IBS-D, 30.7% had IBS-C, 20.5% had IBS-A, and 15.5% had IBS-U. Whereas the residency, there were 34% of urban had IBS-D and 31.7% of them had IBS-C, 19.5% had IBS-A, and 14.8% had IBS-U.

Table 5: Predominant clinical varieties of IBS for female gender, age-group and urban residency.

Type of IBS	Gender (female)	Age (20-39)	Residency (urban)
Diarrhea predominant	(39.5%) 15	13(33.3%)	14(34%)
Constipation predominant	11 (29%)	12(30.7%)	13(31.7%)
Alternating predominant	7 (18.5%)	8(20.5%)	8(19.5%)
Unclassified predominant	5 (13%)	6(15.5%)	6(14.8%)
Total	38	39	41
p-value	0.9	0.8	0.3

DISCUSSION

In reference to (Table 1) that exhibits 135 individuals divided in 4 age groups comprising of (60 patients with IBS, with median age of 33.5 +/- 2.5) demonstrates that IBS is more prevalent in age group of 20-39 (with a percentage of 65%) than other age groups in the case cluster. This result corresponds to a study in Lebanon 2017 which described 67% of cases of the same age group⁽¹⁹⁾. Other study labeled 40% in same age group in China⁽²⁰⁾.

These studies can be explained along with what our results have shown that the reasonably high occurrence of IBS in young people may be owing to psychological and emotional influences, such as stress related to studies and exams, finding jobs, monetary status, or marriage.

Our result reveal IBS more occurred in female patients 63% than males 37% as in (Table 2), these numbers are comparable to those of a study by ford⁽²¹⁾ in USA which stated that 62% were female and 38% were male of study sample, also correspond to other studies worldwide^(22, 23). An alternative research by Farzaneh 2013⁽²³⁾ of the IBS patients, 62.1% were females, 37.9% were males. On the contrary, various studies accomplished in Asia did not expose gender variance prevalence, other resources has identified a predominance of females^(24,25). The basis for this debatable gender dissimilarity is indefinite. Pan et al⁽²⁶⁾ ascribed this gender variance to female hormones on account of the falling occurrence of IBS in women post-menopause. Chang & Heitkemper⁽²⁷⁾ designated that

gender-related differences in GIT transit time, visceral hyper-excitability, neurological pain processing, neuro-endocrine, autonomic nervous system, and anxiety responses can clarify the majority of IBS in women.

As by (Table 3), our result demonstrated 35% of cases were positive *H. pylori* and in control group there were 30.6% had positive *H. pylori*, these finding are not statistically significant (p value 0.7). a study by Antonio Barrios showed that among 38 patients enrolled, 50% were *H. pylori*-positive and 50% were negative⁽²⁸⁾ and detected that the total infection rate of *H. pylori* in IBS sufferers in the study has no significant association from that of the of control.

In relation to type of IBS, as per (Table 4) it has revealed 36.6% (IBS-D), 25% (IBS-C), 21.6% IBS-A, 16.8 (IBS-U).

In positive *H. pylori* cases, there were 38% (IBS-D), 23.8% (IBS-C), and IBS-A and IBS-U is 19.1% for each subdivision. These result consistent with result by Dorn SD⁽²⁹⁾ which reported 30% (IBS-D), 25% (IBS-C), 14.3% alternating from positive *H. pylori* cases.

When debate with further studies we established that in study by Farzaneh⁽²³⁾, IBS-C around 52% with interchanging symptoms of mixed subtype (IBS-M) and diarrhea (IBS-D) was the maximum prevalent type of IBS. Of all IBS cases which had a referral to gastroenterology clinic in Iran, Roshandel, *et al*, stated that IBS-A is the utmost prevalent (60%) and IBS-C and IBS-D to be 29.1% and 10.9%, respectively⁽³⁰⁾.

The higher prevalence of IBS-D in our research may be clarified by the fact that the majority of patients were referred from primary health centers to our gastrointestinal outpatient clinic. General practitioner may be more assured in managing of IBS-C, since IBS-D may request more complex investigation and procedures. Lin et al⁽³¹⁾ established an alternate diagnosis for 21% of patients referred from primary health care as IBS-D, whereas no different diagnosis was made for IBS-C⁽³²⁾.

As a final point, in our result we can realize that (IBS-D) with regards to female gender comprises of 39.5% cases, 33.3% of age-group 20-39 years, and 34% of urban residency (Table 5). These statistics parallel to outcome by ford 2014, which labeled those with IBS-D, were younger, more probable to be female^(21,33). On the other hand, a study by Feng Xiong⁽⁴³⁾ 2016,

established that patients between 41-50 years of age had the maximum occurrence of IBS-D with female predominance.

Conflicts of Interest: There is no conflict of interest.

Source of Funding- Self

Ethical Clearance: The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/ have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity.

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Groundwater Contamination of Some Soils Near the Kefal River

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ABSTRACT

Groundwater is the water that is located below the surface of the earth and forms all or some of the spaces in the rock formations which are originally rainwater or river water or water resulting from the melting of the ice as it seeps into the ground and form a layer of groundwater and be on two types of water close of the surface of the earth as in the study area and groundwater beyond the surface of the ground and the groundwater despite some of their layers from the ground level of the most important sources of freshwater liquid has received great attention from specialists in the field of environmental protection. The pollution of water damage and corruption of water quality on this leads to pollution and malfunction in its system, which reduces its ability to perform its natural role and makes it lose much of its economic value and cause many health and environmental damage when used. Water is contaminated by many human, plant, mineral, industrial or chemical waste, the study is an agricultural area with fertile soil suitable for agriculture and animal husbandry.

Keywords: *Environmental Protection, Groundwater, Kefal River, Elements*

INTRODUCTION

The groundwater accumulates under the outer crust of the earth. These water resources are considered the main sources of water resources ⁽¹⁾. Random use guide him. The wealth of groundwater in Iraq and in the study area where the water is close to the surface of the earth and the inhabitants of these areas are used for domestic purposes and watering the plantations during the water scarcity through the wells of artesian. Ground wells have long been the main sources of water away from pollution as a result of what they do the soil is a candidate for water, but this belief is changing now. In many cases, the wells are close to the surface of the earth, which increases the chance of biological or chemical pollution ⁽²⁾. This is what we observe in the study area because it is located between the Indian Shatt and the Kefl River and is exposed to flooding during the period of water increase. The groundwater is very close to the surface of the earth not exceeding a few centimeters. Wells with a depth of 40-50 feet are less likely to be contaminated because water passes through semi-porous porous layers that filter and purify water from most Impurities. Groundwater is also polluted by waste and waste from

factories, oil pipelines, mines, and radioactive materials, as well as pollutants from agriculture due to the use of industrial fertilizers, pesticides, and wild animals ⁽³⁾. This is what we saw in the study area during the field study because it is famous for breeding sheep, cows, buffalo, and goats. Groundwater is difficult to get rid of this pollution, or to conduct any treatment of existing water-bearing classes where groundwater pollution leads to the reduction of water use in various purposes in addition to damage to human life. That animals and plants by causing various diseases. ⁽⁴⁾

The causes of groundwater pollution in the area near the Kefl River and what is the quality of the water and its suitability for different uses in the study area. The various human activities represented by agricultural activity and civil activity are directly related to pollution of groundwater in the study area.

The need for this study emerged as a result of the water scarcity experienced in the study area and the lack of surface water represented by the Indian steppe and the Kefl River due to the low water level of Shatt Hindi which causes the lack of water to flow into streams and rivers. The chemical and physical elements of groundwater in

the study area. ⁽⁵⁾

The importance of research is that the groundwater is one of the most important sources of liquid fresh water, which highlights its importance and the great role it plays from the human need of water in the study area which is located near the Kefl river and so close to the surface of the earth so it can be used in watering crops Animals and other human uses especially during drought time the area was totally dependent on the water so it was used to drink by some people.

Geology of the study area

The area of the study is located in the district of Hilla in the province of Babylon within the scope of the sedimentary plain in the unstable pavement in relation to the division of Iraq, where this range is called the scope of Mesopotamia between the mountains of Zakros in the north-east and the Arab plateau in the south-west and covers the research area in general sediments Of the four-year-old Pleistocene. The deposits of this sediment are characterized by the easy flux of both the Euphrates River and its branches. These sediments are generally composed of thin layers of fine sand, silt, and mud, whereas wind sediments are found in the eastern parts of the plains (E). ⁽⁶⁾

Geomorphology Study Area

The study area is located in Babil Governorate within the Sedimentary Plain, which is characterized by its flat surface, its incline and low general slope. The slope is about 22 cm per kilometer. Some dunes are found in some areas such as south of Hilla. Winds are shapes according to their direction. Agriculture has increased the soil level by (mm) per year, Groundwater in general is close to the surface and its salinity ranges from (10000) to (50000) ppm for the entire governorate. The center of Hilla city is about (1000-3000) ppm.

Components of groundwater from salts

The concentration of dissolved salts in groundwater is a measure to determine their suitability for the general use of groundwater, such as domestic use, drinking, agriculture, industry, and power generation. Table (1) shows. The qualitative division of groundwater according to dissolved total salts.

Table 1. Shows the qualitative division of groundwater according to dissolved total salts.

Water quality	Total dissolved salts mg/ L
fresh water	0 - 1000
Salted Water	1000 - 10000
Saline Water	10000- 100000
High salinity water	More than 100,000

Groundwater sources: - Groundwater sources are divided into three sources

Air or water falling: - The main source of groundwater, including rainfall and water flowing on the surface of the earth and water resulting from the melting of snow, to access these waters to the ground during the layers of rock as in the study area.

Water geological or fungal: - The water arising or composed of rocks between fresh water or the sea and the cohesion of the edges of the rocks, they store water droplets between the spaces forming one of the sources of groundwater.

Collective water or water crystallization of magma: - The water associated with the events of the volcanic and volcanic events that occur during the formation of igneous rocks and known as the rising water or underground water, which contains a high percentage of dissolved minerals and high temperatures.

water crystallization of magma: - include the water associated with the volcanic events that occur during the formation of igneous rocks and include the remaining solutions of water crystallization of magma known as the name of water rising and characterized by a high proportion of soluble salts and have a high temperature and often mixed with water to decrease its temperature And the salt concentration is less.

Waste

Like the area near to the river Kefl and Shatt Hindi high population density generated by different types of waste as this area does not reach municipal cars for cleaning, so they throw their industrial waste or from household and other uses, whatever their forms, whether solid or semi-solid or liquid It is dumped in exposed areas and buried in a thin layer of soil and since the

groundwater is close to the surface of the earth when this area to sink water from the irrigation of crops or irrigation, wrong or excessive or the fall of rain or exposure to the waters of the falcon deposition some of the components of these wastes After being dissolved or dissolved into the aquifer. ⁽⁷⁾

Table.2 shows the results of the chemical tests of selected samples for the area near the Kefl River for the year 2017-2018

NO.	Type of examination	Environmental determinants	Bashni Location (2)	Ibn Tufail Location (3)	Awfi Location (4)	Alshimary Location (5)	Al-Fanhara location (6)
1	Electrical connection EC	–	2.6	2.8	2.9	2.3	2.7
2	PH	–	8.3	8.2	8.1	8.4	8.7
3	Mercury	0,002	NIL	0.0025	0.029	0.031	NIL
4	Nickel Ni	0.02	0.126	NIL	0.110	NIL	Nil
5	Lead PB	0.1	Nil	0.068	0.052	Nil	Nil
6	Copper Cu	1	Nil	0.90	Nil	Nil	0.290
7	Zinc Zn	0.5	Nil	0.171	0.69	Nil	Nil
8	Cadmium Cd	0.003	0.002	Nil	0.001	Nil	Nil
9	Sodium Na	–	10.8	10.9	10.7	10.2	10.2
10	Sulfates SO4	–	7.00	7.77	7.15	6.55	7.4

Results of chemical analysis conducted in the Directorate of the Environment of Babil province on 15/11/2017

1. Electrical connection EC

Table 2 shows that the groundwater salinity of the study area and the sites affected by agricultural and animal wastes, as these areas are known for the cultivation of fruits and vegetables, as well as date palms, especially sites (2.3.5). Groundwater in these sites is highly saline according to the International Classification of Irrigation Water. Due to faulty irrigation.

2. Alkaline and acidic PH

Water is acidic if the value of ph. 1-6 and if the base is ph. Between (14-18) or if the value of ph. (7) the water is ideal or neutral. It appears from Table (2) that ph. The groundwater in the study area is of a basic nature and for all the studied sites due to the low presence of carbon dioxide in this water, as its solubility in the water leads to the transformation of water from the acidic to the basal. ⁽⁸⁾

3. Mercury: - hg

The element of mercury is toxic and dangerous, and if it is present in drinking water at a higher rate than its normal presence, it will be very dangerous for its users for agricultural purposes or drinking (Table 2 shows that the water of the study area is not polluted by the element of mercury, (0.031) due to the exposure of this site to insecticides and fungus being agricultural area in addition to that mercury affects the nervous system and reproductive system causes tremor and imbalance and kidney failure and menstrual irregularity in women and abortion and cerebral palsy.

4. Nickel: - NI

Nickel is found in acidic and oxidizing environments. The recipe for this environment is reflected in its presence in the Earth's crust in the form of oxides, carbonates and silicate with iron. Nickel concentration in the earth's crust is equal to (01.0%). It is concentrated in basal rocks and is cobalt- Nickel is also found in Iraqi fertilizers (Table 2) shows that the study area and all sites are not contaminated with nickel.

5. Lead: - Pb

Lead is found in many rocks where it is found in the minerals of igneous rocks above the base such as olefin and is slightly in groundwater due to the lack of melting of lead compounds in groundwater. Lead is considered to be a toxic element of regeneration and its concentration causes cancer, brain damage, Lead types of the most dangerous types of lead produced in oil and its derivatives. The element of lead is a toxic element and its effect in water is easier than hard water. Table (2) shows that the minimum lead (nil) and the upper limit (0.068) showed that the water in the study area is not contaminated with the lead element and all the studied sites. ⁽⁹⁾

6. Copper: - Cu

Copper is a natural element in nature where it is found in the form of sulfide or oxides. Its concentration is increased by increasing the temperature and increasing the acidity of water (ph) and 1.0ppm is present in groundwater. p.m)) Water is toxic and causes degenerative diseases, diarrhea and fatal heart disease of humans. The concentration of copper in the study area according to the table (2) has a minimum of (nil) and a maximum of 0.390 at site (5). The study area is not contaminated with copper.

7. Zinc: - ZN

The concentration of zinc is low in groundwater due to its weak solubility in moderately acidic water and its concentration increases with water acidity and is ionized when ph. (9.7). Table (2) shows that the lowest percentage in the study area (nil) and the highest 0.171) at the site (2). This means that the study area is not contaminated with zinc. ⁽¹⁰⁾

8. Cadmium: - CD

The most important sources of cadmium are phosphate fertilizers, heavy dirty household water, and industrial waste. Cadmium is a toxic and polluting element of the environment and has little importance in life processes. Cadmium causes kidney failure, acute pulmonary embolism, chronic pneumonia, and pneumonia. Table (2) shows that the minimum cadmium in the study area (nil) and the upper limit (0.002) at Site 1 shows that the study area is not contaminated with cadmium and is found to be within the permissible limit

according to the 1996 Iraqi specifications of (0.003) The limit of rare elements in groundwater.

9. Sodium: - Na

Sodium belongs to alkaline minerals and is the only element found in large quantities in groundwater. Sodium salts are high in groundwater where concentrations in groundwater are from (10-100 mg / L). Table (2) shows that the study area is not Contaminated and for all sites.

10. Sulfate: - SO4

The sulfates in groundwater are composed of water gypsum and anhydrous gypsum (CASO4). The igneous and transformative rocks contain less than 100 mg / L of sulfates. In addition, they contain magnesium sulfate called salt or sodium sulfate, Bitter taste in the presence of sufficient quantities. As for people who are not used to drinking water containing a high proportion of sulfates cause them diarrhea.

CONCLUSION

Groundwater in the area between the Kaffl and Shatt al-Hindi is an important source on which water is scarce because it is an area with fertile agricultural soil known for growing fruits and vegetables of all kinds, as well as palm trees. This study deals with the study and analysis of the impact of agricultural and human waste on the groundwater pollution of the study area and its validity for various uses of life. This study was based on the collection and analysis of five models of selected groundwater areas of the area near the Kefal River. Each model has 10 chemical and physical elements for 2017-2018 and is found to be uncontaminated with groundwater in the study area.

Ethical Clearance: People identified as potential research participants because of their status as relatives or carers of patient's research participants by virtue of their professional role in the university and departments.

Source of Funding: Self-Funding

Conflict of Interest: The authors declare there is no conflict interests

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Relationship of Patient Characteristics with Patient Satisfaction

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ABSTRACT

Patient satisfaction becomes one of the indicators used as the initial imaging in providing good service to patients. The data of patient satisfaction assessment of PLK Unair in the last three year, overall approaching the achievement of the target set. However, there is a decreased performance from 2015 to 2016. The health care provider needs to understand the patient's characteristics for decision-making regarding the services provided so that the patient can be satisfied. The objective of the study was to analyze the relationship between respondent characteristics (sex, age, education, and occupation) with patient satisfaction. The study was conducted at the Airlangga University Healthcare Center (PLK) in November 2017. The population of this study were all patients who visited PLK Unair. Sampling technique using accidental sampling for 100 respondents. The statistical test used by Chi-Square test. The results showed that the characteristics of the respondents are mostly women as many as 65%, young as many as 80%, high education as many as 96%, and unemployed as many as 72%. Of the 100 patients, less satisfied were 64%. The statistical test results between sex, age, education and occupation with patient satisfaction respectively were 0.055, 0,000, 0.260, and 0.006. The conclusion is no relationship between sex and education with patient satisfaction. There is a relationship between age and work status with patient satisfaction. The suggestion is to be expected by doing a periodic satisfaction assessment can be a benchmark of service success.

Keywords: *patient characteristics, patient satisfaction*

INTRODUCTION

Nowadays, the company is experiencing a great competition, it can also be felt in healthcare. Healthcare providers are required to prioritize patient satisfaction so that patients will be satisfied with the service. To obtain such satisfaction, the service provider must be in contact with the recipient of the service in informing, engaging and motivating the patient in achieving recovery.

The measure of the success of service delivery is determined by the level of satisfaction of the service recipient. Service receiver satisfaction is achieved when the recipient receives the service as required and expected. Service recipients also expect a quality service, because with a quality service then the recipient will feel satisfied.

Patient satisfaction is important for healthcare providers¹ and will affect the marketing of the Healthcare Center of Campus C, Universitas Airlangga. The

emergence of various forms of competition in providing services in the community both provided by government agencies and private, and many other agencies serving service in the community is a heavy burden for Healthcare Center Campus C Univeritas Airlangga to further improve the quality of services provided at the clinic.

Based on the data assessment of patient satisfaction PLK Unair in the last three year, overall approaching the achievement of the target set. However, there is a decrease in the achievement of satisfaction assessment from 2015 to 2016. Achievements in 2014 amounted to 99.08%, 2015 by 101.85%, and in 2016 97.90%².

Patient services are activities that undertaken to meet the needs, wants and expectations of patients. If the service received is in line with patient expectations it means the service has satisfied the patient. To understand how to satisfy the patient is to identify the needs and wants of the patient³. The needs, wants, and expectations

of the patient can be identified by looking at the characteristics of each patient. Healthcare providers need to understand the characteristics of patients for decision-making related to hospital services so that services are provided in accordance with the needs and wants of the community in general and patients in particular³.

The characteristics of the patient are the particular characteristics or special identity attached to the user of the health service or the hospital patient, can be used to equalize or distinguish the patient with another patient and assumed to generate the same or different reactions among patients. The reaction of a person who produces the same or different judgments is largely determined by the background or individual characteristics, such as age, sex, education, occupation, and income. The magnitude of the influence of patient characteristics on the aspect of the quality of health services in the hospital can lead to feelings of satisfaction or dissatisfaction⁴.

According to the study of Abdillah AD and Muhammad Ramdan (2016) mentioned that there is a relationship between patient characteristics (sex, age, education, occupation) with outpatient satisfaction in Puskesmas Sindangkerta West Bandung regency⁵. Based on the description above, the researcher wanted to know how the relationship between patient characteristics (sex, age, education, and occupation) with patient satisfaction at PLK Airlangga University Surabaya in November 2017.

MATERIAL AND METHOD

This research is an analytic observational research with cross sectional study design. Data collection was conducted in November 2017. The population in this study was all patients who visited PLK Unair. Sampling was done by non-probability sampling with accidental sampling. Samples were taken accidentally, if there have been found visitors who want to get the health services, then they will become samples. The sample in this study were 100 respondents. Respondents were interviewed with questionnaires.

The questionnaire contains questions about the characteristics of respondents consisting of age, sex, education, work status and income, and questions about patient satisfaction consisting of 21 items of questions that have been tested for their validity and reliability. In this research, patient satisfaction variable is categorized into 2, that is satisfied and not satisfied. Patient is satisfied if got score from patient satisfaction questionnaire >mean. The statistical test used by Chi-Square test.

RESULTS AND DISCUSSION

A) Results

Based on the results of interviews with the help of questionnaires instruments to 100 respondents, the result can be seen as follows:

Table 1. Relationship between Patient Characteristics and Patient Satisfaction of PLK Unair in November 2017

Patient Characteristics	Patient Satisfaction				Total		P-value
	Less Satisfied		Satisfied		n	%	
	n	%	n	%			
Gender							
Male	18	51,4	17	48,6	35	35,0	0,055
Female	46	70,8	19	29,2	65	65,0	
Age							
Young	58	72,5	22	27,5	80	80,0	0,000
Old	6	30	14	70,0	20	20,0	
Education							
Low	1	25	3	75,0	4	4,0	0,260
High	63	65,6	33	34,4	96	96,0	
Occupation							
Unemployed	52	72,2	20	27,8	72	72,0	0,006
Employed	12	42,9	16	57,1	28	28,0	

B. Discussion

Relationship of gender with patient satisfaction

Based on the table above, it is known that most patients with female as many as 65%. Patients with female but less satisfied as many as 70.8%. Based on statistical test by using chi square test, it was found that $p\text{-value} = 0,055 (> 0,05)$. This means that there is no relationship between gender and patient satisfaction at PLK Unair in November 2017.

According to Rahman (2006) and Mohammed (2011) states that men have a higher level of satisfaction than women⁶. This research is in line with research of Christasani PD & Satibi (2016) which states that there is no relation between sex to satisfaction shown by $p = 0,683 (p > 0,05)$ ⁷. Hidayati AD's research, Chriswardani Suryawati & Ayun Sariatmi (2014) also stated that there is no relationship between gender to satisfaction^{7,8}.

Relationship of age with patient satisfaction

Based on the table above, it is known that most patients are young patients as many as 72%. Patients who are young but dissatisfied as many as 72.5%. The young patients in this study were patients <35 years of age. Based on statistical test by using chi square test, it was found that $p\text{-value} = 0,000 (<0,05)$. This means that there is a relationship between age and patient satisfaction at PLK Unair in November 2017.

WHO study in nine developing countries has concluded that the largest population using health care facilities is the five-year-old age group and the 30-35 year age group. Previous research conducted by Abdillah AD & Muhamad Ramdan (2016) mentioned that age group more than 30 years 63,2% expressed satisfaction, whereas in age group less than 30 years only 21,8% who expressed satisfaction⁵.

From this it can be seen that the age group of less than 30 years tends to be dissatisfied compared to the age group more than 30 years. This is in accordance with the opinion of Lumenta (1989) that this productive age group tends to be more demanding and expect much towards the ability of basic health services and tend to criticize. According to Rahman (2006) states that satisfaction based on productive age has greater demands and expectations than old age⁶. This study is in line with the results of research conducted by Farianita R

(2016), which states that there is a relationship between age and patient satisfaction⁹.

Relationship of education with patient satisfaction

Based on the table, it is known that most patients with higher education as much as 95%. Highly educated but unsatisfied patients were 65.6%. Based on statistical test by using chi square test, it was found that $p\text{-value} = 0,260 (> 0,05)$. This means that there is no relationship between education and patient satisfaction at PLK Unair in November 2017.

According to Mar'at, the feeling of satisfaction on each individual is not the same, but the expression of satisfaction on a group of individuals can occur almost the same because of the influence of the environment and society of certain groups. Just as Azrul Azwar (1994), points out that as well as the quality of service the dimensions of patient satisfaction vary greatly. So patient satisfaction is not only influenced by one's education but on other aspect¹⁰.

Lumenta (1989) states that a person with a higher level of education tends to demand or criticize a lot of services he receives if he is not satisfied. Someone with a low level of education, he tends to receive more because he does not know what he needs, as long as heal it is enough for him.

Carr and Hill (1992) argue that highly educated societies tend to be dissatisfied because their knowledge demands better service¹¹. This study is in line with research conducted by Hidayati AN, Chriswardani Suryawati & Ayun Sariatmi (2014) who found that there is no relationship between education and patient satisfaction level^{7,8}.

Relationship of work status with patient satisfaction

Based on the table above, it is known that most patients are unemployed as many as 72%. Patients who are unemployed in this study were patients with status as students, students, housewives, retired and jobless. Patients who are unemployed but less satisfied as many as 72.2%. Based on statistical test by using chi square test, it was found that $p\text{-value} = 0,006 (<0,05)$. This means that there is a relationship between work and patient satisfaction at PLK Unair in November 2017.

This is not in accordance with the Rahman (2006)

opinion which states that people who work (employed) tend to have higher expectations than people who do not work (unemployed)⁶. This research is also not in line with the opinion of Lumenta (1989) which states that a person working is more likely to demand or criticize the service he received if it is not satisfied for him compared with the unemployed. However, this study is in line with research conducted by Abdillah AD & Muhamad Ramdan (2016) who stated that there is a relationship between occupation and patient satisfaction⁵.

CONCLUSIONS

The conclusions of this study are:

1. Characteristics of respondents in this study mostly are women as many as 65%, young as many as 80%, high education as many as 96%, and unemployed as many as 72%. Of the 100 patients, patients were dissatisfied as many as 64%, while 36% satisfied.
2. There is no relationship between gender and patient satisfaction in PLK Unair in November 2017 (p-value = 0,055).
3. There is a relationship between age and patient satisfaction at PLK Unair in November 2017 (p-value = 0,000).
4. There is no relationship between education and patient satisfaction at PLK Unair in November 2017 (p-value = 0.260).
5. There is a relationship between occupation and patient satisfaction at PLK Unair in November 2017 (p-value = 0.006).

The suggestions that can be given are:

1. The management of PLK Unair is expected to conduct periodic satisfaction appraisal in order to be a measure of service success.
2. Provide a means to facilitate customers in submitting a complaint through a suggestion box or SMS complaints.
3. Facilitate access to information services to customers by using social media is growing.

Ethical Approval: Related departments should be assured about the confidentiality of the results of questionnaires.

Conflict of Interest: The authors report no conflict of interest.

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Evaluation on Preparation of Fire Hazards in Pt. X Muncar Banyuwangi (Study on Fish Canning Company in Muncar Banyuwangi)

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ABSTRACT

Fire is a disaster event that comes from an unwanted fire and can cause harm. Decree of the Minister of Manpower of the Republic of Indonesia Number. 186 / MEN / 1999 on Fire Prevention in the workplace, so that fire hazards can be prevented and avoided as early as possible. This study aims to evaluate the preparedness of fire prevention in PT. X Muncar Banyuwangi through observational with cross sectional approach. Population in this research is all employees of production at PT. X Muncar Banyuwangi as many as 90 people. Data collection is done by using questionnaire, observation and examination. Data processing is done by descriptive analysis and correlation by using spearman test. The result of research of correlation between age with employee knowledge have weak relation ($\rho_s = -0,340$), relationship between training with employee knowledge have medium relation ($\rho_s = 0,350$), relation between working period of respondent with level of knowledge in preparedness fire prevention at PT. X in the weak category ($\rho_s = -0.089$), and the relationship between socialization and application of fire prevention procedures and readiness to the knowledge of employees at PT. X in the weak category ($\rho_s = -0.127$), while the observation result of infrastructure inspection obtained APAR (73.3%), hydrant, fire alarm, detector, sprinkler (0%) because the tool is not installed in PT. X, place of assembly (100%), exit signs (50%), emergency stairs and emergency exit (0%). Implementation of fire prevention preparedness at PT. X can work well if all elements of the fire hazard management system are implemented thoroughly.

Keywords: *evaluation, fire, fire prevention preparedness, knowledge*

INTRODUCTION

The fire emergency response system is part of the fire management management process in the readiness of building management in anticipating a fire emergency within a building. One workplace that has a fire risk is a fish canning factory. Fire risk occurring in fish canning plant has a high rank, then evaluation is needed in an effort to improve the implementation of fire prevention preparedness at PT. X Muncar Village Banyuwangi. Building of PT. X Muncar Banyuwangi equipped with facilities and infrastructure include management office, production room, clinic room, and other supporting infrastructure such as laboratory space.

In the process of production of fish processed in the exhaust box of fish cooked by using steam heat generated by boilers with a high enough temperature, the use of equipment requires a large electric power in

case of surge or excess electric current so that the heat can cause a fire. According to the NFPA³ itself, the classification of fire hazards of fish canning industry is classified into class A fire hazard (fire with paper, cloth, plastic and wood), class B (fire caused by methane, ammonia and diesel) and class C (electric fire). With the risk of this PT. X Muncar Banyuwangi does not have emergency procedures understood by all employees and management, so it is possible if there is a fire hazard, there is no effective and efficient rescue procedure and can be an evaluation so that the need for management readiness in the implementation of fire emergency response in PT. X Muncar Banyuwangi. Fires are caused by various factors, but in general the factors that cause fire are human and technical factors⁸. In case of fire in Indonesia around 62.8% is caused by electricity or short circuit of electric current. Spatial planning and lack of fire prevention infrastructure also contribute to the

emergence of fires, particularly fires in industrial estates and settlements.

According to the Decree of the Minister of Manpower R.INo.KEP.186 / MEN / 1999 on Fire Response Unit at Work², the fish canning industry is classified as a high risk level of fire hazard and if there is a fire will have a considerable impact, important to do. For this purpose, Law No. 1 of 1970 concerning occupational safety has stipulated that every workplace should make efforts to create workplaces and survivors, including from fire hazards.

Observation result of fire hazard protection in PT. X Muncar Banyuwangi there is an active fire protection system in the building building in the production area is not good because there are some components that have not met the standard. In alarms, detectors, sprinklers, hydrants are still not available, the APAR component is only the label component of the officer's name that maintains the card or APAR label is not yet available, and there are some rusty and poorly grounded APARs. It is therefore necessary to evaluate the preparedness of fire prevention in order to increase awareness of fire disaster.

Results of subsequent interviews with the management of PT. X Muncar that based on the Decree

of the Minister of Manpower RI No. 186 / MEN / 1999 on Fire Management at Work², PT. X muncar Banyuwangi does not yet have a fire organizational structure so that in the implementation of emergency response the fire hazard has not been implemented properly, this is causing the effort in prevention and handling fire hazard is not running maximally.

The purpose of this study is to evaluate the implementation of fire prevention preparedness at PT. X Muncar Banyuwangi based on Minister of Manpower Decree No. RI. 186 / MEN / 1999 on Fire Management in the Workplace².

MATERIAL AND METHOD

This research uses quantitative method with cross sectional awakening design which aims to photograph and analyze the situation in a certain time period against the evaluation of fire preparedness prevention in PT. X Muncar Banyuwangi. The data were collected by questioner and question and answer. While the observation with cross sectional study approach and by way of examination by using check list list. Data processing is done by correlation analysis using spearman test. Population in this research is all employees of production at PT. X Muncar Banyuwangi as many as 90 people.

FINDING

Table 1. The relationship between age and employee knowledge in PT. X Muncar Banyuwangi

No.	Age	Level of Fire Preparedness Readiness						Total		ρ_s
		Low		Medium		High				
		n	%	n	%	n	%	N	%	
1.	<25 years old	8	61,5	4	30,8	1	7,7	13	100	0,084
2.	25-45 years old	13	27,7	30	63,8	4	8,5	47	100	
3.	>45 years old	2	6,7	11	36,7	17	56,7	30	100	

Table 1 shows that the age of employees <25 years old are 8 people with a percentage (61.5%) have low knowledge, 25-45 years old employees turn out 30 people with percentage (63.8%) have medium knowledge and age > 45 year turns out 17 people with a percentage

(56.7%) have a high knowledge. From the table it can be concluded that age with knowledge level has weak relationship because of the older age of employees the better the level of knowledge.

Table 2. Relationship between training with employee knowledge in PT. X Muncar Banyuwangi

No.	Training	Level of Fire Preparedness Knowledge						Total		p _s
		Low		Medium		High		n	%	
		n	%	n	%	n	%			
1.	Ever	1	8,3	7	58,3	4	33,3	12	100	0,350
2.	Never	38	48,7	37	47,4	3	3,8	78	100	

Table 2 show that respondents who claimed to have received fire prevention training with medium knowledge level as much as 7 respondents with percentage (58,3%) whereas respondents who stated never received fire prevention training with medium knowledge level 38 respondents with percentage (48,7) %). From the

table can be concluded that the relationship between fire prevention training with the level of knowledge of employees at PT. X Muncar banyuwangi has a moderate relationship because employees who have never conducted fire training have medium knowledge level.

Table 3. Relationship between the working period with the knowledge of employees in PT. X Muncar Banyuwangi

No.	Work Duration	Level of Fire Preparedness Readiness Knowledge						Total		p _s
		Low		Medium		High		N	%	
		N	%	n	%	n	%			
1.	1-5 years old	35	55,6	27	42,9	1	1,6	63	100	0,089
2.	6-10 years old	3	25	7	58,3	2	16,7	12	100	
3.	11-20 years old	2	25	3	37,5	3	37,5	8	100	
4.	>20 years old	1	14,3	1	14,3	5	71,4	7	100	

Table 3 shows that the employment period of 1-5 years and 6-10 years turned out 35 people have a percentage (55.6%) have low knowledge and 7 people with percentage (58.3%) have moderate level of knowledge, the working period of 11-20 years it turns out that 3 people have a percentage (37.5%) with medium and high knowledge have the same number and

service life > 20 years turns 5 people with percentage (71,4%) have high knowledge level. From the table can be concluded that the relationship between the working period of respondents with the level of knowledge in the preparedness of fire prevention in PT. X has a weak relationship because the longer one's working period the knowledge level is good.

Table 4. Relationship between socialization and implementation of fire prevention procedures and preparedness with knowledge of employees at PT. X Muncar Banyuwangi

No.	Socialization and Application of Fire Preparedness Readiness	Level of Fire Preparedness Readiness Knowledge						Total		p _s
		Low		Medium		High		n	%	
		n	%	N	%	n	%			
1.	Yes	4	13,3	20	66,7	6	20	30	100	0,462
2.	No	34	56,7	25	41,7	1	1,7	60	100	

Table 4 indicates that once done the sosialisasi and the application of procedures and readiness of fire prevention was 20 people have percentage (66,7%) with medium knowledge level and employee who claimed has never done sosialisasi and application of procedure and readiness of fire prevention turns out 34 people have percentage (56,7%) with low knowledge level. From the table can be concluded that the relationship between socialization and application of fire prevention procedures and readiness with knowledge of employees at PT. X Muncar Banyuwangi has a moderate relationship because employees who have received socialization have a moderate level of knowledge.

DISCUSSION

a. The relationship between age and employee knowledge in PT. X Muncar Banyuwangi

The results of this study indicate that age with knowledge level has a weak relationship because the older age of employees eat the better the level of knowledge. The existence of relationship between age with employee knowledge about fire prevention preparedness at PT. X Muncar Banyuwangi, because most of the employees who work in the fish canning production is the male sex numbered 82 people and most respondents have high knowledge with age > 45 years. This may be because older ages tend to have more interest or commitment to understanding fire threats than younger ones. Based on the Decree of the Minister of Manpower of the Republic of Indonesia Number KEP.186 / MEN / 1999 on Fire Response Unit in the Workplace² Article 8 paragraph 2, stipulates that to be appointed as fire fighting team must meet the requirements of physical health, minimum age 25 years and maximum 45 years, have a minimum of high school education and have attended basic fire fighting technique course II (Package D).

b. The relationship between training and employee knowledge at PT. X Muncar Banyuwangi

The results of this study indicate that the relationship between fire prevention training training of employees at PT. X Muncar Banyuwangi has a moderate relationship because employees who have never conducted fire training have medium knowledge level. The results of this study is explained that most respondents have not been given training and fire simulation that should the management of PT. X Muncar Banyuwangi provide

training to its employees about fire training that is given such as the use of APAR, fire extinguisher using APAR and evaluate every room in PT. X Muncar Banyuwangi. This means that if management has provided training to employees who work in PT. X whether implemented in the workplace or held by the city government of Banyuwangi, the hope is there is an increase of knowledge and skills to employees of PT. X in the handling of disasters and fires at PT. X Muncar Banyuwangi. Education and training for employees working in fish canning production is not selected on the basis of experience but is shaped and nurtured through training programs that include theoretical education, physical training, fire fighting practices⁷. Based on Per Men PU no. 20 / PRT / M / 2009 Concerning Technical Provisions for Urban Fire Management⁶ that fire education and training should be held at least once in 6 months.

C. The relationship between the working period and the knowledge of employees in PT. X Muncar Banyuwangi

The results of this study indicate that the relationship between the working period of respondents with the level of knowledge in the preparedness of fire prevention in PT. X has a weak relationship because the longer one's working period the knowledge level is good. Employees who have a working period of 1-5 years have a low knowledge of the possibility at the working period of 1-5 years is a lot of employees who graduated from elementary school so that knowledge of the preparedness of fire hazard management do not understand, bathed by the working period > 20 years most employees have high knowledge, most likely high school graduates where in the working group > 20 years of respondents this is a productive age group where they are more active and easy to access information through mass media or internet than those who have a working period 1-5 years who tend to have a sense of responsibility is less and tend to be less lazy and less curiosity and lazy to find the latest information about emergency response of fire hazard. In addition, employees with a working period of > 20 years are likely to have been trained in previous workplace fire hazards as well as those run by government agencies. Working period is one of the factors in labor characteristics that make up behavior⁴. The longer the work period will make the workforce more familiar with the workplace environment conditions and the fire hazards that exist in the workplace. Knowledge can increase because of

the experiences gained in life⁵, in which case experience is gained from the length of the person's labor.

d. The relationship between socialization and implementation of fire prevention procedures and preparedness with knowledge of employees at PT. X Muncar Banyuwangi. The results of this study indicate that the relationship between socialization and application of fire prevention procedures and readiness to the knowledge of employees at PT. X Muncar Banyuwangi has a moderate relationship because employees who never get socialization have low knowledge level. The result of the research is explained that most of respondents stated that there has never been socialization and application of fire preparedness prevention procedures of PT. X Muncar Banyuwangi. From the results of interviews with the management and employees stated there has been no socialization about the preparedness of fire prevention and document review also stated PT. X Muncar Banyuwangi does not have a fire preparedness procedure in all rooms so what if there is fire the employees will be less responsive to fire and the company will suffer big losses. Education and training for firefighters are not selected on the basis of experience but are shaped and nurtured through training programs that include theoretical education, physical training, firefighting practices with a view to improving the quality and capability of both the fire prevention field and in performing the tasks in accordance with their function fire management organizations, enhancing theoretical, conceptual, moral and technical skills of job implementation⁷. The higher a person's education the better his knowledge⁵. Top of Form

c. The relationship between the working period and the knowledge of employees in PT. X Muncar Banyuwangi

The results of this study indicate that the relationship between the working period of respondents with the level of knowledge in the preparedness of fire prevention in PT. X has a weak relationship because the longer one's working period the knowledge level is good. Employees who have a working period of 1-5 years have a low knowledge of the possibility at the working period of 1-5 years is a lot of employees who graduated from elementary school so that knowledge of the preparedness of fire hazard management do not understand, bathed by the working period > 20 years most employees have high knowledge, most likely high school graduates where in the working group > 20 years of respondents this

is a productive age group where they are more active and easy to access information through mass media or internet than those who have a working period 1-5 years who tend to have a sense of responsibility is less and tend to be less lazy and less curiosity and lazy to find the latest information about emergency response of fire hazard. In addition, employees with a working period of > 20 years are likely to have been trained in previous workplace fire hazards as well as those run by government agencies.. Knowledge can increase because of the experiences gained in life⁵, in which case experience is gained from the length of the person's labor.

d. The relationship between socialization and implementation of fire prevention procedures and preparedness with knowledge of employees at PT. X Muncar Banyuwangi

The results of this study indicate that the relationship between socialization and application of fire prevention procedures and readiness to the knowledge of employees at PT. X Muncar Banyuwangi has a moderate relationship because employees who never get socialization have low knowledge level. From the results of interviews with the management and employees stated there has been no socialization about the preparedness of fire prevention and document review also stated PT. X Muncar Banyuwangi does not have a fire preparedness procedure in all rooms so what if there is fire the employees will be less responsive to fire and the company will suffer big losses. Education and training for firefighters are not selected on the basis of experience but are shaped and nurtured through training programs that include theoretical education, physical training, firefighting practices with a view to improving the quality and capability of both the fire prevention field and in performing the tasks in accordance with their function fire management organizations, enhancing theoretical, conceptual, moral and technical skills of job implementation⁷.

CONCLUSION

1. Organization of fire prevention has not been established, fire prevention team has not been established, preparedness handling guidelines have not been prepared, and Human resources K3 not yet available so that not yet fulfill the requirement of Decree of Minister of Manpower RI No. 186 / MEN / 1999

2. Active and passive fire equipment infrastructure equipment

a. Active infrastructure facilities Active fire protection system in building building in production area of PT. X Muncar Banyuwangi not good because there are some components that have not met the standard. In alarm, detector, sprinkler, hydrant still not available at PT. X Muncar Banyuwangi. In the APAR component only the label component of the officer's name performing maintenance on the APAR card or label is not yet available, and there are some rusty and less well-maintained APARs,

b. Passive infrastructure facilities Passive fire protection system in PT. X Muncar Banyuwangi not yet suitable that is not available fire resistant door.

3. The relationship between age and knowledge of employees in the production unit at PT. X Muncar Banyuwangi has a weak relationship because the older the age of employees the better the level of knowledge.
4. The relationship between training and employee knowledge in the production unit at PT. X Muncar Banyuwangi has a moderate relationship because employees who have never conducted fire training have low knowledge level.
5. The relationship between the working period of respondents with the level of knowledge in the preparedness of fire prevention in PT. X has a weak relationship because the longer one's working life the better the level of knowledge.
6. Relationship between socialization and application of fire prevention procedures and readiness with employee knowledge in PT. X Muncar Banyuwangi has a moderate relationship because employees who never get socialization have low knowledge level.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: The research proposal has been approved by Health Research Ethical Commission of Public Health Faculty Airlangga University. All respondents were given explanation and information about the purposes and methods of the research, and also had signed informed consent forms.

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Association between Exclusive Breastfeeding with Health Belief Model in Working Mothers

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ABSTRACT

Exclusive breastfeeding is important thing to do from the mother to the baby since it could decrease infant mortality rate. Exclusive breastfeeding on work place has been arranged in Indonesian Government Regulation No. 33/ 2012. Though the company has provided dedicated room for lactation as supporting factor to the achievement of exclusive breastfeeding, yet it only reach 14.25%. This research has objective to find out factors related with exclusive breast feeding practice by Health Belief Model theory. The research is conducted with cross sectional design. Sample size is 78 working women having baby ages 6-12 months. The sample is obtained by simple random sampling technique. The analysis of data correlation is processed by chi square test ($\alpha=0,05$) and logistic regression. Research result showed that perception ($p=0,036$), parity ($p=0,018$), knowledge ($p=0,017$), socio culture ($p=0,016$), family support ($p=0,006$), direct superior support ($p=0,013$), and nanny role ($p=0,045$) in the relation of exclusive breastfeeding practice on working mother at Garment Company "X". Result of logistic regression indicate direct superior support is the most influenced variable. Low practice of exclusive breast feeding on working mother at Garment Company "X" is influenced by direct superior support factor. Also the factor of perception, parity, knowledge, socio culture, family support and nanny role.

Keywords : *working, mother, lactation, exclusive, breastfeeding*

INTRODUCTION

Based on Indonesia Demography and Health Survey (IDHS) in 2012 indicate infant mortality rate (IMR) is 32 per 1000 life birth. This is quite far from 2015 target which is 23 per 1000 birth life. One effort to decrease the IMR is by exclusive breast feeding. Exclusive breast feeding means giving breast milk to the baby for first six month of life without additional food or other liquid. The percentage of exclusive breast feeding in Indonesia in 2013 is 54.34%, in 2014 it is increased to 60%. And still, far from the target 80%.¹

The government has tried to increase exclusive breast feeding. One of the effort is through health regulation number 33 year 2012. In the regulation mentions that every work place is obligated to provide lactation room. The garment X company has provided it as regulated yet the number of working mother giving exclusive breast feeding is still low, which is only 14.25%.

Rahmawati, research result mentioned that job is one of the reason of exclusive breast feeding failure. The 8 hours work hours become the reason of low intensity of mother-baby meet. Indeed, there has been a 3 ministries joint regulations issued by Ministry of Women Empowerment and Children Protection (48/MEN.PP/XII/2008), Ministry of Workers and Transmigration (PER.27/MEN/XII/2008) and Ministry of Health (1177/MENKES/PB/XII/2008) mentioned breast feeding during work hour at work place.²

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Anggraeni, mentioned that there is a difference of exclusive breast feeding based on work status.³ Research by Putri, mentioned that exclusive breast feeding on mother working in factory is less than housewife.⁴ Other research by Hidayanti, found out work place support like lactation room and health attendant suggestion influence exclusive breast feeding by working mother.⁵

The Health Belief Model (HBM) theory can be used to describe behaviour determined factor. It can be used in this research since the practice of exclusive breast feeding is a matter of privacy. The HBM theory says the behavior of one is influenced by the perception or individual belief it self.⁶ Therefore, this research's objective is to find out the factors influencing exclusive breast feeding by HBM theory approach.

MATERIAL AND METHOD

The research is conducted at Garment Company

Table 1. Factors related with Exclusive Breast Feeding Practice of Working Mother at Garment Company "X"

No	Variables	Cathegory	Exclusive Breast Feeding Practice						p value
			No		Yes		Number		
			f	%	f	%	f	%	
1.	Perception	Poor	36	46,2	2	2,6	38	48,7	0,036 *
		Good	30	38,5	10	12,8	40	51,3	
2.	Parity	1 child	33	42,3	1	1,3	34	43,6	0,018 *
		>1 child	33	42,3	11	14,1	44	56,4	
3.	Knowledge	Poor	35	44,9	1	1,3	36	46,2	0,017 *
		Average	26	33,3	9	11,5	35	44,9	
		Good	5	6,4	2	2,6	7	9,0	
4.	Socioculture	Negative	22	28,2	0	0	22	28,2	0,016 **
		Positive	44	56,4	12	15,4	56	71,8	
5.	Nanny Role	Poor	35	44,9	2	2,6	37	47,4	0,045 *
		Good	31	39,7	10	12,8	41	52,6	
6.	Family Support	Less Support	37	47,4	1	1,3	38	48,7	0,006 *
		Support	29	37,2	11	14,1	40	51,3	
7.	Direct Superior Support	Less Support	52	66,7	5	6,4	57	73,1	0,013 **
		Support	14	17,9	7	9,0	21	26,9	
8.	Peer Support	Less Support	28	35,9	5	6,4	33	42,3	1,000 *
		Support	38	48,7	7	9,0	45	57,7	
9.	Education	Elementary (≤ 9 years)	30	38,5	2	2,6	32	41,0	0,108 **
		High School ($> 9-12$ years)	36	46,2	10	12,8	46	59,0	

Remark :

* : *chi-square test*

** : *fisher exact test*

"X", located on Bawen, Central Java, Indonesia, in March to April 2016. This research is analitical with cross sectional study . The samples are working mother at Garment Company "X" having infant ages 6-12 months and 78 working mothers are selected by simple random sampling. The data analysis is conducted by two methods which are chi-square test or Fisher Exact Test $\alpha = 0,05$) and logistic regression.

FINDING

HBM theory is the theory of the alter of health behavior and psychological model used to predict health behavior by focusing on perception and individual belief on a disease. The HBM theory is based on an understanding that someone will take any action related with health based on the perception and belief. *Chi-square test* or *fisher exact test* results are as below:

From table 1 can be found that p value on perception variable = 0.036, parity = 0.018, knowledge = 0.017, socio culture = 0.016, nanny role = 0.045, family support = 0.006, direct superior support 0.013, peer support = 1.000 and education = 0.108. Variables with p value < 0.05 are variables having significant relation with exclusive breast feeding practice. On the opposite, variables having p > 0.05 do not related with exclusive breast feeding practice on working mother at Garment Company “X”.

Table 2. Logistic Regression of Exclusive Breast Feeding Practice Research Variables

Variable	Wald	df	p
Education(1)	c	1	.996
Socioculture(1)	.000	1	.996
Family Support(1)	.000	1	.998
Direct Superior Support(1)	4.187	1	.041
Nanny role(1)	.000	1	.999
Constant	.067	1	.796

From Logistic Regression Analysis can be seen that direct superior support variable is the most dominant among all variables. As on table 2, Wald value of the variable is 4.187 which is the highest compare to others. Aligned with the p value 0.041 which is the smallest value compare to others.

Perception is one of the variable that related with exclusive breast feeding practice on working mother at Garment Company “X”(p = 0,036 < 0,05). Mother having poor perception regarding lactation management mostly do not do exclusive breast feeding compare to mother having good perception. Questions asked consist of vulnerable perception, seriousness, advantage, obstacle, and terms and condition to do lactation management and exclusive breast feeding. From the result can be known that respondents perception regarding vulnerability and seriousness of health problem due to do not give exclusive breast feeding obtain lower score compare to other perception. This is caused by the impacts or disadvantages occurred from do not give exclusive breast feeding are indirectly visible. This result is supported by one by Fikawati, Miguel, and Pawenrusi, stated that there is significant relation between mother perception regarding exclusive breast feeding.^{7,8,9} It is also aligned with HBM Theory stated that one behavior is determined by perception owned.⁶

Parity has a significant relation with exclusive breast feeding practice on working mother at Garment

Company “X”(p = 0,018 < 0,05). Mother having child >1 is tend to give exclusive breast feeding than mother having 1 child. The experience of breast feeding on previous birth giving influencing someone to repeat it on the next birth giving.¹⁰ In HBM theory, parity is included in demography variable. Demography is one of the factor influencing someone perception to behave.⁶ Breast feeding experience also become a terms to repeat it on next birth giving, thus it will initiate a mother to give exclusive breast feeding to the baby though she is working by doing lactation management.

Beside the perception and parity, other variable having significant relation with exclusive breast feeding is knowledge (p = 0,017 < 0,05). Most of mothers are less aware the importance of breast milk as baby main nutrition source. Mother only know about exclusive breast feeding, yet does not know and understand correctly regarding lactation management and other things that should be concerned in order to keep giving exclusive breast milk particularly on working mother.¹¹

A behavior is closely related with the local culture. Research result indicates that socio culture has a significant relation with exclusive breast feeding practice on working mother at Garment Company “X”(p = 0,016 < 0,05). Mother having negative socio culture (still rely on belief and tradition regarding breast feeding) does not give exclusive breast milk. On the opposite, mother giving exclusive breast milk is no longer rely on

belief, tradition and myth that can fail exclusive breast feeding such as giving or spreading honey on the lips of new born baby so the baby can talk earlier, giving coffee so the baby do not stiff and feeding banana so the baby gains weight and health.

Other variable having significant relation with exclusive breast feeding is nanny role ($p = 0,045 < 0,05$). The nanny has an important role to replace the mother during work time. Yet many of the nannies are not provide sufficient support to give exclusive breast feeding and do lactation management. The data indicates that mothers having nanny with good role tend to give exclusive breast feeding compare to them having nanny with less role.

A support is one of the factor that can motivate someone to behave. It can be obtained the environment, whether it is family or work place. Family support is significantly related with exclusive breast feeding practice on working mother at Garment Company "X" ($p=0,006 < 0,05$). The respondent said that the most supporting family member in lactation management are husband and mother (the baby's grandmother). Support giving can ignite mother behavior in exclusive breast feeding. It is showed by the research result. Respondents with family support tend to do lactation management and exclusive breast feeding compare to them with less family support.

Beside family support, one from direct superior also related with exclusive breast feeding practice ($p = 0,013 < 0,05$). The data obtained indicate that many direct superior does not give sufficient support the mother to do exclusive breast feeding . This causing many mother do not give exclusive breast milk to the baby. Mother with support tend to do exclusive breast feeding for her baby compare to them with less support from direct superior.

The tolerance and special permission for breast feeding mother to do lactation management like breast milk squeezing within working hour surely will give positive impact on exclusive breast feeding by working mother. Beside, if a sufficient facility is provided on the work place, it will be assisted working mother to do exclusive breast feeding.¹¹ The support from direct superior is cathegorized in sign to act in HBM theory. The support gived can motivate a mother to practice exclusive breast feeding though she is working.⁶

Yet, for peer support statistically does not related with exclusive breast feeding practice ($p = 1,000 > 0,05$). This result is contradictive compare with result of research by Ida and Suyes, stated that one of the factors influencing exclusive breast feeding is peer support.^{12,13} Mother working outside her home will interact more with the people in the work environment. Thus the support from work peer will influence the mother decision to do exclusive breast feeding.¹¹ In HBM theory, peer support also become a sign to act influencing a mother to behave.

Based on the data obtained can be known that tough many work peer support, yet only few mother do exclusive breast feeding practice. This is due to the peer giving the support does not practice lactation management and experience failure in exclusive breast feeding practice. According to behavior theory stated by Bandura which is Social Learning Theory explaining that human behavior is a continuous both side interaction between cognitive, environment and behavior factors. So the behavior to do exclusive breast milk is not only influenced by cognitive factor, but also environment factor. Environment factor in this term is not just a support provided by work peer but much further is the example given by the work peer (modeling). With many case of unpracticing lactation management such as squeezed breast milk and failure to do exclusive breast feeding by friend that viewed as a model or example, are caused the respondents not to do squeezed breast milk and do not give exclusive breast feeding though they got support from their work peer.⁶

Other variable that does not related with exclusive breast feeding practice on working mother at Garment Company "X" is education ($p= 0,108 >0,05$). This result is aligned with Weber and Banu, stated that education does not related with exclusive breast feeding practice.^{14,15} Yet vary with the research by Sholeye, stated that mother education is related with exclusive breast feeding practice.¹⁶

HBM theory categorize education as demography variable that able to influence perception to behave on someone.⁶ But as statistical test result, obtain that there is no relation between education with breast feeding practice on working mother at Garment Company "X". This difference can be occured due to the respondent's education back ground is only reached senior high school. Beside that the information regarding breast milk does not obtained from the school, but from instantion and health attendant. So does on Theory of

Reasoned Action (TRA) which stated that one behavior is influenced by belief, attitude and will, ignoring the education background.

From all variables significantly related with exclusive breast feeding practice, the analysis result of logistic regression stated that variable of direct superior support as the most dominant variable. This is acceptable, since the respondent is the working mother. The work environment is one of the circumstance that able to influence a mother to behave. Work demand and high work load dictate the mother to complete her job. If it does not counterbalance with support from the superior to lactation management, then the mother will have large percentage to fail in exclusive breast feeding practice.

CONCLUSION

The research showed that low practice of exclusive breast feeding on working mother at Garment Company "X" Semarang, Central Java, Indonesia is influenced by some variables. Variables that related with exclusive breast feeding practice are perception, parity, knowledge, socio culture, family support, direct superior support and nanny role. While variables of education and peer support are not related with exclusive breast feeding practice on working mother at Garment Company "X". Result of logistic regression showed that direct superior support is the most dominant variable in this research.

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Availability, Accessibility, and Acceptability of Health Services in Remote Indigenous Community of the Baduy Dalam Tribe

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ABSTRACT

Background: Unequally in rights to health cause a disparity between indigenous communities and people in general, which should be avoidable. The *Baduy Dalam* tribe is one of the indigenous communities in Indonesia that refuses to follow modern developments. The *Baduy Dalam* tribe's strong obedience to their tradition bothersome health workers in delivering modern health services. Availability, accessibility, and acceptability of health services as a base of health service concept and rights to health need to be further analyzed in the *Baduy Dalam* tribe.

Method: This qualitative research uses a Basic Human Rights paradigm approach to obtain in-depth information regarding health services among the *Baduy* community. The method used was in-depth interviews, and informants were chosen using a purposive technique to achieve correct and adequate information for this research. Results were analyzed using a matrix and content analysis to identify the thematic information. To maintain validity, document review and literature review on the subject were conducted.

Results: Utilization of available healthcare facility majorly affected by community acceptance. Mobile health services can't be conducted without the community leader's permit and acceptance. There's an urgent need to do strategic approach to increase the community acceptance using sensitive cultural approach. Attention and effort from multi-sectoral governments are very low.

Conclusions: Healthcare services to the *Baduy Dalam* community is not performed well as there are various obstacles in the availability, accessibility, and acceptability of modern healthcare services in The *Baduy Dalam* community.

Keywords: Primary Healthcare services; indigenous communities; availability; accessibility; acceptability

INTRODUCTION

There are approximately 370 million indigenous communities spread across 90 countries around the world. The total population of indigenous communities makes up 5% of the world population.¹ In Indonesia there are 231,268 families in remote indigenous communities. A regulation from the Indonesian government defines remote indigenous communities as

a group of individuals attached as a unit, geographically, economically, and/or by social culture, and poor, remote, and/or fragile social economy.² On the other hand, the UN categorizes indigenous community such as a group of people with their own social structures such as pre-colonial communities, those who profess to being an indigenous community, have strong ties to an area or the surrounding environment, form a minority, have specific culture and language, and protects the culture of the ancestors.³

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Currently, indigenous communities in developing and in developed countries are a marginal group with minimal access to basic healthcare and poor health

conditions compared to the general population.⁴ As well as traditional knowledge and sustainable practices that are invaluable resources for human development. However, indigenous people remain on the margins of society in high, middle and low-income countries, and they bear a disproportionate burden of poverty, disease, and mortality compared to the general population. These inequalities have persisted, and in some countries have even worsened, despite the overall improvements in health indicators in relation to the 15-year push to meet the Millennium Development Goals. As we enter the Sustainable Development Goals “(SDGs)” Indigenous communities are located far away from basic healthcare services, placing them at higher health risks to reach healthcare facilities in time of urgent need. Moreover, unreachable modern healthcare services put them in a condition where traditional medicine is their only alternative to cure their illnesses.⁵

Unequal health status between the indigenous communities and the general population is an unacceptable condition because it can be prevented by government’s policy. This condition is a matter of concern to healthcare service providers in all countries as they have responsible in providing equal services for all. Provision of equal healthcare services to indigenous communities to fulfill their rights to healthcare is part of providing their basic human rights.⁶ Availability, accessibility, and acceptability are three components that have strong connections and are the bases for providing rights to healthcare. In addition, they are often used in various healthcare research for susceptible communities such as the disabled communities, indigenous communities, and other minority groups as they focus on equal healthcare rights and reflect a balance between characteristics and expectation of healthcare providers and receivers.⁶⁻⁸

There is an indigenous community in Indonesia that refuses to live using technology and limits themselves from the changing modern society, it is the *Baduy* Tribe which divided into two – *Baduy Luar* (outer *Baduy*); and *Baduy Dalam* (inner *Baduy*). The difference is that *Baduy Luar* has been exposed to modern lifestyle, whereas the *Baduy Dalam* still follows a traditional lifestyle such as not using electricity, electronic devices, and vehicles. Till today, the *Baduy Dalam* travel by foot even though they need to travel far distances.⁹

The *Baduy Dalam* Community is known for their

determination to follow traditions. There are traditional laws, “*lojor teu meunang dipotong, pondok teu meunang disambung*” which translates to “long cannot be cut and short may not be joined”. This means that all things may not be added or removed. That law has become a consideration of healthcare personnel in delivering services to the community.^{11,12}

In several studies about availability of healthcare service in indigenous communities recommend to provide services that incorporate the community perspectives on modern medicine and adjusted to their condition which would then increase its acceptance by the community.^{5,13} Based on Ipa (2014), healthcare services for the *Baduy Dalam* community should not be provided using the same model for other general communities. Adjustments to certain characteristics and conditions of the *Baduy Dalam* community are needed so they may be used and accessed healthcare services. As a country with big cultural diversity, Indonesia government has a lot of things to be considered to make health services equitable. Further analysis is required to identify the condition of health service for *Baduy Dalam* community using health rights paradigm from the availability, accessibility, and acceptability aspects.

METHOD

This is a qualitative study aimed at obtaining in-depth information on the provision of healthcare services to the *Baduy Dalam* community. Information was obtained by in-depth interview using in-depth interview guide. Respondents chosen by purposive technique were “one” representative from Lebak District Health Department, Head of Cisimeut CPHC, a nurse from Cisimeut CPHC, a Midwife coordinator at Cisimeut CPHC and as a pioneer of modern healthcare services for *Baduy* Tribe (*Baduy Luar* dan *Baduy Dalam*), Kanekes Village Midwife. Two healthcare personnels (a nurse and a midwife coordinator) from Cirinten CPHC were chosen because of its location near the *Baduy Dalam*’s exit gate in Cijahe and also they have close relation and good information about *Baduy Dalam* Tribe. Another respondent chosen by snow ball techniques were Kanekes Village Officer, three Kanekes Village Health Cadres, two persons from two humanitarian non-government organization, and three persons from inside and out *Baduy Dalam* Community. The interviews were written in the form of a transcript then simplified into a matrix. Thematic content analysis was performed to

obtain in-depth information regarding the availability, accessibility, and acceptability of healthcare services by *Baduy Dalam* community. To maintain data validity, data and information obtained from informants were compared, and document review and literature review of associated topics were performed.

RESULTS

Availability

All approach to make health service available for the tribe, such as mobile health service, additional health workers, and a transit-birth house didn't go well because of community's acceptance and healthcare workers' skill in approaching the community.

Cisimeut CPHC doesn't have special approach or strategy to build good relationship with the community and they feel helpless in delivering health services to the community. The Health Department in Lebak District already give all authority to Cisimeut CPHC to deliver health service, but their attention to monitor and evaluate how health services delivered to *Baduy Dalam* community is very low. Without intensive attention, help, and supervision from The Health Department district, Cisimeut CPHC performance will be the same. Even healthcare service is available for the *Baduy Dalam* tribe, leader's permit and community's belief play a major role on acceptability of modern healthcare services.

Even the health service was available and adapted to indigenous' characteristic, birthing house which built by Constitution of Mexico wasn't utilized by their indigenous community. Constitution of Mexico was built traditional birthing house where traditional birth attendance can help indigenous mother under supervision of professional birth attendance. But, the house wasn't utilize by their indigenous community because of indigenous' trust and comfort issues so the indigenous community prefer to deliver their babies in their own house.¹⁴ Before provide a health service for indigenous, it's important to maintain a good relation and trust between health provider and indigenous community. Without indigenous community acceptance, available health service won't utilize well.

Accessibility

Communication as an important aspect in health access also have big influence in delivering healthcare

services. Interviewed healthcare personnel said that they have difficulty in communicating with the *Baduy Dalam* community. It's not caused by the language, but it is because the *Baduy Dalam* community have different perspective about health and have low understanding about their own compliant and health needs which always confused the healthcare personnel as stated below.

“Communicating with them is very... very hard... we have to bring someone who have close relation with them such health cadres from The *Baduy Luar* community, so they will feel ease to communicate with us” (KP)

“When they visited me, they just sat... stayed quiet and and didn't say anything. Just quiet. So at the moment, I knew that I have to be very proactive in communicating with them, ask them why and what they want... sometimes after I asked them, they hardly to communicate what they want because of their lack understanding about their own health condition...” (BD-3)

With poor health seeking behavior of The *Baduy Dalam* community, the healthcare personnel shouldn't have to wait passively until The *Baduy Dalam* community come and ask for help. To reach the *Baduy Dalam* area, walk by foot is the only way that healthcare personnel can do. the travel time into The *Baduy Dalam* area from Cisimeut CPHC is about 3-4 hours by walk. Even the distance between Cisimeut CPHC and the *Baduy Dalam* area is about 8 Km, the healthcare personnel must pass a small pathway through hills and valleys. Besides that, the *Baduy Dalam* community mostly work in their field located far from *Baduy Dalam* area. That condition makes the healthcare personnel difficult to meet them, especially when they have to conducted a sweeping activity to do an examination and treatment for neglected disease such Yaws which still exist in the *Baduy* tribe.

Some informants were said even the *Baduy Dalam*'s priority to treat their illness were using traditional medicine and spiritual ceremony, few people from the community needs help from healthcare personnel. They started to need help from healthcare personnel because traditional medicine they always use didn't heal their illness. Some informants were said that they are afraid to go to health clinic or CPHC because they don't have enough money to pay the bills. The village officer said majority of the *Baduy Dalam* community haven't

covered from national health insurance. The Village officer said it was a dilemma for them to registered all the Kanekes Village citizen categorized as a poor and in need of National Healthcare Insurance so they can access healthcare service freely because it will raise poverty degree and cause another trouble in the village. Also, there's no specific regulation to protect the indigenous community from *out-of-pocket* health expense. Lack of attention and poor coordination between governments blocking community's opportunity to improve their life quality and it could be assumed as right to health violation that happen systematically.

One of the indigenous in Indonesia, *Orang Rimba* Tribe, live nomadic inside South Sumatera Forest had accept modern health service. The head of District Health Departments was working with other sectors to deliver regular healthcare services. Cultural approach as their main strategy results in good relationships between the government, healthcare personnel, and The *Orang Rimba* tribe while increase the tribe's health degree. Without direct support, synergy, and involvement of multi-departments, healthcare service innovation for indigenous community will not have a good impact.¹⁶

Acceptability

Acceptability of healthcare services is a combination of value as reflected by someone's ability to accept the services based on perception, experience, and response towards the services and highly associated with the social culture of an individual.¹⁷ The *Baduy Dalam* community known with their strong obedience to their culture and their leader's decisions. Based on in-depth interview, respondent from non-government organization said if there's something emergency cases related to health, the community couldn't make decision by themselves, they have to ask the leader's solution. If the community leader decides something that not in line with medical treatment, the community will still follow the leader's decision even it can threaten their life.

From in-depth interview, birthing assistance by professional healthcare is forbidden for the community. The women have to give birth without any assistance and traditional healer should come after the baby was born to cut the placenta. The community believe that blood released during childbirth can cause a disease especially for kids and men. But in 2000, one of the *Baduy* tribe leaders requested a village midwife to assist his daughter.

Because of the distances, the baby was already born when she arrived. After that, there's no request from the *Baduy Dalam* community to the midwife village.

Other restrictions related to modern healthcare are using family planning, immunization, antenatal care and postnatal care. For the community, family planning regarded as an act of refusal god's blessed and contrary to the culture their belief.^{11,18} The healthcare personnel said that the community believe that immunization doesn't prevent a disease but instead bring a new disease for healthy body. The community have a restriction on the use tools made of metals. That's why they refuse medication through injection.

Lack of culturally sensitive approach from healthcare personnel, make healthcare services remain strange and taboo for the *Baduy Dalam* community. One of the informants said, if there's any regular mobile healthcare services conducted in the *Baduy Dalam* area, although the healthcare services are just basic examination such as weighting and height measurement, these things will be considered as a threat and can contaminate the purity of their culture. Lack of healthcare personnel understanding about the community's culture had increase the community's discomfort. Discrimination and bullying experience brought by healthcare personnel lack knowledge about indigenous culture could increase indigenous refusal of modern healthcare services and widens communication gap between healthcare personnel and indigenous community. In New Zealand, cultural safety approach was developed and trusted as an innovation to minimize communication gap between healthcare personnel with indigenous community.^{19,20}

CONCLUSIONS

Healthcare services for the *Baduy Dalam* community mostly affected by their acceptance on modern healthcare services. Even though the healthcare services are available, it will not be utilized well when the community has low acceptance. Healthcare service access such communication, distances, and protection from financial hardship is in complicated condition and need a lot of attention from multi-sectoral governments. Before providing available healthcare service that also accessible for the community, the governments must do strategic safety cultural approach to increase community's acceptability.

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The Effectiveness of Applying Score System in Growth Chart to Predict Stunting and Improve Nutritional Knowledge of Pre-Schoolers' Mother in Indonesia.

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ABSTRACT

Background: A growth chart is widely used to monitor child growth, but not to predict stunting. Therefore, there is a high need to create a more simple growth chart. The study aimed to find out the effectiveness of the application score system in growth chart in predicting stunting and improving mothers knowledge.

Materials and Method: This study was a quasi experimental study. A total of 533 pre-schoolers aged 4-5 years old and 110 mothers were selected from forty kindergarten schools in Deli Serdang and Aceh Besar District. Twelve field workers were trained to conduct height measurements using the score growth chart and teaching mothers on nutrition. Data on height status was presented in six classifications. Chi-Square test was performed to test the difference of mother's knowledge before and after intervention.

Findings: Of the total 533 pre-schoolers, 22.5% were stunted and 33.1% children had been predicted to be stunted. After intervention, mothers in the intervention group were three and half times more likely to have better knowledge than mothers in the control group (85.2% vs 56.6%) and Relative Risk : 3.5 (1.5-6.5)

Conclusions: Application of the score system in growth chart was practicable in predicting stunting and improving maternal knowledge. It needs to consider applying the wall score growth chart in nutritional survey. Children under-five year old need to involve in further studies.

Keywords: Score system, Growth Chart, Stunting, Pre-schooler, Nutritional Knowledge

BACKGROUND

Stunting is defined low-length-or height-for-age below two of standard deviation of the World Health Organization standard .^[1] Globally, the prevalence of stunting prevalence is improving. It has resulted in being an identified as a major global health priority.^[2] In sub-Saharan countries have the higher prevalence than Southeast Asian countries, 40% and <30%.^[3] WHO reported that since 1996-2010 there was not meaningful decreasing of stunted children all over the developing countries.^[4] In Indonesia, since 2007 until 2013 the stunting prevalence has remained stagnant at 35.0% to 37.0%. It is because children with height for age between <-2 to -1 standard deviation were not targeted in the nutrition intervention program. Meanwhile, WHO

stated that stunting prevalence has to decrease < 20.0%.^[5,6]

A growth chart is widely used as a nutrition education tool for parents to monitor their child growth including to detect stunting. However, most mothers found it difficult to interpret the child growth on the chart. Roberfroid found that 40%-70% mothers in Asia, Africa and Latin America had low understanding in interpreting their child growth.^[7,8] In Indonesia, not more than 34.0% mothers understood the function growth chart.^[9] Therefore, there is a high need to create a more simple and communicative growth chart to be easily understood by parents.^[10] Recently, more than 200 kinds of modifying growth charts created in eighty countries^[11,12] to allow parents have a better understanding of

early growth patterns. Several studies had found that good understanding of growth chart was effectively decreasing stunting.^[13,14]

In this study, we used score growth chart as the main media to detect and predict stunting and in teaching mothers on child nutrition. Scores 5, 6, 7, 8, 9 and 10 were applied in interpreting the nutritional status of children. This modified growth chart had been tested and resulted high sensitivity (91.0%) and specificity (92.0%).^[15]

The ideas of applying numbers emerged from several public health studies that applied percents and scores in motivating clients to do positive activities.^[16-18] This study aimed to find out the effectiveness of score growth chart to predict stunting and improve mothers nutritional knowledge.

MATERIAL AND METHOD

Study Design

This study was a quasi experimental study conducted in twenty kindergarten schools in urban areas of two districts that purposefully selected from two provinces; ten schools in Deli Serdang of North Sumatera Province as intervention location and ten schools in Aceh Besar of Aceh Province as control study. The prevalence of stunting in Deli Serdang and Aceh Besar was comparable, 24.4% and 26.4%, respectively.^[19,20]

Participants

a. Preschoolers

A total of 533 pre-schoolers aged 4-5 years old were selected from forty kindergarten schools; 265 children in Deli Serdang and 268 students in Aceh Besar. Selection of schools based on the number of students, school performance, the ratio of teacher and student and school health program.

b. Mothers

The number of mothers were determined by sample size calculation. We calculated the sample size keeping in view, there would be a 30% improvement of nutritional knowledge after intervention and adding 10% for drop-out possibility, using this formula;^[21]

Materials

Score Wall Growth Chart

Score growth chart is a modified growth chart. It is made from a thick plastic material with the size 150 cm x 200 cm. The horizontal lines show the height in cm (0-130 cm) and vertical lines show the child's age in months. Score 5, 6, 7, 8, 9 and 10 are placed on the left side.

These scores imply six classifications of height status: 1) Score 5 (HAZ <-3SD) = Severely Stunting. 2) Score 6 (HAZ ≤-3 to -2SD) = Stunting, 3) Score 7 (HAZ ≤-2 to -1 SD) = Tend to be Stunting. 4) Score 8 = Normal (HAZ 0 to +1SD), 5) Score 9 (HAZ +1 to +2SD) = Tall and 6) Score 10 (HAZ +2 to +3SD) = Very Tall.

Taking height measurement

The measurements were taken individually and collectively. See fig.1 and 2. Prior to taking the measurement, child's age had to put into groups. Measurement was started by positioning the child in front of the wall chart, calculated the height and determine nutritional status. The mother was asked to observe and to record child height and status.

Data collection

There were four steps data collection implemented in this study. Step one was collecting data on the height measurement of 533 pre-schoolers in forty kindergarten schools. Three field workers were responsible to take the measurements. Data on child height, scores and nutritional status of each child were recorded by enumerators. Step two was collecting data on respondents' economic characteristics and nutritional knowledge. A pretested structured questionnaire was administered to obtain information on socioeconomic profile, child age, weight, length and sex, parents education and occupation. Step three was conducting a nutrition education class. Mothers in the intervention group were taught on child growth and healthy food. Mothers were presented with five topics; 1) Function of the growth chart 2) Function of scores 3) Normal height gain 4) Interpreting growth scores 5) nutrition status. While in mothers control group were encouraged to weigh their children regularly and providing healthy breakfast and step four was re-collecting data on mother's knowledge.

Data Analysis

Data on height status of 533 pre-schoolers was presented was presented in distribution frequency table. Based on the mean scores of twenty questions used to categorize the level of knowledge. It was divided into two categories; high knowledge and low knowledge. Statistical calculation used was T-test and Chi-Square test. The significance level was determined by the *p*-values.

RESULTS

Table 1. Socioeconomic characteristics of respondents, by location of study

Socio-economic characteristics	Deli Serdang, n=265		Aceh Besar, n=268		p-value
	n(%)	Mean±SD	n(%)	Mean±SD	
Children characteristics					
Sexual types	121(45.7)		129(48.3)		> 0.05
Boy	144(54.3)	3.2±0.38	139(51.7)	3.2±0.45	> 0.05
Girl		48.2±1.9		48.0±1.6	> 0.05
Birth weight (kg)	95(35.9)		105 (39.3)		
Birth length (cm)	170(64.1)		163 (60.7)		
Current age (months)					
48-54 months					
55-60 months					
Parent's characteristics					
Mother's age (years)		26.8±4.44		28.9±4.59	0.73
Father's age (years)		152.3±3.44		151,6±4.44	0.78
Mother's education	25(9.4)		30(11.2)		
Grade 1-6	75(28.3)		63(23.8)		0.79
Grade 7-9	137(51.4)		140(52.9)		
Grade 10-12	28(10.9)		35(13.1)		
Grade >12					
Mother's occupation					
Household workers	197(74.3)		179(66.8)		0.37
Government workers	32(12.0)		43(16.0)		
Agricultural/skill labour	24(9.1)		28(10.4)		
Private sector	12(4.6)		18(6.7)		
Father's education					
Grade 1-6	13(4.6)		8(2.8)		0.47
Grade 7-9	53(20.0)		44(16.3)		
Grade 10-12	162(61.4)		170(64.0)		
Grade > 12	37(14.0)		46(16.9)		
Father's occupation					
Government workers	16(6.0)		13(4.9)		0.38
Agricultural/skill labour	40(15.1)		37(13.8)		
Private sector	200(75.5)		204(76.1)		
Others	9(3.4)		14(5.2)		

Table 2. Scores and Height Status of Preschoolers, by Location of Study

Score and Height Status	Location of study				TOTAL N=533	
	Deli Serdang, n= 265		Aceh Besar, n=268			
	n	%	n	%	n	%
5 = Severely stunting	10	3.8	18	6.7	28	5.2
6 = Stunting	33	12.4	59	22.0	92	17.3
7= Tend to be stunting	77	29.0	90	33.6	167	31.3
8 = Normal	119	45.0	83	31.0	202	37.8
9 = Tall	20	7.5	14	5.2	34	6.7
10= Very Tall	6	2.3	4	1.5	10	1.9

Table 1 shows the four characteristic variables of pre-schoolers and six characteristic variables of parents. Sexual types, birth weight, birth length and current age of children in the two locations of the study were comparable ($p>0.00$). The mean of birth weight and length of children in two locations of the study was normal; 3.2 ± 0.38 vs 3.2 ± 0.45 and 48.2 ± 1.9 vs 48.0 ± 1.6 respectively. None of the characteristics of parents were significantly different ($p>0.00$), even though mothers age in Deli Serdang was relatively younger than in Aceh

(26.8 ± 4.44 vs 28.9 ± 4.59) and more high education parents in Aceh than Deli Serdang (80.9% vs 74.5%).

As presented in Table 2. Of 533 pre-schoolers, 22.5% were stunted. Almost one third (31.3%) of children tended to be stunted. In terms of location, number of stunting children in Aceh Besar was almost double than in Deli Serdang (28.7% vs 16.2%), while the number of tall children were more in Deli Serdang than in Aceh Besar (9.8% vs 6.7%).

Table 3. Level of Mother's Knowledge Before and After Intervention

Level of knowledge	Before				<i>p-value</i>	After				<i>p-value</i>	Relative risk
	Intervention group, n=54		Control group, n=53			Intervention group, n=50		Control group, n=50			
	n	%	n	%		n	%	n	%		
High knowledge	30	55.5	28	52.8	0.58	42	85.2	30	56.6	0.00	3.5(1.5-6.5)
Low knowledge	24	44.5	25	47.2		8	14.8	20	43.4		

Before intervention, the nutritional knowledge in both groups were comparable. However, after intervention there was significantly changing. Table 3 shows, before intervention the proportion of high knowledge between intervention and control group was comparable (55.5% vs 44.5%; $p = 0.58$). After intervention, the high knowledge improved by 29.7% in intervention group and 3.8% in control group. Mothers in the intervention group were three and half times more likely to have better knowledge (RR = 3.5 (1.5-6.5) and $p = .00$)

FINDINGS

The present study proved that using score growth chart detected 22.5% stunted children and predicted 31.3% “tend to be stunted” children with HAZ >-1 to -2SD.

Assuming that half of those “tend to be stunted” children (15.7%) will be really stunted, therefore in the next round survey the prevalence of stunting could be in the range of 22.5% to 38.0%. The underlying reasons were because in most of nutritional surveys, parents were never well-informed on their child’s nutritional status. Most parents overestimated to their child nutritional status. [22-24] and restricted to get food make the children to have a risk to be malnutrition.[25]. The consequences the prevalence of stunting to be stagnated. This condition had happened in Indonesia. Since 2010 till 2016 prevalence of stunting stagnated at 35.0-37.0%. [5,6] and the coverage of food supplementary, exclusive breastfeeding and growth chart belonging was very low, 36.8%, 29.5% and 34.0%, respectively.[26]

These findings in line with the situation in other developing countries. de Onis et.al, found than by the year 2005-2010 stunting among pre-school children in Africa regions had stagnated at 38.8-38.2% and slightly decrease from 37.6% to 37.1% .[4] In sub-Saharan and Southeast Asia countries, the prevalence of stunting stagnated at 30%-40%, in Eastern Ethiopia 45.8%. [3,27] Lutter CK., et al (2011) also reported that only 36% of children in developing countries had exclusive breastfeeding and around half (~50%) poor meal practices.[28]

This study found that wall score growth chart was efficient as nutrition education media. Scoring system made it easier for mothers to interpret child growth. Involving mothers in taking child height measurements

and to do plotting in the chart were potential parts in nutrition education session. This results in a line with several studies who used a modified growth chart to improve maternal knowledge.[12,16], and the application of scores in health activities.[17,18] However, the economic and education level of participants might have played important role in these achievements.

The implication of this finding was in the next anthropometry survey, it needs to presents specifically the prevalence of children with HAZ >-1 to -2SD status and targeting them into nutritional intervention.

The primary strength of this study was the ability to prove the causes of stagnated stunting prevalence. The main limitation of the study was the sample. This study focused only the pre-schooler age and low number of mothers. Further study needs to cover the under-five year children and to include fathers in nutrition education session.



Figure 1. Taking height measurement individually



Figure 2. Taking height measurement collectively

CONCLUSION

The tracking of an individual child height-for-age z-scores on growth curve is an important indicator for

assessing stunting. This study found that the HAZ-1 to -2SD status is a useful indicator for predicting stunting children. Application of the score system in growth chart was effectively detecting and predicting stunting and improving mothers' knowledge of child growth.

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Conflicts of Interest: We declare that there are no conflicts of interest in this study

Ethical Clearance: The ethical clearance was taken from the Ethics Board, Polytechnic of Health Medan

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The Relationship between Hypermobility Syndrome and Systemic Lupus Erythematosus

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ABSTRACT

Objectives: investigate joint laxity in patients with systemic lupus erythematosus (SLE).

Patients and Method: case-control study involved 53 patients with SLE; disease activity for SLE assessed with the SLE Disease Activity Index (SLEDAI). Case histories and personal information assessed: age, SLE disease duration, body mass index (BMI), all subjects screened for hypermobility syndrome according to criteria of Beighton for joint hypermobility (total score 4 or more).

Results: Twenty-eight (52.8%) of the patients SLE had hypermobility compared to 31 (47.7%) of the control group. There is a slight increase in the risk of hypermobility in SLE patients compared to control the OR (95%CI): 1.229 (0.594-2.540). Considering joints complain Elbow pain was significantly higher in SLE patients compared to control. However, the rest (back, knee, and shoulder) showed no statistical difference between SLE and control. In SLE patients lower BMI associated significantly with hypermobility. There was a weak inverse relationship between hypermobility and age. There was no significant association in systemic lupus erythematosus patients between hypermobility with Anti- dsDNA, ANA, C₃ and C₄, but longer duration of disease and higher disease activity (SLEDAI) associated weakly with hypermobility.

Conclusion: SLE patients had a similar probability of having hypermobility compared to control, hypermobility increase with increasing immunological markers and with lower age and BMI, disease activity and ESR weakly increase the risk of hypermobility in SLE patients. Elbow joint pain associated with hypermobility in SLE compared to control while no such relationship found with back, knee and shoulder pain.

Keywords: SLE, Hypermobility, disease activity index, joint pain, disease activity

INTRODUCTION

SLE is a prototypic autoimmune disease characterised by multisystem involvement and the production of an array of autoantibodies. Clinical features in individual patients are highly variable, ranging from skin and joint involvement to organ- and life-threatening disease. SLE

is typically associated with a waxing and waning clinical course, but some patients have continuous disease activity⁽¹⁾. Systemic lupus erythematosus primarily is a disease of young women, with a peak incidence between the ages of 15 and 40 and a female: male ratio of 6 – 10: 1. The age at onset, however, can range from infancy to advanced age; in both pediatric- and older-onset patients, the female: male ratio is approximately 2:1⁽²⁾. The reported prevalence of SLE in the general population is approximately 20 to 150 cases per 100,000 persons⁽³⁾. In Iraq, the prevalence of SLE was estimated to be one case per 1867 of the population, one per 1127 of the total female population and for women aged between 10 and

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49 years it was one per 616⁽⁴⁾.

Benign joint hypermobility syndrome (BJHS) is a heritable disorder associated with laxity and pain in multiple joints⁽⁵⁾. It found in chromosomal and genetic disorders such as Down syndrome and metabolic disorders such as homocystinuria and hyperlysinemia⁽⁶⁾. Benign hypermobility syndrome may present with joint dislocation and subluxation, arthralgia, arthritis, tendonitis, tenosynovitis, damaged ligaments and ligamentous attachments and fractures. BJHS can also involve other organ systems resulting in other collagen-related disorders⁽⁷⁾. Benign Joint hypermobility syndrome (BJHS) is very common in musculoskeletal disease clinics, but the diagnosis often missed, and the actual prevalence of JHS is not known⁽⁸⁾. In general, women have greater joint laxity than men⁽⁹⁾. In Iraq, the prevalence of joint hypermobility among university students determined from a survey made in 1981 in 25.4% of males and 38.5% of females⁽¹⁰⁾.

METHOD

Study design: a case-control study conducted at the Rheumatology Unit Department of Medicine in Baghdad Teaching Hospital from September 2016 to May 2017.

Sample selection: a total of 106 subjects enrolled in the study, 53 of them diagnosed as SLE, met the revised American College of Rheumatology (ACR) classification criteria⁽¹¹⁾, and 53 were controls age between (18-50). The degrees of joint hypermobility in both groups recorded according to Beighton method for all participants in the two groups. Participants who recorded 4 or more scores were considered hypermobile⁽¹²⁾. Hypermobility measured without blinding; patients excluded if they suspected of having Marfan or Ehler-Danlos syndromes—namely, the presence of a marfanoid habitus, dermal extensibility, and cutaneous scarring. Patients with renal failure and on haemodialysis excluded.

Data collection: All patients reviewed for age, gender, occupation, educational status, body mass index (BMI), SLE disease duration, data related to main disease

manifestations and other related features to BJHS. Disease activity for SLE assessed with the SLE Disease Activity Index (SLEDAI)⁽¹³⁾. Sociodemographic data and medications recorded.

Laboratory measurement: 1) Blood investigations measured in the form of haemoglobin, white blood cells (total and differential count), platelets, blood urea, serum creatinine, serum GPT, serum GOT, antinuclear antibodies, anti-double stranded-DNA (anti-ds-DNA) antibodies, and complements components. 2) Urine examination is done for the measurement of protein, white blood cells, red blood cells and cellular casts.

Ethical approval and signed consent: Ethical approval was taken from the medical department in Baghdad teaching hospital and college of medicine. Informed written consent was taken from the individuals for admission in the study.

Statistical analysis: chi-square test or Fisher exact test (used instead of chi-square for a 2x2 table, if total sample <20 and if 2 or more with an expected frequency is less than 5) used to analyse the discrete variable between 2 groups. Two samples t-test used to analyse the differences in means between two groups (if both follow a normal distribution with no significant outlier). Binary logistic regression analysis used to calculate the odds ratio (OR) and their 95% confidence intervals, when the outcome can categorise into two binary levels. SPSS 20.0.0 software package used to make the statistical analysis, p-value considered when appropriate to be significant if less than 0.05

RESULTS

All the patients and control in this study were females with mean age of SLE patients 33.0 ± 10.1 years and 31.0 ± 9.9 years for control, 26.6 ± 5.3 kg/m² was the BMI for control and 26.7 ± 6.2 kg/m² for SLE patients, the rest of the data explained in table 1. There was no significant difference between a patient with SLE and control in age, sex (all patients and control were female), weight, height and BMI, as illustrated in table 1.

Table 1: Demographic and clinical characteristics of patients and controls

Variables	Controls	SLE	P value
Number	65	53	-
Age (years), mean \pm SD	33.0 \pm 10.1	31.0 \pm 9.9	0.277
Sex			-
Female	65 (100%)	53 (100%)	
Weight, mean \pm SD	67.9 \pm 14.9	67.4 \pm 15.7	0.862
Height, mean \pm SD	159.6 \pm 6.4	157.2 \pm 15.3	0.249
BMI, mean \pm SD	26.6 \pm 5.3	26.7 \pm 6.2	0.972
Disease duration (years), median (IQR)	-	4 (1 – 7)	-
SELENA-SLEDI score	-	8 (2 – 12)	-
Inactive disease	-	20 (37.7%)	-
Active disease	-	33 (62.3%)	-
Hemoglobin, mean \pm SD	-	12.0 \pm 2.0	-
WBC, mean \pm SD	-	8.1 \pm 3.4	-
Platelet, mean \pm SD	-	264.6 \pm 87.7	-
ESR, median (IQR)	-	35 (24 – 53)	-
Positive Anti-Ds DNA	-	24 (45.3%)	-
Positive ANA	-	49 (92.5%)	
Decreased C₃	-	7 (13.2%)	-
Decreased C₄	-	17 (32.1%)	-
SLE: systemic lupus erythematosus, ANA: Anti-nuclear antibody, Anti –dsDNA: Anti-double-stranded deoxyribonucleic acid, cm: Centimetre, kg: kilogram, WBC: white blood cell, ESR: Erythrocyte sedimentation rate			

The percentage of DM and hypertension in both SLE and control was not statistically significant (despite that their percentages were higher in SLE patients), considering joints complain only Elbow was significantly

higher in SLE patients compared to control (18.9% vs 1.5%), however the rest (back, knee, and shoulder) was not statistically different between SLE and control, as illustrated in table 2

Table 2: Co-morbid disease and joint complain for patients and controls

Variables		Controls	SLE	P value
Number		65	53	-
Co-morbid diseases				
DM	Not	65 (100.0%)	50 (94.3%)	0.088
	DM	0 (0.0%)	3 (5.7%)	
Hypertension	Not	61 (93.8%)	44 (83.0%)	0.062
	HTN	4 (6.2%)	9 (17.0%)	
Joint complain				
Back	Negative	52 (80.0%)	43 (81.1%)	0.877
	Positive	13 (20.0%)	10 (18.9%)	
Elbow	Negative	64 (98.5%)	43 (81.1%)	0.001 [Sig.]
	Positive	1 (1.5%)	10 (18.9%)	
Knee	Negative	53 (81.5%)	42 (79.2%)	0.754
	Positive	12 (18.5%)	11 (20.8%)	
Shoulder	Negative	65 (100.0%)	51 (96.2%)	0.200
	Positive	0 (0.0%)	2 (3.8%)	
DM: Diabetes mellitus, HTN: hypertension, SLE: Systemic lupus erythematosus				

Despite there was no statistically significant difference between patients and control median Beighton score was higher in patients than control four versus 3, and 52.8% of the SLE had hypermobility compared to 47.7 in control (there is 22.9% probability that patients with hypermobility have SLE compared to control), as illustrated in table 3.

Table 3: hypermobility and Beighton score for patients and controls

Variables	Controls	Patients	P value	OR (95%CI)
Number	65	53	-	-
Beighton score for joint hypermobility	3 (2 – 6.5)	4 (2 – 6)	0.825	1.229 (0.594-2.540)
No hypermobility	34 (52.3%)	25 (47.2%)	-	
Hypermobility	31 (47.7%)	28 (52.8%)	-	
OR: odds ratio, (95%CI): Confidence interval,				

Younger age (≤ 30 years), low haemoglobin, low WBC, low platelet-associated weakly with hypermobility, however only lower BMI associated significantly with hypermobility. Positive DNA, and positive C_4 associated weakly with hypermobility (2 folds associated with hypermobility), positive C_3 , positive ANA, longer duration of disease and higher disease activity (SLEDI) also associated weakly with hypermobility as illustrated in table 4

Table 4: Hypermobility in SLE patients

Variables	No hypermobility	Hypermobility	P value	OR (95%CI)
Number	25	28	-	-
Age (years)	33.4 \pm 10.5	28.8 \pm 9.0	0.062	0.952 (0.890-1.003)
≤ 30 years	13 (52.0%)	15 (53.6%)	0.909	0.939 (0.319-2.766)
> 30 years	12 (48.0%)	13 (46.4%)	-	1.0
BMI	28.4 \pm 7.2	25.2 \pm 4.8	0.037	0.914 (0.818-0.997)
< 25	11 (44.0%)	15 (53.6%)	0.507	1.0
25 – 29.9	5 (20.0%)	7 (25.0%)	0.278	0.489 (0.134-1.782)
≥ 30	9 (36.0%)	6 (21.4%)	0.970	1.027 (0.257-4.108)
Hemoglobin	12.2 \pm 1.7	11.9 \pm 2.2	0.577	0.922 (0.698-1.220)
WBC	8.6 \pm 4.0	7.7 \pm 2.8	0.372	0.370 (0.787-1.093)
Platelet	287.0 \pm 80.1	244.6 \pm 90.6	0.079	0.994 (0.987-1.001)
ESR	33 (23 – 44.5)	42 (25.3 – 57)	0.373	1.014 (0.986-1.043)
Disease duration	4 (1.5 – 6.5)	4 (1 – 7)	0.886	0.990 (0.918-1.068)
SLENA-SLEDI	8 (3 – 10)	8 (2 – 12)	0.719	1.016 (0.934-1.105)
Inactive	9 (36.0%)	11 (39.3%)	-	-
Active	16 (64.0%)	17 (60.7%)	-	-
DsDNA (positive)	9 (36.0%)	15 (53.6%)	0.202	2.051 (0.680-6.186)
ANA (positive)	23 (92.0%)	26 (92.9%)	0.906	1.130 (0.147-8.682)
C_3	3 (12.0%)	4 (14.3%)	0.806	1.222 (0.246-6.083)
C_4	6 (24.0%)	11 (39.3%)	0.238	2.049 (0.623-6.740)

DISCUSSION

In the current study, 52.8% of the systemic lupus erythematosus patients had Beighton score ≥ 4 while 47.7% of the matched control had Beighton score ≥ 4 , and those joints classified as hypermobile. The current study aimed to the possible correlation between systemic

lupus erythematosus and hypermobility joint in a case-control study. The results of the current study was in agreement with previous studies in which there was no significant difference in the rate of hypermobility between systemic lupus erythematosus patients compared to matched control, initial study by Klemp et al. [1] reported 7% vs 6% hypermobility between

systemic lupus erythematosus and control respectively; and in their study [1] the frequency of hypermobility in both systemic lupus erythematosus and control was lower than our, also in another study [2] the frequency of hypermobility 23% vs 27% in SLE vs control which also was similar to our finding of no association between systemic lupus erythematosus and hypermobility. These difference in the rate of hypermobility among studies and compare to the current study caused by the different methodology in each study.

In systemic lupus erythematosus patients, there was no significant difference between patients with Beighton score ≥ 4 with those < 4 in age, and disease duration which is similar to the findings of Klemp et al. ⁽¹⁴⁾, indicating both these variables did not affect increasing or decreasing the frequency of hypermobility in SLE patients.

Back, knee and shoulder joint complain statistically not significant between systemic lupus erythematosus and control, while in Gumà et al. ⁽¹⁵⁾ more than 80% of systemic lupus erythematosus patients had musculoskeletal symptoms which they attributed this high rate of symptom to SLE disease activity and less came from hypermobility; while in the current study both groups had a low rate of such joint involvement in both control and SLE and more large sample size are needed, or our patients had low disease activity or in remission ⁽¹⁵⁾.

Systemic lupus erythematosus patients presented with the generalised tendinous condition, especially those present with atlantoaxial subluxation, Jaccoud's arthropathy, and tendinitis. In a study ⁽¹⁵⁾ the authors reported that half of their SLE patients had localised hand hypermobility, and they also reported the most frequent manifestations were distal interphalangeal joint laxity and wrist instability ⁽¹⁵⁾.

In the current study no significant association in systemic lupus erythematosus patients between hypermobility with dsDNA, ANA, C₃ and C₄ (using univariate binary logistic regression analysis to predict the association) which in agreement with Gumà et al. ⁽¹⁵⁾ of no association between hypermobility with immunological, clinical and analytical features of SLE.

In the current, there was a weak inverse relationship between hypermobility and age (odds ratio = 0.952, i.e. for each year the patient younger there is 4.8% increased

probability of having hypermobility) which is similar to the previous study of increased hypermobility in younger age ⁽¹⁶⁾ and decreased slowly with ageing. In the current study we could not assess the relationship between gender and hypermobility since all our patients are females which is a possible bias of neglecting males, however, the rationale for this that female had a higher prevalence in SLE patients and also female had a higher rate of hypermobility; so we exclude male from seeing the effect of hypermobility of female SLE patients they are born to higher possible risk for both conditions ⁽¹⁶⁾.

In the current study the effect of BMI was similar between SLE and control ($p = 0.972$), however within the SLE patients there was inverse correlation between BMI and hypermobility (OR=0.914, $p = 0.037$) indicating the lower the BMI the higher probability of having hypermobility (1 unite increase in BMI there is 8.6% increased probability of having hypermobility), no study in the literature study the effect of BMI on hypermobility in SLE patient founded, and this the first reported observation about this correlation.

There is a slight increase (i.e. non-significant) in the association between disease activity of SLE and hypermobility (odds ratio = 1.016) indicating the higher the disease activity, the higher the probability (by 1.6% for each unit increase in disease activity) of having hypermobility. In the current study only elbow joint was significantly higher in SLE patients compared to control, no current explanation why the only elbow was significantly higher in SLE compared to control while other joint did not, which could be caused by low sample size that affects the power of detection of this, further studies are required to elucidate this relationship.

CONCLUSION

Systemic lupus erythematosus patients had similar probability of having hypermobility compare to control, hypermobility increase with increasing immunological markers, hypermobility increase with decreasing age and BMI, disease activity and ESR weakly increase the risk of hypermobility in SLE patients, and Elbow joint complains associated with hypermobility in SLE compared to control while no such relationship found with back, knee and shoulder pain.

Conflict of Interest : None

Ethical Clearance: Informed written consent obtained from all the participants in the study, and the

study and all its procedure were done by the Helsinki Declaration of 1975, as revised in 2000. The study approved from the medical department in Baghdad teaching hospital and college of medicine

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Mapping the Model of Ecological Vegetation as Potential Malaria Habitats in a Malaria-Endemic Region in Oesao Village, Kupang Regency, Indonesia

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ABSTRACT

Environmental risk factors, both physical and biological (e.g. ecology of vegetation/plants, forest), equally serve as the risk factors for *Anopheles* mosquitos breeding. This study was designed to determine a model of spatial mapping for the ecology of vegetation and the potential habitats for the *Anopheles* mosquitos. Descriptive epidemiological research was implemented to carry out the project, supported with a cross-sectional design. The research took place in Kupang regency, Oesao village, lasting for 2 months from October to November 2014. The ecology of the vegetation and all habitats of the mosquitos in Oesao village were regarded as the population of the research. They were purposively sampled. The vegetation mapping revealed that the land area for rice fields is 169 ha, coconut and banana tress 56.68 ha, maize 67.03 ha, vegetable plants 59.53 ha, forages 21.52 ha, and forests 16.24 ha. The results of the mapping also revealed that the mosquitos breeding sites entail paddy fields, swamps, irrigation channels, and damps. The ecology of all types of plants mapped serves as potential habitats for the *Anopheles* mosquitos breeding sites. Plant ecology is quite varied in the Oesao Village, as well as extensive areas of the plant that are closely linked to inadequate growth and development of mosquitos and specific species of *Anopheles*, *An. vagus* and *An. annularis*.

Keywords: Ecological vegetation mapping; Breeding sites; Malaria mosquitos

INTRODUCTION

Malaria, a mosquito-borne disease, has caused an enormous number of deaths worldwide, particularly in the developing countries⁽¹⁾. Children and pregnant women are the most vulnerable groups to malaria deaths. The eastern Indonesia province of Nusa Tenggara Timur (NTT) is one of the provinces with the third highest malaria case in Indonesia; there was an estimated of 16.37% of malaria cases confirmed with blood test⁽²⁾. Based on the Annual Report of the Provincial Health

Office of NTT, the annual parasite incidence (API) for Kupang regency has been high for the last three years, with API of 3.55 ‰ in 2009, 6.48 ‰ in 2010, and 6.72 ‰ in 2011⁽³⁾.

There are community health centers (*puskesmas*) in Kupang regency showing an increase of malaria cases, included as health centers with high case incidence (HCI), i.e. Oesao, Naikliu and Oekabiti. The health center in Oesao district is the one with the highest number of increasing malaria cases. Concerning the Annual Parasite Incidence (API) in Oesao, it reached 4.04 ‰ in 2009, and continuously increased to 7.67 ‰ in 2010 and 10.17 ‰ in 2011⁽⁴⁾.

In NTT province the physical and biological environment (plant/plant ecology, forest) serves as environmental risk factors for *Anopheles* mosquitos

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breeding. This is so, for the spread, cluster and varieties of plants greatly vary; it is further supported by temperature, light intensity, air temperature, humidity, wind speed and precipitation, all of which provide suitable breeding environments for *Anopheles* population. The bionomic life of mosquitos that suits both the environment and cultural factors present in the society and the community behaviors becomes reinforcing and enabling factors, supporting the *Anopheles* mosquitos breeding in NTT province. As a result, it still places the province at a high risk of malaria cases and this becomes the major problem in the pursuit of malaria eradication.

There has not been an effort made to carry out spatial mapping (geographically) to map the physical and ecological factors of plants and mosquito breeding sites; the employment of advanced technology for mapping local specific areas with appropriate and accurate equipments is still rare as well. Such technology is pivotal to obtain a description of the physical environment conditions, the ecological patterns (species and area of forests/plants), and the geographical locations of the mosquito breeding sites (river, lake, standing water, ditch).

This study aims to map the risk factors for malaria: mapping of plant ecology and potential breeding habitats of *Anopheles* mosquitos. Furthermore, images of the mapping are used as the basis in establishing malaria intervention and eradication model in malaria endemic areas in Kupang regency.

MATERIALS & METHOD

Research Design

Descriptive epidemiological research was implemented to carry out the project, administering surveys to obtain ecological and geographical information. Furthermore, a cross-sectional study was employed. This research was conducted in Kupang regency, Oesao district. The research lasted for 2 months running from October to November 2014. Population in this research is all *Anopheles* sp mosquito habitats and plant ecology in Oesao district, Kupang regency.

Data Collection

The mapping of plant ecology and malaria breeding sites is done by mapping the distribution and abundance of plants in the *Anopheles* sp mosquito habitats and measuring the mosquito breeding sites in the malaria

endemic areas using GIS and GPS equipments.

Research Instruments

GPS (Global positioning system) was operated to take coordinates and track the mosquito habitats in the research site and a software, was respectively employed to process the data.

Data Analysis

The data obtained were presented in the form of spatial map images, which were then spatially and descriptively analyzed. Spatial data analysis program was used to process the spatial data.

FINDINGS

The larval habitat map consists of 4 habitat types: rice fields, swamps, rivers, irrigation channels, and dams. Based on Figure 1, it can be seen that larval habitats for rice fields have larger areas than other larval habitats; the arable area is 169.00 Ha. Other larval habitats found are water dams, swamps, irrigation channels and rivers, all of which become the breeding sites of *Anopheles* mosquito larvae. From the above map, it appears that all potential habitats for the growth and the spreading of *Anopheles* mosquito larvae reside in this region, covering a quite large area.

As presented in Figure 2, the area for coconut and banana trees covers 56.68 hectare. They are kinds of high-tree plants. So far, there has not been any research finding describing the leaves of coconut and banana trees as favorite resting places for *Anopheles* mosquitos.

Based on Figure 3, the map of the distribution of the maize (not kinds of high-tree plant species) spread evenly throughout the village. The area of maize is 67.03 hectare. From all plant species, maize covers the largest area.

Vegetable plants widely found in Oesao village are mustard, water spinach, cabbage, and root tuber. The land area for the vegetable crops is 59.53 hectare. Most people work to grow fast growing or short-term vegetables that can be immediately harvested. The crops are for local consumption, and they are also sold (Figure 4).

Figure 5 shows the forest land area in Oesao village. The forest land area for large plant types is quite small, covering only 16.24 hectare. It is the smallest area

compared to other areas in the village.

Types of plants included in forage plants are red barons, grasses, and shrubs. In Figure 6 above, it is shown that the land area for the forage plants covers approximately 21.52 hectare.

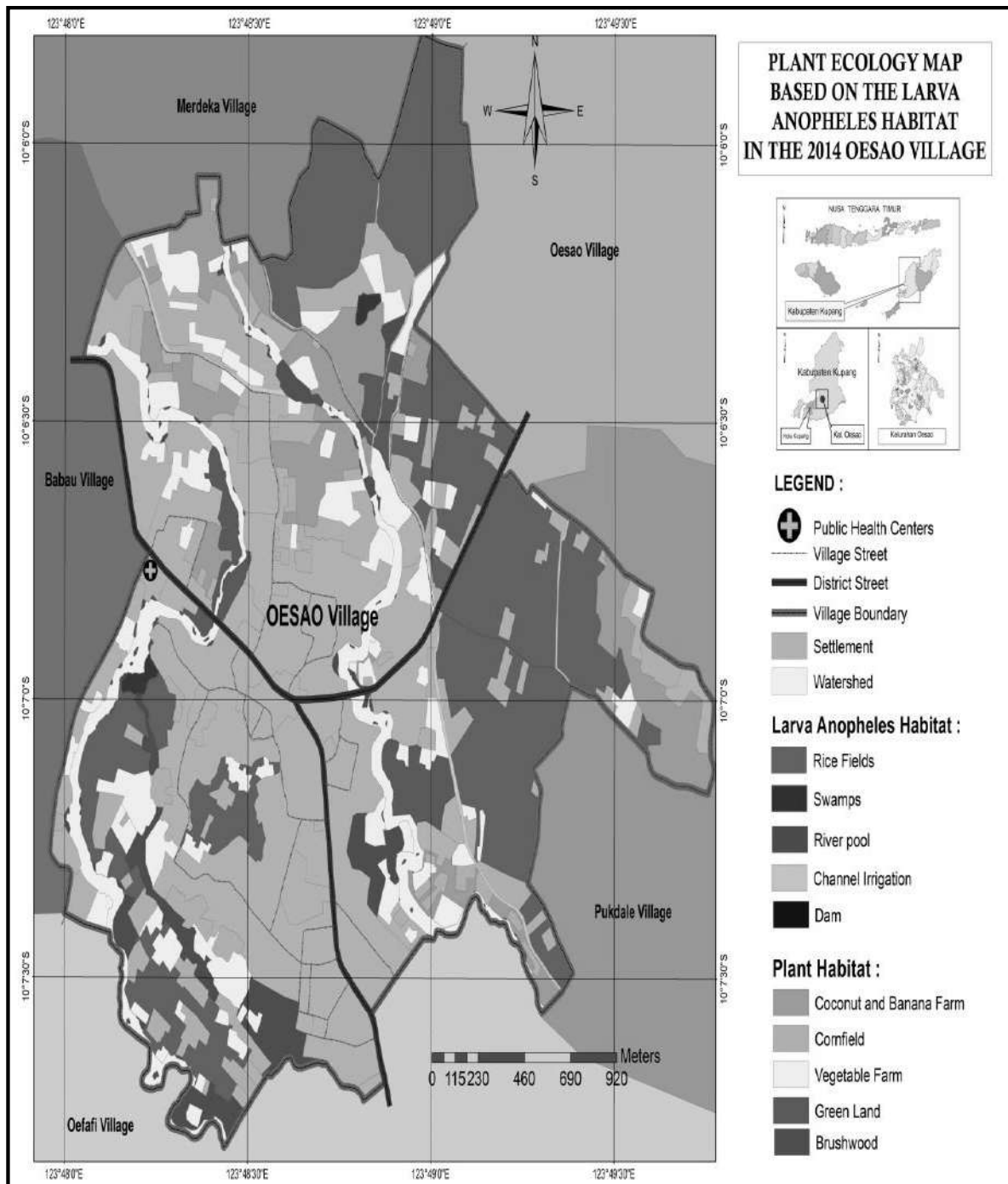


Figure 1. A Map of mosquito breeding sites (*Anopheles Sp* larval habitats) and ecology of vegetation in Oesao Village in 2014

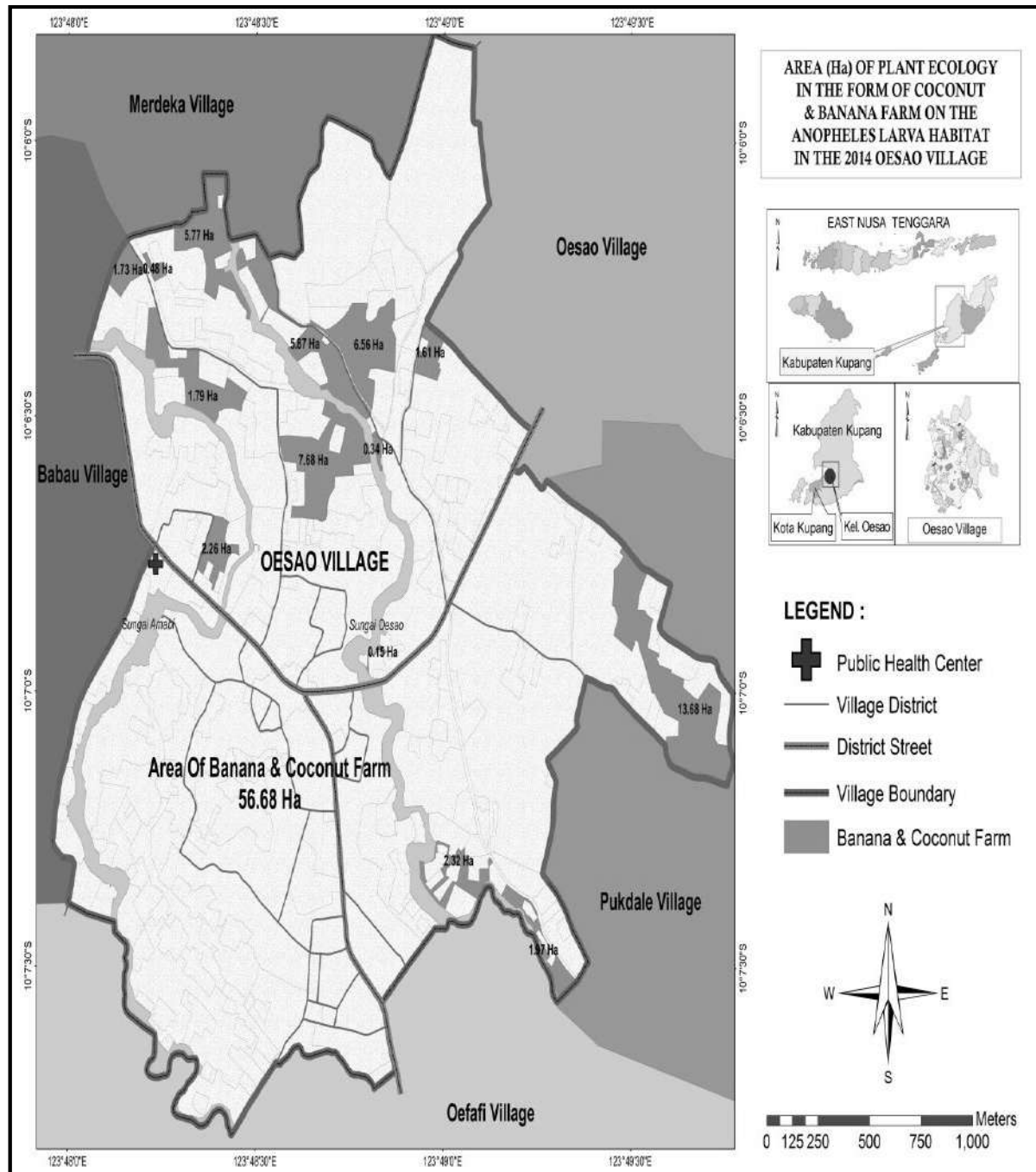


Figure 2. A map of ecology of coconut and banana trees and the land area in Oesao Village in 2014

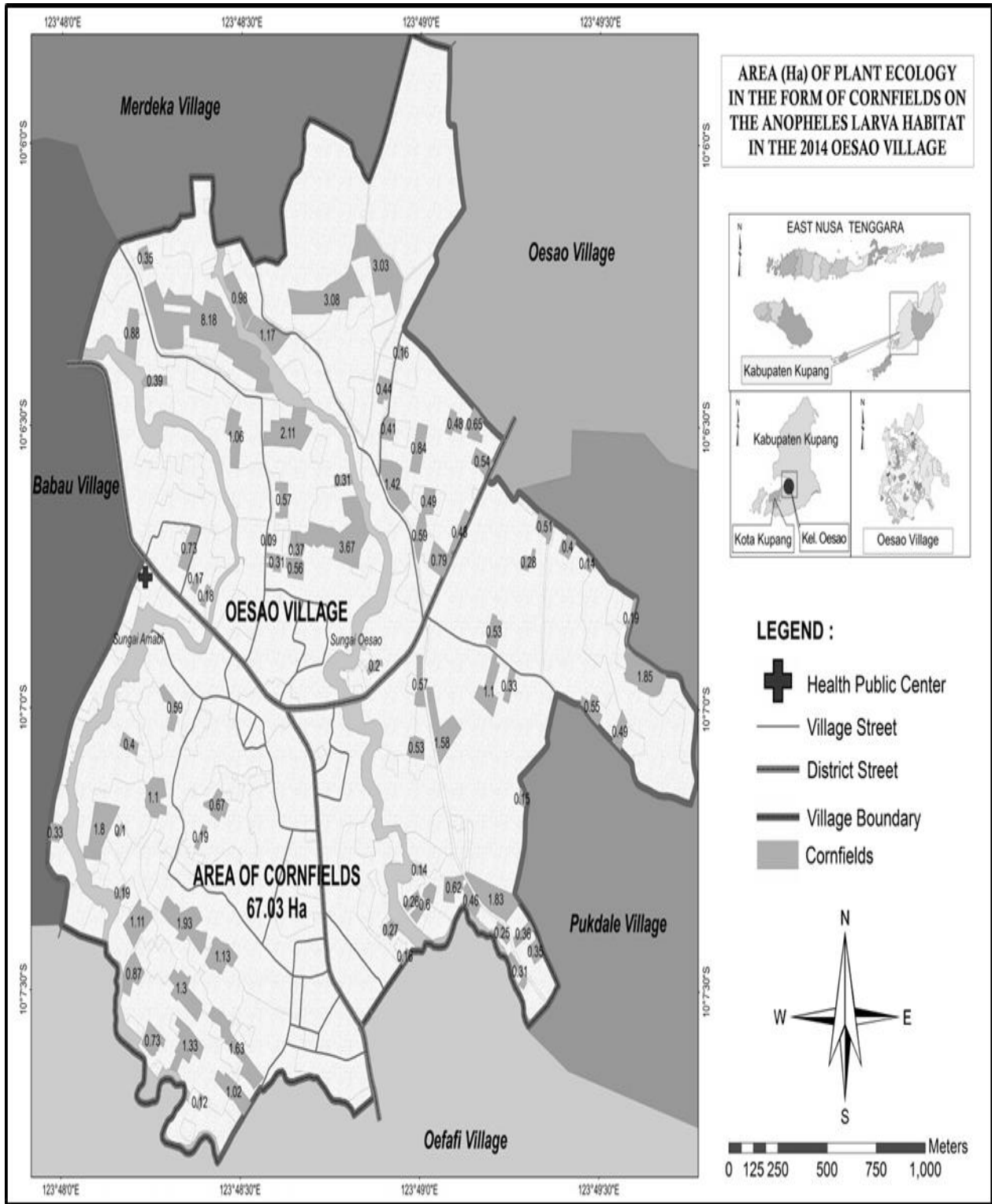


Figure 3. A map of ecology of maize and the land area in Oesao Village in 2014

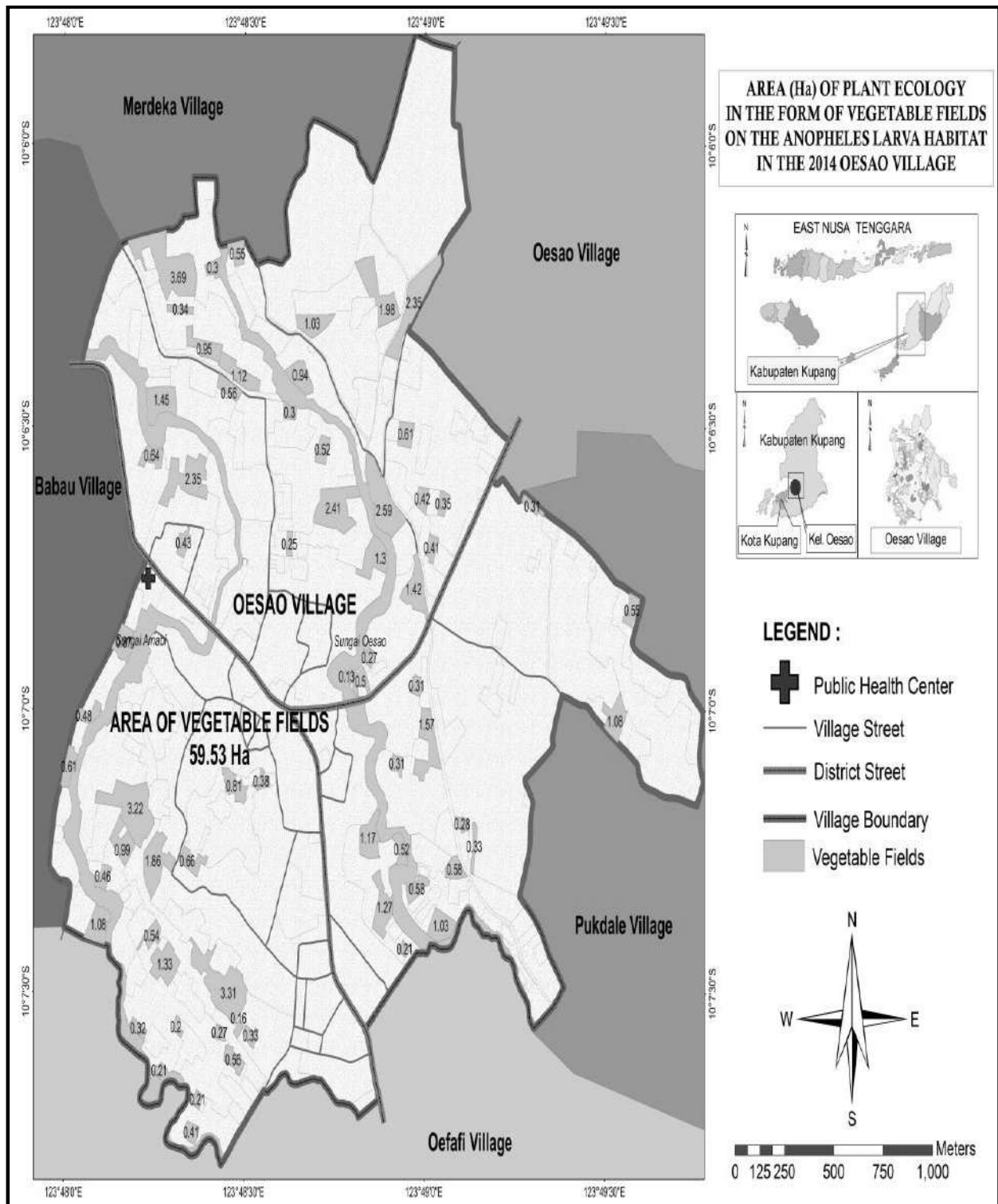


Figure 4. A map of ecology of vegetable plants and the land area in Oesao Village in 2014

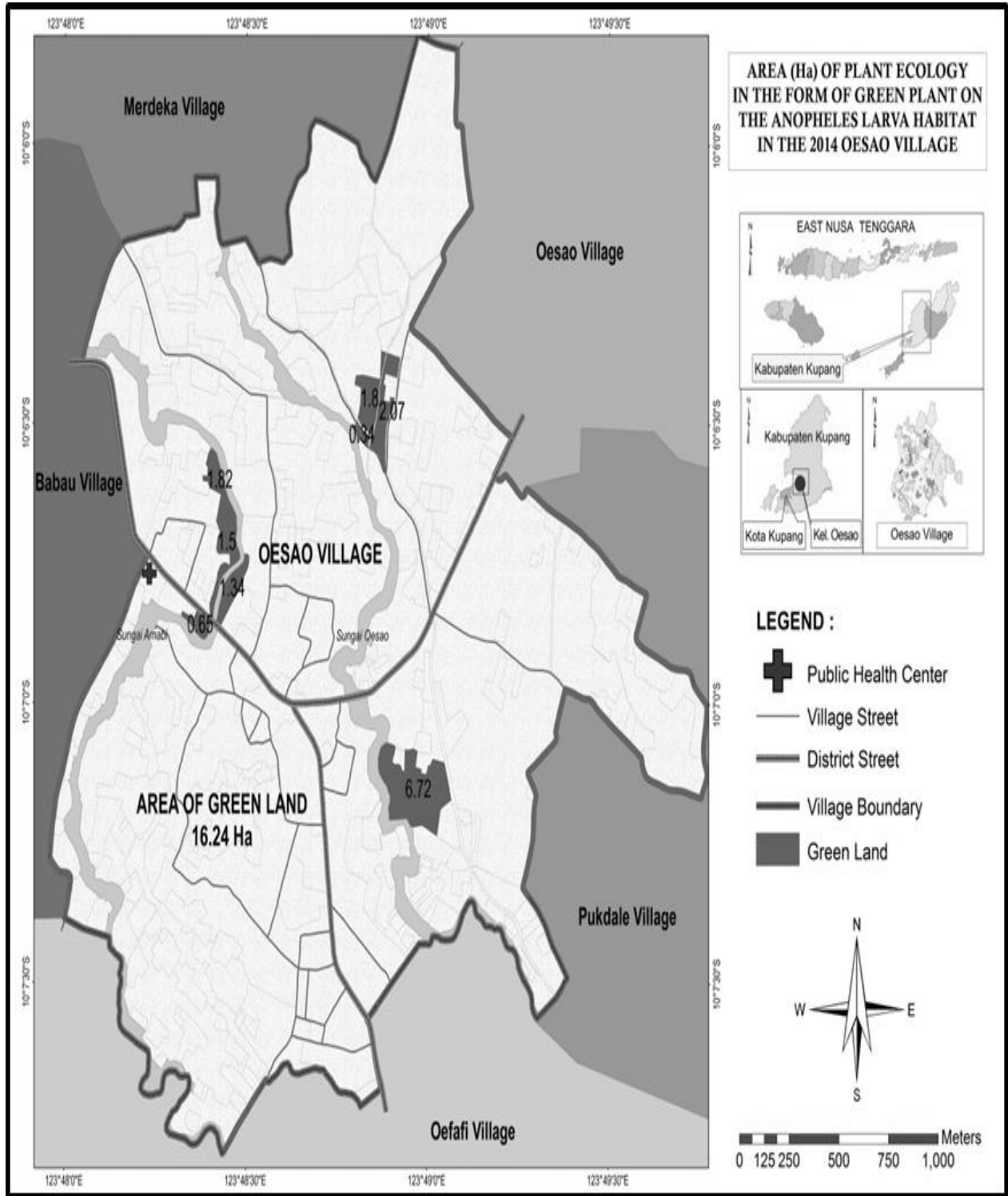


Figure. 5 A map of ecology of forest area/large plants (green area) in Oesao Village in 2014

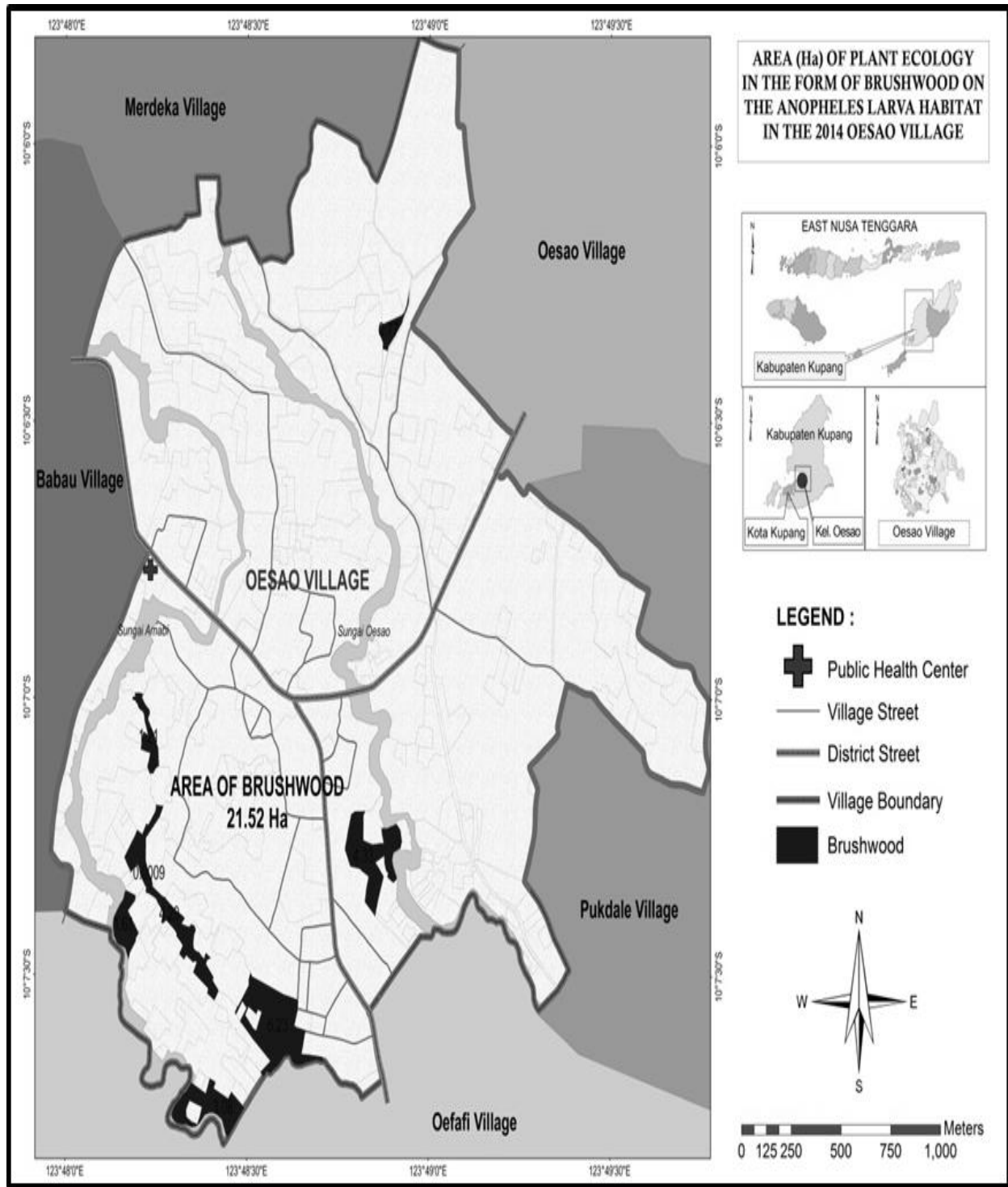


Figure 6. A map of forage plants and the land area in Oesao Village in 2014

From the illustration of the distribution of cases on the map (Figure 7), the spread is evenly distributed, and the types of plasmodium are falciparum and vivax.

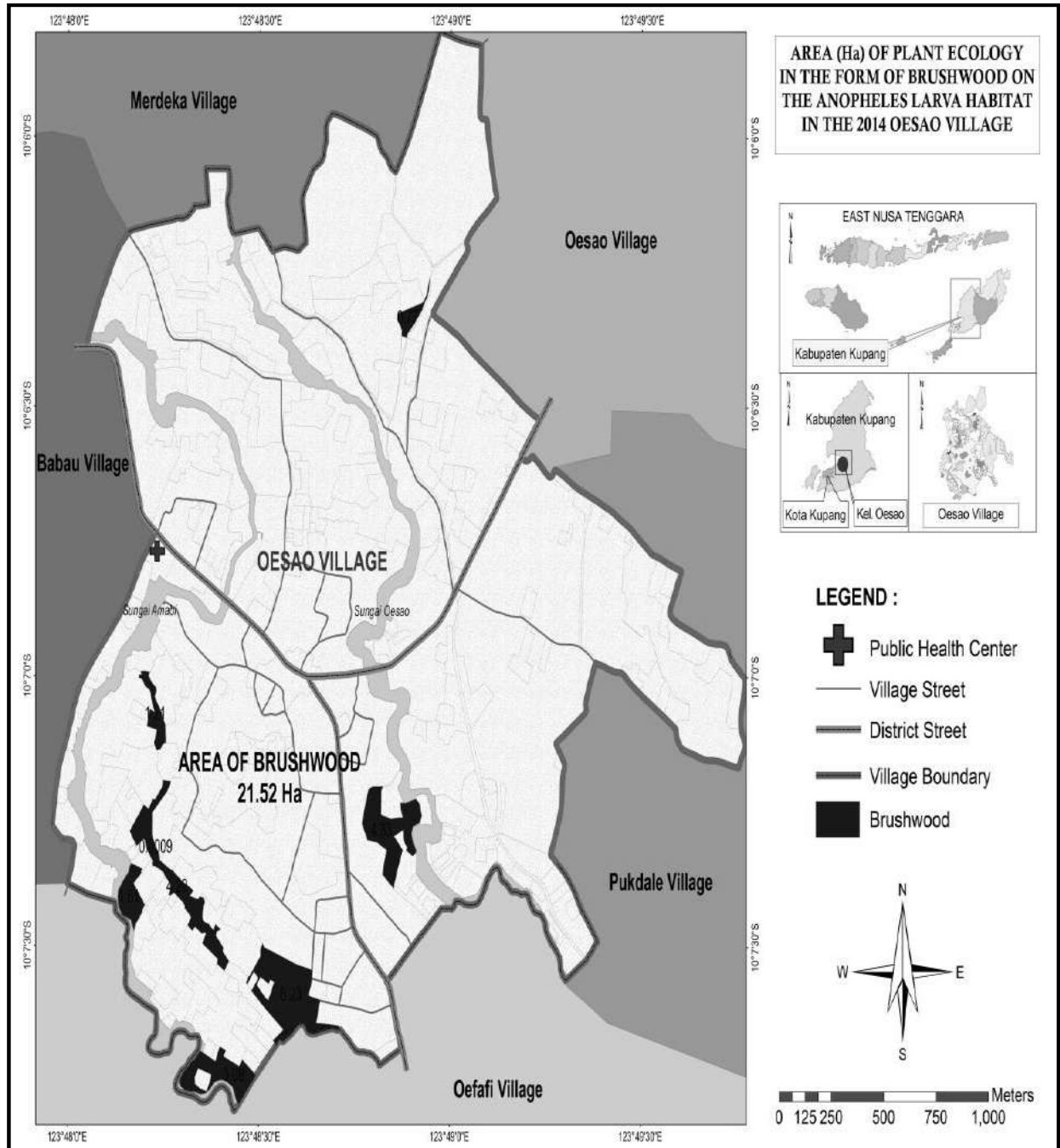


Figure. 7 A map of the distribution of malaria cases and the ecology of vegetation in Oesao District, Kupang Regency

DISCUSSIONS

Ecological Vegetation Mapping

The ecology of vegetation is a community of plants according to their types and distributions that support the vectors breeding and growth of *Anopheles* mosquitos, particularly as resting sites and producers of oxygen

supply (O₂) contributing to the survival of mosquitos and other living organisms.

In general, there is a relationship between the plant habitat, types of plant, also the area of arable field on the growth and proliferation of *Anopheles* mosquitos⁽²⁾. For some types of plants in arable lands such as rice, kale, root tubers, grasses, blushes, and shrub, they become

very suitable habitats or resting sites for *Anopheles* sp mosquitos. Based on the research results, the researcher found an average of one to three larvae in a cup of water in the arable area. Geographically, rice paddy is the largest cultivation area in Oesao district. This is so, for the soil structure and rainfall intensity of Oesao district are suitable for the rice cultivation. Therefore, it reasons out why most Oesao people choose rice cultivation as the main source of their livelihood.

Theoretically, the ecology and area of rice paddy in Oesao district including irrigation canals and standing water along with grass as its protector make them suitable sites for *Anopheles* mosquitos breeding. In addition, another factor that supports proliferation of *Anopheles* mosquitos is the temperature of water in the Oesao's rice paddies. The result of measurement showed that the average of water temperature in the arable area is 29.37 °c. The water temperature was measured in the peak of dry season with very hot ambient temperature. The optimum temperature for *Anopheles* mosquitos' proliferation is 26°C up to 30°C⁽²⁾. Another reference says that the optimum temperature for the growth and proliferation of mosquitos is 20°C up to 30°C⁽⁵⁾. In addition, pH measurements in the rice paddies also demonstrated nominal values ranging from 6.6 to 6.98. However, according to the book published by Department of Health, 2017, "Ecology Malaria Vector", it is stated that the optimum pH for larvae's development is 6 - 8.

The researcher found another fact that in the ecology of Oesao District there are all types of plants ranging from groups of forages (including grass and shrub), vegetables (mustard, kale, eggplant, sweet potato, cassava), rice crops (rice paddy), high-tree plant species (coconut and banana trees), to forest areas (green fields). Some experts suggest that vector growth is inextricably linked with the number and type of plants. The land and plants area affect the growth and proliferation of *Anopheles* mosquitos. The wider and the more diverse the types of plants, the better for the mosquitos' proliferation than the dry and barren areas.

From the environmental aspect, pH and temperature provide positive contributions to the growth and breeding of mosquitos. Moisture level and adequate rainfall intensity per year also support such conditions to thrive. Concerning the book published by UNICEF in 2012, "Malaria, Immunization and Integrated KIA (Maternal

and Child Health)", geography and meteorology factors such as temperature, humidity, rain, and altitude are very beneficial to malaria transmission in Indonesia. These are the major factors that explain why malaria case in Oesao district is very high.

Mapping of the Mosquito Breeding Sites (Larvae Habitats)

The illustration of map on larval habitats comprises of 5 habitat types: rice paddies, swamps, rivers, irrigations, and dams. The mosquito breeding sites in rice paddies are the standing water and the water in irrigation canals that flow continuously on edge of the rice paddies. Based on Figure 1 above, the rice paddies become the largest area of the mosquito habitat compared to other larval habitats; the size of rice paddy is 165.03 Ha. The researcher classifies rice paddies into two roles: (1) as plant ecology and (2) as habitat of malaria mosquito breeding sites. In the discussion above, the rice paddy is closely related to the bionomic life of malaria mosquitos.

Previous studies found that the best resting places for adult mosquitos are areas in rice paddies like terraces, and edges. These places are suitable sites for adult mosquitos since they are not far from water puddles, water drains, irrigation canals of rice paddies, so that adult mosquitos can easily put their eggs in water anytime⁽⁴⁾. Beside rice paddies, the other larval habitats are water dams, swamps, irrigation canals, and rivers. Nevertheless, all types of habitats mentioned above are very suitable for the growth and proliferation of *Anopheles* mosquitos.

From the above map, it appears that all potential habitats for the growth and proliferation of *Anopheles* mosquito larvae reside in this region, with a large enough area.

Distribution of Malaria Cases

After combining the data of ecological vegetation with the previous data of the mapping, and mosquito breeding sites (larval habitat), the result revealed that the spreading of malaria patients in Oesao district was distributed evenly. Based on spatial mapping, it is clearly illustrated that the main factors that contribute to the growth and proliferation of larvae and malaria mosquitos are the number and types of plants, the area of arable land, pH and temperature of the malaria mosquitos' breeding sites, and also the types of the breeding sites.

To ensure the relationship or influence of these three factors, a more in-depth analytical research needs to be conducted in the future; 232 such as the analysis based on the demographic characteristics, the mobility of sufferers, etc.⁽⁶⁾.

CONCLUSION

Ecology of plants by type consisting of 5 types of plants are dominant, namely: crop rice (paddy), maize crops, vegetable crops, coconut and banana plants, plant shrubs and grass and forest plants. Plant ecology are quite varied in the Village Oesao, as well as extensive areas of the plant that is closely linked to inadequate growth and development of mosquitoes as well as species specific anophelles that kind of *An. vagus* and *An. annularis*.

Conflict of Interest: None

Ethical Clearance Certificate: Ethical Committee of Faculty of Public Health, Airlangga University.

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Barriers in Treating Patients with Acute Coronary Syndrome in Indonesia Primary Health Care: A Phenomenological Study

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ABSTRACT

Introduction: Acute Coronary Syndrome (ACS) is the leading cause of mortality in the world. Primary prevention strategy focuses on reducing the risk of disease spread. At the same time, curative strategy aims at reducing the risk of disability and mortality. Initial therapy should be considering early stabilization and immediate advanced care to reduce the risk of complication. Therefore, it is important to improve guidelines, the medical referral system, and family consent procedure to save patients with ACS.

Aim: This research aimed at exploring the barriers faced by nurses in treating patients with ACS in Primary Health Care (PHC).

Method: This research employed a qualitative research method using descriptive phenomenology. This study involving 16 subjects of nurses working in PHC with indepth interview . The data analysis procedure proposed by Clark and Brown 2013.

Result: Three main themes were pointed out by 16 participants; 1) Update Guidelines, 2) Inefficient referral process to other health centers, 3) Consent making process by the family.

Dicussion: Barriers in performing health care for patients with ACS in the emergency unit of PHC needs updating guideline to be enhanced by engaging the advancement of technology and communication using electronic medical record system, family education, and fulfillment of better medical facilities to make the process more efficient. At the same time, also improves the management service for patients with ACS and making it possible for PHC to provide reliable health care as the first health care provider for the society.

Keywords: *Barriers to care, Health Care Referral, Acute Coronary Syndrome, Emergency Nursing, Primary Health Care*

INTRODUCTION

Acute Coronary Syndrome (ACS) refers to a condition or complication of diseases which cause unstable condition caused by burst of blood vessels, causing sudden occlusion in the coronary artery.^[1] According to the data released by the WHO (2008), acute coronary syndrome is the world's top killer and causes death twice as much as cancer.^[2] Record shows

that around 7.200.000 people (12.2%) have died of ACS. The chance in rescuing patients with cardiac arrest declines around 7-10% every minute.^[3] Based on the data released by the European Society of Cardiology (ESC) on the guideline, initial stabilization procedure within the first 72 hours for patients who have low risk of complication.^[4]

Primary Health Care (PHC) attempts at providing responsive, comprehensive, effective and efficient that decreases the expenses of inpatient care and reduces the health gap in the society in order to let anyone have the access to reach excellent health service at affordable price. PHC in Indonesia is a first-level health service in peripheral areas development in health services. There

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are fullfill of 20 million with rate 70% -90% in the population with health problems. This problem should be taken as a challenge for PHC to improve its service and facilities.^[5] A study conducted in New Zealand shows that generally nurses always try to apply nursing principles while they are performing their jobs.^[6] The role of PHC nurses in Indonesia performs health promotion, screening and treatment of general emergency diseases.

PHC service In treating emergency patients, referral procedure should be highly concerned, regarding to the fact that the distance to more advanced hospitals is quite far, and ineffective communication procedure as well as the lack of facilities might appear as the barriers during the process. At the same time, primary treatment that focuses on decreasing the risk and reduce of ACS. Whilst, curative strategy should also be given to decrease the risk of disability and death. Patients who felt the symptoms of cardiac diseases need deep investigation and immediate treatment, chest pain not always caused by ACS.^[7] Barriers in this process needed to be determined regarding to the fact that families of the patients might be lacking of knowledge to take immediate consent, nurses might also lack of experience and skills, as well as limited resources, accessibility issues and inefficient referral procedure.^[8] Some indicators are used to evaluate the quality of emergency treatment including nurses' emergency nursing experience, medical facilities and trainings given to deal with emergency patients.^[9] A study conducted in Sri Lanka also shows that poor communication.^[10] The result of this study is expected to give insights in solving the problems and improving the referral system across health care providers as well as advancing the facilities in PHC.

MATERIAL & METHOD

Research Design

A qualitative approach using a descriptive phenomenology design was employed in this study. The result of this study describes nurses' view about their nursing experiences related to certain concept or phenomena.

Setting

This reseach took place in Primary Health Care, Malang Regency, East Java, Indonesia.

Population and samples

For this study were selected by snowball sampling. Criteria of selection were that participant 16 nurse at PHC who owned 3-15 years nursing experience and minimal had 1 year experience treatment patients with ACS. 16 nurses possessed diploma degree in nursing and bachelor of nursing. All of the participants joined several professional trainings such as Basic Cardiac Life Support (BCLS).

Data Collection Instrument

In-depth interviews were done to collect data in which voice recorder was used to help the researchers in recording the complete data. The semi-structured in-depth interviews were conducted based on critical decision method using a set of open-ended questions, allowing the participants to give in-depth and broad explanation about their views.

Procedure

This research was conducted for 4 months from September to December 2017. Researchers acted as the key instrument in this study. After being given the explanation, the participants were asked to sign a consent for. Researchers scheduled the exact time and place for the interview.

Data Analysis

The data obtained from the interview were transcribed to be later analyzed using the thematic method proposed by Clark and Brown (2013).^[11] The thematic data analysis consisted of these steps: (1) transcribing; (2) identifying the data; (3) coding; (4) grouping the key words into sub-theme categories; (5) arranging the themes; (6) writing the report of data analysis which contained nurses' explanation about their experience that could not be analyzed using software.

Ethics

Ethical clearance procedure was administered and legalized by the board of ethics of the Medical Faculty, Brawijaya University number 216/EC/KEPK/06/2017.

Finding

The participants (nurses) selected for this research were 20–35 aged and had been working in the ED for 3-15 years. In the term of education background, it was obtained that participants almost were diploma in nursing graduates while the other 4 had Bachelor's degree

in Nursing. Participants have training certifications of BCLS. According to the results of the qualitative data analysis, there are three themes obtained based on the objective of the research.

Theme 1: Update Guidelines

The sub theme is update of ACS management SOP. The update is done by updating, replacing, adding, or subtracting. With the updated guidelines, nurses have a sense of calm in performing the action.

I have ever known the guideline, but yaa, you know, sometimes patients in EDs have different characteristics. Whether the ED is crowded (full of patients) cannot be ascertained, we will try to take care of him accordingly with the guideline... (P9)

In my opinion, the SOP should be upgraded in accordance with the scientific development and adjusted to the policy. The existing SOP may be replaced, added, or subtracted (P11, P16)

Theme 2: Inefficient referral process to other health centers

The sub theme are The communication network among health care providers, Barriers in transferring the patients to more advanced hospitals. the need for equipment availability, and Additional duties.

We desperately looked for referral hospital but it took quite a while. Patient's condition dropped. Unfortunately, 30 minutes was not enough to save the patient. (P6)

We always called the referred hospitals, usually we contacted the regional hospitals but sometimes it was not easy to reach them. So we had to bring the patients to RSSA (Saiful Anwar Hospital) which is quite distant. (P1, P3)

When the EKG record indicates IMA case, we directly refer the patient to a more advanced hospital. But the referral process can only be granted by ACS group. Thus, we always have to consult the case to cardiologists before it is granted. Usually, we contacted the cardiologists via telephone. Sometimes they did not grant the requests and we could not do anything. (P7)

...no oxygen saturation tester available. So, nurses collected their own money to buy it in order to save the patients with heart disease indication. (P5, P14)

We already propose for the equipment which has been months and years, but there is no response (P10, P15)

Actually, I tend to respond it as a part of the delegation or responsibility that we have to commit. But, it cannot be denied that such duties will increase our workload... (P13)

Theme 3: Consent making process by the family

The sub theme are Family rejected transferring patient and Family rejected medical treatment

Sometimes, conflicts occurred. Families insisted on staying here even if the patients agreed to be transferred to regional hospitals. Families wanted to stay in nearby hospitals. (P12, P2)

Families might not understand the condition of the patients. They stuck to their own assumption to transfer advanced hospital. They underestimated the patients' condition. (P4)

There were families who rejected the heart resuscitation procedure because they felt terrible to the patients. They might have watched the procedure on television and they assumed most of the procedure failed. (P8)

DISCUSSION

Transition in Epidemiology has changed the paradigm that believed non-contagious diseases could not be the major cause of mortality. Nurses in PHC hold the responsibility to give pre-hospital emergency health treatment which requires them to have adequate human resources and excellent coordination and communication among the personnels.^[10] Patients lives are the top priority of the SOP, allowing the nurses to change treatments in order to minimize any live-threatening risks.^[12]

The results of the interviews showed some barriers, first: guideline ineffective, the lack of medical tools or devices, delegation tasks or additional make nurse work overload, such as taking transporter actions and handling administrative. According Deaton (2016) that study found the nurses who have some barriers yet still showed a high level of responsibility for patients by maintaining their care quality despite those emerging barriers.^[13] Therefore, the nurse practice guidelines renewal is important to be done to improve the quality and service. SOP development is an effective tool

to improve the quality of service and documentation completion, so also avoid heavy workload.^[14]

Referral to other health care facilities requires a strategic, pragmatic, even, and coordinative system to provide a continuum health care from the first health facility to a more advanced health facility. This theme describes that crucial issue is related to the lack of knowledge, skills, resources and accessibility that also affect the efficiency of the referral process.^[8] There has to be a good integration in the communication system between PHC and regional hospitals to make the process faster. However, some nurses stated that sometimes negative responses due to disagreement from ACS consultant group in the regional hospitals. Studies show that as many as 67% of the population reported poor accessibility to reach advanced health services in rural areas compared to urban areas.^[14,15] Vast advancement of technology makes it possible to create innovations in medical treatment system. Excellent integration of advanced information, communication and technology allows betterment in information system which guarantees information continuity, quality service, medical treatment, and better access for people who live in outskirts areas. The innovations can be made in the form of electronic medical record system and telemedicine.^[16] Beside that lack of facilities like equipment at PHC, nurses often had to make their own donation which reflects their sincerity to their patients to buy some equipment needed because limited and it would take quite. Oxygen saturation tool is an important tool to measure the oxygen level in patients' blood and shows the risk of heart attack. This deficiency is associated with budget constraints which will have an impact on service quality.^[17]

According to the interview, they agree that family as decision making. Families are the closest relatives of patients. Any treatment given to the patients should be agreed by the family at first by signing the informed consent. This procedure also reflects the legal ethical even in emergency situation, such as informed consent like two-way communication between patient and one or more health practitioners which patients should be given the rights benefits and risks treatment.^[18] Any medical treatment should not be given when in a sensitive and difficult condition either or not to take life-saving treatment such as cardiopulmonary resuscitation (CPR) even if this treatment might save patients' lives.^[19] New Zealand has a complete set of patients' basic rights

which involves the participation of the patients, patients' family and medical practitioners in deciding the medical treatment. Meanwhile, in some Asian countries, there is a cultural-bond phenomena in which the family hold the strongest authority. Nursing ethics require the nurses to reach this balanced decision by solving the problems related to family consent.^[20]

CONCLUSION

In this study, nurses who participated in this study have explained the problems. Three major problems appear as the barriers during the treatment. These problems can be solved by implementing an advanced integration of technology in the communication system such as using electronic medical record system and guideline of nurse need updating, educating patients' family and the management of health care service, especially for patients with ACS.

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Limitation: This research explains the Barriers found by nurses of PHC in peripheral areas of Indonesia. The result of this study cannot be simply generalized for other areas.

Implications for further research

Implication for future researchers to design guidelines for PHC services by implementing network-based referral system and using electronic medical record system to provide better emergency nursing in PHC services.

Conflict of Interest: No conflict of interest involved in this research.

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Association between Papilledema and Guillain - Barré Syndrome

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ABSTRACT

Background: Guillain barre syndrome is monophasic acute polyradiculoneuropathy autoimmune in nature, it appears as rapid developing areflexia and motor weakness with or without sensory and autonomic disorder, it reaches nadir in less than 4 weeks. Papilledema is rare and usually asymptomatic finding in patient with GBS, the CSF protein is usually elevated in GBS with papilledema, and high protein level will cause a disorder in the appropriate absorption of CSF at the arachnoid villi.

Aim of the study: To determine the percent of papilledema in GBS, the causes of papilledema in GBS, the correlation of papilledema to different clinical presentations of GBS.

Patients and method: A cross sectional study was made on seventy patients who have GBS during 4 weeks hospitalization, males are thirty seven and females are thirty three, that admitted to neurological ward and Respiratory Care Unit in Baghdad Teaching Hospital between 1st January- 2017 to 1st January- 2018. All patients were newly diagnosed by consultant neurologist and selected according to criteria by Asbury and Cornblath 1990 and meet with Brighton Collaboration Diagnostic Criteria Level 1 and 2. Regarding patients who have papilledema diagnosed by consultant neurologist by fundoscopic examination and supported by consultant ophthalmologist by slit lamp examination .

Results: There is a correlation between GBS and papilledema, in this study 3 patients had papilledema, the percent of papilledema in GBS was (4.29%) and the cause appears to be high CSF protein.

Conclusions : Regarding the patients who had elevated CSF protein, there is significant association between the presence of papilledema and need for mechanical ventilation. There is more correlation between AIDP and papilledema as compared with (AMAN, AMSAN).

Keywords: *Gullian berre syndrome, papilledema, cerebrospinal fluid protein, Acute inflammatory*

demyelinating Polyneuropathy.

INTRODUCTION

Guillain Barré syndrome is an acute monophasic polyradiculoneuropathy autoimmune in nature. It manifests as rapidly evolving areflexic motor paralysis with or without sensory disturbance and autonomic

manifestation. The usual pattern is an ascending paralysis, it may be severe and fulminant^[1]. Two-thirds of patients can recall a preceding illness, most frequently upper respiratory in 58% or gastrointestinal infection in 22%, respiratory and gastrointestinal illness in 10%, surgery in 5%, or immunization 1 - 4 weeks before the onset of neurological symptoms in 3% ^[2]. its begins commonly with acroparesthesia, followed 7–10 days later by symmetric ascending type weakness, associated with severe radicular pain in up to two thirds of patient, proximal and distal weakness is usually the predominant feature, Hyporeflexia or areflexia may be delayed one week. Most reach weakness nadir by 2 weeks, but 80% by 3 weeks and 90% by 4 weeks, The disease ranges

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from mild weakness to flaccid quadriplegia and up to one-third progress to respiratory failure, AIDP accounts for 80% of GBS cases, CSF protein is elevated in most patients^[3].

Protein elevated in 90% in the absence of white blood cell elevation (less than 20 per mm³), called albuminocytologic dissociation, CSF protein elevation may be delayed; a repeated lumbar puncture in 5 to 7 days may be supportive of the diagnosis, CSF pressure typically normal but may be raised and high protein cause papilloedema^[4].

Papilledema mean optic nerve head swelling caused by increased intracranial pressure with absent spontaneous venous pulsations, usually bilateral but may be asymmetric^[5]. It is primarily due to a rise of pressure in the optic nerve sheath, which produces axoplasmic flow stasis in the optic nerve fibers in the surface nerve fiber layer and prelaminar region of the optic nerve head, Axoplasmic flow stasis then results in swelling of the nerve fibers, and consequently of the optic disc, Swelling of the nerve fibers and of the optic disc secondarily compresses the fine, low-pressure venules in that region, resulting in venous stasis and fluid leakage; that leads to the accumulation of extracellular fluid^[6]. Papilledema caused by brain mass like tumor or pseudotumor include: Idiopathic intracranial hypertension, cerebral venous thrombosis, meningeal diseases include infections, gliomatosis cerebri, drugs include hypervitaminosis A, administration or withdrawal of corticosteroids, metabolic disturbances, hyper- and hypoadrenalism, myxedema, hypoparathyroidism, GBS, spinal tumor such as oligodendroglioma, systemic lupus erythematosus, severe systemic hypertension, and hypersecretion of CSF by a choroid plexus tumor^[7].

Papilledema and raised intracranial pressure have been reported in association with GBS, The cerebrospinal fluid protein is usually reported to be high. In most of these reports the papilledema appeared after established limb weakness and very rare the papilledema preceded the limb weakness, These elevated proteins will cause a defect in the proper absorption of CSF at the arachnoid villi, giving rise to increase intracranial pressure^[8].

The Pseudotumor cerebri also been rarely reported with (AIDP), where the CSF protein level was normal and papilledema develop^[8]. The papilledema in patients with Guillain Barré syndrome may be very rarely

secondary to cerebral edema and hypernatremia^[9].

Aim of the study: To determine the percentage and causes of papilledema in GBS, correlation of papilledema to different clinical presentations of GBS.

Patients and methods:

A cross sectional study was made on seventy patients have GBS during 4 weeks hospitalization, who were admitted to neurological ward and Respiratory Care Unit of Baghdad Teaching Hospital between 1st of January- 2017 to 1st January- 2018. The age of patients ranged from 18–75 years, males are thirty seven and females are thirty three. All patients gave their consent to participate in the study.

The inclusion criteria: All patients selected according to criteria by Asbury and Cornblath 1990, and meet with Brighton Collaboration Diagnostic Criteria Level 1 and 2^[10,11]. All patients were newly diagnosed by consultant neurologist and were investigated by Electromyography and Nerve Conduction Studies, CSF opening pressure and analysis was done after at least seven days from the onset of the disease. All patients who had papilledema were diagnosed by consultant neurologist by fundoscopic examination and classified according to Frise'n Papilledema Grading Scale, supported by consultant ophthalmologist by slit lamp examination and Optical Coherence Tomography (OCT) to excluded pseudopapilloedema and to approve finding.

The exclusion criteria: The patients with secondary causes of papilledema.^[7] The following investigations were done for every patient with papilledema to exclude secondary causes: 1-Brain and Spine Magnetic Resonance Imaging (MRI), Magnetic Resonance Venography (MRV) 2-CSF pressure and analysis. 3-Serum calcium and sodium. 4-Liver and renal function test. 5-Complete blood count, erythrocyte sedimentation rate and C reactive protein. 6-Antinuclear antibody, anti-double stranded DNA antibody, lupus anticoagulant, anticardiolipin antibody.

Statistical analysis: SPSS 20.0.0 software package applied to do the statistical analysis, p value considered when suitable to be significant if less than 0.05.

RESULTS

In this study, the age of patients range from (18-75) years with mean age of (36.1 ±16.2) years, 33 (47.1%)

are female while 37 (52.9%) of patient are male.

Forty four patients had antecedent infection (few weeks) preceding onset of the weakness, being most frequent respiratory tract infection (RTI) in 33 (47.1%), diarrhea in 7 (10.0%) of patients and 26 (37.1%) of patients had no previous infection.

The sensory symptoms was observed in 45 patients(64.3%),bulbar involvement in 24 patients (34.3%),involvement in 18 respiratory patients (25.7%),requirement for mechanical ventilation in 10 patients(14.3),facial weakness in 29 patients (41.4%),as shown in table 1

Three patients (4.29%) of GBS developed papilledema, while the remaining 67 (95.71%) did not had papilledema,as illustrated in table 2.

In the current study three cases had papilledema, two of them male and one female were presented below are their characteristics, which in summary; 2/3 had grade 2 papilledema presented within the 3rd week, with 1/3 presented in the 2nd week had grade 1 papilledema. All three cases were asymptomatic, as illustrated in table 3.

There was no significant difference in age, gender, limb weakness, sensory symptom, bulbar weakness, respiratory involvement, requirement for mechanical ventilation, bifacial weakness and cells in CSF among patients presented with or without papilledema. On the other hand, the CSF protein level and pressure was significantly elevated in GBS with papilledema compared to those without, with p value (0.004),(0.001) respectively, as illustrated in table 4.

In this study 47(67.1%)of patients had high CSF protein level ,there was no significant difference in age ,gender and various presentations (limb weakness ,sensory symptoms ,bulbar weakness, respiratory involvement and bifacial weakness)among patients presented with or without papilledema w, but on other hand there was significant association between requirement for mechanical ventilation and patient had papilledema with p value (0.016), as illustrated in table5.

In the current study four cases were AMAN and two cases were AMSAN, the CSF protein was lower than that in patients with (AMAN, AMSAN) compared to those with AIDP with p value (0.002), Odd Ratio (0.978) and 95% Confidence Interval (0.955–0.999), i.e. there is negative relationship between CSF protein level

and axonal variant (AMAN, AMSAN), as illustrated in table 6.

Table 1: Demographic and clinical characteristics (Descriptive data).

Variables	Value
Age (years), mean ± SD	36.1 ± 16.2
Gender, number (%)	
Female	33 (47.1%)
Male	37 (52.9%)
Antecedent infection, number (%)	
Respiratory tract infection (RTI)	33 (47.1%)
Diarrhea	7 (10.0%)
Others	4 (5.7%)
Negative	26 (37.1%)
Presentation	
MRC score of Limb weakness, mean ± SD	35.8 ± 10.5
Sensory Symptom, number (%)	45 (64.3%)
Bulbar involvement, number (%)	24 (34.3%)
Respiratory involvement, number (%)	18 (25.7%)
Requirement for mechanical ventilation, number (%)	10 (14.3%)
Bifacial weakness, number (%)	29 (41.4%)
Time of CSF aspiration (days), mean ± SD	8.7 ± 1.4

Table 2: Frequency of papilledema in GBS patients (n=70).

	NO.	%	95%CI
papilledema	3	4.29	3.81 – 4.76%
No papilledema	67	95.71	-

Table 3: Characteristic of the patients with papilledema.

ID	Timing	Grade	CSF pressure	CSF protein	CSF	Fate of
			(up to 250mm H ₂ O)	(up to 45 mg/dl)	WBC	papilledema after 3 months
1	3 rd week	Grade2	240	220	1	Recover
2	3 rd week	Grade2	220	205	2	Recover
3	2 nd week	Grade1	220	210	4	Recover

Table 4: GBS patients compared according to presentation with or without papilledema (n=70).

Variables	No papilledema (n=67)	Papilledema (n=3)		P value
Age (years), mean ± SD	35.33 ± 5.03	36.12 ± 16.49		0.935
Gender				0.599
Female	31 (46.3%)	2	(66.7%)	
Male	36 (53.7%)	1	(33.3%)	
Presentation				
MRC score of limb weakness, mean ± SD	44.00 ± 3.46	35.40 ± 10.62		0.169
Sensory Symptom	42 (62.7%)	3	(100.0%)	0.548
Bulbar weakness	22 (32.8%)	2	(66.7%)	0.269
Respiratory involvement	16 (23.9%)	2	(66.7%)	0.160
Requirement for mechanical ventilation	8 (11.9%)	2	(66.7%)	0.052
Bifacial weakness	26 (38.8%)	3	(100.0%)	0.067
CSF analysis				
Pressure, mean ± SD	168.43 ± 29.19	226.67 ± 11.55		0.001
Protein level , mean ± SD	108.79 ± 59.11	211.67 ± 7.64		0.004
Cells, mean ± SD	2.33 ± 1.53	1.64 ± 2.33		0.298
EMG study				
Demyelinating	61 (91.0%)	3 (100.0%)		1.0
Axonal	6 (9.0%)	0 (0.0%)		

Table 5: High CSF protein level GBS patients compared according to presentation with or without papilledema (n=47).

Variables	No papilledema (n=44)	Papilledema (n=3)	P value
Age (years), mean ± SD	34.36 ± 16.25	35.33 ± 5.03	0.919
Gender			0.579
Female	19 (43.2%)	2 (66.7%)	
Male	25 (56.8%)	1 (33.3%)	
Presentation			
MRC score of limb weakness, mean ± SD	36.00 ± 10.20	44.00 ± 3.46	0.166
Sensory Symptom	29 (65.9%)	3 (100.0%)	0.541
Bulbar weakness	13 (29.5%)	2 (66.7%)	0.235
Respiratory weakness	8 (18.2%)	2 (66.7%)	0.110
Requirement for mechanical ventilation	2 (4.5%)	2 (66.7%)	0.016
Bifacial weakness	18 (40.9%)	3 (100.0%)	0.082

Table 6: Correlation between CSF protein level and GBS variant types.

	(AIDP)	(AMAN,AMSAN)	OR	95%CI	P value
Protein level	118.2 ± 61.7	59.5 ± 22.6	0.978	0.955–	0.002
				0.999	

DISCUSSION

In this study there was association between Guillain Barré syndrome and papilledema, the percentage of papilledema in Guillain Barré syndrome was (4.29%). This agree with study done by Karkare in Bangalore (India) on sixty patients with Guillain Barré syndrome who found the percentage of papilledema was (3.3%)^[12]. And consisted with the Turkish study done by Güngör on thirty-two Guillain Barré syndrome patients which found the percent of papilledema was (3.1%)^[13]. And also similar to the percent of papilledema in Guillain Barré syndrome reported by Canadian Ophthalmological

Society 2015 which confirm the papilledema detected in (4%) of Guillain Barré syndrome cases^[14].

In this study three cases were reported with papilledema, regarding the causes of papilledema in GBS, this study found that the CSF protein level and pressure was significant elevated in Guillain Barré syndrome with papilledema compared to those without. In the current study not all patients had high CSF protein, only (67.1 %) of the patients had high CSF protein level during first 2 weeks of disease, this agree with study done by Massachusetts General Hospital (Boston) on 110 patients with GBS which found the CSF

protein elevations in (73 %) of patients^[15]. And agree with the Indian study done by Kalita between 2000 and 2012 on 328 Guillain Barré syndrome patients who found (68%) had CSF albuminocytological dissociation^[16]. The possible explanation of high CSF protein was increase in permeability of the blood – nerve – barrier due to inflammation of the proximal nerve roots, thus will lead to defect in absorption of CSF at arachnoid villi and increase ICP^[8].

Regarding other clinical feature of GBS in patients with papilledema, the follow up (after 3 months) also showed complete resolution of these finding, this agree with usual outcome of disease in general which was reported by Biomed Central Neurology in United Kingdom (BMC) 2013 in which (87%) of GBS experience full recovery^[17].

This study showed there is significant correlation between (CSF Protein level and CSF pressure) with time of CSF aspiration, the CSF protein level and pressure increase with time, this agree with Turkish study by Sahin carried out between 2011 and 2015 on 24 patients in which the CSF Protein level could be normal in first week and start to elevated after that in 2nd and 3rd week^[18]. And since the cause of papilledema is the high CSF protein, so give impression for increase possibility to find papilledema with time of disease progression.

CONCLUSIONS

There is correlation between GBS and papilledema, the percent of papilledema in GBS was 4.29%.

CSF protein level and pressure was significantly elevated in patients with papilledema comparing to those without. CSF protein level and pressure was elevated with time of disease progression.

No significant difference in the age, gender, limb weakness, sensory involvement, bulbar involvement, respiratory involvement, need for mechanical ventilation and facial palsy among patients presented with or without papilledema. But regarding the patients who had high CSF protein, there is significant association between papilledema and requirement for the mechanical ventilation.

There is more correlation between papilledema and AIDP as compared to (AMAN, AMSAN).

Ethical Clearance- Taken from Iraqi Board for

Medical Specialization /Ministry of Higher Education And Scientific Research /Republic of Iraq.

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Conflict of Interest: Nil

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Effect of Sensory and Tactile Stimulation to Increase Glasgow Coma Scale (GCS) Score on Stroke Clients who Have Consciousness Disorders at Abdul Moeloek Hospital, Lampung

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ABSTRACT

The stroke prevalence based on the diagnosis of health workers and the symptoms found in Lampung province was 5.4 ‰. This study aimed to determine the effect of sensory and tactile stimulation on increasing Glasgow Coma Scale (GCS) scores in stroke patients who experience decreased consciousness, using experimental quasy designs. The population in this study were stroke patients with decreased consciousness (GCS < 13), with a sample size of 32 respondents. Each respondent was measured for 5 days. The mean GCS score before intervention in the treatment group was 8.31 and the control group was 11.06. After the intervention, the mean GCS score in the intervention group was 8.94 and the control group was 11.12. While the p-value was 0.006, so it was interpreted that sensory stimulation and tactile stimulation can significantly increase the GCS score. It is recommended that nursing practitioners apply sensory stimulation and tactile stimulation in the management of stroke patients who experience impaired consciousness.

Keywords: *Sensory stimulation, Tactile stimulation, Stroke, GCS score*

INTRODUCTION

Stroke is a functional disorder of the brain due to obstruction of blood flow to the brain caused by blockage (ischemic stroke) or brain hemorrhage (hemorrhagic stroke) which can cause nerve paralysis even to death. According to Basjiruddin (2007), in the USA it is estimated that the incidence of strokes per year in the USA is > 700,000 which causes 160,000 (20%) deaths per year. Stroke is the third leading cause of death in industrialized countries and is a major cause of disability in adults. The incidence of stroke is increasing, because the number of people aged > 65 years has increased from 390 million at present to 800 million by 2025⁽¹⁾.

Based on the 2013 Riskesdas data, it is known that there are 12 stroke patients per 1000 population. The prevalence of stroke in Lampung Province based on the

diagnosis of health workers is 3.7 ‰ and based on the diagnosis of health workers and symptoms is 5.4 ‰⁽²⁾.

Stroke is the number one killer disease in Indonesia. People aged > 65 years are most at risk for stroke, but 25 % of strokes also occur in people aged < 65 years, including children. People who smoke, lack exercise, and have a poor diet are also prone to stoke. In addition, people with impaired blood circulation due to high blood pressure, high cholesterol, irregular heartbeat or atrial fibrillation, and diabetes, are also prone to stroke⁽²⁾.

The initial attack of ischemic stroke is generally in the form of impaired consciousness, unconsciousness, confusion, headache, difficulty concentrating, disorientation, while hemorrhagic strokes are usually often accompanied by acute headache and decreased consciousness that develops rapidly to coma⁽¹⁾.

Nursing or non-pharmacological therapies that can be given to patients with coma are to provide sensory stimulation in the form of visual stimulation, olfactory, tactile, gustatory, auditory and⁽³⁾. Sensory stimulation as soon as the symptoms of stroke are detected can prevent widespread damage to the brain area⁽⁴⁾.

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The effects of sensory stimulation, one of which is music therapy can reduce the stimulation of the sympathetic nervous system. The response that arises from the decline in activity is a decrease in adrenaline activity, reduce tension in neuromuscular activity, and increase the threshold of consciousness. Indicators that are commonly measured are decreased heart rate, respiratory rate, stomach acid, and blood pressure⁽⁵⁾.

Campbell (2002) states that hospitals in the world that apply music therapy such as Beth Abraham Hospital in the American Bronx, Charing Cross Hospital in London, music therapy are used during the surgical process. Saint Luke’s Hospital in Chesterfield uses music therapy in the field of physical rehabilitation, Saint Mary Hospital’s respiratory intensive care unit in Green Bay uses music therapy in order to create a healing atmosphere⁽⁶⁾.

Besides sensory stimulation, tactile stimulation also has important meaning. According to Scanhanberg, touch has power ten times greater than verbal or emotional contact, and touch affects almost everything a person does. There are no other senses that are more stimulating than touch. Researchers now know that certain types of tactile stimuli on the skin, will send a message to the brain, which in turn stimulates the formation of oxytocin and endorphins. Oxytocin strengthens the bond between mother and baby, while endorphin-peptide is related to opiates which creates a feeling of comfort⁽⁷⁾.

In Indonesia, music therapy and tactile stimulation have not been widely applied in Dr. H. Abdul Moeloek hospital also has not applied sensory stimulation and tactile stimulation as one of the alternative therapies in order to cure patients.

MATERIALS AND METHOD

The design of this research was quasi-experimental. The research was conducted on 2 to 31 October 2017 at

Dr. H. Abdul Moeloek Hospital, Lampung, Indonesia. The population of this study were impaired ischemic and hemorrhagic stroke patients (GCS < 13) who were treated in the intensive care unit (ICU) and the Bougainvillea Room of Dr. H. Abdul Moeloek Hospital, Lampung. The sample size of the intervention group and control group were 16, respectively, chosen by accidental sampling technique.

The research intervention instrument was a music player from the VSB - 810 Desktop Bluetooth Speaker using soft volumes without earphones. The data collection instrument about Glasgow Coma Scale (GCS) was an observation sheet. Data collection was carried out using the following procedures: 1) before being given sensory and tactile stimulation, GCS was first measured, 2) music was played to the patient, with a volume that was heard by normal people’s ears, for 30 minutes, 3) when the patient listened to music, tactile stimulation was carried out by sweeping tapping technique, that was, the patient’s family rubs all of the patient’s extremities for 20 minutes, followed by an approximation of pressing all the joints on the extremities for 10 minutes (the family must be trained first, 4) sensory stimulation was performed once a day, morning, afternoon and at night, for 5 days, 5) GCS evaluation was carried out, 6) calculation of the difference in GCS values between pre-intervention and post-intervention in the intervention group and control group. data about awareness level (GCS) is numerical data so it is presented in the form of mean, standard deviation, minimum score and maximum score⁽⁸⁾. The T test with a 95 % confidence interval was used to test the difference in GCS values between the two groups.

FINDINGS

The results of measuring the level of consciousness of patients based on GCS for the intervention group and control group are presented as follows.

Table 1. The level of consciousness of patients based on GCS for the intervention group and control group before the intervention

Group	Mean	SD	Min – Max	95% CI
Intervention group (n = 16)	8.31	2.245	5-13	7.12-9.51
Control group (n = 16)	11.06	2.048	7-13	9.97-12.15

Table 2. The level of consciousness of patients based on GCS for the intervention group and control group after the intervention

Group	Mean	SD	Min – Max	95% CI
Intervention group (n = 16)	8.94	2.048	5-13	7.85-10.03
Control group (n = 16)	11.12	2.125	7-14	9.99-12.26

Table 3. Comparison of changes in GCS mean scores between the intervention group and the control group

Group	Before	After	Changes in mean score	p-value
Intervention group (n = 16)	8.31	8.94	0.63	0.0006
Control group (n = 16)	11.06	11.12	0.60	

Based on the table above it can be interpreted that the intervention group has an increase in the average GCS score that is greater than the control group. The T Test results showed p-value 0.006 so it was concluded that there was a significant difference between the GCS mean score of the intervention group and the GCS mean score of the control group.

DISCUSSION

Based on the results of data analysis, there were significant differences in GCS mean scores between the intervention groups who received music therapy and tactile stimulation, with the control group. The results of this study are in line with the results of Asrin's research that music therapy is useful in increasing the status of consciousness of patients with severe head trauma. In addition, music therapy can also provide a positive stimulus to physical and psychosocial responses⁽⁹⁾.

Rosenfeld & Dun (1999) also reported the same thing that music therapy can help patients to restore awareness, communication, some physical abilities, and provide a pleasant experience⁽¹⁰⁾. Auntari (2001) concluded that auditory stimulation is a beneficial thing to encourage healing of head injury patients from coma and increase the level of patient awareness⁽¹¹⁾. The behavioral response of head injury patients with loss of consciousness who are given stimulation of familiar music sounds is greater than patients who are not given music sound stimulation. The above can occur due to the relaxation effect of soft music which is likely to have a positive effect on the brain because of the reticular activating system (RAS) which functions to control alertness or awareness and wake-sleep cycles. For patients with unconscious head

trauma, the only function is the RAS and hypothalamus and as a consequence of the healing process, the higher elements of the brain will begin to function⁽¹⁰⁾.

The effect of sensory stimulation including music therapy is to reduce the sympathetic nervous system stimulation. The response that arises from the decline in activity is decreased adrenaline activity, decreased tension in neuromuscular activity, and increased awareness threshold. Indicators commonly measured are decreased heart rate, respiratory rate, decreased gastric acid, and decreased blood pressure⁽⁵⁾.

When viewed from the mechanism of the relationship between the nervous system and the endocrine system, music stimulation or sound waves can stimulate the activation of dopamine which physiologically plays a role in increasing one's alertness. This is consistent with other studies at McGill University Montreal that "listening to music can trigger the release of dopamine in the body⁽¹²⁾.

In this study, in addition to sensory stimulation patients also received tactile stimulation. According to Scanhanberg, touch is ten times stronger than verbal or emotional contact, and touch also affects almost everything a person does. There are no other senses that are more stimulating than touch. Researchers now know that certain types of tactile stimuli on the skin, will send a message to the brain that stimulates the formation of oxytocin and endorphins. Oxytocin strengthens the bond between mother and baby, while endorphin-peptide which is related to opiates creates a feeling of comfort⁽⁷⁾.

Tactile stimulation is performed on the skin, muscles, joints with various techniques, namely tapping, swiping, approximation. Tactile stimulation in principle must cause muscle contraction, so that it will stimulate the golgi tendon and muscle spindle. Impulses derived from muscle spindles and tendon organs are sent by conduction fibers that are the most rich in myelin, namely fiber. Other proprioceptive impulses derived from fascial receptors, deeper joints and connective tissue, travel in less myelin fibers. Knocking, swiping, tapping and approximation will stimulate proprioceptors on the skin and joints, the muscle spindle will react by sending the impulse to the anterior motoneuron. Stimulating these neurons causing a brief increase in contraction.

Stimulation of muscle spindles and golgi tendons will be informed through afference to the central nervous system so that they will contribute facilitation and inhibition (gracianin). The tactile stimuli that are repeated will provide information to the “supraspinal mechanism” so that an integrated motion pattern occurs and becomes movements with functional patterns. Tactile stimulation through the peripheral motor nerves exercises “graps” and “release” hand functions and can facilitate muscle weakness in movement.

CONCLUSION

Based on the results of the study it can be concluded that the combination of music therapy and tactile stimulation proved effective to increase consciousness of stroke patients who experience impaired consciousness.

Source of Funding: Authors

Conflict of Interest: None

Ethical Clearance: Yes

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Liver Function and Some Biochemical Parameters affected by Anabolic Androgen Steroids and Diet Supplements Consuming

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ABSTRACT

This study aims to evaluating the possible effect of anabolic androgen steroids (AAS) and diet supplements DS consuming by bodybuilders on their liver function and some biochemical parameters depending on consuming period. Blood samples were collected from 20 men didn't play any sport and 82 sport men who divided to four groups: 20 bodybuilder men consuming AAS, 20 consuming DS, 20 without consuming, and 22 football players. BMI of the subjects were also calculated. BMI and The frequency of overweight were significant higher in bodybuilder consuming AAS compared to other groups. Total and direct serum billirubin was significant higher in football player than bodybuilder consuming AAS and DS. The total bilirubin was also significant higher in football player than non sport men. While Alkaline Phosphate (ALKP) level was significant lower, Aspartate transaminase AST and Alanine transaminase (ALT) level were significant higher in serum of bodybuilder consuming AAS. Furthermore, their levels in bodybuilder consuming diet supplement were significant higher than non sport. No differences in ultra high-density lipoproteins (UHDL) and Cholesterol (Chol) levels were detected while Trig level was significant lower in serum of football player. Triglyceride (Trig) level was also significant lower in the serum of bodybuilder without consuming than consuming AAS. The differences of these parameters were studied in Bodybuilder consuming AAS and diet supplement groups in three consuming period: less 1 year, 1 to 2 years, and more than 2 years. No differences between the two groups after consuming period less than 1yr and 1-2yr while significant higher in bodybuilder consuming AAS after more than 2yr compared to consuming supplement were detected. As conclusion, both AAS and protein supplements have side effects on the liver function and other biochemical parameters and these effects increase with the consuming period especially the effects of AAS.

Keywords: *AST, ALT, AAS, ALKP, billirubin*

INTRODUCTION

The search for ways to increase the speed and quality of physical strength and activity has been a tendency for centuries⁽¹⁾. The use of hormones and protein supplements has become prevalent throughout the world. More disturbing is the fact that multiple studies have reported that a large number of people who consume these improvements did not seek medical advice before taking them⁽²⁾. Most athletes use more than

one product. The widespread use of anabolic steroids (AAS) has been reported by athletes, for purpose of enhance muscle functions and strength in sport.

The side effects of AAS abuse are well established such as its effect on the cardiovascular system⁽³⁻⁵⁾, hepatic function^(6, 7), and adrenal and renal function^(8,9). On the other hand, the usage of supplements is more accepted by bodybuilders because of not mentioned some harmful additives, which are included in dietary supplements, on the labels of their packages. Despite the fact that these supplements have many side effects, they are not subject to a serious examination of their effectiveness and public safety⁽¹⁰⁾. Many studies have reported that dietary supplements have many dangers effect such as, cardiovascular disease, blood diseases,

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metabolism, and neurological problems⁽¹¹⁾ While there is little scientific data confirming the beneficial effects of dietary supplements in athletes⁽¹²⁾.

So this study was conducted for the purpose of evaluating the possible effects not only of steroids hormones but also of some commonly used supplements by bodybuilders on their some biochemical and liver function parameters depending on consuming, and then comparison was made with a control group.

MATERIAL AND METHOD

In this study, a total number of 82 sport men were selected from the different gyms in Thi-Qar/Iraq which divided to four groups: 20 bodybuilder men consuming AAS (G1), 20 bodybuilder men consuming diet supplements (G2), 20 bodybuilder men without any drug consuming (G3), and 22 foot ball players (G4); and 20 men didn't play any sport (G5) with apparently healthy status were included. The age group was in the range of 18- 40 years.

After one day from ASS and DS consuming, the consent was taken and 5 ml of venous blood was collected from antecubital vein with all proper aseptic precautions and by disposable syringe in a dry sterile test tube. The blood samples were centrifuged for 5 min. at 5000 rpm. The serum samples were used to estimate the biochemical and liver function parameters by Architect plus/Abbott c4000/ Germany using kits from Abbott.

The body weights of individuals were measured by body balance and the body heights of them were

measured by paper tape. BMI was calculated as weight in kilograms divided by height in meters squared⁽¹³⁾. The BMI of individuals was classified according WHO classification to underweight, Normal weight, overweight, and obese (<18.5, 18.5-24.9, 25.0-29.9, and >30 kg/m² respectively).

Results are expressed as mean ± standard error (M±SE) or ± standard deviation (M±SD) and as frequency of observations percentage (Cases %). Data were analyzed by one-way analysis of variance (ANOVA) followed by Fisher's test for multiple comparisons, using Statview version 5.0. Differences were considered significant when p<0.05.

RESULTS

The (M±SD) of age was significant lower in the football player (G4) (22.3±0.9) than other groups (27.4±1.4 in G1, 27.9±1.3 in G2, 29.7±1.8 in G3, and 26.1±1.4 in G5). The (M±SE) of BMI was significant higher in the bodybuilder consuming AAS (G1) (27±0.4) compared to other groups (24.9±0.4 in G2, 24.2±0.3 in G3, 23.4±0.2 in G4 and 22.8±0.3 in G5). The frequency of overweight was also significant higher in the bodybuilder consuming AAS (G1) (82%) and in DS (G2) (45%) compared to others (20% in G3, 10% in G4 and G5).

Total and direct serum bilirubin was significant higher in football player than bodybuilder consuming AAS and consuming DS. The total bilirubin was also significant higher in football player than non sport men (Figure-1)

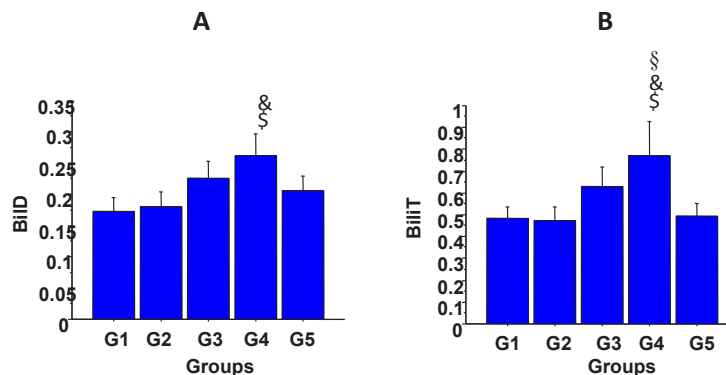


Figure-1: Direct (A) and Total (B) bilirubin levels in serum of bodybuilder consuming AAS (G1), consuming DS (G2), without consuming and supplement (G3), football player (G4), and non sport (G5). \$ Significant difference vs G1, & significant difference vs G2, and § Significant difference vs G5

GOT or AST and GPT or ALT levels were significant higher in serum of bodybuilder consuming AAS compared to non sport, football player, and bodybuilder without consuming. Furthermore, AST level in bodybuilder consuming DS was significant higher than non sport. (Figure-2A&B)

ALKP level was significant lower in serum of bodybuilder consuming DS compared to non sport, football player, and bodybuilder without consuming (Figure-2C)

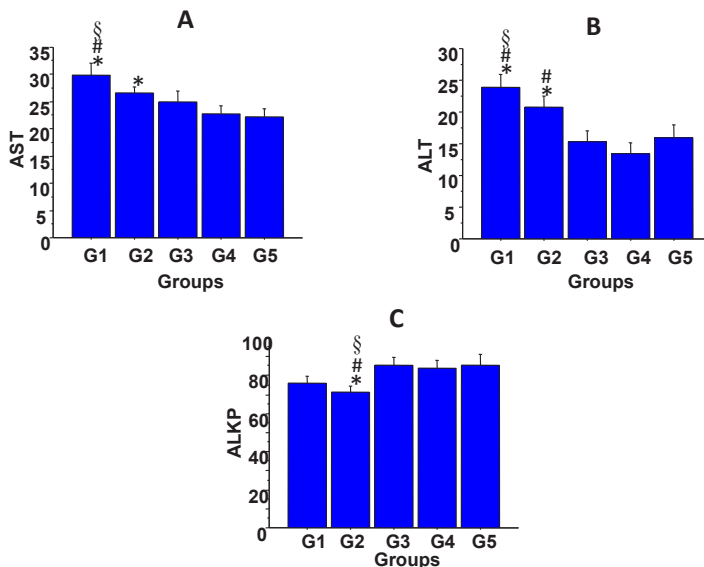


Figure-2: AST (A), ALT (B), and ALKP (C) levels in serum of bodybuilder consuming AAS (G1), consuming DS (G2), without consuming and supplement (G3), football player (G4), and non sport (G5). * Significant difference vs G5, # significant difference vs G4, and § Significant difference vs G3.

No differences in UHDL and Chol levels were detected while Trig level was significant lower in serum of football player compared to consuming AAS, and DS. Trig level was also significant lower in the serum of bodybuilder without consuming than consuming AAS. (Figure-3)

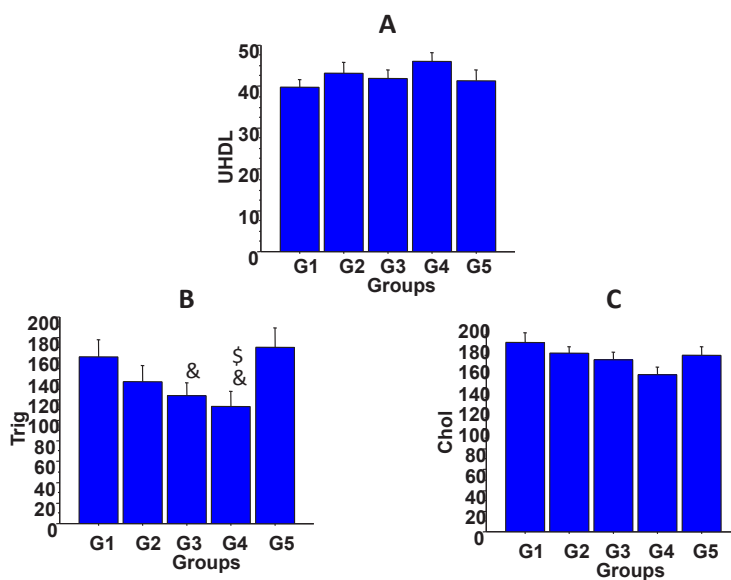


Figure-3: UHDL (A), Trig (B), and Chol (C) levels in serum of bodybuilder consuming AAS (G1), consuming DS (G2), without consuming and supplement (G3), football player (G4), and non sport (G5). § Significant difference vs G1, and & significant difference vs G2.

No differences in the Direct and total bilirubin levels between the two groups after consuming period less than 1yr and 1-2yr were detected while significant higher direct and total bilirubin levels in bodybuilder consuming AAS compared to DS after more than 2yr consuming period (Figure-4)

In bodybuilder consuming AAS, AST level was significant higher after consuming period 1-2yr while

ALT and ALKP levels were significant higher after more than 2yr compared to consuming DS (Figure-5).

No differences in the UHDL, trig, and chol levels between the two groups after consuming period less than 1yr and 1-2yr were detected while after more than 2yr they were significant higher in bodybuilder consuming AAS compared to consuming DS (Figure-6)

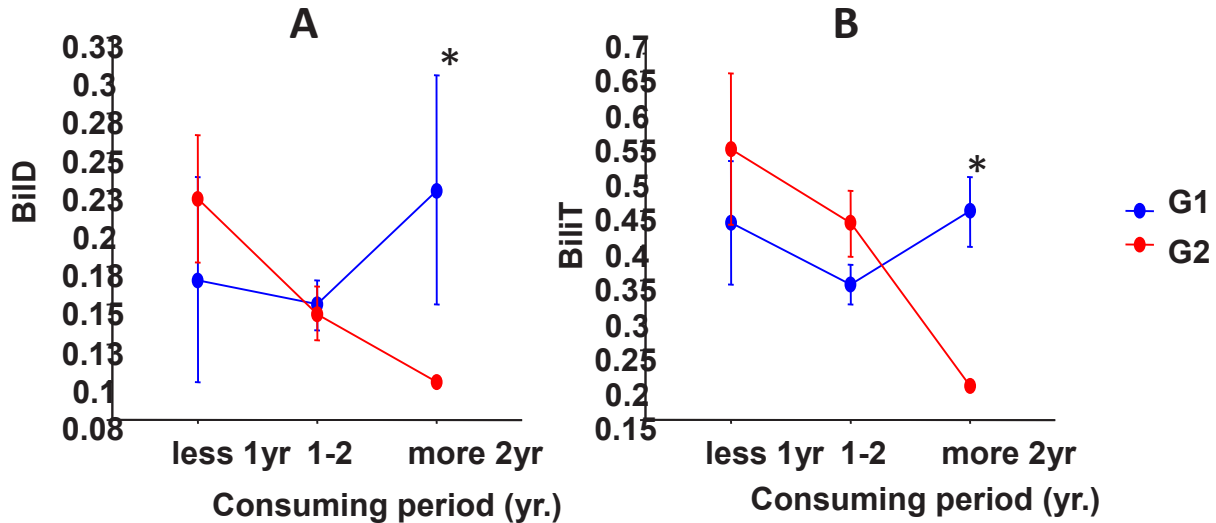


Figure-4: direct bilirubin (A), Total bilirubin (B) levels in serum of bodybuilder consuming AAS (G1) and consuming DS (G2) after difference consuming periods. * Significant difference G1 vs G2.

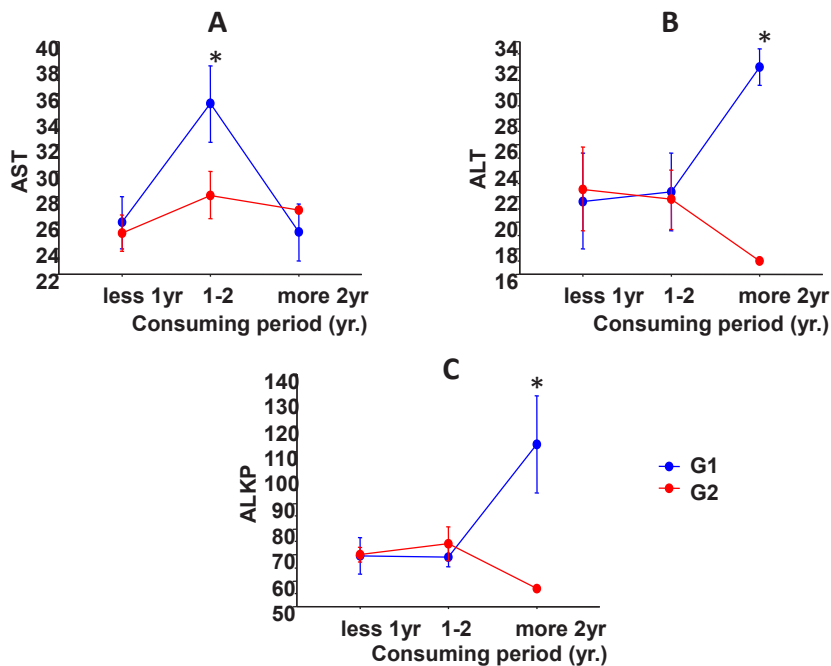


Figure-5: AST (A), ALT (B) and ALKP (C) levels in serum of bodybuilder consuming AAS (G1) and consuming DS (G2) after difference consuming periods. * Significant difference G1 vs G2.

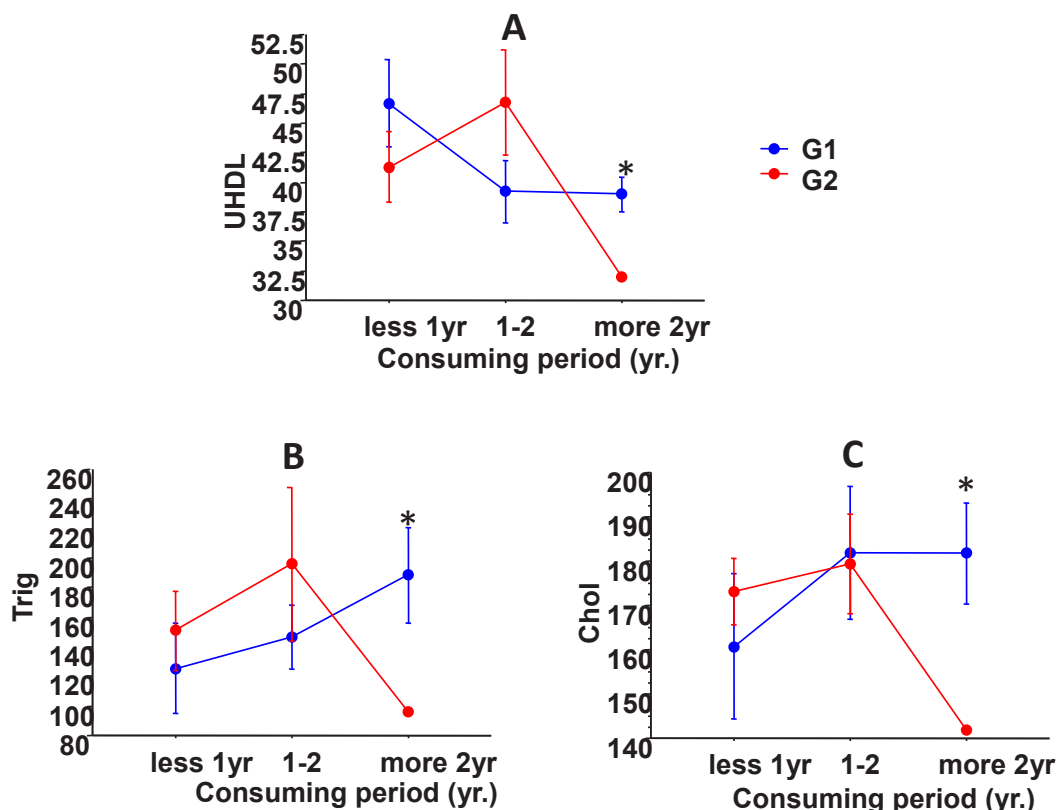


Figure-6: UHDL (A), Trig (B) and Chol (C) levels in serum of bodybuilder consuming AAS (G1) and consuming DS (G2) after difference consuming periods. * Significant difference G1 vs G2.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from Biology Department/ Science College/ Mustasiriyah University which have a deal with Health Ministry

DISCUSSION

Many athletes used Anabolic because of its effect on protein synthesis and muscle growth⁽¹⁴⁻¹⁶⁾ which lead to increase muscle size and reduce body fat. AASs produce anabolic effects by binding to receptors of steroid. They activate the receptor of androgen which controlled the targeted gene transcription and lead to regulate the accumulation of DNA needed for growth of muscle. Since amino acids are effectively used for synthesis of proteins, The muscular strength and mass are increase when AAS bind with the androgen receptor of skeletal muscle^(14, 17). It also reduces the glyocorticoid-based metabolism by linking competitively to glucocorticoid receptors⁽¹⁸⁾. These evidences can explain the increase of BMI and the frequency of overweight in bodybuilder group which consumed AAS Bodybuilders. On the

other hand, the bodybuilder may complement their protein diet for convenience, lower cost (relative to meat and fish products), ease of preparation, to avoid the simultaneous consumption of carbohydrates and fats, and to support maximum muscle growth^(19, 20); but Anders et al reported there was no significant effect on BMI by consuming diet supplement⁽²¹⁾. Our results show that the BMI didn't affected by diet supplement but the frequency of overweight was higher also in the bodybuilder consuming diet supplement.

The hepatotoxicity occurrence of drug is a major problem in all stages of clinical development of drug and the main cause of post marketing warnings and withdrawals⁽²²⁾. The liver function tests asymptotically elevated during clinical trials resulting by drug-related and many other factors, such as strenuous exercise which may increase the levels of blood transaminase⁽²³⁾ but there was no information about the effect of body build on liver function tests^(24, 25). In this study, it has been shown that consuming of AAS and diet supplement resulted in profound increases in the liver function parameters, AST and ALT but not ALKP levels.

AAS has many toxic and hormonal effects which were documented, attention has recently been shifted to increased levels of cholesterol and LDL and decrease levels of HDL^(26, 27). Some studies have showed that repeated doses of AAS are correlated with an increase in cholesterol levels, while others have failed to show such correlation⁽²⁸⁾. Some studies have reported that the high exercise increase the liver lipoprotein lipase, which in turn leads to improved TG clearance and may reduce the plasma clearance of HDL components⁽²⁹⁾. The significant variation in the effect of ASS on cholesterol and triglyceride may be due to different study designs used, sampling time, AAS type, management path, and etc^(30, 31). our study has showed that the levels of cholesterol, UDHL, and triglyceride did not effected in the bodybuilder consuming AAS or diet supplement but triglyceride decreased in bodybuilder without consuming any drug and in football player.

In this study, all these parameters levels were higher after 2 years from AAS consuming compared to diet supplement. So we can concluded that both AAS and diet supplements have side effects on the liver function and other biochemical parameters and these effects increase with the consuming period especially the effects of AAS.

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Relationship between Self-Concept with Women's Premenopause Anxiety in Facing the Menopause, in Pamekasan, East Java

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ABSTRACT

Introduction: Menopause is a natural thing that happens to every woman, Some people think that menopause is a pleasant thing and some think that menopause is sadness because of losing productive time, often women face menopause with anxiety and anxiety because menopause is identical to aging, mostly women enter the premenopausal period three to five years earlier than actual menopause. This study aims to determine the correlation concept of self with women's anxiety in the face of menopause.

Method: The study design used analytic observational with a partial cross-sectional approach, the independent variables in this study were self-concept and dependent anxiety, with a population of 70 respondents. The sample was 60 respondents using Probability Sampling simple random sampling technique using questionnaires. To obtain the significance level of the relationship, chi-square (χ^2) statistical test was performed with $\alpha = 0.05$.

Results: The results showed that most respondents had a positive self-concept, that most respondents have experienced mild anxiety, there is a relationship of self-concept with women's fear in the face of menopause in Sampang Village, Sampang District, Madura Regency.

Discussion: The results of this study are expected to add insight and knowledge for respondents especially regarding self-concept and anticipate the occurrence of anxiety in the face of menopause so that they are ready to face the age of menopause.

Keywords: *Anxiety, Self Concept, Menopause*

INTRODUCTION

Menopause is naturally happen to every woman, Some people think that menopause is a pleasant thing and sadness because of losing productive time. Women often face menopause with anxiety because of identical to aging(1) . The term menopause means the period of menstruation stops. This period is the normal stage of life where every woman will pass between the ages of 40 and 60, the average menopause starts at the age of 52. Most women enter the perimenopause period three to five years earlier and the real menopause (Life challenge.s.2007). The stages of development are one psychological stressor. For example, adolescence, adulthood, advanced menopause that naturally will be experienced by everyone. And if these stages of

development cannot be exceeded properly (unable to adapt) there will be anxiety (2).

The menopausal syndrome is experienced by many women in almost all of the world. Around 70-80% of European anita. 60% of women in America. 57% of women in Malaysia. 18% of women in China 10%, women in Japan and Indonesia(3). In Asia, according to the World Health Organization (WHO), in 2025 the number of elderly women will increase from 107 million to 373 million. In Indonesia, life expectancy from year to year has increased. In 1971 Indonesia's life expectancy was 46.5 years, and in 2005 it reached 68.2 years. Besides that, there was a shift in menopause age from 46 years in 1980 to 49 years in 2000. This increase was also experienced by Lampung Province. Namely

the number of life expectancy in 2002 was 66.1 years to 67.6 years in 2004 and Metro as the highest city, the life expectancy is 71.8 years with a population of pre-age women as many as 8,948 people. Metro Timur Subdistrict area is the number of pre-elderly women as many as 2017 people ⁽⁴⁾. The results of the preliminary study conducted at the Panglangkek District of Bajur Village, Waru Subdistrict, Pamekasan Regency, through interviews with ten postmenopausal women found that most (75%) of women before menopause experienced anxiety in the face of menopause and 25% did not experience anxiety.

Health problems begin to emerge due to the loss of the hormone estrogen which plays an active role in the work system of female organs. Changes that occur a lot at this time are physical changes, ranging from hair, eyes, skin to other physical organs. Target physical organs such as problems in the breast and vagina, as well as a burning sensation that radiates in the body (hot flushes). Some factors that influence a person's self-concept are the high expectations for work and ideal in a person. Although not an illness, this event has an impact on a woman's life, especially for women who are active, so that it can be felt as a disorder⁽⁵⁾. Psychological symptoms at menopause are Moodiness. Anxiety, change in mortality and feelings, emotional lability feel helpless, memory impairment. Reduced concentration. difficult to decide. Feel worthless⁽⁶⁾. These symptoms result in changes in self-concept. Stressors that can affect self-concept are a loss of body parts, surgery, pathology of disease, changes in body structure and function, growth and development, procedures and treatment⁽⁷⁾. It is estimated that the number of people who suffer from both acute and chronic anxiety reaches 5% of the population, with a comparison between women and men 2 to 1 ⁽⁸⁾. It is influenced by several factors including the level of education and economic status as well as information sources with a sufficient level of education that someone will be more mature in dealing with all the problems that occur. Information about health is needed for a woman before menopause. With enough information, a person will gain knowledge so they can understand their own needs.

The effort that must be done is to add insight or increase knowledge about the symptoms caused during pre-menopause to anticipate changes - changes that occur in a person. Anxiety often disturbs women aged 40-60 years. These feelings also arise due to a lack of

knowledge about menopausal signs and symptoms. Also, information and counseling about the changes in menopause they have not received, causing fear of being ostracized or no longer noticed by family members. It can be overcome by increasing knowledge through counseling and counseling by health workers (Posted, 2008).

The effort that must be done is to add insight into the causes caused during pre-menopause to anticipate changes that occur in a person. Anxiety often disturbs women aged 40-60 years. These feelings also occur. Also, information and counseling about the changes in menopause they have not received, causing fear of being shocked or no longer noticed by family members. It can be overcome by increasing knowledge through counseling and counseling by health workers (Posted, 2008).

METHODOLOGY

The research design used in this study is analytic observational, which examines the relationship between variables that aim to reveal the relationship between variables. With a study cross sectional approach, the type of research that emphasizes the time of measurement of independent and dependent variables is assessed simultaneously at one time, and there is no follow-up ⁽⁹⁾.

The population in this study were all women aged 40-60 years in Pangdangkek Hamlet, Bajur Village, Waru District, Pamekasan Regency.

In this study, the researcher used the Probability Sampling technique which is by using simple random sampling which is grouping data based on the area ⁽¹⁰⁾.

To collect data, the researcher will use a Closed-Ended Questionnaire which has been made by the researcher concerning the library consisting of 10 questions for self-concept including, physical changes, body shape, individual way of looking at themselves and psychological stability while 14 statements for anxiety. From the results of the presentation of the questionnaire described descriptively by using a frequency distribution table in the form of a table that is confirmed in the form of percentages and narratives.

To determine the relationship of self-concept with the level of anxiety of women in the face of menopause in the village Pangdangkek Bajur Waru District Pamekasan. Chi-square statistical test was used with

SPSS computerization technique with a significant level of 95% or $\alpha = 0.05$. This correlation coefficient test is a test to measure the degree of closeness of a relationship between levels or variables in a sequence of levels of other variables with data requirements on ordinal or semi-quantitative scale variables. The degree of significance $\alpha = 0.05$ means that if p is less than 0.05 H_0 is rejected and H_1 is accepted and if p is more than 0.05, H_0 is accepted, and H_1 is rejected

RESULTS

In this section, there will be presented the results of research showing the relationship of self-concept with the anxiety of pre-menopause women in Pangdangkek village, Bajur village, Waru sub-district, Pamekasa district.

General Data

Characteristics of respondents based on age. Table 1 Distribution of Frequency of Respondents by Age in Bajur village Based on Table 1 shows that most respondents aged 48-49 years were 42 people (70%)

Characteristics of respondents based on education. Table 2 Distribution of Frequency of Respondents by Education in Bajur Village Based on table 2 shows that most respondents have elementary school education as many as 33 people (55%)

Characteristics of respondents based on work. Table 3 Distribution of Frequency of Respondents by Work in Bajur Village. Based on table 3 shows that most respondents work as farmers as many as 31 people (51.7%)

Characteristics of respondents based on religion. Table 4 Distribution of Frequency of Respondents Based on Religion in Bajur Village. Based on that all Islamic respondents were 60 people (100%)

Characteristics of respondents based on the number of children. Table 5 Distribution of Frequency of Respondents Based on Number of Children in Bajur Village. Based on that almost half of the respondents had 2 and three children each with 23 people (38.3%)

Primary Data

Characteristics of respondents based on self-concept

Table 1 Distribution of Frequency of Respondents Based on Self Concept

Self-concept	Frequency (F)	Percentage (%)
Positive	32	53.3
Negative	28	46.7
Total	60	100

Based on Table 1 shows that most respondents have a positive self-concept as many as 32 people (53.3%)

Characteristics of respondents based on the level of anxiety in the face of menopause

Table 2: Distribution of Frequency of Respondents Based on Anxiety Levels of Premenopausal Women in Facing Menopause

Anxiety level	Frequency (F)	Percentage (%)
No anxiety	0	0
Mild anxiety	36	60
Medium anxiety	16	26.7
Severe anxiety	8	13.3
Very severe anxiety	0	0
Total	60	100

Based on Table 2 shows that most respondents experience mild anxiety as many as 36 people (60%)

The relationship between Self-Concept and Women's Anxiety in Facing Menopause

Table 3 Cross-tabulation of Self-concept and Anxiety of Pre-Menopausal Women in Facing Menopause

		Anxiety level			Total
		Medium anxiety	Severe anxiety	Very severe anxiety	
Self concept	Positive	30	2	0	32
		93.8%	6.3%	.0%	100.0%
	Negative	6	14	8	28
		21.4%	50.0%	28.6%	100.0%
Total		36	16	8	60
		60.0%	26.7%	13.3%	100.0%
P= 0.000					

Table 3 shows that most respondents (53.3%) as many as 32 respondents had a positive self-concept and experienced mild anxiety as many as 30 people (50%). To find out the relationship between self-concept and women's anxiety in the face of menopause, it was tested using the chi-square test with SPSS 15 for Windows program, it got the result that df 2 with 32.879 person correlation with a significant level of 0.000 < 0.05 means that H1 is accepted and Ho is rejected thus there is relationship of self-concept with women's anxiety in the face of menopause in Bajur Village

DISCUSSION

Self-Concept

From the results of the study found that most respondents have a positive self-concept as much as 32 respondents (53.3%) of the total respondents. Self-Concept is how one views size. Appearance and function of the body and its parts ⁽¹¹⁾. When someone is born to death. Then for 24 hours a day, the individual lives with his body. So that every change in the body will affect the lives of individuals ⁽¹²⁾. Changes in body appearance. Like amputation or changes in facial appearance is a stressor that influences self-concept ⁽¹³⁾. A realistic view of self. Receiving and liking parts of the body will provide a sense of security to avoid anxiety and increase self-esteem.

With a positive self-concept, one will be more able to accept all forms of change in themselves, so that they will be more confident in their condition. This causes a person to be more able to act positively in every action. In this study, most respondents have a positive self-concept. This is influenced by several factors including the age of a person.

That most respondents are aged 48-49 years. This age range is considered as an adult and has a lot of experience in living life. So they know more about their needs and what they have to do to meet the needs of their families. By the opinion of the more mature someone's age, they will have more experience and knowledge so that they can meet the needs of both the family and themselves.

The anxiety of Premenopausal Women in Facing Menopause

That most respondents experienced mild anxiety as many as 36 respondents (60%). According to ⁽¹⁴⁾, that anxiety is a feeling experienced by an individual, such as when he experiences fear. In this anxiety, feeling is vague, unrealistic or unclear object while the object fear is clear. Anxiety is a form of feeling of worry, anxiety and other unpleasant feelings. Usually, these feelings are accompanied by a feeling of lack of confidence, inability, feeling inferior, and unable to deal with a problem. Indecisiveness of individuals in facing a problem and coupled with concerns about things that are not clear are signs of anxiety in individuals. Anxiety

is a psychological reaction to the mental condition of a depressed individual. If people realize that things that can't work well in certain situations will end badly, they will worry. Pressing conditions or situations will cause anxiety⁽¹⁵⁾.

From the description above shows that anxiety is an individual psychological condition in the form of tension, anxiety, anxiety as a reaction to the existence of something that is threatening.

Relationship of Self Concept with Anxiety of Premenopausal Women in Facing Menopause

Based on the cross-tabulation of the relationship between self-concept and pre-menopausal women's anxiety in the face of menopause, the data obtained showed that the majority of respondents (53.3%) as many as 32 respondents had a positive self-concept and experienced mild anxiety as many as 30 people (50%).

Changes in body appearance. Such as amputation or changes in facial appearance is a stressor that clearly affects the self-image⁽¹⁶⁾. The impact of self-change on a person includes, Refusing to see and touching the changing parts, Not being able to accept changes in the structure and function of the body, Reducing social contact so that there is self-cultivation, feeling or negative view of the body, Preoccupation with body parts or lost body functions, Expressing despair, expressing fear of being rejected, depersonalization, refusing an explanation of body changes. Thus someone will be reluctant to meet other people. But if it is addressed with someone's maturity, it will ease the burden on him. So it doesn't worry too much about the situation.

If someone has a positive self-concept, then anxiety in the face of menopause will decrease. This is evidenced by the results of the above research that most respondents have a positive self-concept and experience mild anxiety.

CONCLUSION

Most respondents have a positive self-concept, some respondents have mild anxiety experiences. Women who have a positive self-concept will experience mild anxiety in the face of menopause.

SUGESTION

The results of this study are expected to add insight and knowledge for respondents especially regarding

self-concept and anticipate the occurrence of anxiety in the face of menopause.

Add information about your self with anxiety in the face of menopause

The results of this study can be used as additional references in improving knowledge about the self-concept of pre-menopausal women in the face of menopause. And it is hoped that it can be used as additional reference material in improving health services for the community.

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The Effect of Use of Edutainment on Changes in Hemoglobin Levels in Adolescents (Case Study of SMPN 4 Banjarbaru)

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ABSTRACT

Anemia is a body condition characterized by deficiency in size and number of erythrocytes or in insufficient hemoglobin levels for the function of O² and CO² exchange between blood tissues. The prevalence of anemia in adolescents in Indonesia is quite high, namely 21.7% with anemia sufferers aged 5-14 years by 26.4% and 18.4% of patients aged 15-24 years. Banjarbaru City is the highest area of anemia in adolescents in South Kalimantan Province at 58.75%. Efforts that can be made to improve the application of balanced nutrition in adolescents in preventing anemia have not been optimal either direct efforts such as giving tablets blood or not directly through counseling and socialization. another effort to provide information related to nutrition according to their needs, one of which is to provide nutritional education in the form of counseling edutainment. Edutainment is a form of counseling or education that is packaged in the form of fun entertainment. The purpose of the study is to analyze the effect of using edutainment on changes in hemoglobin levels in young women.

The study uses a Quasi Experiment design with a pre-test and post-test group design approach. The number of samples was 90 young women who were taken by purposive sampling technique. The data obtained were then analyzed using Paired T-Test and Wilcoxon statistical tests for paired different tests, and Anova and Kruskal Wallis tests for unpaired different tests, which was then followed by Post Hoc test for Anova test and Mann Whitney test for Kruskal Wallis test. The results of statistical analysis showed that overall the p value obtained was <0.005, this indicates the meaning that edutainment booklet and edutainment video had different effects before and after the intervention was given to changes in hemoglobin levels in adolescent girls.

Keywords: Edutainment, Changes in Hemoglobin Level, Anemia in adolescents

INTRODUCTION

Anemia is a body condition characterized by deficiency in size and number of erythrocytes or in insufficient hemoglobin levels for the function of O² and CO² exchange between blood tissues¹. Based on data from the Data and Information Center of the Republic of Indonesia Ministry of Health (2016) the average adequacy of energy consumption for adolescents aged

13-18 years is 72.3% with the proportion consuming <70% of the energy adequacy rate (AKE) of 52.5%. shows that adolescents still consume energy under minimum requirements². The lack of energy needed can lead to anemia. This is corroborated by the 2013 Basic Health Research data showing that the prevalence of anemia in Indonesia is 21.7% with anemia patients aged 5-14 years at 26.4% and 18.4% of patients aged 15-24 years³.

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Nutrition program report data from the South Kalimantan Health Office in 2015 stated that the prevalence of anemia among female teenagers in South Kalimantan was still quite high, amounting to

29.13% before administration of blood-added tablets. After blood-tablet intervention, the results decreased to 13.64%. Of the 13 Regencies or Cities, Banjarbaru City of 58.75% was the highest problem of anemia among female teenagers before administration of blood-added tablets (TTD) followed by Banjar Regency of 48.92% and Tanah Bumbu Regency of 43.67%. This is corroborated by the results of the 2015 Banjarbaru Nutrition Program report on the highest data in SMP 4 Banjarbaru as many as 82.4% of girls who experience anemia.

Efforts that can be made to improve the application of balanced nutrition in adolescents in preventing anemia have not been optimal, both direct efforts such as giving blood tablets or not directly through counseling and socialization. This is corroborated by the Banjarbaru City Health Office report data that after being given a tablet intervention the blood was still anemic at the second examination, which was as much as 26.17% above the anemia prevalence of South Kalimantan Province which was 17.81%. So it needs other efforts to provide information related to nutrition according to their needs, one of which is by providing nutritional education in the form of counseling edutainment. Edutainment is a form of counseling or education that is packaged in the form of fun entertainment⁴.

MATERIAL AND METHOD

The method used in this study is quantitative research with Quasi Experiment design using the pretest and posttest group design approach. This research method is applied to see the effect of media booklets and visual media on changes in hemoglobin levels in young women. This research was conducted at Banjarbaru 4 Middle School with consideration based on secondary data of the Banjarbaru city health service. The population in this study were all female adolescents in grades VII and VIII at Banjarbaru 4 Junior High School, totaling 309 people. The size of the sample in this study was calculated using a formula according to Lemeshow (1997) with a large sample of 81 young women. The dependent variable in this study is the change in Hb level. The independent variables in this study are edutainment booklet, video edutainment, edutainment booklet and video. Data was analyzed by univariate and bivariate.

FINDING

The results of the measurement of anemia levels before and after being given edutainment booklet

Table 1 Distribution of Hemoglobin Levels in Adolescent Edutainment Booklets

No	Hemoglobin Levels	Pretest		Posttest	
		n	%	n	%
1	Anemia	10	33.3	4	13.3
2	Not anemia	20	66.7	26	86.7
	Total	30	100.0	30	100.0

Distribusi kadar hemoglobin sebelum intervensi *edutainment booklet* remaja yang mengalami anemia sebanyak 10 orang (33,3%) terjadi penurunan setelah diberikan intervensi menjadi sebanyak 4 orang (13,3%).

Tabel 2. Efektifitas Edutainment Booklet Terhadap Perubahan Kadar Hemoglobin

No	Media	Tes Normality (Sig.)	Mean Rank	P-Value
1	Edutainment Booklet	.000	45.32	.001

Based on 4.18 table, the results of the wicoxon test showed $p < 0.05$ which showed that there was a change in hemoglobin level between pretest and posttest in the edutainment booklet group.

The results of statistical analysis on adolescent girls obtained p value < 0.05 . So that means that there is a difference in the effectiveness of edutainment booklets on changes in hemoglobin levels. Based on table 4.25 shows that the increase in the average value of hemoglobin levels in the group given booklet edutainment intervention is higher at 45.32, thus means that the booklet is more effective in increasing hemoglobin levels than other media in young women.

The results of the wicoxon test obtained p value < 0.05 , which means that there was a change in hemoglobin level between pretest and posttest in the edutainment booklet group. Based on table 4.6 the distribution of hemoglobin levels before the edutainment intervention of adolescent

booklets that experienced anemia were 10 adolescents (33.3%) decreased after being given intervention for 12 weeks as many as 4 meetings to be 4 adolescents (13.3%). This shows that the edutainment booklet affects changes in hemoglobin levels, this is due to the occurrence of increased knowledge, attitudes and behavioral changes in the fulfillment of balanced nutrition. This data is supported also by the results of the edutainment booklet media questionnaire in the appendix that has been made which shows that 97.5% of teenagers consider edutainment booklets interesting, 100% of teenage girls understand the contents of edutainment booklet media, 100%, like edutainment booklets, 100% edutainment booklet media increase knowledge about anemia for adolescents, 100% of edutainment booklet media increases insight on prevention of anemia in adolescents, 100% of edutainment media booklet contains about how to drink blood tablets, 100% of teenagers after reading edutainment media booklet agree to prevent anemia and average results the average questionnaire showed 99.75%. In addition, booklets can also be taken home, so that subjects can read or study them.

The results of Listiana research (2016) showed that health education with booklet media had an effect on changes in hemoglobin levels in children in elementary schools with a significant value of 0.043. Nutrition education or counseling is an educative approach to produce individual or community behavior that is needed to improve food improvement and nutritional status⁵. This is also corroborated by the Adirsa study (2005) that the results of paired t-test hemoglobin levels in the treatment group before and after the intervention showed $p < 0.05$, which means there is a significant difference in hemoglobin levels⁶. According to Peymen (2016) The level of knowledge and behavior in food selection will ultimately affect the nutritional state concerned⁷.

CONCLUSION

1. Edutainment booklets affect hemoglobin levels in young women.
2. Edutainment booklets are effective for increasing hemoglobin levels in young women.

Ethical Clearance: this study approved and

received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for ethical clearance and informed consent. The informed consent included the research title, purpose, participants right, confidentiality and signature.

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Conflict of Interest: The authors declare that they have no conflict of interest.

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Relationship between Folate Receptor Alpha (FR α) with Estrogen Receptor, Progesterone Receptor, HER-2 Neu Expression in Breast Carcinoma

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ABSTRACT

Folate alpha receptor (FR α) was a membrane receptor protein of glycosyl-phosphatidyl-inositol, which used as an antigen marker and also as a new molecular subtype in breast carcinoma with complex and heterogeneous genetic disorders. This study aimed to determine a relationship among FR alpha expression with Estrogen receptor (ER), Progesterone Receptor (PR), and HER-2 expression in breast carcinoma. This was observational study with a cross-sectional design, FR alpha expression was confirmed by immunohistochemistry methods, ER / PR alpha expression using Allred Score (1998), Human Epidermal Growth Factor Receptor -2 (HER-2) expression according to ASCO and Cap (2013), histopathological grading based on Nottingham Modification of The Bloom Richardson System. The total sample for this study was 75 samples of breast carcinoma patients. This study showed FR alpha expression was not significantly associated with alpha ER / PR expression ($p = 0.887$) and histopathological degree ($p = 0.190$), but FR alpha expression was significantly associated with HER-2 overexpression ($p = 0.037$) in breast carcinoma. Overexpression FR alpha was more dominant in breast carcinoma with a poor and aggressive prognosis.

Keywords: Breast Carcinoma, FR alpha, ER-alpha, PR alpha, HER-2 neu.

INTRODUCTION

Breast cancer was a complex and heterogeneous disease, had different histological and molecular features, behavior and varied therapy responses. Heterogeneous breast cancer morphology was related to specific molecular profiles, which could be investigated with gene expression.¹ Estrogen receptor (ER), Progesterone Receptor (PR) and Human Epidermal Growth Factor Receptor -2 (HER-2) reported as biomarkers related to clinical and biological behaviors in breast cancer.^{2,3} Folate Receptor Alpha (FR α) expression in breast cancer showed new and unique molecular subtypes and was useful for therapeutic interventions. It was 74% overexpression of FR α in breast cancer with negative ER/PR.⁴

FR α was a membrane protein of glycosylphosphatidylinositol (GPI-anchored), encoded by FOLR1 genes consisted of 257 amino acids.⁵⁻⁷ FR α

overexpression found in solid tumors, such as ovarian, breast and lung carcinomas.⁸ However, it was a low expression in healthy human tissue.⁹ Overexpression of FR α affected to the growth of cancer cells through direct or indirect mechanisms with the uptake of folic acid.⁴

Hansen et al., revealed a new transduction pathway initiated by folic acid and folinic acid bonded with FR α which resulted to cellular response through gp 130 co-receptors accompanied by JAK and STAT activations. Activation of STAT 3 oncogenes conducted by folic acid and folinic acid increased the complexity of the role of vitamin B9 in one-carbon metabolism. This pathway influenced several cellular processes through cell division, angiogenesis, metastasis and inhibited cancer cell apoptosis.¹⁰

This study aim were Examining the importance of FR alpha as a marker of targeting therapy in breast cancer.

MATERIALS DAN METHOD

Collection of Samples

This was observational research with a cross-sectional design. The study sample was a population of breast carcinoma patients, diagnosed based on histopathological examination and performed ER/PR/ Her-2 immunohistochemistry examination at the Makassar Pathology Diagnostic Laboratory, from January to December 2017.

Inclusion criteria: Block paraffin tissue of breast carcinoma carried out by ER α , PR α , Her-2 Immunohistochemistry examination which processed according to standard procedures.

Exclusion criteria: damaged paraffin blocks of breast tissue. Amount of samples which met inclusion and exclusion criteria were 75 paraffin blocks of breast carcinoma.

Pathological Review

Histopathological features of breast carcinoma were examined using hematoxylin-eosin staining. Scaled based on the Nottingham Modification of the Bloom Richardson System. Immunohistochemistry examination of ER / PR alpha evaluated based on Allerd 1998 score and Her-2 neu evaluated based on ASCO and Cap 2013.

Immunohistochemistry Evaluation of FR α expression

The Immunohistochemistry scores and evaluation results of FR alpha were assessed by two pathologists. Colored FR alpha expression was seen in the cell membrane and scaled based on the study of O'Shannessy D.J, et al. (2012) and set cut-off score of the cell colored percentage (> 5%) with the intensity of any color, then divided expression score into:

A. 3+ score, Cell Membrane has strongly colored at four times Obj magnification and confirmed with ten times Obj

B. Score 2+, Cell Membrane was moderate colored at ten times obj magnification of obj and established with obj 20 times

C. 1 + score, cell membrane was weakly colored at 20 times or 40 times obj magnification

D. 0 score, no cell membrane was stained with obj 20 times and 40 times

Data Analysis

Data analysis using Statistical Package for Social Science version 24. Analysis of relationship among expression FR α and clinicopathological criteria used chi-square test, with P<0.05.

RESULTS

Clinicopathological characteristics

In this study, there were 75 samples in the age range of 29-80 years old, the highest frequency in the age group (43 samples) was less than 50 years old(57.3%). Based on histopathological grading there were nine samples (12%) with low-grade breast carcinoma, 34 samples (45.3%) with moderate grade breast carcinoma and 32 samples (42.7%) with high-grade breast carcinoma. The study sample consisted of 25 samples (33.3%) with positive alpha ER / PR expression and 50 samples (66.7%) with negative alpha ER / PR expression. Regarding receptor marker and Her-2 status, It was divided into three groups, included Negative ER / PR / Her-2 group; Her / 2 Positive ER / PR Negative; Positive ER / PR Her-2 Negative / Positive, and each group consisted of 25 samples (33.3%). While positive Her-2 status was 29 samples (38.7%) and negative Her-2 status was 46 samples (61.3%) showed in Table 1.

Table 1. Percentages Characteristic of Respondents

Characteristics	Results	n	%
Age	< 50 yo	43	57.3
	≥ 50 yo	32	42.7
Histopathological Grading	Low Grade	9	12
	Moderate Grade	34	45.3
	High Grade	32	42.7

Cont... Table 1. Percentages Characteristic of Respondents

Marker	ER/PR/Her-2 Negatives	25	33.3
	ER/PR Negative Her-2 Positif	25	33.3
	ER/PR Positive Her-2 Negative/Positif	25	33.3
Her-2 Status	Positive	29	38.7
	Negative	46	61.3
Expression of ER/PR alpha	Positive	25	33.3
	Negative	50	66,7
Expression FR alpha	Positive	29	38.7
	Negative	46	61,3
score of Expression FR alpha	0	46	61.3
	1+	12	16
	2+	8	10,7
	3+	9	12

Immunohistochemistry expression of FR α in breast carcinoma

The results of this study showed 29 samples (38.7%) were expressed positively and 46 samples (61.3%) were expressed negatively in breast carcinoma. The intensity of FR alpha expression from the score range 0 to +3, the highest frequency was the group with FR alpha 0 expression score (61.3%), then the group with +1 score (16%), +3 score (12%), +2 score (10.7%) showed in figure 1. showed in figure 1.

Although statistically there was no significant relationship among FR α expression and patient age and

histological grading, however breast carcinoma with high histological grading which resulted to expression FR α was 43.8% shown in Table 2.

The relationship among FR α expression with ER/PR alpha expression, Her-2 neu, where FR alpha expression was significantly associated with Her-2 status (P = 0.037). However, ER / PR alpha expression there was no significant relationship with Her-2 status (P = 0.887). It could be seen that FR α was more expressed in breast carcinoma with negative alpha ER/PR of (40%) and ER- / PR- / Her-2 + group of (52%) was shown in Table 3.

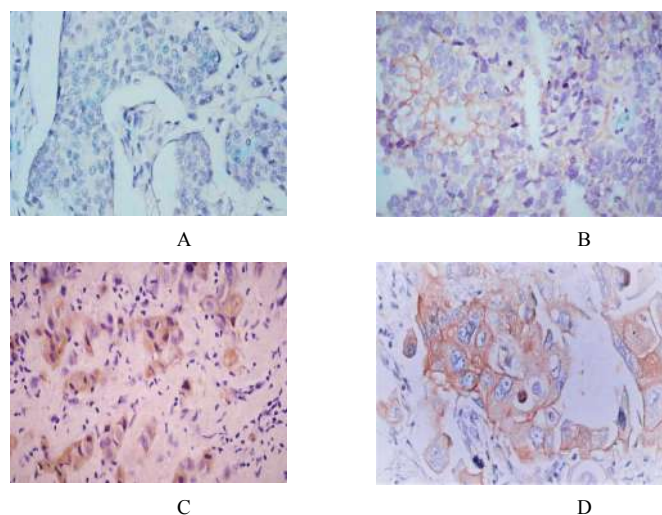


Figure 1. Folate Receptor Alpha expression in breast carcinoma

Negative membranous and cytoplasmic Immunohistochemistry expression of FR α in breast carcinoma (obj 40x)

Positive 1, weak membranous and cytoplasmic Immunohistochemistry expression of FR α in breast carcinoma, (obj 40 x).

Positive 2, moderate membranous and cytoplasmic Immunohistochemistry expression of FR α in breast carcinoma, (obj 40 x).

Positive 3, strong membranous and cytoplasmic Immunohistochemistry expression of FR α in breast carcinoma, (obj 40 x).

Table 2. Clinicopathological characteristics of breast carcinoma based on Immunohistochemistry expression.

Clinicopathological Parameters	Expression of Folate Receptor Alpha				Total	P value
	Positive		Negative			
	Amount	Percentage	Amount	Percentage		
Age						0,95
< 50 yo	16	37,2 %	27	62,8 %	43	
\geq 50 yo	13	40,6 %	19	59,4 %	32	
Histological Grade						0,190
High Grade	14	43,8 %	18	56,3 %	32	
Moderate Grade	14	41,2 %	20	58,8 %	34	
Low Grade	1	11,1 %	8	88,9 %	9	

Table 3. A Relationship among Expression FR alpha with ER, PR alpha and Her-2 neu (N=75)

Receptor	Expression of FR alpha				Total	P Value
	Positive		Negative			
	Amount	Percentage	Amount	Percentage		
Marker						
ER/PR/Her-2 Negative	7	28%	18	72%	25	0,207
ER/PR Negative Her-2 Positive	13	52%	12	48%	25	
ER/PR Positive Her-2 Negative/Positive	9	36%	16	64%	25	
Her-2Status						
Positive	16	55,2 %	13	44,8 %	29	0,037
Negative	13	28,3 %	33	71,7 %	46	
Expression ER/PR alpha						
Negative	20	40%	30	60%	50	0,887
Positive	9	36%	16	64%	25	

DISCUSSION

Breast carcinoma subtypes distribution differences based on age, race, staging, grading Bloom-Richardson, tumor size, and lymph node status.¹¹

FR alpha was a glycosyl-phosphatidylinositol (GPI) protein anchored in the cell membrane with high affinity for binding and transporting folate whereas folate acted as a one-carbon metabolism in essential components of cell metabolism, DNA synthesis, and reproduction, as well as rapid cancer cell division. Therefore, it was found high expression levels in malignant tumors from epithelium compared to healthy cells.¹²

In this study, breast carcinoma expressing FR alpha was only 38.7% of the total sample. There was a meaningful relationship among FR alpha expressions with Her-2 status with a value of $p < 0.05$. This showed that breast carcinoma with Her-2 status could affect the expression of FR alpha.

During the Her-2 phosphorylation process, in spite of inducing downstream intra-cell signaling, it also activated genes associated with cell growth.¹³ One of them was the FOLR gene 1. Previous research of Necela, et al., it was stated that breast tumors with Her-2 positive could express FR alpha.¹⁴

The role of Her-2 neu as a critical driver of cell growth was one of the transmembrane receptors of epidermal growth factor (EGF) receptor family, which was encoded by the erbB-2 gene. This gene amplification could result in 18-20% overexpression of Her-2 in phenotypic breast carcinomas that were more aggressive. Her-2 could activate three central signaling pathways, namely: Ras/Raf/MAPK, JAK/Stat, and PI3K/AKT/m-TOR. Those affected by cell growth and survival, proliferation, division, metabolism, apoptosis and migration ability. Therefore, tumors with Her-2 was classified as a tumor with a poor prognosis.¹⁵⁻¹⁷

Also, phosphorylation of serine and threonine from the erbB-2 gene could be stimulated by the PKC enzyme activated by phorbol ester.¹⁸ According to Elnakat et al., recycling FR required enzyme protein kinase C alpha (PKC α), which was activated by diacylglycerol and phorbol ester to bind RACK 1 receptor. Thus it increased FR alpha amount on the cell surface.¹⁹ This showed that indirectly PKC enzyme pathways could increase expression of FR alpha and Her-2 neu in breast

carcinoma.

Regarding important role of PKC enzymes in some cascade signal transductions, receptor desensitization also functioned, such as membrane structure modulation, transcription regulation, immune system mediation, regulation of cell growth and learning and memory processes.²⁰ Therefore, the understanding of the regulatory process of FR alpha recycling through the PKC pathway, it also functioned as effective drug delivery.

In other research results, it was found that there was no significant relationship among FR alpha expression with ER/PR expression in breast carcinoma. However, it showed that FR α was more expressed in breast carcinoma with negative alpha ER/PR at (40%) and ER-/PR-/ Her-2 + (52%). This stated that FR alpha expression affected by hormonal receptors (ER/PR) with steroid hormone especially estrogen.¹² It was known that regulation of FR alpha expression was very complicated depending on the subtype of breast carcinoma.¹⁴

Kelemen L.E et al., stated that regulation of gene expression and protein FOLR1 depended on the concentration of extracellular folate, the level of intracellular homocysteine, other transcription and translation rules, epigenetic regulation, hormonal regulation, and genetic mutation.⁹

Kelley et al. stated that promotor of FR alpha gene was repressed by 17- β estradiol/ER bonds in promotor of P4 area, then, it was depressed by antiestrogen tamoxifen. ER alpha corepressor in the form of SMRT played a role in increasing repression of FR alpha gene promoters with 17- β estradiol/ER. Therefore, breast carcinoma with ER was positive directly and actively repressed expression of FR alpha.¹²

It is known that corepressor was an essential regulator of ER α -mediated work, while transcription activation conducted by ER alpha was complex and multi steps. If this corepressor was lost, it affected breast cancer growth and resistance to endocrine therapy.²¹ This multiprotein complex had effects through several mechanisms depending on the type of corepressor and chromatin remodeling, histone deacetylation (HDACs) or basal transcription. In the transcription process of the FR alpha gene, the SMRT and NCoR corepressors played a role in repressing transcription factor via HDACs in Ligand Binding Domain (LBD) area.²²

On the contrary with the progesterone receptor (PR alpha) which indirectly increased regulation of the FOLR gene 1, androgen and glucocorticoid hormones could activate and improve control of the FOLR 1 gene.²³

Regarding biological regulatory processes of the FOLR 1 gene and other influential factors, the role of this gene in breast carcinogenesis was understood. Therefore, a new therapy for breast carcinoma with a low toxicity effect could be developed.

A variant of other previous research was probably related to the presence of polymorphism from the FOLR 1 gene, sample size differences and evaluation method differences of expression of FR alpha.

CONCLUSION

This research found that FR α expression was present in breast carcinoma with a poor and aggressive prognosis. Suggested to use FR α immunohistochemistry examination as additional prognostic factors in breast carcinoma.

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Study of Quality of life at Worker User Train *Commuter line* and TransJakarta Busway Bogor - Jakarta 2018

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ABSTRACT

Many studies have concluded that commuting activities have an impact on the quality of life of commuters on physical, mental / psychological, health, and social / environmental aspects. The objective of this study is to determine the quality of life of commuting workers who use busway Transjakarta and train commuter line modes of transportation from Bogor to Jakarta and the influencing factors. This study was conducted using cross sectional design with WHO Quality of Life BREF questionnaire. The result was analyzed using univariate and bivariate by Chi square. The result shows the respondents have used train commuter line for ≥ 4 years (50.6%) while workers using the Transjakarta for <4 years are 52.5% with the frequency of ten times a week for train commuter line (72.4%). The quality of life of the users of commuter line and busway Transjakarta is categorized as good by percentage of 57.1% and 70%. The psychological and environmental domains have the highest scores on both transportation modes, while the physical domain has the lowest score. The bivariate analysis reveals that the quality of life of workers using train commuter line is affected by income and psychological conditions, while that of the workers using busway Transjakarta is affected by the types of work

Keywords: *Quality of Life, WHOQOL- BREF, Worker Commuter, Busway Transjakarta, KRL Commuter line*

INTRODUCTION

Many previous studies concluded that commuting affects the quality of life of commuters on the physical and mental/psychological aspects, as well as their health, and social/environment ¹⁻⁶. The psychological aspect of the commuters are also affected, for example they become stressed out while commuting that increases bad mood which can cause anxiety, low tolerance, frustration ^{1,4,7,8}, impatience while driving ^{9,10}, and feeling unhappy. Another study found the level of quality of life and happiness of commuters using public transportation is lower than non-commuters ^{4,11}.

Besides the physical and psychological effects, commuting also affects the social aspect, i.e. social capital/modal. Commuters tend to limit their free time for social and recreational activities and create negative

externalities in the community by reducing participatory activities¹². In fact, social capital can be the resource that arises from social relations in the community that can be used to solve problems both individually and collectively¹³. Moreover, another study showed that public transportation commuters with longer duration had lower community social participation¹³.

Another study presented that the duration of commuting leads to higher health risk if the commuters use private cars rather than public transportation. Car users have lower health condition, lower life satisfaction and higher Body Mass Index than public transportation commuters⁶. Commuter line users can also be potentially exposed to Particulate Matter (PM) and Ultrafine Particles (UFPs)^{14,15}, respiratory tract problems due to air pollution¹⁵. Air pollution produces pollutant, including particulate matter (PM), carbon monoxide (CO), nitrogen dioxide (NO₂), volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs)¹⁶.

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Based on the background and description above, the objective of this research is to elaborate the quality of life of commuter line workers that use Transjakarta Busway and commuter line train from Bogor to Jakarta and the factors that affect it.

METHOD

This study was conducted using a cross sectional design. The samples of this study are respondents from commuters/users who started their commute to work from Bogor station and Depok station, and the Transjakarta Busway users who started their commute to work from Cibinong terminal and Bogor terminal to their destination, Jakarta in April until June 2018. The total respondents were 196 people. The primary data

of this study were collected using WHOOL-BREF questionnaire and trip-inconvenience questionnaire, Health Conditions, Psychological Conditions, and Bad Experience. The data were analyzed using univariate descriptive and bivariate by Chi square test using SPSS 20 software.

RESULTS

This following is the social demographic characteristic of workers using commuter line train and workers using Transjakarta Busway based on their age, gender, educational level, type of job, income, marital status, number of children, duration the transportation mode usage, and frequency of using mask.

Table 1 : Social Demographic Characteristic Workers Using Commuter Line Train and Workers Using Transjakarta Busway (N=156) and Busway Transjakarta (N=40)

Respondents' Characteristics	Commuter Line Train Percentage		Transjakarta Busway	
	n	Percentage	n	Percentage
Age				
≤ 29 years old	71		13	32,50
> 29 years old	85		27	67,50
		45,5		
		54,5		
Gender				
Male	82	52,6	23	57,50
Female	74	47,4	17	42,50
Educational Level				
Middle/High School	13	8,3	1	2,50
College (Diploma/Bachelor/ Magister/ Doctoral)	143	91,7	39	97,5
Type of Job				
Government Employee(s)	46	29,5	9	22,5
Private Company Employee(s)	85	54,4	22	55,0
Entrepreneur(s)	6	3,8	3	7,50
Others	19	12,2	6	15,0
Income (IDR)				
3 million – 6 million	56	35,9	13	32,5
6 million – 9 million	52	33,3	13	32,5
9 million – 12 million	25	16,0	6	25,0
> 12 million	23	14,7	8	20,0
Marital Status				
Single	61	39,1	12	30,0
Married	95	60,9	28	70,0

Cont... Table 1 : Social Demographic Characteristic Workers Using Commuter Line Train and Workers Using Transjakarta Busway (N=156) and Busway Transjakarta (N=40)

Duration of Transportation Mode Usage (years) < 4 years ≥ 4 years	77 79	49,4 50,6	21 19	52,5 47,5
Frequency of Transportation Mode Usage (in week) < 10 times ≥ 10 times	43 113	27,6 72,4	21 19	52,5 47,5

Quality of life of commuter line train users and Transjakarta Busway users include physical domain, psychological domain, social relations domain, and environmental domain. The first domain score of commuting workers of the commuter line train and Transjakarta Busway is physical condition (physical domain), the score from second domain is the psychological condition (psychological domain), the third domain score is social relation of the commuting workers using commuter line train and Transjakarta Busway. The fourth domain score is the environmental condition of the commuting workers using commuter

line train and Transjakarta Busway.

Hereafter, to make the analysis easier, the researcher grouped the quality of life score into two parts, namely poor and good, based on the respondents' answer regarding their quality of life, with the result that the commuting workers of the commuter line train has a good quality of life by 57,1% and poor quality of life by 42.9%. On the other hand, the Transjakarta Busway users has a good quality of life by 70% and poor quality of life by 30% as presented in Table 2 below.

Table 2 : Respondents Distribution Based on Quality of Life Level

Quality of Life	Commuter Line Train		Transjakarta Busway	
	Frequency	Percentage	Frequency	Percentage
Less/ Poor	67	42.9	12	30,0
Good	89	57,1	28	70,0

The result of the bivariate analysis to see the correlation between two variables as presented in table 3, namely the relation of quality of life with social demography of commuter workers of commuter line train and Transjakarta Busway, which is correlated with the income and type of job.

Table 3: Correlation of Quality of Life with Social Demography of Commuter Workers of Commuter Line Train and Transjakarta Busway

Variable	QOL Commuter Line		P value	OR	QOL Transjakarta		P value	OR
	Poor	Good			Poor	Good		
Age								
≤ 29 years old	32	39	0,744	1,172 (0,620 – 2,215)	5	9	0,720	1,508 (0,374 – 6,085)
> 29 years old	35	50			7	19		
Gender								
Male	33	49	0,578	0,792 (0,420 – 1,496)	6	17	0,780	0,647 (0,166 – 2,527)
Female	34	40			6	11		
Educational Level								
High School	6	7	1,000	1,152 (0,369 – 3,602)	0	1	1,000	1,444 (1,172 – 1,781)
College	61	82			12	27		

Cont... Table 3: Correlation of Quality of Life with Social Demography of Commuter Workers of Commuter Line Train and Transjakarta Busway

Type of Job								
Government	18	18	0,304	1,767 (0,265 – 2,836)	0	9	0,043*	~ 0,289 (0,204-16,512)
Private Company	34	51		1,200 (0,354 – 2,289)	9	13		
Entrepreneur(s)	2	4		0,277 (0,182 – 7,926)	2	1		
Others	13	6		1,667 (0,078 – 0,988)	1	5		
Income								
3 – 6 million	32	24	0,011*	0,758 (0,988 – 4,605)	6	7	0,373	4,714 (0,056 – 2,697)
6 – 9 million	20	32		0,529 (0,656 – 4,391)	2	11		1,714 (0,204-16,512)
9– 12 million	11	14		1,846 (1,905 – 21,05)	2	4		2,571 (0,065 – 6,871)
> 12 million	4	19		-0,288	2	6		1,167 (0,065 – 6,871)
Marital Status								
Single	29	32	0,446	1,359 (0,710 – 2,601)	6	6	0,130	3,667 (0,862 – 15,59)
Marriage	38	57			6	22		
Duration								
< 3 and 4 years	35	43	0,746	1,170 (0,620 – 2,207)	9	12	0,128	4,000 (0,887 – 18,03)
>= 3 and 4 years	32	46			3	16		
Frequency								
< 10 times	27	26	0,202	1,636(0,838 – 3,192)	5	16	1,000	0,536 (0,136 – 2,10)
≥ 10 times	40	63			7	12		

DISCUSSION

The profession with the highest percentage among the commuter workers of commuter line train is Private Company Employees by 54.4%, so does with the users of Transjakarta Busway by 55%. It is in line with Central Bureau of Statistics survey data on 2014¹⁷ that the the business fields with the biggest number of commuter workers of commuter line train include industries, trade, social services, social, and accommodation. These business fields need employees as labor/manpower, which means that most workers are private company employees.

The amount of income with the highest percentage among commuter workers of commuter line train is 3 – 6 million by 35.9%, as is Transjakarta Busway workers by 32.5%. The DKI Jakarta Provincial Minimum Salary in 2018 is Rp. 3,600,000.00. It means that the average income of the respondents working in Jakarta is in accordance with DKI Jakarta Provincial Minimum Salary.

The biggest inconvenience of the trip felt by commuter line users is the crowded condition, meanwhile the lowest is accidents. For the Transjakarta Busway users, the biggest inconvenience of the trip was

traffic jam, and the lowest perceived was noise. Crowded condition was the most affecting the inconvenience perceived by commuter line train users. The researcher believes that crowded condition occurs due to the large number of workers using commuter line train. The result of a survey conducted by Central Bureau of Statistics in 2014¹⁷ indicate that there were 149,921,245 users of the commuter line train from Bogor to Jakarta.

For health condition, the complaint with the highest percentage from commuter line users is muscle aches, meanwhile the lowest percentage is nausea. It is the same as Transjakarta Busway users that the complaint with the highest percentage is muscle aches, meanwhile the lowest percentage is nausea. Bowling (2001)¹⁸ stated that the transportation problem is one factor correlated with quality of life level that can cause health condition.

For psychological condition, the highest perceived by commuter line train users is inconvenience/discomfort, meanwhile the lowest perceived is the miserable situation, and so are with Transjakarta Busway users. These are caused by the condition inside the commuter line train or Transjakarta Busway which can be filled with passengers causing the passengers to jostle. For bad experience, the most experienced by commuter line users is schedule delay, while the most infrequent occurrence

is accident, and so are for Transjakarta Busway users.

The commuter workers on both commuter line train or Transjakarta Busway obtain lowest score to physical domain. Temporarily, it can be said that the workers has lack of ability to resolve the factors that affect physical condition, such as illness, sleep quality, energy and fatigue, mobility, activities in daily life, dependence on medication or medical therapy. The most common factor experienced by commuter line train and Transjakarta Busway workers is in terms of sleep quality problems. It is possible because the factors of fatigue and daily routines caused by waking up early and going home from work late at night are related to the workers having to pursue the commuter line train or Transjakarta Busway schedule.

The domains of commuter line train and Transjakarta Busway workers with the highest score are psychological and environmental domains. For the moment, it can be said on both commuter workers of commuter line train and Transjakarta Busway have better psychological and environmental domain compared to physical and social domain. Also, both of those have good quality for psychological and environmental condition. The environmental domain includes financial source, freedom, physical safety, dan security, health treatment, and social care, homey feeling, the opportunity to get and receive a lot of new information and new skills, the opportunity to do recreation or activities, physical environment, and transportation.

For psychological domain, it can be said that commuter line train and Transjakarta Busway users have good capability/ability such as bodily and appearance, positive and negative perceived, self-esteem, thinking, learning, memory and concentration, and spiritual aspect.

In this research, the factors correlating with quality of life of commuter line train workers are psychological condition and income, meanwhile for Transjakarta Busway workers there is no dominant variable. Social demographic factors influence the quality of life among Indonesian workers, as well as job characteristics (work status, work shift and work area condition), individual characteristics (educational level) and lifestyle (sleep duration and exercise habit)¹⁹. Other study found lifestyle, working characteristics, workplace conditions were associated with QOL among SME workers in

South East Asian Countries²⁰. Another previous study by Dalkey (2002)²¹ found the influence from demographic factor is income with subjective perceived quality of life. It is presented that the respondents who make less than the Provincial Minimum Salary are more at risk to experience stress than workers whose income is above the Provincial Minimum Salary.

CONCLUSION

The percentage of quality of life of commuter workers using commuter line train and Transjakarta Busway whose workplace is in Jakarta categorized as good is 57.10% and 70%. Environmental and psychological conditions are domains that have the highest score to commuter workers using commuter line train and Transjakarta Busway. From the bivariate analysis, the significant correlation variables to quality of life of commuter line train workers are the income and psychological condition variables, whereas correlation variable the quality of life of Transjakarta Busway workers is type of job variable.

Conflict of Interest: None

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The Effect of Sleep Hygiene and Brain Gym on Increasing Elderly Comfort and Sleep Quality

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ABSTRACT

Introduction: Quality of life is one of the important things to consider, with the increasing number of elderly people, the number of problems and the number of elderly people living in nursing homes also increased. The greatest need for the elderly is the level of health, so that one can live a prosperous life by applying a healthy sleep pattern and carrying out physical exercise. The purpose of this study was to determine the effect of sleep hygiene and brain gym on increasing comfort in the elderly. **Method:** This type of research is a pretest posttest with control group design quasy experiment. The sampling method used was purposive sampling as many as 50 people and had fulfilled the inclusion and exclusion criteria. Sleep hygiene intervention was applied every day for 30 days, and the brain gym was held as many as 16x meetings for 4 weeks. The statistical test used is the independent t-test to test the hypothesis. **Result:** The independent t-test hypothesis test results are 0,000. This study showed significant results on the treatment group, which means that there is an effect of sleep hygiene and brain gym on increasing comfort and sleep quality in the elderly. **Conclusion:** Intervention of sleep hygiene and brain gym can improve comfort and sleep quality in the elderly.

Keyword: *sleep hygiene, brain gym, comfort, sleep quality, elderly*

INTRODUCTION

Aging process is a natural process which is accompanied by a decrease in physical, psychological and social conditions that interact with one another. The greatest need for the elderly is the level of health, in order to live well. Improving the welfare of the elderly is carried out by a series of activities carried out in a coordinated manner between the government and the community to empower the elderly so that the elderly can still carry out their social functions and play an active role naturally in the life of society, nation and state¹.

The central bureau of statistics projects that the elderly population (60+) was expected to increase to 27.1 million by 2020, to 33.7 million in 2025 and 48.2 million in 2035¹. The results of the 2010 population census show that Indonesia is among the top five countries with the highest number of elderly population in the world, reaching 18.1 million people or 7.6 percent of the total population.

Sleep deprivation in the elderly influences physical, cognitive abilities and quality of life. Elderly people who experience sleep disorders will experience an

increase in the amount of sleep during the day, problems with attention and memory, depression, the possibility of falling at night, and low quality of life²³. During NREM a person experiences 4 stages during the sleep cycle. Stages 1 and 2 are characteristic of superficial sleep and someone is easier to wake up. Stage 3 and 4 are deep sleep and difficult to wake up^{4,5}.

Kolcaba introduces the theory of convenience as the middle range theory⁶. Kolcaba relates these three types of comfort to four comfort contexts, namely physical, psychospiritual, environmental, and social^{7,8}. Fulfillment of basic human functions can be provided with comforting intervention to achieve the comfort needs of recipients of care, including physiological, social, cultural, economic, psychological, spiritual, environmental, and physical interventions⁹. One way of comforting intervention to meet the comfort needs of the elderly from physical and environmental aspects is by applying sleep hygiene and brain gym implementation.

Sleep hygiene is an exercise or habit that can affect sleep¹⁰. Improving sleep hygiene in the elderly is a simple but effective way to improve sleep quality¹¹. Good

sleep hygiene behavior can prevent the development of disturbances and sleep problems¹². That means good sleep hygiene behavior can help a person to have good sleep quality. Sleep and sleep disturbances during the day indicate that a person has poor sleep hygiene. Poor behavior of sleep hygiene in the elderly for example the elderly often spend more time in bed or intermittently falling asleep during the day more awake at night¹³. Sleep hygiene is applied to the elderly to achieve REM sleep, loss of muscle tension, increased cerebral activity (oxygen consumption, blood flow, neural stimulation), release of epinephrine, and β waves which cause a relaxed or comfortable feeling¹⁴.

Types of physical activity in the elderly include aerobic exercise, muscle strengthening, flexibility, and balance training¹⁵. Brain gym is an activity that aims to maintain brain health with simple movements¹⁶. In principle, the basics of brain gym are to train the brain to stay fit and relieve stress¹⁷. Physical activity that is beneficial for the health of the elderly should meet the FITT criteria (frequency, intensity, time, type). Frequency is how often the activity is carried out, how many days in a week. Intensity is how hard an activity is carried out. Usually classified into low, medium and high intensity. Time refers to the duration, how long an activity is carried out in a meeting, while the type of activity is the types of physical activity carried out¹⁶.

In planning long-term efforts, the government must maintain and improve the quality of life of the elderly¹⁸. Through brain gym the elderly are trained to be able to bring about a relaxation response so that they can reach a state of calm. This relaxation response occurs through a significant decrease in the body's oxygen requirements, which in turn will flow smoothly, the neurotransmitter will be released, the nervous system will work properly so that the muscles of the body that relax can cause a feeling of calm and comfort. The three types of comfort are: relief which means when the specific comfort needed by the client is fulfilled, ease means when the client feels calm and satisfied, and the latter is transcendence when the client succeeds in exceeding the need for comfort⁹.

Sleep quality changes as a function of normal aging, both in terms of decreased duration and consolidation^{19,20}. The Pittsburgh Sleep Quality Index (PSQI)²¹ was originally developed to provide clinicians with a valid, standardized measure of sleep quality that could reliably categorize individuals as either "good"

or "poor" sleepers. This 19-item questionnaire assesses sleep quality using subjective ratings for 7 different components (i.e., sleep quality; sleep latency; sleep duration; habitual sleep efficiency; sleep disturbance; use of sleeping medication; and daytime dysfunction). Respondents are asked to answer the questionnaire retrospectively, surveying sleep components spanning the previous month. The PSQI is quick and easy to administer, and score; making it an attractive tool for sleep quality assessments.

METHOD

This research was conducted from August to September 2018 at the social institution in Malang. The study used a quasy pretest posttest with control group group analysis that was intervened according to the planned trial protocol, in the treatment group, whereas in the non-intervention group there was no intervention or intervention other than the one being tested. The implementation of sleep hygiene is applied every day for 30 days and brain gym is done for 4x in a week with a duration of 15-20 minutes and is done for 30 days. The sample of this study amounted to 50 respondents using purposive sampling technique. The statistical test used is the independent t-test to test the hypothesis²². The sample in this study was taken according to the criteria of the researchers as many as 50 elderly.

RESULTS

The results of this study were processed using a contingency coefficient correlation test with the help of the Statistical Product and Service Solution (SPSS) program. Based on Table 1 shows that the characteristics of respondents based on age, the most respondents have age 75-90 years (old) as many as 28 respondents (56%). More female sex characteristics than women, as many as 37 respondents (74%). Characteristics of education, the highest number of respondents were high school, namely 18 respondents (36%). The characteristics of the length of stay in the institution of the longest number of respondents is -51-5 years as many as 23 respondents (46%).

Table 1. Characteristics Distribution of the Respondents

Karakteristik f (%)		Total %
Age		
	Age 60-70 years old (<i>elderly</i>)	22 (44)
	Age 75-90 years old (<i>old</i>)	28 (56)
	Age > 90 years old (<i>very old</i>)	-
Gender		
	Male	13 (26)
	Female	37 (74)
Education		
	Not completed primary school	8 (16)
	Elementary School	13 (26)
	Junior High School	11 (22)
	Senior High School	18 (36)
period of staying in the elderly nursing house		
	< 1 years	17 (34)
	≥ 1- 5 years	23 (46)
	> 5 years	10 (20)

Based on table 2, the mean of comfort at posttest is 75.90 and the average post test is 7.055. The mean of sleep quality at posttest is 8.35 and the average post test is 2.207. It was seen that there was an increase in the average of comfort and sleep quality before and after being given intervention. To find out whether there is a difference between treatment and control, a paired sample t-test is performed, but normality testing is done first. The results of the Shapiro-Wilk normality test showed

that the convenience variable was normally distributed with a significance value of more than 0.05. The results of the independent test t-test after intervention in the treatment and control groups, for comfort variables, β endorphin and sleep quality obtained $p < 0.05$. In the convenience variable $p = 0,000$ and sleep quality $p = 0,000$ shows that there is a significant difference in the comfort and quality of sleep between the treatment and control groups after getting an intervention combination of sleep hygiene and brain gym.

Table 2 the Hypothesis Test of the Treatment Group and the Control Group

Group	N	Intervention				Control				Significance	Remarks
		$\bar{X} \pm SD$	Min	Max	$\bar{X} \pm SD$	Min	Max				
<i>Comfort Post</i>	50	75.96 ± 6.50	62	87	65.04 ± 4.90	55	79	0,000	Significant		
<i>Sleep quality post</i>	50	8.44 ± 2.00	4	11	5.76 ± 1.09	4	8				

Based on table 3 shows the change in the comfort and sleep quality of pre and post test in the treatment and control groups by using paired t-test test obtained $p = 0,000$ and $p = 0.001$ which means that there is a significant difference in the level of comfort and quality of sleep between before and after intervention.

Table 3 Paired t-test test results on treatment and control groups

Variabel	N	Sig. (2-tailed)
<i>Comfort Pre test</i>	50	.320
<i>Comfort Post test</i>	50	.000
<i>Sleep quality Pre test</i>	50	.030
<i>Sleep quality Post test</i>	50	.001

DISCUSSION

An experimental study provided interventions in the form of physical activity and the application of good sleep hygiene for the elderly for 16 weeks and the results were significantly improved sleep quality, improved mood and improved quality of life. Factors that influence the quality of sleep in the elderly include illness, psychological stress, medication, nutrition, environment, motivation, lifestyle and exercise (gymnastics)²³. Efforts to maintain the health of the elderly both in the form of care, treatment, healthy lifestyle, including elderly exercise²⁴. Changes in sleep hygiene in a better direction can improve the quality and quantity of sleep¹³. The implementation of sleep hygiene is applied starting to wake up until it will sleep again in accordance with 10 points of sleep hygiene guidelines and applied for 30 days. Scheduling sleep time is written on sleep diary to evaluate the waking time and sleep time of the elderly regularly. In the afternoon around 15.30 a brain gym is held with special movements performed 4x a week. The combination of these two interventions can improve comfort. Mc Cormick asserted that in shaping the comfort of a product or design, attention to human factors plays an important role in creating a design that has good ergonomics, which will create comfort for its users²⁵.

Better quality of life in elderly people can be achieved by increasing sleep quality as well as promoting good sleep. In order to improve their quality of life and health status, the assessment of sleep characteristics by

health-care providers, especially by nurses, is essential and is an important caring activity. Nurses play an important role in recognising the negative effects of sleep disturbances on well-being and the quality of life. In the assessment of the sleep characteristics of the elderly, taking a detailed history, sleep hygiene, sleep patterns, medical diseases, and drugs should all be evaluated²⁶. Lack of sleep, sleep problems and the perception of poor health negatively affects the quality of sleep in an old person²⁷. As a result of the advancement of age, problems related to sleep increase and adversely affect an individual's perception of poor health and sleep²⁶.

Quality of life is the extent to which a person can feel and enjoy the occurrence of all important events in his life so that his life becomes prosperous²⁸. If a person can achieve a high quality of life, then the life of the individual leads to a state of well-being, on the contrary if someone achieves a low quality of life, then the life of the individual leads to an ill-being²⁹. The regularity of the implementation of sleep hygiene combined with the implementation of brain gym for 15-20 minutes is a good combination for the elderly to achieve optimal quality of life. The combination of sleep hygiene with brain gym includes physical, psychological, social and environmental aspects in accordance with WHOQOL.

CONCLUSION

The provision of sleep hygiene, sleep hygiene and brain gym interventions and combinations (sleep hygiene and brain gym) showed significant differences in comfort and sleep quality in the elderly.

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Analysis of Factors Relating to Practice of Breast Self-Examination (BSE) among Women in Indonesia

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ABSTRACT

Background: Cancer is a global health problem, the mortality rate of breast cancer especially due to not being detected until an advanced stage, because of reluctance for undergoing early detection of breast cancer. Diagnosis of breast cancer at an early stage affords good opportunity for long-term survival. Effort has been made to decrease the number of deaths from breast cancer and the aim of this research for understanding factors related to the practice of breast self-examination (BSE). **Method:** This study was cross-sectional study and respondents in research were women work at Martapura Public Health Centre, with number of respondents being 168. Cluster sampling was used and the independent variables were age, job, education, experience, awareness of breast cancer, acquaintances ever having suffered from breast cancer, knowledge and BSE attitude, whereas the variable dependent in the research is BSE practice. Data were collected using questionnaire to obtain data on demographic, knowledge, attitude and practice. **Results:** Statistical results of the tests showed no significant relationship between age, job, education, experience, awareness of breast cancer, acquaintances ever having suffered from breast cancer and BSE practice; however, there was significant relationship between knowledge ($p = 0.047$), attitude of BSE ($p = 0.004$) and BSE practice. **Conclusion:** Factors that have a relationship with the BSE practice in women are knowledge and attitude toward BSE. Increased knowledge and attitudes are expected to increase one's desire to do beneficial things such as practising BSE on time, in the right direction and in the right position.

Keyword: demographic characteristics, knowledge, attitude, Breast Self-Examination (BSE) practice

INTRODUCTION

Breast cancer is a malignant tumour originating from breast cells developing uncontrolled so that it can spread to tissues or organs around the breast or other body parts.¹ Breast cancer is a major cause of death among all cancers experienced by women in Indonesia. Cancer is one of the major global health problems and there is an increase in breast cancer mortality because of detection at an advanced stage.² Late diagnosis of breast cancer is often because of a patient's reluctance to undergo early detection.³ Breast cancer diagnosis in the early stage affords good opportunity for long-term survival. Efforts to reduce the mortality rate from breast cancer require effective screening.⁴

An early detection programme makes it possible for early diagnosis more effective intervention and increased possibility of success in dealing with breast cancer. There are three methods of early detection of cancer breast, Breast Self-Examination (BSE), Clinical Breast Exam (CBE) and mammography.² BSE is a screening method used for detecting early signs of breast cancer by looking and fingering to find abnormality, lump, and swelling in the breasts. BSE as a method is easy, economical, not invasive, and causes no harm and which allows women to know the shape of the breast and quickly recognise if abnormalities are found on the breast, such as detention time or lump.⁵

The best time to start BSE is when a woman has reached puberty and experience breast development. BSE has a main role in intervention at an early stage of breast cancer, with statistics in America and Indonesia showing that 95% of breast cancer events were found by

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sufferers themselves. In fact, 90% of breast cancers were found by women when doing BSE. ACS recommends the practice from the age of 20. Although BSE is a simple, easy and economical screening method, many women do not do BSE or do not use correct BSE practice.⁶ Qualitative research has found⁷ that fear of finding signs and symptoms of breast cancer, such as a lump in the breast, and fear of being diagnosed with breast cancer is a barrier for women to do BSE or other screening methods. According to Miller (2015)⁸ respondents will do health examination if there is push factor such as an intervention.

The Indonesian government announced the Early Cancer Prevention and Detection Movement for Indonesian Women in 2015.⁹ Priority of an early detection programme in Indonesia is directed at women aged 30-50 years with a target of 50% women by 2019. The event aims at increasing awareness in the community about controlling risk factors and early cancer detection. This involves a series of activities including promotive, preventive, early detection and follow-up activities.

METHOD

Design

This study used a cross-sectional design.

Instrument

The data were collected using a questionnaire that was tested for validity and reliability. The questionnaire consisted of demographic data including level of education, acquaintances ever having suffered from cancer, age, and experience of obtaining information about breast cancer. The questionnaire was related to knowledge of breast cancer and BSE was developed by the researcher and consisted of 15 questions with two choices of answer, correct and wrong. If respondents answered correct then it was given a value of 2 and if they answered wrong the value was 1. Instrument attitude and also a practice instrument of BSE, that previously in Test validity done by using test Pearson's product Moment by comparing the r count with the r table; the r table in this research is 0.361 (0.05).

Research Respondents

The sample in this research consisted of 168 people utilising cluster sampling, with criteria inclusion: 1) No d nature circumstances, pregnant or breastfeeding; 2)

Can read and write; 3) Willing to follow activities from start to finish.

Data Collection

The researcher collected data from the Puskesmas region among women suited to inclusion in the research. The researcher approached respondents based on the data provided by the health centre. Researcher gives sealing about the destination, and continued by asking respondents to sign an informed consent form. Next, respondents were asked to complete the demographic data questionnaire and questionnaire research.

Ethical Clearance

This study has passed the institutional review board from the Faculty of Nursing, Universitas Airlangga, Surabaya, number 622-KEPK.

RESULTS

The majority of respondents were aged 36-45 years with 87 respondents (51.8%). The education level of respondents was mostly high school/equivalent with as many as 71 respondents (42.3%). Most respondents were housewives with as many as 55 respondents (32.7%), and most of the respondents had received information about breast cancer with as many as 92 respondents (54.8%). The majority of respondents said they did not have acquaintances who had had cancer.

Table 1. Demographic data of respondents

Data	N	%
Age		
16-25	14	8.3
26-35	33	19.6
36-45	87	51.8
46-55	22	13.1
56-65	12	7.1
Education		
Elementary school/Sederajat	5	3
Middle School/Sederajat	15	8.9
High School/Sederajat	71	42.3
Diploma	19	11.3
Bachelor	58	34.5
Job		
Government employees	50	29.8

Cont... Table 1. Demographic data of respondents

Data	N	%
Housewife	55	32.7
Entrepreneurship	31	18.5
Employee	31	18.5
Freelance worker	1	0.6
Acquaintance ever having cancer		
None	146	86.9
Friend	15	8.9
Sister	2	1.2
Mother	1	0.6
Cousin	1	0.6
Parents' relations	2	1.2
Husband	1	0.6
Experience of getting breast cancer information		
Ever	76	45.2
Never	92	54.8

Table 2. Knowledge, Attitudes and Practice of BSE

Variable	N	%
Knowledge		
Good	35	20.8
Enough	100	59.5
Less	33	19.6
Attitude		
Positive	107	63.7
Negative	61	36.3
Practice		
Good	25	14.9
Enough	123	73.2
Less	20	11.9

Based on Table 2, most respondents had sufficient knowledge about breast cancer and BSE with as many as 100 respondents (59.5%). Most had a positive attitude of 107 prescriptions (63.7%) and most of the respondents in the category had sufficient awareness of the practice of BSE with as many as 123 respondents (73.2%).

Table 3. Relations of demographic data with BSE practice

Variable	BSE practice		
	B	T	P Value
Age	- .480	- .612	0.542
Education	0.243	1.118	0.265
Job	0.611	1.364	0.174
Acquaintance ever having cancer	0.760	1.492	0.138
Experience of getting breast cancer information	0.184	-.203	0.839
Knowledge	0.261	2.003	0.047
Attitude	0.474	2.891	0.004

Table 3 shows that the variables of age, education, occupation, acquaintances who had cancer, the experience of obtaining information of breast cancer and BSE did not have a significant relationship with BSE practices in women. But knowledge and attitude had a significant relationship with the practice of BSE.

DISCUSSION

Knowledge has a relationship with breast self-examination (BSE). The majority of respondents had sufficient knowledge in BSE with a high school education and an age range of 36-45 years. The increase in the mean value of knowledge was marked by an increase in respondents' knowledge of breast cancer, signs and symptoms of breast cancer, and breast cancer risk factors. The mean value of respondents' knowledge increased regarding their breast self-examination (BSE) about the best time to do their breast self-examination (BSE) and their practice of breast self-examination (BSE). The results of this study are in line with research which states that one's knowledge is related to the practice of BSE.¹⁰ Other studies state that knowledge of breast cancer, breast cancer risk factors, and breast cancer mammography examination improves BSE practices in women.¹¹ The level of knowledge is significantly related to the behaviour of early detection of breast cancer.¹² Wahyu (2009)¹³ concluded that there was a significant relationship between knowledge about

breast cancer and the motivation of patients to have an early check-up at the Dr. Oncology Surgery Clinic at Dr. Sutomo Surabaya.

Attitudes have a relationship with breast self-examination (BSE). The majority of respondents had a positive attitude toward BSE with a high school education and an age range of 36-45 years. The factors that determine a person's attitude to the importance of early detection of breast cancer are their attitude and direct experience of the object of attitude.¹⁴ Previous research states that there is a relationship between attitudes toward awareness with conscious behaviour.¹⁵

Respondents were not aware or did not realise it depends on the stimulus they receive. If the stimulus receives supports, the respondent will realise, but if the stimulus received does not have support, the respondent will not be aware. The stimulus received by the respondent can be in the form of knowledge about awareness, or support from family or friends. Before realising, the respondents also experienced behavioural stages caused by the stimulus. These stages include awareness, interest, evaluation, trial and adaptation. Each stage will affect the next stage. If each stage supports the other, then the resulting behaviour will be positive. But if they don't support each other, then the resulting behaviour will be negative.¹⁶ According to Ouyang and Hu¹⁷, change in practice implementation occurs after the respondent acquires increased knowledge and BSE attitude.

CONCLUSIONS

Factors that have a relationship with the practice of BSE in women are knowledge of and attitude to BSE. Increased knowledge and attitudes are expected to increase one's desire to do good things, such as practising BSE on time, in the right direction and in the right position.

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Mangosteen Rind on Oral Mucositis Caused by Radio and Chemotherapy in Cancer Treatment (In Vivo Study on Rats)

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ABSTRACT

Background: Cancer malignancy is often treated by using medication supplements using radio and chemotherapy. However, these treatments have adverse effects on oral which cause difficulties in talking, eating, and even opening the mouth. Therefore, herbal medicine like mangosteen rind gel may become the alternative therapy for this condition.

Method: This research was quantitative and experimental randomized pre-post test with control group design. Samples were 15 Sprague Dawley female rats divided into three groups where group 1 was applicated with mangosteen rind gel intervention, unit 2 was with standard gel intervention (positive control) and the last group was untreated group (negative control). Effect of the mangosteen rind gel of treatment group and post-test of the control group were performed with the ANOVA test.

Results: The usage of mangosteen rind gel on oral mucositis accelerated the reduction of oral mucositis diameter compared to the standard gel and untreated group. On the 14th day of intervention, the recovery rate of oral mucositis on team 1 reached 99.80%, on unit 2 was 67.70% and only 1.20% in an untreated group. Cell signaling examination showed an average increase of TNF- α from day one until day 14. The lowest difference of TNF- α was group 1 (8.88 pg/mL or 14.50%), then followed by group 2 was 12.71 pg/mL (19.25%), and the highest difference was group 3 (21.43 pg/mL or 32.55%).

Conclusion: Mangosteen rind gel may accelerate healing of oral mucositis caused by radio and chemotherapy in cancer treatment. However, further study is necessary to determine the applicability to human being.

Keywords: cancer, mangosteen, oral mucositis, rats

INTRODUCTION

Cancer is a killing illness that causes prime death in over the world. Based on International Agency for Research on Cancer (IARC), there were 8.201.575 cancer death and found 14.067.894 new cancer cases in the world ⁽¹⁾. Treatment of cancer is usually followed either by chemotherapy or radiotherapy, but adverse effect of this therapy is oral mucositis inflammation of oral mucosa with ulcer ^(2, 3). This kind of inflammation will be followed by burning sensation, so the patients

causing difficulties in talking, eating and even opening the mouth (3rd grade of cancer therapy). Furthermore, the advance condition (4th grade of cancer therapy) shows that the patients aren't able to consume delicious food ^(4, 5).

Therapy of oral mucositis depends on the symptoms which are usually used to calm down the pain due to the inflammation and cure the oral infections. Topical application is one of therapy used for oral mucositis. Nowadays, the standard gel is mostly used for cancer patients with oral mucositis. Unfortunately, sometimes this gel causes hypersensitivity reaction such as skin eruption, itchiness, edema, etc. The researcher reported among 30 patients with oral and oropharynx lesions treated by standard gel generated 83% with pain

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reduction, 13% with no change condition, 3% with early repairment but then become worse⁽⁶⁾. Besides, the gel is no more effective than therapy with *Sucralfate* and *Mucaine* in relieving the pain associated with radiotherapy including *Oral Mucositis*⁽²⁾. Due to this condition, herbal treatment could be an alternative solution.

Mangosteen is Indonesian fruit usually used as traditional medicine to cure a stomachache, chronic ulcer, skin infection. Besides, it also has the effect of analgesic and anti-inflammation^(8, 9). It contains phenol derivative such as xanthenes or xanthan-9H-ones⁽⁸⁾. Mangosteen rind safe to be used⁽¹⁰⁾ includes of variation of xanthone: α -, β -, γ -mangosteens. They have the ability as the antioxidant, antitumor, anti-bacterial, anti-virus, anti fungi, anti-allergic and anti-inflammation^(11,12,13). Besides, α -Mangosteen can prevent hypoxia due to Reactive Oxygen Species (ROS) of cancer cell⁽¹⁴⁾. According to some researchers, the diameter of tumor became decrease, and complete regression happened on rats after treated by high doses of xanthone (3.0 mg per tumor)⁽¹⁵⁾.

The initial study⁽¹⁶⁾ showed that mangosteen rind as anti-inflammation gave an excellent impact for male Wistar rats on the recovery of oral ulcer caused by trauma. During inflammation phase in wound healing process, some cytokines have an essential role especially such as IL-1, IL-1 β , IL-6, and TNF- α ⁽¹⁷⁾. This study would like to investigate the ability of mangosteen rind in healing oral mucositis happening during cancer treatment with chemo and radiotherapy.

METHODOLOGY

Material

1. Carcinogenic agent 7,12-dimethylbenz[a]anthracene (DMBA), corn oil, prepared as test compound mixture.

2. Elisa Kit from Biologend Company.

Method

1. The extract of mangosteen rind (18) :

a. Identification of the type of mangosteen: *Garcinia mangostana* L.

b. Prime active substance: xanthone and α -mangosteen.

c. Mangosteen rinds were cut, dried in oven 50°C in 72 hours, ground to become powder and stored in air

retention bowl.

d. Then the powder of mangosteen rind was extracted by Soxhlet method.

2. The formula of mangosteen rind gel:

a. Mangosteen rind extract and other additional material were mixed homogeneously.

b. Added in sequence: Na Benzoid, Carbopol, HPMC (Hidroksi Propyl Metil Selulosa), TEA (Triethanolamine) and mixture homogenously when attached to each material.

c. Put it in a tube.

3. Cancer induction with 7,12-DMBA (Dimethylbenzene (a) anthracene) (19):

a. DMBA solution was made by mixing it with corn oil and vortex in 15 minutes.

b. Given doses were 20 mg/kg weight, twice a week in 5 weeks (frequency: 10 times).

c. Injected with the oral cannula through the oesophagus.

d. Observed from the first week after DMBA initiation. Palpation its breast 1-2 times a week till there was a lump.

4. Oral mucositis model:

a. Make a wound on the lower oral labial mucosa.

b. Treated with H₂O₂ (hydrogen peroxide) 3% using cotton bud in 90 seconds.

c. Observed till there was an ulcer (around 48 hours).

Identification of oral mucositis recovery:

1. Measured the diameter of the wound (mm) every day from the 1st day until the 14th day.

2. Measured TNF α on the 1st and 14th day:

a. Centrifuged 5 ml blood taken from a retro-orbital sinus (20).

b. Elisa (Enzyme-linked immunosorbent assay) kit was used to detect the amount of TNF α in blood serum (pg/mL).

Subjects:

1. Female Sprague Dawley rats :

a. 160-180 g in weight,

b. 5 – 6 weeks old,

c. Healthy condition and never used in research before.

2. Sample

With simple random sampling, 15 rats were divided into three groups:

- a. Group 1: the wound was treated with mangosteen rind gel.
- b. Group 2: the wound was treated with standard gel (positive control).
- c. Group 3: untreated/without treatment (negative control).

Each group consisted of 5 (five) rats and 1 (one) additional rat to anticipate death rat (21). Data were analyzed with repeated ANOVA test and presented in tables and graphics.

RESULTS

Formula of Mangosteen Rind Gel

Table 1. Formula of Mangosteen Rind Gel

Material	Amount
Mangosteen Rind Extract	60% x 20 g = 12 g
HPMC	
TEA	1.1 g
Carbopol	
Na Benzoate	
Aquadest	20 g – (12 g + 1.1 g) = 6,9 g

Diameter of Oral Mucositis Recovery Process

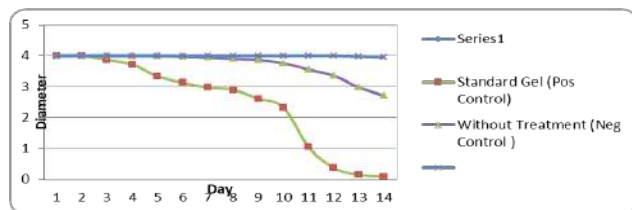


Figure 1. Diameter of Oral Mucositis Recovery Process

Figure 1 showed that diameter of oral mucositis became decreased. On the 14th day, group 1 (treated by mangosteen rind gel) healed (99.8%) with diameter 0.08 ± 0.08 mm. Group 2 (treated by standard gel) only healed 67.7% with diameter 2.71 ± 0.41 mm. Group 3 (untreated) only 1.2% healed with diameter 3.95 ± 0.10 mm.

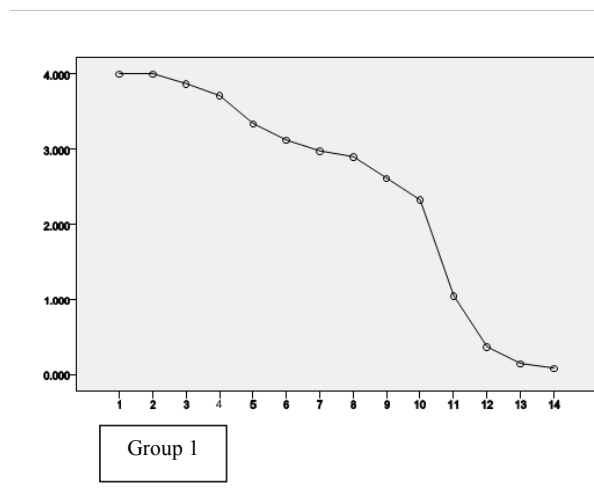
TNF- α

Table 2. Measurement of TNF- α on Oral Mucositis Recovery Process

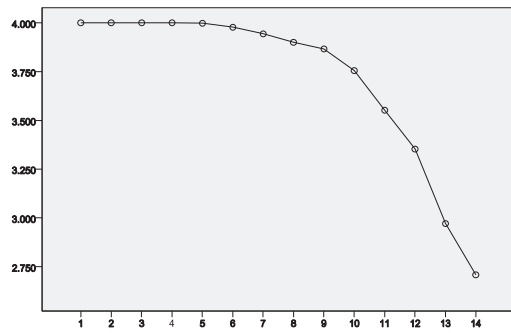
No.	Intervention	Mean of TNF- α \pm SD (pg/mL)		Δ TNF- α	
		Day-1	Day-14	pg/mL	%
1.	Mangosteen Rind Gel	52.40 ± 13.92	61.29 ± 14.25	8.89	14.50
2.	Standard Gel (Positive Control)	53.34 ± 8.52	66.06 ± 8.85	12.71	19.25
3.	Without Treatment (Negative Control)	44.40 ± 6.48	65.83 ± 22.86	21.43	32.55

Table 2 showed that the amount of TNF- α was increased from day 1 to day 14. The lowest difference in each group was on the team I which was treated by mangosteen rind gel (8.89 pg/mL or 14.50%), followed by group 2 was 12.71 pg/mL (19.25%) and the highest difference was group 3 (21.43 pg/mL or 32.55%).

Inferential Analysis:

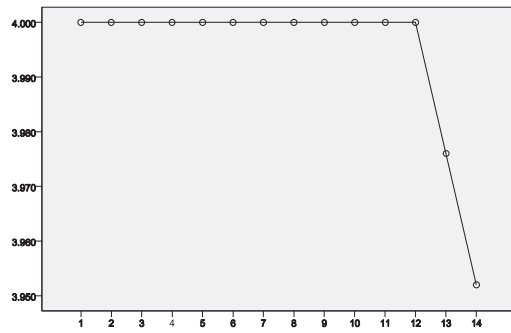


Group 1



Group 2

Measurement of Oral Mucositis Diameter



Group 3

Figure 2. Measurement of Oral Mucositis Diameter Treated by Mangosteen Rind Gel (Group 1), Standard Gel (Group 2) and Untreated Group (Group 3)

There were significant differences analyzed by ANOVA test. ($p_{value} < 0,001$). The wound healing process on group 1 happened on day 2 and day five on group 2, but no healing process happened until day 12 in group 3.

Measurement of Oral Mucositis Diameter among Groups

Table 3. Differential Test of Oral Mucositis Diameter Inter Groups

Pairwise Comparison		p value
Group 1*)	Group 2	.000
	Group 3	.000
Group 2*)	Group 1	.000
	Group 3	.001
Group 3*)	Group 1	.000
	Group 2	.001

*) Group 1: treated by mangosteen rind gel; Group 2: treated by standard gel ; Group 3: without treatment

Table 3 showed there was significant difference on measurement of oral mucositis diameter ($p_{value} \leq 0,001$) in inter groups.

DISCUSSION

This study used mangosteen *Garcinia mangostana* which contains xanthone dan α mangosteen (18). Mangosteen rind gel (20 g) only comprised 60% (12 g) of its active substance due to the research that mangosteen rind extract with concentration more than 40% could inhibit the bacteria growth (16). The result showed that the decrease in the size of diameter oral mucositis treated by mangosteen rind gel was faster than others. Wound healing process happened on the 2nd day while others were on the 5th day (positive control group) and 12th day (untreated group). On the 14th day, wound healing process was almost complete (99.8%) with the diameter 0.08 ± 0.08 mm. Meanwhile, the healing process on the group treated by standard gel was only 67.7% with diameter 2.71 ± 0.41 mm and just 1.2% with diameter 3.95 ± 0.10 mm on the untreated group. Wound healing process would be optimal if the material contained with subsequences that could protect the cells from bacteria infection, decreased inflammation process and induced cell proliferation to reconstruct the broken cells (22). Besides, antioxidant subsequences could help in reducing inflammation process (23).

Xanthone has biochemistry effects such as antioxidant, anti-bacterial, anti-inflammation so it could be used to treat wounds. Some researchers had proved the role of xanthone in wound healing, tumor or carcinogenic activities (24). Another research had shown that extract of mangosteen rind had the ability as oral anti-bacteria to inhibit the growth of *Streptococcus pyogenes*, *Streptococcus mutans*, *Staphylococcus aureus*, and *Porphyromonas gingivalis* (13,25). Xanthone had also effect on the maturation of collagen, it was primary protein (70-80%) in the extracellular matrix that had an essential role in wound healing process (26). This healing process consists of 4 (four) phases hemostatic, inflammation, cell proliferation and maturation. It's started with the formation of fibrin and infiltration of the neutrophil. This process happened precisely and orderly. The interruption occurred in the process would cause chronical wound and prolong the recovery time (27).

The result showed that there was an increase of TNF- α from day one until day 14 in wound healing process of oral mucositis. The lowest difference of TNF- α was on group 1 with mangosteen rind gel (14.50%), then followed by group 2 with standard gel (19.25%) and the highest difference was on team 3 (32.55%). TNF- α was released by neutrophil and macrophage cells. This TNF- α had roles in inflammation and reepithelialization process, and it would increase on the acute and chronic wound (17). It was produced at the beginning of healing process, and its concentration was essential to the result of wound healing. When its concentration was low, it could support indirectly on inflammation process and increase growth factors which produced macrophage cell. On the other side, the higher the level of its concentration, it could depress synthesis or matrix cellular protein (ECM), promoted the production of natural tissue inhibitors (TIMPs) and increased matrix metalloproteinases (MMPs) (28). So the process of wound healing might be delayed.

CONCLUSION

There was an effect of mangosteen rind gel on wound healing process of oral mucositis due to cancer therapy – chemotherapy and radiotherapy. It could accelerate the healing of oral mucositis within 14 days. Amount of mangosteen rind extract 60% on gel formula could heal this oral mucositis.

Measurement of oral mucositis diameter on the 14th day, group 1 (mangosteen rind gel intervention) healed 99.80% with diameter 0.08 ± 0.08 mm, group 2 (standard gel intervention) only healed 67.70% with diameter 2.71 ± 0.41 mm and group 3 (without intervention) only 1.20% healed with diameter 3.95 ± 0.10 mm.

There was an increase of TNF- α from day one until day 14 in wound healing process of oral mucositis. The lowest difference of TNF- α was on group 1 treated by mangosteen rind gel was 8.89 pg/mL; 14.50%, on group 2 treated by standard gel was 12.71 pg/mL; 19.25% and on unit 3 without intervention was 21,43 pg/mL; 32,55%.

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Factors Related to Personal Absorbed Dose in Health Workers at Hospital's Radiology Unit

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ABSTRACT

Diagnostic radiology services are an integral part of medical services that need special attention because they are useful in diagnosing, but also very dangerous for patients, officers and the environment. The purpose of this study was to analyze factors related to the personal absorbed dose of health workers

This study was an observational study with cross sectional approach. This study conducted at private hospitals in Surabaya (Hospital A, B and C) and the population was 36 workers. Dependent variable in this study was personal absorbed dose while independent variable was gender, knowledge, attitude, age, education, study program, length of working, type of work, obedience in using personal protective equipment, presence of workers when rest time, average of treated patient by workers, dose limitation, x-ray, facility building, record and report, policy, and supervision.

Result of linear regression test showed that there is five variable that its standardization coefficients are related to personal absorbed dose, such as length of work, age, policy and obedience in using radiation Personal Protective Equipment (PPE) completely (β 0,206, β 0,579, β - 0,716, β -0, 161 respectively)

It is recommended for hospitals to make a supportive policy to reduce dose of exposure to health workers. It is necessary to supervise the completeness of using radiation Personal Protective Equipment (PPE).

Keywords: Health Workers, Radiation, Personal Absorbed Dose, Policy

INTRODUCTION

Hospital is a workplace that has many risk factors such as physical, biological, ergonomic, psychological and chemical. Potential hazards in hospitals due to physical, biological, chemical, ergonomic, and psychosocial factors can cause illness and accidents for workers, patients, visitors and communities around. Hospital workers have a higher risk than other workers for work-related disease and work-related accident¹

The radiology installation, which is part of the hospital, as a medical supporter, use ionizing radiation sources to diagnose the presence of a disease in the form of anatomical features displayed in radiographic films. The negative effects of exposure to X-ray radiation in the human body can be acute and chronic effects, acute effects can usually be seen immediately after

exposure, whereas chronic exposure begins to develop if accumulated several years after exposure. The effects of radiation can affect almost all parts of the human body, ranging from the skin, eyes, thyroid, lung, reproductive organs, blood clotting system, digestive system and fetus

According to the Department of Manpower in Indonesia, in 2011 there were about 61 cases of accidents caused by radiation exposure. Research at company X Surabaya, as many as 7 people (46,7%) from 15 respondent radiographer, leukocyte count is not normal and this can be caused by X-ray exposure and radiographer condition itself².

A preliminary study at the radiology unit of RS A Surabaya and an interview with the head of the Radiological Unit showed that the implementation of radiation safety has not gone well. There is still

no medical physician officer, measuring instrument of radiation dosage of TLD badge is only given to radiographer who have permanent employees status, medical check up is done every 2 years, and facilities of radiology room is not enough. In addition, radiation accidents have occurred in workers. Measurement results in May 2016 show that 50% of health workers have a personal absorption dose exceeding the Dose Limit Score set by the Nuclear Power Control Agency 20 mSv / year.

Based on the background above, the purpose of this study was to analyze factors related to the personal absorbed dose of health workers at Hospital A, Hospital B and Hospital C in Surabaya. RS A, RS B and RS C in Surabaya.

MATERIAL AND METHOD

This study was an observational study with cross sectional approach. This study conducted at private hospitals in Surabaya (Hospital A, B and C) and the population was 36 workers. The data were collected

by questionnaire, observation and interview. The data analysis is done by linear regression test to see how big the relation of independent variable to dependent variable.

FINDINGS

Characteristics of Health Workers

Based on table 1, it showed that mostly man are at Hospital C with percentage (50%) as many as 8 respondents while woman are more dominant in Hospital B with 60% percentage as many as 9 respondents. The average age of Hospital B employee is relatively young which is 28 years old while Hospital C 48 years old. The length of work in each hospital an average of 7 hours per day. The highest education level of respondent is D3 (93,3%) at Hospital B and dominant of Radiology Study Program (100%) while in Hospital C there are 31,3% health workers that have equal education of SMU and not radiology program. Radiology health workers in Hospital B mostly have radiation protection training (86,7%), while Hospital C only 56,3%.

Table 1. Characteristics of Responden at Hospital A, Hospital B and Hospital C

Variable	Hospital A		Hospital B		Hospital C	
	N	%	N	%	N	%
Gender						
Man	4	80	6	40	8	50
Woman	1	20	9	60	8	50
Age (X± SD	5	39±14	15	28±9	16	48±9
Length of Work (hour/da	5	6±2	15	7,5±0,2	16	7±1
Type of Work						
Doctor (S2)	1	20,0	1	6,7	4	25,0
Radiographer(D3)	4	80,0	14	93,3	7	43,8
Asistant (SMU)					5	31,3
Study Program						
Radiology	5	100	15	100	11	68,8
Non Radiology					5	31,3
Radiation Protection Training						
Ever	4	80,0	13	86,7	9	56,3
Never	1	20,0	2	13,3	7	43,8
Knowledge about Radiation Safety						
Good	4	80	8	53,5	12	75,0
Fair	1	20	7	46,7	4	25,0
Attitude to Occupational Health and Safety						
Good	3	60	14	93,3	12	75,0
Fair	2	40	1	6,7	4	25,0

Cont... Table 1. Characteristics of Responden at Hospital A, Hospital B and Hospital C

Obedience in using PPE completely						
Good	2	40	4	26,7	10	62,5
Fair	3	60	11	73,3	6	37,5
Presence of workers when rest time						
In the Room	4	80	11	73,3	13	81,3
Outside the Room	1	20	4	26,7	3	18,7
Average of treated patient by workers	5	10±2,6	15	10,8±2,6	16	9,8±1,7

Hospital C have 12 responden that have good knowledge about radiation safety (75%). Hospital B have 14 responden that have a good attitude of occupational health and safety (93,3%). Obedience in using PPE completely with good category (62,5%) is at Hospital

C while in Hospital B is fair (73,3%). When the health workers are at rest, they dominantly rest in the room (81,3%) at Hospital C and 26,7% of health workers at Hospital B are outside the room. Approximately, health workers treat 11 patient a day.

Table 2. Result of Multiple Linear Regression of Independent variable to Dependent Variable at Hospital A, Hospital B, and Hospital C

Variable	Standarized Coefficients Beta	Sig
Length of work	0,206	0,343
Age	0,579	0,058
Presence of workers when rest time	0,103	0,69
Dose Limitation	0,066	0,812
Policy	-0,716	0,001
Training	-0,102	0,505
Obedience in using PPE completely	-0,161	0,555
Average of treated patient by workers	0,127	0,468
Attitude to Occupational Health and Safety	-0,021	0,902
Knowledge about Radiation Safety	0,158	0,436
Gender	-0,013	0,941
Constant	: 0,950	
R Square	: 0,574	
Anova	: 0,013	

Notes: Education and Study Program have multicollinearity, X-ray, facility building and gender are excluded variable.

Based on table 2, independent variable such as length of work, age, training, presence of workers when rest time, obedience in using PPE completely, average of treated patient by workers, knowledge, attitude, type of

work, gender, policy and dose limitation have effect on personal absorbed dose simultaneously. It can be seen on *Pvalue Anova* $0,013 > \alpha = 0,05$.

a) Relation of gender with personal absorbed dose

Gender is the difference between men and women biologically from birth. The difference between men and

women is not only biologically but also physically and psychologically.

The value of man regression coefficient equal to -0.013. It can be interpreted that man regression variable has a negative effect on the absorption of radiation. This shows that the man regression will increase by 1 unit, the absorption of radiation will decrease by 0,013.

The effects of radiation on men and women are almost the same. Every body tissue also has its own sensitivity to radiation (organ weight factor), for example, the sex cells have higher organ-weight factors than bone marrow, kidney, lung, and others. But for women, the effect is increasingly complex. Not only damage the cells and tissues but also the fetus (if in a condition of pregnancy). In addition to pregnancy, according to BATAN female workers in the breastfeeding period are not allowed to work in radiation areas with high risk of contamination³

b) Relation of age with personal absorbed dose

The results showed that age had positive effect on the absorption dose of radiation that is 0,579. The higher the age, the absorbed dose of radiation will increase by 0.579.

Based on the results of the study, workers over the age of 40 years are radiology specialists and radiographers who have had a long working period, experienced in the field both in the field of diagnostic and interventional radiology and more interventional action. Radiation received by interventional radiologists has a potentially high risk of radiation and may exceed the⁴

c) Relation of length of work with personal absorbed dose

The result of analysis showed that the duration of work had positive effect on the absorption dose of radiation equal to 0,206. When the duration of work increases by 1 unit, the absorption dose of radiation will increase also by 0.206.

The longer the working hours, meaning the more the number of patients performed radiological examiner and many complex procedures / actions performed per day for example the action of fluoroscopy where the radiation beam emitted directly and continuously with the duration of the old work the exposure to radiation received greater

d) Relation of Presence of workers when rest time with personal absorbed dose

The result of the analysis showed that rest in the room had positive effect on the absorption dose of radiation that is 0,103. In indoor workers, radiation absorption doses will increase by 0.103.

Most health workers resting indoors feel secure because there is a Pb shield on the wall of the X-ray room with a room directly adjacent to the workspace. The radiology unit served 24 hours, when an officer rested, the other officers were still working

When resting, it should be outside the radiation area, to avoid possible exposure to radiation scattering radiation rays.

e) Relation of dose limitation with personal absorbed dose

The results showed that the dose limitation had positive effect on the absorption dose of radiation that is 0,066. When the dose limitation is increased by 1 unit, the absorption dose of radiation will also increase by 0.066 or vice versa.

If the dose limitation aspect in the form of providing radiation protection equipment should be able to reduce the absorbent dose of health workers, but the fact that there are non-adherent health workers use PPE radiation completely so that the acceptable personal absorption dosage increases. One of the main factors to minimize exposure is adequate protection equipment and proper use in the procedure / action space

f) Relation of policy with personal absorbed dose

The results of the analysis showed that the policy had a negative effect on the absorbed dose of radiation -0.716. When the policy increases by 1 unit, the absorbed dose of radiation will decrease by 0.716, or vice versa.

If the policy related to service standards in the radiology unit is well implemented and there is supervision from risk management of radiation exposure may decrease. Management must strive to reduce and control hazards and risks, prevent accidents and injuries, and maintain safe conditions⁵

g) Relation of radiation protection training with personal absorbed dose

The results showed that the training had a negative effect on the absorption dose of radiation that is 0.102. As the training increases by 1 unit, the absorption of radiation will decrease by 0.102.

Training is an activity designed to help increase the access of workers to gain or increase the knowledge, skills, attitudes and behaviors required to perform the job well ⁶ Most health workers have attended radiation protection training, with training, they gain knowledge on how to prevent and minimize exposure to radiation in the body

h) Relation of Obedience in using PPE completely with personal absorbed dose

In conducting the activities of radiation workers are sometimes required to use personal protective equipment, because exposure to radiation generated X-ray plane is high enough. For this purpose, the radiology unit is obliged to provide complete personal protective equipment for its workers, as a means of minimizing the impact and effects of radiation received by workers.

The result of the analysis showed that PPE compliance had negative effect on the absorption dose of radiation that is 0,161. When PPE compliance increases by 1 unit, the absorption of radiation decreases by 0.161.

Compliance with nest in the use of radiation APD completely can reduce radiation exposure so as to avoid the health hazards of both stochastic, non stochastic and nasokimia infections in carrying out their duties. There are abnormalities experienced by 4 respondents who, due to not wear Personal Protective Equipment (PPE). The abnormality is characterized by reduced levels of leukocytes (white blood cells), which serves to defend the body from disease. This is in accordance with the results of research indicating that adherence to the use of PPE affect the absorption of radiation

i) Relation of Average of treated patient by workers with personal absorbed dose

The results showed that the number of patients per day had a positive effect on the absorption of radiation dose of 0.127. The more the number of patients per day treated, the absorbent dose of radiation will increase by 0.127.

The more patients treated, the more likely it is to

get radiation exposure and increase the personal dose. This is because Radiation received by radiation workers is mostly radiation scattering from patients.

The level of radiation exposure around the patient can be higher in normal working conditions. If protective devices and radiation measurements are not used and if many complex procedures / actions are performed per day, there is a possibility of interference. In many cases, the relationship between the dose of the worker and the patient is largely dependent on the equipment, the doctors/interventional procedures.

j) Relation of attitude with personal absorbed dose

The result of the analysis shows that the negative effect on absorption of radiation is -0,021. When the attitude increases by 1 unit, the absorption of radiation will decrease by 0.021.

Attitude is a state of being affected by a person, an idea, or an object. Attitude can indicate a person's readiness to behave. The highest level of attitude is when a person is responsible for the risks to be faced due to his choice of a problem⁷

Health workers who have a positive attitude to work safely can reduce the risk of radiation because nakes work with caution and use the radiation APD to minimize the absorbed dose of radiation received.

k) Relation of knowledge with Personal Absorbed Dose

Workers with good practice categories are widely owned by workers with a good level of knowledge⁸. Knowledge related to occupational safety and health in this case radiation safety need to be explored, maintained and developed and well utilized to improve the competence and safety of the officer. This is because knowledge is one of the internal factors that can affect one's behavior ⁹

The result of the analysis showed that the knowledge had positive effect on the absorption dose of radiation that is 0,158. When knowledge increases by 1 unit, the absorption dose of radiation will also increase by 0.158, or vice versa.

This happens because the well-informed workers are able to perform various work-related actions in

the radiation field, such as: guiding the percutaneous procedure in the operating room, performing fluoroscopy, despite full radiation APD to minimize exposure dose, the job has a high radiation risk because the radiation beam is continuous and in the long duration until the surgical / surgical action is completed.

CONCLUSION

It can be concluded that there are five variables of standardization coefficient related to the personal absorption dosage that is the variable of work, age, policy and compliance of Personal Protective Equipment (PPE).

Conflict of Interest: None

Source of Funding : None

Ethical Clearance: The study was approved by the ethical committee of Universitas Airlangga. All subjects were fully informed about the procedures and objectives of this study and each subject prior to the study signed an informed consent form.

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Analysis of Factors Related to Communication Skills in Midwifery Students

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ABSTRACT

Introduction: Skills to practice and communication skills is important for midwifery students, The importance of soft skills will later be used when students are in the world of work. This study aims to determine what factors are correlated with the communication skills of midwifery students. **Method:** The research design is cross-sectional using a simple random sample. The number of respondents was 38 students. The dependent variable in this study is communication skills. The independent variables are motivation, self-leadership strategies, job satisfaction, self-efficacy, psychological empowerment, task commitment, and communication skills. The analysis used is a statistical test Spearman Rho correlation with $p=0.05$. **Results:** The results showed that motivation has a correlation with communication skills ($p=0.00$), job satisfaction has a correlation with communication skills ($p=0.00$) and task commitment has a correlation with communication skills ($p = 0.00$). At the same time, self-leadership strategy, self-efficacy, psychological empowerment and communication skills do not have a correlation with communication skills (absolute). **Conclusion:** Factors related to communication skills are motivation, job satisfaction, and task commitment.

Keywords: *Communication skills, soft skills, education, motivation*

INTRODUCTION

Education is a major factor in the formation of human persons. Education plays a role in shaping the good and bad in human beings according to normative measures.¹ Recognising the importance of this, the government has paid serious attention to dealing with the education sector, because it is hoped that a good education system will give birth to the nation's next generation of qualified individuals able to adapt to the life of the society, nation, and state (Republic of Indonesia's Law no 20 in 2001). Surveys from the National Association of College and Employee USA 2002), to 457 leaders in America, about the 20 most important qualities of successful people, the results show successive soft skills and only two hard skills.² The importance of mastering soft skills in the world of work requires educational institutions to design soft skill development

programs for learning as a means of building work ethics with midwifery students, including direct learning in the community.³

The key to success is 90% determined by soft skills and only 10% determined by hard skills.⁴ Ministry of Education in 2009 stated that someone's success in education is 85% determined by soft skills. Education in Indonesia is generally still oriented towards hard skills.⁵ The inability to provide soft skills education results in midwifery student graduates only being good at memorizing lessons and having a few skills when they are already on the job.⁶ They act like machines because of the mastery of skills but are weak in leading.⁷ Soft skills are the skills for dealing with others. The users of college graduates hope that the workforce made up of college graduates has positive soft skills, a strong attitude, is honest, uplifting, able to work together, polite in communication, good at negotiation, has high work motivation, is creative and adaptable, so it can work intensively.⁸ Therefore, researchers are interested in analyzing factors related to the communication skills of midwifery students.

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METHOD

This research is quantitative, analytic and descriptive using a cross-sectional design approach and simple random sample.⁹ The number of respondents was 38 students at the Department of Midwifery, Ministry of Health, Surabaya Health Ministry. The dependent

variable in this study is communication skills. The independent variables are motivation, self-leadership strategies, job satisfaction, self-efficacy, psychological empowerment, task commitment, and communication skills. The instruments used in data collection are questionnaires that have been tested for validity and reliability. The analysis used was the Spearman Rho correlation test with p = 0.05.

RESULTS

Table 1: Frequency Distribution of Respondent Characteristics

No.	Indicator	Category	Frequency	
			Σ	%
1.	Age of Respondents	18	1	2.6
		19	10	26.3
		20	26	68.5
		21	1	2.6
2.	Number of siblings	Single	4	10.5
		1	13	34.2
		2	15	39.5
		3 or more	6	15.8
3.	Child to (child order)	First	24	63.2
		Second	7	18.4
		Third	6	15.8
		Fourth	1	2.6
4.	Reasons for studying midwifery	Parental encouragement	15	39.5
		Own desire	19	50.0
		Did not pass the SBMPTN	4	10.5
5.	The desire to study at Sutomo	Own	23	60.5
		Parent	15	39.5
6.	Initial ideas	Midwifery	9	23.7
		Doctor	8	21.1
		Other: businessman, etc.	21	55.3
7.	Interest in clinical / field practice	Interest	14	36.8
		No interest	24	63.2
8.	GPA	<3	1	2.6
		3 - <3.5	10	26.3
		3.5 or more	27	71.1

Table 1 shows that more than half of the students are a first child and wished to study the Sutomo D3 Midwifery Study Program in Surabaya themselves. Most respondents prefer learning clinical practice and more than half have a GPA of 3 or more.

Table 2: Relationship motivation, self-leadership strategies, self-efficacy, psychological empowerment, task commitment, communication skills, job satisfaction with communication skills for midwifery students.

Variable	Communication Skill						Total		r ²	p
	Good		Enough		Weak		N	%		
Motivation	N	%	N	%	N	%	N	%	0.678	0.000
Strong	0	0	0	0	0	0	0	0		
Medium	0	0	1	2.6	10	26.3	11	28.9		
Weak	0	0	5	13.2	22	57.9	27	71.1		
Total	0	0	6	15.8	32	84.2	38	100		
Strategy Self leadership	N	%	N	%	N	%	N	%	1.000	0.100
Good	0	0	4	10.5	2	5.3	6	15.8		
Enough	0	0	0	0	0	0	0	0		
Weak	0	0	2	5.3	30	78.9	32	84.2		
Total	0	0	6	15.8	32	84.2	38	100		
Psychological empowerment	N	%	N	%	N	%	N	%	1.000	0.100
Height	0	0	0	0	0	0	0	0		
Medium	0	0	6	15.8	0	0	6	15.8		
Low	0	0	0	0	32	84.2	32	84.2		
Total	0	0	6	15.8	32	84.2	38	100		
Self efficacy	N	%	N	%	N	%	N	%	1.000	0.100
High	0	0	0	0	0	0	0	0		
Medium	0	0	6	15.8	32	84.2	38	100		
Low	0	0	0	0	0	0	0	0		
Total	0	0	6	15.8	32	84.2	38	100		
Task commitment	N	%	N	%	N	%	N	%	0.725	0.000
High	0	0	0	0	0	0	0	0		
Medium	0	0	1	2.6	9	23.7	10	26.3		
Low	0	0	5	13.2	23	60.5	28	73.7		
Total	0	0	6	15.8	32	84.2	38	100		
Communication Skill	N	%	N	%	N	%	N	%	1.000	0.100
Good	0	0	0	0	0	0	0	0		
Enough	0	0	2	5.2	4	10.6	6	15.8		
Weak	0	0	4	10.6	28	73.6	32	84.2		
Total	0	0	6	15.8	32	84.2	38	100		
Job satisfaction	N	%	N	%	N	%	N	%	0.819	0.000
Very satisfied	0	0	6	15.8	0	0	6	15.8		
Satisfied	0	0	0	0	28	73.7	28	73.7		
Less satisfied	0	0	0	0	4	10.5	4	10.5		
Not satisfied	0	0	0	0	0	0	0	0		
Total	0	0	6	15.8	32	84.2	38	100		

Table 2 above shows that the results of the statistical test Spearman's rank correlation coefficients or Spearman's Rho in the relationship of motivation, job satisfaction and task commitment with communication skills show a significance value (p-value) $p = 0.000$. The significance level used is $p < 0.05$ meaning that H_0 is rejected and H_1 is accepted that there is a relationship between motivation, job satisfaction and task commitment, and communication skills. The correlation results coefficient shows $r = 0.678$, $r = 0.819$ and $r = 0.725$ which means that there is a strong correlation with the direction of a positive relationship. The Spearman's Rho test on the relationship between self-leadership strategies, psychological empowerment, self-efficacy and communication skills with communication skills shows absolute p-value, meaning that there is no relationship between self-leadership strategies, psychological empowerment, self-efficacy and communication skills with communication skills.

DISCUSSION

The results showed that there was a relationship between motivation and communication skills in midwifery students with a high correlation in the direction of a positive relationship. Based on the results of the study it can be seen that respondents with moderate and weak motivation could have both sufficient and weak communication skills. Communication skills are one of the parameters of interpersonal soft skills, where soft skills are abilities that are used for themselves and relate to others, for working together in groups, and with others. To be able to connect with other people, a good communication process is needed. In order for communication to work well in accordance with one's goals, then one must have good communication skills.¹⁰

Motivation is important because motivation is the thing that causes, distributes and supports human behaviour so that people want to work hard and enthusiastically to achieve optimal results.¹¹ Midwifery students are midwives who have a role in giving midwifery care to clients, and so that they can fulfil their role well, some skills are needed, one of which is communication skills.

Motivation both from individual students and motivation that comes from or originates from the students themselves. Motivation is able to move

someone so that they have a desire and willingness to do something to get results or achieve certain goals. The clearer the goals expected or to be achieved, the more clearly how motivation is carried out. Motivation is needed for a person's efforts to achieve optimal results or goals. One of the efforts required is the ability to communicate.

The results showed that there was no relationship between motivation and communication skills in midwifery students. Based on the results of the study, it can be seen that respondents who have good and weak self-leadership strategies have weak and sufficient communication skills. The ability of self-leadership, then a person will have 5 disciplines, namely the discipline of renewal, the discipline of knowledge that is abundant, the discipline of the body means expressed as we care for our bodies, so we take care of our minds². Knowing other people is intelligence: knowing yourself is true wisdom.¹² This makes it clear that communication skills require the ability to be able to know other people, but what is important is the ability to know yourself.¹³ A person will be able to recognise and control themselves if the individual has good self-leadership skills.¹⁴

The results showed that there was no relationship between psychological empowerment and communication skills in midwifery students. This is not in accordance with the statement that empowerment means giving power to people who operate in unfavourable situations in an organization.¹¹ Psychological empowerment of individuals will produce several positive things, namely work results and improving the work process, as well as sharing knowledge, skills, and experience better. Psychological empowerment can improve the work process. In order for communication to work effectively, one must have good communication skills.¹⁵

Communication skills are absolutely necessary for every individual, especially for those who work in an organisation or company.⁴ A person's communication skills can make it easier for individuals to convey brilliant ideas to their boss or co-workers. With good communication skills, it will be young for someone to present their ideas so that the idea might be accepted even greater. Although in this study psychological empowerment is not related to student communication skills, the increase in psychological empowerment is still very necessary because high psychological empowerment can have a positive impact on the improvement of other

variables that can improve performance.

The results showed that there was no relationship between self-efficacy and communication skills in midwifery students. Self-efficacy is a person's belief that he/she is able to do something or someone's belief that he/she is able to achieve results in accordance with the stated goals. In communication skills, a communicator already has the objectives to be achieved through his communication activities.¹⁶ Effective communication is the delivery of messages that are carried out in accordance with the intent and purpose of the sender of the message. Effective communication is what is desired by every communicator. With effective communication, fundamental problems in communication such as misunderstandings and messages that cannot be overcome do not arise.

This study found that most of the communication skills of students in physiological midwifery care practices were in the weak category but the students mostly had self-efficacy in the sufficient category. Although no relationship was found between self-efficacy and communication skills, self-efficacy is high on the list of a person's will to believe in order to achieve communication goals he/she has set.

The results showed that there was a relationship between task commitment and communication skills in midwifery students with a high correlation with a direction towards positive relationships. Based on the results of the study, it can be seen that respondents who have low task commitment can both have weak communication skills. Commitment always reflects a sense of trust, sincerity and a very strong desire to always be willing to earnestly develop, maintain and work for the interests of an organisation without wanting to leave the organisation.⁴ A highly committed person is a superior person. A person who upholds high commitment actualises the work culture in total.

Building commitment is not easy, especially building commitment to the organisation. The emergence of commitment in a person is strongly influenced by factors such as the atmosphere of the workplace environment, leadership, workload, and compensation obtained. But the most important thing is that the commitment is not waiting for the organisation or leader, but commitment will be better if it arises because of self-awareness about the importance of doing or completing tasks to achieve

individual and organisational goals.

Today's leaders must be able to become pioneers; thus, a leader can show his function as a creator of growth and learning. This means that the leader is the creator of growth and learning, both for himself and for those who are under his responsibility. A person with appropriately high commitment will feel the benefits, namely by improving their performance as a leader and for the people being led.

The results showed that there was a relationship between job satisfaction and communication skills in midwifery students with a high correlation with a direction towards a positive relationship. Based on the results of the study, it can be seen that respondents who have job satisfaction are very satisfied and can have sufficient communication skills. Job satisfaction factors are a good initial input for developing a model of job satisfaction, job satisfaction and not for job satisfaction due to several factors or dimensions that cause satisfaction or job dissatisfaction.¹⁷ If the perception of people or individuals towards the dimensions of job satisfaction is positive then the individual will feel satisfied, and vice versa.¹⁸ The results of this study indicate that job satisfaction is related to communication skills, so specifically, the Midwifery Study Program still needs to try and pay attention to job satisfaction.

CONCLUSION

Motivation, job satisfaction and task commitment are closely related to the communication skills of midwifery students. The advantage of having good communication skills is that they will facilitate students in carrying out various clinical skills in the world of midwifery work.

Ethical Clearance: This study has passed the institutional review board from the Health Ministry Polytechnic of Surabaya, number 016 / S / KEPK / V / 2017.

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Improving the Immune Response IL-10 and Secretory Immunoglobulin A in the Elderly after Getting Synbiotic

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ABSTRACT

Increasing age will reduce the body's resistance, so it needs functional foods that can maintain the body's immune system, especially the elderly. This research was conducted to see the synbiotics effect on IL-10 immune response and secretory immunoglobulin A (sIgA) which was done by intervening to the elderly using synbiotics. The results showed that after administration of IL-10 and sIgA ($p < 0.05$) there was an increase in the immune response of the two markers. Based on the results of this study can be recommended the use of synbiotics as an alternative to maintaining the immune system in the elderly.

Keyword: *Functional Foods, Synbiotic, Immune response, Immunoglobulin A*

INTRODUCTION

Elderly people grow very fast even faster than other age groups. Demographic implications that arise due to the growth of the elderly, namely the number of elderly population is increasing and according to WHO's projections Indonesia is a country with the number 8 elderly population in the world that is equal to 21,194,000 people or 8.2% of the total population in Indonesia. The other seven countries that have the highest number of the elderly population are China, India, USA, Japan, Russian Federation, Brazil and Germany⁽¹⁷⁾.

This shows a very large amount, so if it is not done efforts to improve the welfare of the elderly from now on will cause problems and can become a time bomb in the future. The tendency of this problem to arise is also marked by the number of elderly dependents according to the 2008 BPS Susenas of 13.72%.

The population dependency rate will be high and felt by the population of productive age if it is coupled

with the dependency of the population aged less than 15 years, where the current population of fewer than 15 years is 29.13%⁽¹⁰⁾.

Provinces with a higher life expectancy also have more elderly population. A territorial is called old structure if the percentage of people older than 7%. There are 11 provinces in Indonesia with the elderly population more than 7%, namely Yogyakarta Special Region (13.4%), Central Java (11.8%), East Java (11.5%), Bali (10.3%), North Sulawesi (9.7%), South Sulawesi (8.8%), West Sumatra (8.8%), West Java (8.1%), Lampung (7.8%), West Nusa Tenggara (7, 7%), East Nusa Tenggara (7.5%)⁽¹¹⁾.

The obstacles faced in the effort to improve the health and welfare of the elderly are the lack of health service facilities and infrastructure that provide friendly health services and are easily accessible to the elderly. In addition, data on the elderly is inadequate and the most recent data on health problems in the elderly based on surveys and research related to the elderly are still very limited. Currently, the data in the new Ministry of Health contains 437 Elderly Community Health Centers and more than 69,500 elderly Posyandu in several districts/cities in Indonesia, but the program has not been maximized⁽²⁾.

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The aging process also leads to a decrease in immune function (immunosenescence), which can increase hyporesponsiveness of vaccination and the tendency for infectious and non-infectious diseases⁽⁹⁾.

Synbiotics are functional foods that the body needs. Sinbiotik is a combination of probiotics and prebiotics can be a food substrate that reaches the large intestine and can affect the composition and activity of bacteria present through fermentation capacity in the elderly. The metabolic products of intestinal bacteria can affect the immune system. Modulation of intestinal microflora by diet is the basis for the synbiotic concept. Various strains of bifidobacteria and lactobacillus as probiotics have also been shown to exert immunostimulatory properties⁽⁷⁾.

In general, reports of research results in an increase in the amount of lactobacillus, bifidobacteria, or both and enterobacteria decrease after administration of FOS⁽²⁰⁾. The synbiotics function interacts with immune cells or receptors to improve the phagocytic function of white blood cells, increase IgA after contact with antigens, increase intraepithelial leukocyte proliferation, Th1 / Th2 cell regulation, induction of cytokine cytolysis⁽¹⁷⁾. However, research has not fully determined its effect on the intestinal microflora of older people.

MATERIAL AND METHOD

This study aims to make recommendations to the elderly in order to improve the immune response (with parameters IL-10 and sIgA) so that the health status of the elderly can be maintained. This research was carried out for 3 months with the intervention using synbiotics that is in November 2015 to February 2016 in the elderly in the Mangasa Health Center in Makassar City.

The main tools used to make measurements were 1) ELISA (The enzyme-linked immunosorbent assay) to measure blood serum IL-10 and 2) the measurement was measured from the feces also using ELISA⁽²¹⁾, 3) the study subjects were elderly, aged 60 - 70 years old, Makassar tribe, has no history of degenerative and infectious diseases with doctor's recommendations, free from probiotic and prebiotic intake and antibiotics, so the sample size is 12 people who get synbiotics.

Evidence of the effectiveness of this simple method implemented by several steps: 1) validation of synbiotics obtained from pharmacies with registration by the Republic of Indonesia Food and

Drug Supervisory Agency 2) Synbiotics consisting of probiotics consisting of *L. acidophilus* 7.5 mg, *L. casei* subsp *casei* 0 , 25 mg, *L. rhamnosus* 10 mg, *L. bulgaricus* 12.5 mg, *Bifidobacterium breve* 5 mg, *B. longum* 5 mg, *Streptococcus termophilus* 9.75 mg and Fructooligosaccharide (FOS) as prebiotics 350 mg., 3) measure response immune IL-10 uses ELISA before and after getting synbiotics for 2 months using 3 cc of blood to get the serum and feces to measure the blood pressure taken at the Hasanuddin University Teaching Hospital Laboratory, 4) supplement control is carried out by enumerators conducted by supervision every day to the subject while the researcher every 3 days during the study, 4) compares the two measurement results to find out the improvement tan IL-10 and sIgA immune responses.

FINDING

Immune Response Measurement Parameters

Functional food is Indonesia's abundant natural resource including probiotics and prebiotics. The combination of probiotics and prebiotics is known as synbiotics. The usefulness of synbiotics is that it can increase immunoglobulin levels in the elderly, which will have a more positive effect on performance against disease⁽¹⁶⁾.

In addition, *Lactobacillus plantarum* will reduce the Th1 / Th2 small intestine lamina propria (SILP) ratio. *Lactobacillus lactis* has an immunomodulating effect that regulates Th1 and Th2 balance, but it can also reduce GATA-3 & Tbet in SILP. Probiotics both *Lactobacillus*, *Bifidobacterium* and *Streptococcus* are promising strategies to prevent or overcome excessive intestinal inflammation and maintain immune homeostasis⁽¹⁴⁾. The importance of determining molecular biomarkers that are predictive of the immune system can give an indication that the elderly still remain productive, namely IL-10, and sIgA as a biomarker of immune response. The selection based on IL-10 is an anti-inflammatory function that balances Th1 and Th2 cells⁽⁸⁾, and sIgA is an adaptive defense that functions as an antibody found on the mucosal surfaces of the mucous tractus digestivus, tractus urogenitalia, and respiratory tractus⁽¹²⁾.

Effect of Sinbiotic Giving on IL-10 and sIgA immune responses

Based on the results of the descriptive study, there were 5 men (41.67%) and 7 (58.33%) men, 60-65 years

old, 10 (83.33%) and 2 66-70 years old women. people (16.67%), marital status shows that married 9 (75%) and divorced 3 (25%).

Table 1: Distribution of Immune Response of IL-10 and sIgA in the Elderly after Synbiotic Giving

Respon immune	before	after	p
IL-10 (ng/ml)	110,08±15,47	249,88±190,12	0,005
sIgA (µg/ml)	1,79±0,39	2,92±0,44	0,002

The average profile of IL-10 in group 2 before supplementation of synbiotics was 110.08 ng / ml with a variation of 15.47 ng / ml. After getting treatment, there was an increase of 140.70 ng / ml to an average of 249.88 ng / ml with a variation of 190.12 ng / ml. The results of statistical tests using Wilcoxon test obtained a value of $0.005 < 0.05$, meaning that there were significant differences in IL-10 profiles between before and after synbiotic supplementation.

The synbiotic supplementation group for sIgA also contained elevated levels of $1.79 \pm 0.39 \mu\text{g} / \text{ml}$ to $2.92 \pm 0.44 \mu\text{g} / \text{ml}$, to see the effect of synbiotic supplementation using the Wilcoxon test had a p value of $0.002 < 0.05$. This means that there is a significant change in the profile of the treatment group.

CONCLUSIONS AND RECOMMENDATIONS

The results showed that a significant increase in IL-10 and sIgA immune responses in all samples increased with time, although the increase was not too high but still showed a balanced state (homeostasis) to maintain the health of the elderly. It is recommended to provide synbiotics to the main elderly who are in an unhealthy condition to improve the immune response to be healthy.

DISCUSSION

Symbiotic are probiotics and prebiotics that are combined in food products. Probiotics are non-pathogenic microorganisms that live as digestive microflora that can have a positive influence on human health, while prebiotics are substrates or food ingredients for probiotic bacteria, where these substrates will help increase the growth and liveliness of one or more probiotic bacteria that are in one colon, so that physiological and metabolic conditions can be obtained which can provide protection to the health of the digestive tract. A good combination

of prebiotics and probiotics can increase the number of good bacteria (probiotics) that can survive in the digestive tract by fermenting the substrates⁽⁵⁾⁽³⁾.

The synbiotic composition has each function, namely, *B. breve* maintains normal intestinal flora, inhibits *E. coli*, reduces the growth of *Candida albicans*. *B. longum* is preventing colon cancer, allergies, crohn colitis, and high cholesterol with the effects of increased IL-10 and IL-12⁽¹⁹⁾. *L. bulgaris* as a natural antibiotic that works with a broad spectrum also increases immune, anti-tumor or cancer. *L. caseisubsp. casei* has the effect of increasing NK cell activation⁽¹⁵⁾, inducing differentiation of regulatory T cells⁽¹⁴⁾. *L. rhamnosus* has the effect of increasing the capacity of phagocytosis⁽⁴⁾. *L. acidophilus* increases stimulation of IgA production and capacity for phagocytosis⁽²⁰⁾⁽¹³⁾. *S. thermophiles* serve to suppress lymphocyte proliferation by inducing apoptosis⁽⁶⁾.

Based on the synbiotic composition used as supplementation material, it reflects pro-inflammatory cytokines by producing IFN- γ because they are bactericidal, suppress chronic colitis, increase commensal bacteria, increase sIgA and increase phagocytosis⁽⁴⁾. The synbiotic composition also directs / potentially increases the immune balance by producing high IL-10 by *B. longum* and *L. casei subsp casei* so that even on the other hand IFN- γ is produced high but IL-10 is also produced to suppress IFN- γ production. The other side of the synbiotic composition FOS serves to suppress by blocking the growth of pathogens⁽¹⁴⁾. This is evidenced by the increase in IL-10 after the administration of synbiotic increased significantly.

CONCLUSION

This study recommends functional food ingredients in this case synbiotics that can maintain the health of the elderly while maintaining IL-10 and sIgA while

increasing according to the state of homeostasis. This finding is expected to provide a positive contribution to improve the quality of the elderly immune response and can be developed in other studies in other vulnerable groups such as pregnant women, toddlers, and young women.

Conflict-of-Interest Statement: In this study between researchers and research, subjects did not have a conflict of interest, because subjects did not have personal or informal relationships with researchers.

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Ethical Clearance: The ethics of this study were obtained from the Ethics Commission for Health Research, Public Health Faculty, Airlangga University, Surabaya, Indonesia.

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Emotional Support of Family and Depression Incidence among Elderly in Ngumpul Village, Jogoroto Sub-District, Jombang City

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ABSTRACT

Generally, the physiological decline among elderly both physically and mentally will give an effect such as less sensitive to various stimuli both internal and external so elderly are vulnerable to mental disorders such as depression. The aim of this study to assess the correlation between emotional support of family and depression among elderly who aged 60-74 years old in Ngumpul Village, Jogoroto Sub District, Jombang City. The design of this study was cross sectional. The population was all elderly people who aged 60-74 years old with the number of population is 526 people. The sample size was 55 respondents, selected by simple random sampling. The data were collected by using questionnaire to assess emotional support of family and Geriatric Depression Scale questionnaire to assess depression level of elderly. Moreover, the data were analyzed by using Fisher's Exact Test statistic with $\alpha = 0.05$. The results of this study found that almost all (78.2%) of respondents had good family support, and almost all (87.3%) of respondents did not have depression experience. The results of the Fisher's Exact Test obtained $0.000 < 0.005$. So, the conclusion in this research was there is relation between emotional supports of family with incidence of depression among Elderly who aged 60-74 years old in Ngumpul Village Jogoroto Sub-district, Jombang city.

Keywords: Emotional supports of family, Depression, Elderly

INTRODUCTION

In essence to grow old is a natural process which means a person has gone through three stages of life, it are: childhood, adulthood and old age. The aging process is an inevitable biological process that everyone will experience. Family support factor is one of factor that can influence stress level among elderly where the higher of family support system will make less stress experienced by elderly. However, a feeling of wasted from family also can increase the stress level among elderly where they were deposited in institution of elderly⁽¹⁾.

A person who experienced stress can be seen from the changes of physical condition. Complaints are often felt among people who experienced stress are angry, moody, anxious, anxious, sad, depressed, pessimistic, crying, mood or mood often change, decreased self-esteem or feel insecure, irritable, and has hostility, nightmares, and concentration / memory problem⁽²⁾. Family support was needed for elderly. Family members' support is good examples for the elderly, such as doing or giving suggestion for healthy daily living. Family members who taking care or much give support for elderly in doing what they want to do⁽³⁾.

In 2010, the number of elderly in Indonesia an estimated 23.9 million or 9.77 % and in 2020 will increasing with estimate 28.8 million or 11.34 %. In East Java the incidence of depression reached 7.18 %, depression became one of the problems of mental disorders that are often occur among elderly⁽⁴⁾. Based on data from the Central Bureau of Statistics (BPS) in 2015 the number of Elderly in East Java reached 4,209,817

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people or (11.14 %) of the total population in East Java (37,794,003 people). Based on data from the Jombang District Health Office in 2014 it was found that the data of elderly number in Puskesmas Mayangan Jombang is 11,615 people ⁽⁵⁾. The elderly data in Ngumpul village which is the work area of Puskesmas Mayangan and the village built by FIK Unipdu Jombang in December 2016 amounted to 526 people.

Based on preliminary study in Ngumpul Village Jogoroto Sub-district Jombang Regency in December 2016 from 10 elderly people who had measured by GDS scale (geriatric depression scale) and found 60 % (6 people) experienced depression in severe level, 20 % (2 people) experienced depression in moderate level and 20% (2 people) experienced depression in small level. Moreover, for family support there are 5 people who never get support, 2 people sometimes get support, 2 people often get support and 1 person always get support from family.

Family support is one form of family therapy for elderly who experienced depression. So with give family support at leasts they have family emotional feelings and it will give support for elderly and the elderly also can go through a period of their life. Therefore, the support from various level are needed, ranging from government institution to the family level to take care of the elderly life either through posyandu elderly, increasing the role of elderly in the organization, intergenerational relationship coaching, and skills training for the elderly. Because in the group, the elderly can discuss about health, brainstorming, and gymnastics together ⁽⁶⁾.

Based on the data above, the researchers interested in conducting research on “relationship between emotional support of family and the incidence of depression among elderly in the Ngumpul Village, Jogoroto District-Jombang”.

MATERIALS AND METHOD

The design of this study was cross sectional. Population in this study were all elderly who aged 60-74 years old in Ngumpul Village Jogoroto Sub-District, Jombang city (population size was 526 people). Sample size was 55 people selected by simple random sampling. The study was conducted in May 2018. The independent variable was emotional support of family and dependent variable was incidence of depression. Data were collected using questionnaire. The categorical data were

presented in the form of frequency and percentage ⁽⁷⁾, then analyzed by Fisher’s Exact Test.

FINDINGS

Table 1. Distribution of general data of respondent

Number	General data	Frequency	Percentage
1	Education		
	Not attend the school	27	49.1
	Elementary & Secondary School	20	36.4
	High School	6	10.9
	University	2	3.60
2	Gender		
	Male	8	14.54
	Female	47	85.46
3	Information		
	Ever	44	80.0
	Never	11	20.0
4	Information source		
	Health care provider	44	100.0
	Magazine	0	0
	Radio/TV	0	0
	Internet	0	0
	Total	55	100

Tabel 2. Distribution of emotional support of family data with depression incident among elderly who aged 60-74 years old

Number	Specific data	Frequency	Percentage
1	Emotional support of family		
	Less	0	0
	Moderate	12	21.8
	Good	43	78.2
2	Depression incident		
	Depression	7	12.7
	Not depression	48	87.3
	Total	55	100.0

Tabel 3. Correlation between emotional support of family and depression incident among elderly who aged 60-74 years old

Emotional support of family	Depression level				Total	
	depression		Not depression			
	ā	%	ā	%	ā	%
Enough	6	10.9	6	10.9	12	21.8
Good	1	1.8	42	76.4	43	78.2
Total	7	12.7	48	87.3	55	100

p = 0.000 a = 0.05

DISCUSSION

Emotional Support of Family

Almost all (78.2%) of respondents had good emotional support of family. The emotional support of family is an attitude, action and acceptance of family for family member who sick. Family as a safe and peaceful place to rest and restore also manage the emotions. Aspects of emotional support are including support form of affection, trust, attention, listen and listening. Family members think that supportive people are always ready to provide help and assistance if needed⁽⁸⁾.

Family support is important to someone. In this study found that almost all elderly have good family support. This is makes the elderly feel calm in their daily life so they rarely feel worried.

Almost half of respondents have elementary and secondary education (46%). The higher level of education will likely get support from the people around him. The

basic concept of education is a meaningful process of learning in education and it has growth process, development or change toward a better mature, and more mature in the individual, group or community⁽⁹⁾.

Respondents who educated in elementary school and secondary school are able to think more mature that respondents feel that they have support from their family to go through to their elder period, so they can feel calm and not worry when faced with problems because they have strong emotional support of family and family availability to provide time to give solutions to their problems. Moreover, elderly who educated in elementary, junior high school were get good support from the family and also this because the elderly also ever get information from health workers about mental health and how to deal with depression among elderly.

Depression incident among elderly who aged 60-74 years old

Almost all (87.3%) of respondents were not have depression experience by 48 people. Depression is a natural disorder of mood that is characterized by depth and sadness and continued until feels lose of life, not has problem about reality testing abilities / RTA is still good, personality remains intact (no splitting of personality), the behavior can be disrupted but within normal limits⁽²⁾. Depression is a disturbing mood of feelings, with the main symptom of sadness. This symptom was easy to find with the prevalence rate of 4-5% of the population, ranging from less, moderate, or severe degrees of disturbance. Judging from the clinical aspect, depression can stand on its own, is a symptom of another disease, has various physical symptoms, or occurs along with other diseases (comorbidities), so it can complicate management⁽¹⁰⁾.

Depression that occurs in the elderly in a category where the level of depression is not disruptive or obstructing in their life, so they can still carry out daily activities on a regular and timely basis and the elderly also happy to do their daily activities. According to researchers at the interview time found that the respondent who has depression was because of bed an event or unconditional environment (often left by their families), anxiety, negative thoughts (bored living in this world) and a small percentage of family members who have experienced depression.

Almost half (46%) of the respondents were hold elementary school, secondary school and high school. Education means that the guidance for someone to the development of others person to get their ambition and in the end they get achievement and happiness. Education is needed to get information such as things that support health so as to improve the quality of life. Education can affect a person as well as a person's behavior of lifestyle especially in motivating to participate in the attitude of development. In general, the higher of education will more easily receive information.

According to the researcher someone who educated has a good way of thinking, especially in dealing with a problem for elderly. With a good way of thinking so the respondents when faced with a problem can solve and prevent depression.

Almost all respondents (80%) received information sources from health workers. The ease of obtaining information can help accelerate a person to increase new

knowledge. According to researchers of the elderly who get the source of information from health workers will get the right information about the importance of doing emotional calm in the aging process so that they do not experience depression.

Relationship of emotional support of family with depression incidence among elderly who aged 60-74 years old

There is a relationship between emotional support of family and the incidence of depression among Elderly who aged 60-74 years in the Ngumpul Village, Jogoroto District Jombang.

Depression is a period of disruption of human function associated with the nature of sad feelings and symptoms, including: changes in sleep patterns and appetite, psychomotor, concentration, anhedonia, fatigue, despair and helplessness, and the risk of suicide. Depression can be a chronic and repetitive problem that will result in someone being unable to take care of themselves, besides depression can also lead to suicide. But depression in the elderly can be prevented by the emotional support of family. Family support is a combination of attitudes and acceptance that can help old age deal with problems. There are several forms of family support such as information support, assessment support, instrumental support, and emotional support⁽¹¹⁾.

Emotional support of family is a form of family therapy that can be given to elderly people who are depressed, through family a variety of health problems that arise at once can be overcome. So with the support of families who have an emotional bond at least will give strength to the elderly to live a better old age, therefore it needs support from various parties, ranging from government agencies to the family level to care for the lives of the elderly through the elderly posyandu, improve the role of the elderly in political and religious organizations, as well as enhancing spiritual formation at the end of the elderly life.

CONCLUSION AND RECOMMENDATION

Conclusion

Emotional support of family in Ngumpul Village, Jogoroto District, Jombang District is almost entirely good.

The incident of depression among elderly who aged

60-74 years in Ngumpul Village, Jogoroto District, Jombang District, almost entirely is not depressed.

There is a relationship between emotional support of family with the incidence of depression among elderly who aged 60-74 years in the village of Ngumpul Jogoroto District, Jombang Regency.

Suggestion

Can provide adequate education and information for the elderly and families such as lifestyle, ways of daily adaptation, personality strength and interest.

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Role of Procalcitonin in Detection of Bacterial Pneumonia

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ABSTRACT

The current study aimed to assess the role of procalcitonin in detection of bacterial pneumonia and to compare the application of this marker with other routine tests. This study conducted during the period from November 2017 to April 2018 at Al Sadder Medical city in Najaf included 42 pneumonia patients and 42 apparently healthy individuals as control group, patients and controls were almost matched for age and gender. Sputum specimens were collected from patients under the supervision of the physician and immediately inoculated. A sample of venous blood was withdrawn aseptically and sent for Hematological and immunological tests. Culture results revealed bacterial pneumonia in 29 patients (69%). Results of identification have shown *Streptococcus pneumoniae* (31%), *Klebsiella Pneumoniae* (23.8%), *Escherichia coli* (7.1%), *Stenotrophomonas Maltophilia*, *Streptococcus pyogenes* and *Haemophilus Influenza* (2.4%) for each. The mean procalcitonin level was significantly higher in patients with bacterial pneumonia (971.71) compared to those with other types of pneumonia (634.00) and controls (227.40), and it appeared to be good predictor for detection of bacterial pneumonia and it was able to differentiate bacterial pneumonia from other causative pneumonia, than other tests used in this study.

Keywords: Procalcitonin, pneumonia, bacteria, C-reactive protein

INTRODUCTION

Pneumonia is an illness, usually caused by bacterial, viral or more rarely fungal organisms¹. It has been identified as the major (forgotten killer of children) by the United Nations Children's Fund (UNICEF) and WHO². The World Health Organization defines pneumonia as an acute disease episode with cough combined with fast breathing with age specific cut-values for increased respiratory rate. This case definition of childhood pneumonia is widely used in poor-resource settings to guide the management of pneumonia³. Pneumonia has received very little attention as there has been little research on the disease apart from vaccine trials that included the evaluations of the impact of these vaccines on pneumonia⁴.

Procalcitonin rises very fast in bacterial infections, making it a good biomarker for bacterial infections. Alongside other calcitonin precursor peptides, PCT is found in the serum in physiological conditions, but the PCT levels detected are very low <0.1 ng/ml. However, in pneumonia patients, the PCT level increases, sometimes to the levels of more than several hundreds of Nanograms per milliliter⁵.

Aim of this study is to diagnose pneumonia caused by bacteria using procalcitonin and compare it with some other markers.

MATERIALS AND METHOD

Study Design

A total of 42 pneumonia patients and 42 apparently healthy individuals (controls) were enrolled in this study. Those patients attended the emergency departments at Al-Sadr Medical City and Al-Hakeem hospital of Al-Najaf province during the period from November 2017 till April 2018. Samples were obtained from different age groups and of both genders.

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Sputum specimen was obtained using universal container after providing the patient suspected to have pneumonia with appropriate instructions. Whole blood was withdrawal from vein, under aseptically conditions. Specimens of blood were collected in EDTA tube and gel tube. The EDTA tubes were subjected for hematological tests, while gel tubes were used for immunological methods including PCT and C-reactive protein⁶.

Sputum Processing and Bacterial Identification

Bacterial isolated recovered from sputum culture were identified to the species level on the basis of macroscopic observation of bacterial colonies morphology, and micromorphological characteristics and biochemical tests confirmed lately using automated system of VITEK2 technique^{7, 8}.

Hematological Tests

Total WBCs

The diluted blood suspension was placed in a chamber then the cell was counted and multiplied by dilution factor and reported as number of cells per microlitter⁹.

Differential Counts

Differential leukocytes was automatically counted using hematology analyzer. Erythrocyte

Sedimentation Rate

The settling of red corpuscles was measured in mm/hr using the Modified Westergren Method⁹.

Immunological tests

Procalcitonin (PCT) Test

Procalcitonin was detected using Elissa technique following the procedure written in the kit which included; the addition of 50µl of standard to the standard well. While the testing sample well contained 10µl of serum and 40µl of Diluent leaving blank well without any addition, 100µl of HRP-conjugate reagent was added to each well covered with an adhesive strip and incubated for 60 minutes at 37°C. Washing process was repeated five times by filling each well with Wash Solution (400µl) using a squirt bottle, manifold dispenser or auto-washer. Aspirating or decanting the wells were performed by inverting the plate and blot it on a clean

paper towel. 50µl of chromogenic A solution and 50µl of chromogenic solution B were added to each well. Gently mixed and incubated for 15 minutes at 37°C and Protected from light. 50µl of stop Solution was added to each well. Optical Density (O.D.) was read at 450 nm using a microtiter plate reader within 15 minutes¹⁰.

C-reactive Protein (CRP) Strip Test

Ten ml of standard, diluted samples and controls were dispensed into the appropriate wells (dilution 1:100 was done by adding 5 ml of samples to 495 ml of sample Diluent). 100 ml of enzyme conjugate was added to all wells tapping the holder to remove air bubbles from the liquid and mixed well and incubated for 60 minutes at room temperature (20-25 C). Liquid was removed from all wells by washing wells three times with 300 ml of 1X wash buffer and blotted on absorbent paper towels. Add followed by applying 100 ml of TMB substrate to all wells and Incubation for 15 minutes at room temperature. Finally 50 ml of stop solution was added Add to all wells and the absorbance was read on ELISA reader at 450 nm within 15 minutes¹¹.

Statistical analysis

Statistical analysis using Chai square, Student's t-test, ANOVA test and Receiver operating characteristics (ROC) were performed to analyze data according to the type of variables within Level of significance of <0.001 and occasionally < 0.05¹².

FINDINGS

There were 42 patients with pneumonia and 42 apparently healthy individuals (controls) enrolled in this study. Patients and controls were almost matched for age and gender, ($P>0.05$). Pneumonia was relatively more frequent in males 22 (52.4%) than females 20 (47.6%), with no statistically significant difference, ($P > 0.05$), also no significant difference in residence between cases and controls, ($P>0.05$), (Table 1). Regarding the type of growth, Streptococcus Pneumoniae and Klebsiella Pneumoniae were the more frequent types; 31% and 23.8%, respectively, However, all other pneumonia represented 31%, (Table 2). The comparison of mean PCT and CRP between cases and controls revealed that pnumonia patients had significantly higher mean level of both PCT and CRP, ($P<0.001$), on the other hand , when pneomonia patients subgrouped as , with bacterial pneumonia and those with other pneumonia

and compared against controls, the PCT and CRP levels were significantly higher in these two subgroups than controls, (Table 3). Regarding the comparison of WBC (Total and Differential) count and ESR level between cases and controls groups, it had been significantly found that pneumonia cases had higher WBC, count, granulocyte percent, lymphocytes percent and ESR, in all comparison, ($P < 0.001$), (Table 4). To assess the validity of PCT in prediction and differentiation of bacterial pneumonia than other pneumonia, Receiver Operating

Characteristics (ROC) curve analysis was used (Figure 1) and revealed that PCT was able to differentiate bacterial pneumonia than other types of pneumonia and it was good predictor for bacterial pneumonia (Area under the curve was 0.811), with a sensitivity, specificity and accuracy of 96.3%, 74.6% and 85.6%, respectively. Conversely, CRP was weak predictor and failed to predict or differentiate bacterial pneumonia with low sensitivity, specificity and accuracy; 53.3%, 42.6% and 50.2%, respectively, (Table 5).

Table 1. Results According to Gender, Age group and Residence

Variable		Pneumonia group (n = 42)		Controls (n = 42)		P. Value
		No.	%	No.	%	
Age (year)	< 40	7	16.7	6	14.3	0.49
	40 – 49	9	21.4	14	33.3	
	50 – 59	11	26.2	12	28.6	
	≥ 60	15	35.7	10	23.8	
Gender	Male	22	52.4	23	54.8	0.58
	Female	20	47.6	19	45.2	
Residence	Urban	28	66.7	25	59.5	0.65
	Rural	14	33.3	17	40.5	
SD: Standard deviation						

Table 2. Types of Bacterial Isolates of Pneumonia Patients

Bacterial Isolate	No.	%
Streptococcus Pneumoniae	13	31.0
Klebsiella Pneumoniae	10	23.8
Escherichia Coli	3	7.1
Stenotrophomonas Maltophilia	1	2.4
Streptococcus Pyogenes	1	2.4
Haemophilus Influenza	1	2.4
Other pneumonia	13	31.0
Total	42	100.0

Table 3. Comparison of PCT and CRP levels between cases and controls

		Group		
		Bacterial Pneumonia	Other Pneumonia	Control
PCT	Mean	971.71 ^{a,b}	634.62 ^a	227.40
	SD*	281.38	336.37	22.09
	Range	257.0 – 1358.0	232.64 – 859.26	124.0 – 256.0
CRP	Mean	9.82 ^a	8.34 ^a	1.39
	SD	3.21	2.89	3.80
	Range	0.01 – 17.75	0.01 – 16.38	0.00 – 13.30

SD; Standard deviation
a, significant difference vs. control, b significant difference than Other Pneumonia

Table 4. Comparison of WBC (Total and Differential) Count and ESR level among the Studied Groups

	Bacterial Pneumonia (n =29)		Other Pneumonia (n = 13)		Control (n = 42)		P. value
	Mean	SD	Mean	SD	Mean	SD	
WBC (x 10 ³ / cm)	14.1	2.3	13.9	2.3	7.2	1.5	< 0.001
Granulocyte (%)	81.9	11.0	28.2	7.1	26.0	5.2	< 0.001
Lymphocytes (%)	15.5	9.9	71.5	15.4	46.4	11.7	< 0.001
ESR (mm/hr)	53.2	22.8	21.4	13.2	5.5	3.8	< 0.001

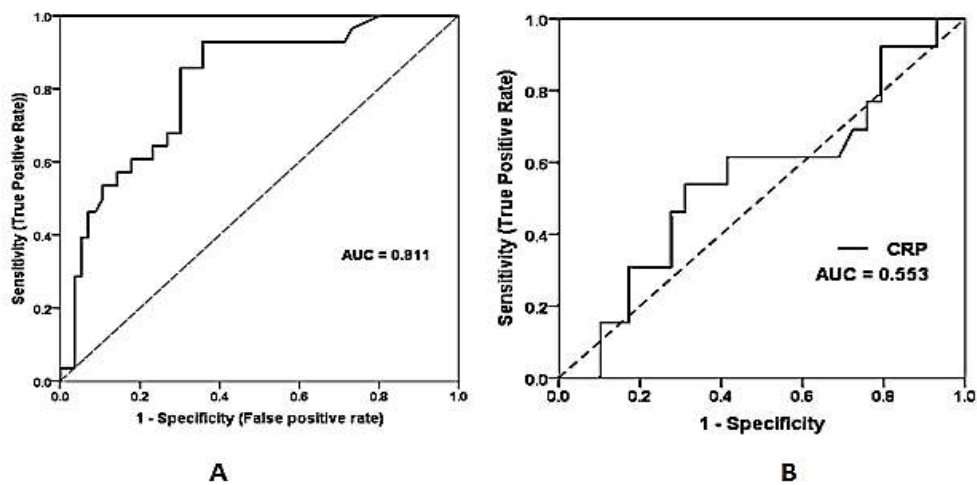


Figure 1. Receiver operating characteristics (ROC) curve for validity of (A) PCT and (B) CRP in prediction of bacterial pneumonia

Table 5. Validity of PCT and CRP parameters in prediction of bacterial pneumonia

Validity parameter	PCT	CRP
Sensitivity	96.3%	53.3%
Specificity	74.6%	42.6%
Accuracy	85.4%	50.2%
Positive predictive value	79.1%	50.4%
Negative predictive value	95.3%	50.6%

DISCUSSION

In the present study, pneumonia was more relatively frequent in male than female, ($P > 0.05$), which agreed with Naderi et al from Iran¹⁴ who stated that males are more commonly affected with pneumonia. The role of sex hormones in the regulation of the immune system may also contribute to the incidence and severity of the various types of respiratory tract infections, especially in adolescents and adults. Concerning with the age groups, the present study found that the highest incidence of pneumonia was found in the age group ≥ 60 years (35.7%) followed by 50-59 years (26.2%) then 40-49 years (21.4%) then followed by <40 (16.7%). according to the residence, record pneumonia was frequent in urban area (66.7%) as compared to rural (33.3%) (Detailed in table 1) this results was in accordance with the study of El-Azeem et al¹⁵. Based on sputum culture results, bacterial pneumonia was reported in 29 patients (69%) while negative culture was reported in 13 patients (31%) and assigned as "other pneumonia" which could be viral or others rather than bacterial, however, the most frequent bacterial agent was *Streptococcus Pneumoniae* (31%) followed by *Klebsiella Pneumoniae* (23.8%), *Escherichia coli* (7.1%), and each of *Stenotrophomonas Maltophilia*, *Streptococcus Pyogenes* and *Haemophilus influenza* had reported in only one patient, 2.4%. Those isolates were identified based on microscopical, culture characteristics and finally the automated Vietek-2 compact system using GN-ID and GP-ID cards that included 47 - 50 biochemical tests. These results were in agreement with the study of Aljanaby A from Iraq¹⁶. Diversity and privilege in bacterial infectious agents could be attributed to that AL- Najaf is always crowded and expatriates from all over the world and from neighboring countries, especially Iran, as most

Iranian travelers come to AL- Najaf first and thus help to spread the infection¹⁶. Based on the statistical results, procalcitonin had significantly the higher mean level in bacterial pneumonia than other pneumonia groups and controls, while CRP, total WBCs and neutrophil percentage were insignificantly different between Bacterial and other pneumonia groups, which indicated that PCT could be a promising predictor, to prove the validity of PCT, in prediction of bacterial pneumonia, ROC curve analysis was applied and revealed that PCT was a good predictor and was able to differentiate between bacterial and non-bacterial pneumonia, the area under the curve (AUC) was (0.811). It is worth mentioning that the higher AUC close to one indicated good validity and predictive value, furthermore, ROC curve revealed that PCT had a sensitivity of 96.3%, a specificity of 74.6%, accuracy of 85.4%, positive predictive value (PPV) of 79.1% and a negative predictive value (NPV). This study was in agreement with Saleem et al¹⁷, but disagreed with Nouvenne et al¹⁸. Additionally, ROC curve analysis revealed that CRP failed to predict or differentiate bacterial pneumonia, (AUC = 0.55), indicated that CRP was not valid to predicting bacterial pneumonia and it was non-specific (42.6%) with poor sensitivity (53.3%) and accuracy (50.2%), (table 5). This study was disagreed with Youssef et al¹.

Recently published revised criteria for pneumonia imply the need to apply procalcitonin as a diagnostic tool¹⁹. A correlation between increased serum concentration and the severity of infection, clinical course, and mortality has been previously reported²⁰. The induction of PCT can be caused by different stimuli both *in vitro* and *in vivo*. Bacterial endotoxins and pro-inflammatory cytokines are powerful stimuli for the production of PCT²¹.

CONCLUSION

This study can indicate that Procalcitonin was able to differentiate bacterial pneumonia from other causative pneumonia, than other tests used in this study, hence, Procalcitonin test could be a promising marker for detection of bacterial pneumonia assists and facilitate the early diagnosis of bacterial pneumonia in addition to clinical characteristics and clinician practice.

Ethical Permission : All official agreements were approved from the local ethical committee in Najaf Health Directorate. The study protocol approved by the

Council of the college. Signed informed consents were obtained from all participants, patients and controls. Data were collected according to the The World Medical Association Declaration of Helsinki 2013

Conflict of Interest : Authors declared: None.

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The Influence of Leadership Style and Domicile to Power Distance of Midwife Coordinators and Village Midwives in Hulu Sungai Tengah District

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ABSTRACT

Four mothers in Indonesia died in a day as a result of giving birth. It puts Indonesia as the second highest maternal mortality rate (305/100,000) and infant mortality rate (26/1,000) in Southeast Asia. Health services that contribute directly to reducing MMR are health services during pregnancy or antenatal care, which are mostly carried out by village midwives. Many factors can influence the performance of village midwives between the distance of power. This research uses a quantitative method with a cross-sectional approach. The population were all midwives, both village midwives and midwife coordinators, totalling 200 village midwives and 19 coordinating midwives. The sample was 95 respondents (village midwives) obtained from 13 public health centre in Hulu Sungai Tengah District. Research results show that midwife coordinators with democratic leadership styles tend to show low power distance. Likewise, the village midwife who lives in the target village tends to show power distance between the midwife coordinators and the low village midwives. Two-way communication and openness of superiors characterize low power distance to all members. Low power distance can to create high job involvement and ultimately can produce a good performance. The tendency of the influence of leadership style and domicile of village midwives to power distance between midwife coordinators and village midwives has not shown a significant influence ($p = -0.466$) and ($p = -0.268$). So, the leadership style of the midwife coordinators and the village midwives domicile shows a certain tendency of power distance but statistically does not show significance.

Keywords: leadership style, domicile, power distance, midwife, village

INTRODUCTION

Based on the 2017 World Bank Report, four mothers in Indonesia died from childbirth. In other words, there is one mother in Indonesia who dies every six hours. One of the data presented is data from the ASEAN Millennium Development Goals (MDGs) in 2017. The data shows that in 2015 maternal deaths in Indonesia still reached 305 per 100 thousand. This figure is three times higher than Indonesia's MDG target, which is 102 per 100 thousand. This figure places Indonesia as

the country with the second highest mortality rate in Southeast Asia.¹

Health services that contribute directly to reducing MMR are health services during pregnancy or antenatal care, which are mostly carried out by village midwives. This condition shows that the performance of village midwives who are the spearhead of antenatal services is also still not good. Many factors that can influence the performance of village midwives include leadership style, domicile, and organisational culture. Organisational culture is widely known as the foundation of management systems and activities in every organisation. One organizational culture is the distance of power which is an important part of the superior-subordinate relationship.²

This data based on the 2015 Hulu Sungai Tengah District Health Office has changed, namely that the

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coverage of antenatal services increased but was still below the target of 75%. This figure is still below the average number for South Kalimantan Province, which is 81.02% and the average number for the national is 87.48%. Based on the data it is also known that as many as 41 villages from 206 villages (19.90%) do not have village midwives, especially for mountainous areas and are very isolated.

MATERIALS AND METHOD

This type of research is analytic observational with the cross-sectional approach. The population in this study were all village midwives in the working area of the public health centre in the Hulu Sungai Tengah District, totalling 200 village midwives with inclusion and exclusion criteria. Calculation of sample size by considering the proportion of precision calculated by the formula:

$$n = \frac{Z^2_{1-\alpha/2} P(1-p)}{d^2}$$

Information :

n: large sample

P: the proportion of ANC performance = 47.4%

$Z_{1-\alpha/2}$ with a 95% confidence level = 1.96

d: precision is set (0.1)

So the sample size is 95 respondents. The sampling technique is a multistage random sampling technique (non-proportional random sampling). The dependent variable is power distance (Y). Independent variables are leadership style (X1), domicile (X2) influences between variables were tested using the chi-square test with α (0,05).

FINDINGS

The results showed that the characteristics of the coordinating midwife from the highest age were above 40 years, the most working time was above 20 years, the highest level of education was a diploma three.

Table 1. Power Distance, Leadership Style, Domicile of Midwife Coordinator and Village Midwife in Hulu Sungai Tengah District 2017

Variable	Amount	Percentage (%)
Power distance between coordinator and village midwife		
Low	79	83.20
High	16	16.80
The leadership style of midwife coordinator		
Autocratic	34	35.79
Democratic	61	64.21
Laisses Faire	0	0
Domicile of the village midwife		
External target villages	15	15.79
Internal guided villages	80	84.21

Table 2. Crosstab Table Leadership Style and Domicile with Power Distance of Midwife Coordinator and Village Midwife in Hulu Sungai Tengah District 2017

Variable	Power Distance				Total (%)	p
	Low		High			
	Amount	%	Amount	%		
Leadership Style						
Autocratic	27	79.40	7	20.60	100	0.466
Democratic	52	85.20	9	14.80	100	
Domisili						
External	11	73.30	4	26.70	100	0.268
Internal	68	85.00	12	15.00	100	

Table 2 shows that midwife coordinators with democratic leadership styles tend to show low power distance. The autocratic leadership style applied by the midwife coordinators tends to show a high power distance. Village midwives who live in the target villages tend to show the power distance between the midwife coordinators and the low village midwives. Village midwives who live outside the target villages tend to show the distance of power between the midwife coordinators and the high village midwives.

DISCUSSION

The Effect of Midwife Coordinator’s Leadership Style on Power Distance Between Midwife Coordinator and Village Midwife

Power distance also depends on the emotional closeness between superiors and subordinates, so that even though the power distance is high but psychologically there is emotional closeness such as friendship or family resulting in employees remaining comfortable to interact with their superiors. So that any leadership style applied does not affect the distance of power between the boss and the subordinate.

This opinion refers to the theory stating that leadership comes from power in a group or organization that consists of three types, namely position, personality, and politics.³

This opinion refers to the theory stating that leadership comes from power in a group or organization that consists of three types, namely position, personality, and politics.³

1. The power that comes from a position

a. Formal or legal power

Including the commander of the army, agency heads, presidents or prime ministers, and so on chances, power as appointed or confirmed by the official rules or regulations.

b. Control over resources and rewards

Employers who pay their employees, rice field owners who pay their workers, chiefs or offices that can reward members or subordinates, lead based on this type of power.

c. Control over punishment

Rewards are usually related to punishment. A leadership whose only source of control is punishment

based on fear. For example, thugs who collect taxes from shop owners.

d. Control over information

People who master information can be leaders. For example, scholars become leaders in religion; scientists become leaders in science.

e. Ecological control

This source of power is also called the engineering of the situation. For example, control over job placement, a supervisor of the head of the personnel section has power over his subordinates by determining the position of its members.

2. The power that is based on personality

Leadership that comes from power because personality begins from personal nature, namely:

a. Skills

For example, in prayer in congregation in the religion of Islam which is used as a prayer leader or priest is the most fluent in reading the verses of the Qur’an.

b. Friendship and Loyalty

The nature of socializing, being loyal or loyal to a group is a source of power so that someone is considered a leader.

c. Charisma

The personality traits that lead to the personal authority of the leader are one of the sources of power in the leadership process.

3. The power from politics. Power derived from politics consisting of:

a. Control or decision-making process

An example of a judge presiding over a trial of justice is because he has control over the course of the trial and the decision or verdict to be handed down.

b. Coalition

Leadership by the source of political power is determined by the right or authority to make cooperation with other groups.

c. Participation

The leader regulates participation and in what form the members participate.

d. Institutionalization

For example, the religious leader marries a husband and wife determines the formation of a

new family, and a notary or judge establishes the establishment of a new foundation or company.

Another thing that can cause the coordinating midwife to apply more democratic leadership style, if analyzed from the characteristics of respondents is because the average age is relatively the same between coordinator midwives and most of the village midwives, so that mutual respect and respect are more dominant. The democratic leadership style also allows communication between superior and subordinate, then it can motivate the involvement of village midwife in all antenatal care program becomes high.⁴

The Influence of Village Midwife Domicile Against the Distance of Power between Midwife Coordinator and Village Midwife

Frequent interactions can play an important role in the formation of closeness and friendship groups. Interaction is the main requirement in group dynamics because with interaction there will be a process of knowledge transfer that can run horizontally based on the need for information about that knowledge. So that the closeness can contribute to the distance of power between the two people who interact.

Authority of the midwife as contained in the Regulation of the Health Minister of the Republic of Indonesia Number 97 of 2014 concerning Health Services Period Pra-pregnancy, Pregnancy, Childbirth, and Period After Childbirth, Organizing Contraception Services, and Sexual Health Services. The authority of the village midwife in antenatal care anywhere is based on the regulation there is no difference.⁵ To achieve good performance can be pursued through a high job involvement without being influenced by the village midwife domicile, but the village midwife domicile in the assisted village has a role in increasing the high job involvement.⁶

CONCLUSION

The distance of the power of coordinator and village midwife not significantly affected by the coordinator leadership style and domicile in the implementation of services health.

Ethical Clearance: Before conducting the data retrieval, the researchers conducted a decent test of ethics conducted at the Faculty of Medicine, Lambung Mangkurat University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the research was conducted in an effort to protect the human rights and security of research subjects.

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Qualitative Study: A History of Stunting in the Massenrempulu Community of Enrekang District

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ABSTRACT

Focus Group Discussion (FGD) method. FGDs were performed with primary children caregivers aged 0 to 24 months. Each of three FGD had 4 participants. FGD were conducted using structured interview guides and recorded tapes. Recorded data were transcribed and analyzed using qualitative thematic analysis techniques. Results : All participants are women, majority as housewives who sometimes help farm husbands and have at least one child in the age group 0-24 months in their home. The findings suggest that short body conditions or stunting are not considered a problem by the local community. The concept of the body that is considered important is capable of activity with normal and productive. People also feel resigned if their child's body stunting because according to them it is a gift from the Creator and should be grateful. Conclusion : The unique cultural element of each ethnic in itself has a value that affects the life of the local community. This is a local context that is often overlooked in the formulation of a policy that is often applied generically same for the whole of Indonesia. Different viewpoints between the government and Massenrempulu community could be a strong factor causing trend of stunting case to be increase every year.

Keywords: *Stunting, children caregivers, Massenrempulu community.*

INTRODUCTION

Stunting is a failure to grow in children under five (infants under five years) due to chronic malnutrition so that the child is too short for his age. Nutritional deficiency occurs since the baby is in the womb and in the early period after the baby is born however, the new stunting condition appears after the 2 year old baby⁽¹⁾.

In Indonesia, around 37% (almost 9 million) of children under five experience stunting (Basic Health Research / Riskesdas 2013) and around the world, Indonesia is a country with the fifth largest prevalence of stunting. Even the prevalence of short toddlers was found to be higher in a number of conditions, including being 42.8 percent of mothers who married young (aged

15-19 years) and 46.7 percent of mothers who were short (height less than 150 cm)⁽²⁾.

Stunting is not just a short body problem. Stunting is a chronic nutritional problem starting from the fetus in the womb until the child reaches the age of two years. The cause of stunting problems is multidimensional, not limited to nutrition and health issues. UNICEF has published the causes of malnutrition in children under five covering economic and socio-cultural causes, and recognizes three levels of causality that are related to children's nutritional status factors, namely indirect factors and the main factors as the direct cause of stunting. There are two direct causative factors that affect an individual's nutritional status, namely food factors and infectious diseases, these two factors influence each other. Malnutrition causes children to be susceptible to infection, because there is a disturbance in the child's immune system, whereas children who are repeatedly infected with the disease will worsen their nutritional condition^(3,4).

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The problem of stunting in toddlers is very closely related to parenting issues. The concept of parenting as a determinant. The concept of parenting as a determinant of child nutrition is a new thing for those who work outside the field of nutrition and health. In addition, for those who work in the field, ways of measuring parenting are a problem because parenting knowledge and practice vary greatly from one culture to another⁽⁴⁾. Some studies have found that mothers with good parenting. Parenting is a practice in the household that is seen by the availability of food and health care and other sources for the benefit of life, growth and development. Parenting includes many aspects, namely maternal care, breastfeeding and complementary feeding, psychosocial care and cognitive stimulation, food storage and storage, health service search patterns and environmental hygiene and sanitation practices^(4,5).

Feeding Babies and Children is an important part of parenting in accordance with the concepts and indicators launched by WHO (2012)⁽⁶⁾. From some research results found the incidence of stunting children, among others, due to improper feeding practices, in accordance with health recommendations, especially in terms of patterns of breastfeeding and complementary feeding. The UNICEF Indonesia study revealed a number of obstacles, especially knowledge barriers at the family level that triggered high incidence of stunting in children aged 6-23. Enrekang District including the two districts with the highest prevalence of stunting under five. The prevalence of stunting toddlers in Enrekang District does not occur evenly across all districts. Some districts show relatively high numbers compared to others. One sub-district that has a high prevalence is Baraka District, while the other regions show relatively low numbers, for example Baroko District and Enrekang City^(7,8).

Based on several considerations that have been described previously, the researchers are interested in examining the study of stunting in the view of the Massenrempulu community and looking more closely at the submission of the Massenrempulu community with a stunting body pattern over time in a long period of time.

MATERIAL AND METHOD

Data collection uses a method of Focus Group Discussion (FGD). FGDs are conducted with primary caregivers from children aged 0 to 24 months. Each of the three focus group discussions has 4 participants. Focus

group discussions were carried out using structured interview guides and recorded.

The instruments needed include recording devices, log books, and FGD guidelines^(9,10).

Research design

This research is a qualitative research with phenomenology study design. The research was conducted in Pepandungan village, Baraka sub-district, Enrekang Regency. The study was conducted in November 2017 to February 2018.

Population and Informant

The population in this study were all mothers from baduta who were stunted and domiciled in Baraka sub-district, Enrekang district in the language of thorns. The large sample of the study were mothers with a million who experienced stunting and were willing to work together and actively participate in the study in the village of Pepandungan as many as 12 mothers.

Data collection

This study uses qualitative methods with a phenomenological approach. The phenomenological approach is about to see what is experienced by humans from the point of view of the first person, namely from the person who experienced it. The focus of phenomenology study is not a particular experience, but rather the structure of the experience of consciousness in the form of objective reality which is tangible in the subjective experience of people. The main study of the phenomenological approach is the subjective meaning of objective reality in the consciousness of people who undergo daily activities⁽¹²⁾.

Data analysis

The recorded data is then transcribed and analyzed using qualitative thematic analysis techniques

FINDINGS

The concept of Massenrempulu culture is very broad regarding various parts of the life of its people. In the Massenrempulu community, giving parents great attention and affection to their children can be seen from the needs considered primary. The main things that are considered important and crucial for the future of their children. In the Massenrempulu culture, there

is the term 'inheritance' which shows parents' love for their children. Inheritance which is generally considered important to be abandoned for their children is buffalo, houses and land.

Based on the FGD that has been carried out, information is obtained regarding the inefficiency of public facilities perceived by informants that directly and indirectly affect the nutritional status of the local community.

CONCLUSIONS AND RECOMMENDATIONS

Road facilities to reach the research location are fairly difficult. When traveling to the research location, the research team had to go through a rocky and muddy road with a fairly narrow road width. Not surprisingly, during the trip, the research team only ran into a number of motorbikes and truck cars. Every now and then, the trip must stop to repair the road first, such as picking up rocks to cover uneven roads to prevent the car from being used down. Along the way from the main highway to the location of the study, it was traversed by the mountain edge on the left and the steep ravine at the right side without the edge barrier. The available road width also makes it impossible to pass a car, even with a motorcycle it is quite difficult. When going to bump into a truck, the truck driver always relents to retreat until he reaches the cornering road, because the width of the road is more likely to cross the point. To drive a car on this road must certainly require good driving skills with a high level of concentration.

From the main highway to the location of the study, the research team passed several points of the area by using the community to settle. However, the distance between one settlement point and another is quite far. Time needed to reach the research location is also quite long, which is around two and a half hours. The length of time needed to get to the location of the study was not only felt by the research team. This was also revealed by the informants when the FGD was held. "Mabela male lako, eda know male pabawa sa mabelai" (abbreviation Sh, Fw, and Dn).

The informant revealed that the distance that must be traveled to the capital of the sub-district is very far, it takes a long time, and is constrained by vehicles. This is also the reason that people rarely access the market in the sub-district, even though there are no market facilities in

the village or local hamlet.

The level of health in the local area is more viewed by one's productivity. For adolescents and adults, a healthy concept is more emphasized on their work productivity. Strengthened by the demands of a life that truly depends on nature and agriculture being the highest source of income in the region, eating ability to work is needed. During this time, they believed that body proportions did not affect their productivity at work.

The government in this case also certainly plays an important role, especially for health and nutrition workers. Giving insight and information for mothers. very important in improving the quality of future generations. The support of the main community and the government is generally a very important point in carrying out various kinds of appeals and interventions. Especially for people who live in remote areas with a culture that is still closely attached. It is also realized from the research that has been done, that the concept of stunting itself is the main role in creating a generation or child who is stunting.

DISCUSSION

So that a short body is not considered a problem that must be troubled, so there are no steps taken to handle the condition.

Household life in the study area which also shows the independence setting also contributes separately in terms of food fulfillment at the household level. Marriage at an early age is common in this area. Even four of the FGD participants who were mothers of children under five were aged ≤ 20 years. And 2 of the FGD participants admitted that their husbands were still in college in another city when the research was conducted. However, the independence setting that grows and develops in this area makes everyone who has married feel proud to live with his parents again. So that only three FGD participants stated that they lived with their parents-in-law because their parents-in-law were old and needed child care.

Setting independence makes young couples feel they have to fulfill their daily needs independently. So, even though the food at the household level has been depleted, they are very reluctant to ask for help from their parents⁽¹¹⁾. The principle is that there is enough or insufficient supply of food for daily needs

to be a household level consequence. Settings like this are certainly very influential in terms of providing materials and ultimately play a role in meeting the daily nutritional needs needed, especially for children. Advanced manifestations of this condition certainly lead to stunting due to intake that is not in accordance with daily consumption recommendations.

Not only is the setting independent, the concept of body proportions which is a divine gift that must always be grateful for the pattern of reinforcement of stunting in the area of research. Height is considered something that has been determined by the Almighty, and it is appropriate for humans to be smart to be grateful for what they have. The belief that height is strongly influenced by heredity, further strengthens the pattern of being grateful for what is owned today. This concept of sincerity or resignation is placed not in its place, because in fact at the age of the child, growth is still very likely to be pursued. And the belief that short is a hereditary factor is a concept that must be broken in the mindset of society. Incorrect trust and a sense of resignation are two things that make mothers do not have the will to do something in the pursuit of child development.

CONCLUSION

A short body or stunting is considered not a problem by the Massenrempulu community. In everyday life, health and body strength are assessed in work productivity. So, if someone is still able to work optimally, short posture is not a problem. For children, a stunting body is also not a problem as long as the child is still able to play and active activities. The perspective of the Massenrempulu community does indeed support the occurrence of prolonged stunting in the region. This fact shows the importance of serious attention from the government to reduce the prevalence of stunting at the age of children to improve the quality of human resources in the future.

Logical & valid derivatives of the findings. Is the answer to the research problem. Made based on facts. Is a statement of the will of the author. Demonstrate the things that need to be developed.

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The Effect of Rosella Beverage Intervention on Lipid Profiles and Antropometric in Obese Adult Men

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ABSTRACT

This study aimed to analyze the effect of rosella beverage intervention toward blood lipid profiles (total cholesterol, triglycerides, HDL and LDL) and antropometric in obese adult men. The current study was a quasi experimental study with pre-post test. Twentyfive obese men subjects in IPB Security Unit were randomly assigned to a control group (n = 11) and intervention group (n = 14). The intervention group consumed a rosella beverage containing anthocyanin 81.16 mg/g and the control group consumed a placebo beverage that did not contain anthocyanin for 6 weeks. Rosella beverage has contained anthocyanin 81.16 mg/g and antioxidant activity 64.8 mg vitamin C/100 g. The results showed that the presence of intervention could effectively reduce weight, body weight and BMI compared to before intervention ($p < 0.05$). Intervention beverageing roselle significantly decreased triglyceride levels ($p < 0.05$) and tend to decrease cholesterol, HDL and LDL ($p > 0.05$). This indicates that the intervention of roselle beverages could improved the lipid profile in obese adults.

Keywords: *anthocyanin, obesity, rosella beverage*

INTRODUCTION

World Health Organization (WHO) estimates that around 1.6 billion adults are overweight and 650 million are obese in 2016. The prevalence of overweight and obesity in Indonesia from year to year has increased as shown by the Riskesdas data in 2007, 2010 to 2013 were respectively 19.1%, 21.7%, and 26.3%. Obesity, particularly central obesity, is a condition of excess fat accumulation in adipose tissue. which has numerous negative impacts for health. Central obesity, featured by abdominal fat accumulation, increases the risk of cardiovascular disease compared to general obesity¹. Central obesity increases the risk of cardiovascular disease concomitant of increasing blood lipid profiles such as cholesterol, triglycerides, Low Density Lipoprotein (LDL), and Low High Density Lipoprotein (HDL)².

Anthocyanin is one of flavanoid that has purple colour and often found in fruits, vegetables and tubers. Previous meta-analysis studies suggested that anthocyanin consumption has health benefits, one of which improves lipid profile for healthy people and people with cardiovascular disease³⁻⁶. The role of

anthocyanin in improving lipid profiles is by suppressing the enzyme regulation of HMG-CoA reductase, thus inhibiting cholesterol synthesis⁴.

Rosella flower is a plant containing 128.76 mg / 100g anthocyanin⁷. Rosella flowers are often consumed by people as a rosella tea. Azis *et al.*⁸ reviewed several research results related to the intervention of rosella against lipid profiles for individuals who have cardiovascular disease but most of them made rosella as tea and capsule product. However, there are still not many research that made beverage from extract rosella as functional food to see the effect on lipid profiles in obese individuals. Functional food has advantages more easily accepted and safe than capsules. Therefore, roselle extract beverage products are made to increase the acceptability and effectiveness of lipid profile improvement in obese individuals.

The objectives of this study were to make high antosianin rosella beverage formulations and to analyze the effect of rosella beverage toward blood lipid profiles (total cholesterol, triglycerides, HDL and LDL) in obese men.

MATERIAL AND METHOD

The design of the intervention study was quacy experimental pre-post design which divided by control and intervention groups in March until May 2018. The location of this study was chosen purposively ini Bogor Agricultural University. The subjects were 25 male security guard from Bogor Agricultural University. This subject consitsted of 11 for the control groups and 14 for the intervention groups. Inclusion criteria in this study were men who were overweight/obese with a BMI value ≥ 23 kg/m² and/or waist circumference >90 cm, aged 30-55 years, were not getting similar interventions (antioxidant beverages). Exclusion criteria in this study were having chronic disease or cardiovascular disease, having a disease or history of gastric disease, consuming alcohol, routinely taking antioxidant supplements and/or phytopharmaca, taking anti-hypercholesterolemia drugs.

The intervention group was given roselle beverage containing anthocyanin 81.16 mg/day for 6 weeks, while the control group was given placebo beverages that had the same color as the intervention product but did not contain anthocyanin. All groups were given 480 mL/day beverages. During the intervention period, the subject was asked not to consume high-food antioxidants, especially anthocyanins, and supplements or multivitamins.

The collected data included secondary and primary data. Secondary data was the profile of IPB security guard obtained from staff department of the Campus Security Unit (UKK) of IPB. Primary data include organoleptic, socioeconomic characteristics, anthropometry and blood lipid profiles. Organoleptic data consists of hedonic and hedonic quality tests. Data of socioeconomic characteristics include of age, education, income and family size. These data were taken by direct interview to the subject. Anthropometric data included of weight, height, and waist circumference. Subjects used light clothing and barefoot during anthropometric measurements. Data of subject characteristics, socioeconomic, anthropometric and lipid profiles were collected at the beginning and the end of the study. The consumption of roselle beverages was monitored by compliance form filled by the subject and confirmed by the researcher.

The data on socio-economic characteristics of the subjects were analyzed descriptively. The distribution of anthropometric data and lipid profiles were analyzed

by Kolmogorov-Smirnov test. The comparison of levels of blood lipid profiles and anthropometry for intra-group comparison (baseline with endline) were analyzed by paired t-test, while inter-group comparison (between intervention and control groups) was analyzed by independent t-test. The ANCOVA test was used to determine the effect of rosella beverage intervention by controlling covariate variables.

RESULTS

Table 1: Characteristics subject in baseline of the study

Variable	Group		p-value
	Control	Intervention	
Age (th)	46.2 ± 5.0	42.6 ± 6.0	0.130 ¹
Early adultl	2 (18.2)	4 (28.6)	
Middle adult	9 (81.8)	10 (71.4)	
Education			0.366 ²
Junior High School	0 (0.0)	1 (7.1)	
Primary High School	11 (100.0)	13 (92.9)	
Family size (people)			0.420 ¹
≤4 people	8 (72.7)	12 (85.7)	
5-6 people	3 (27.3)	2 (14.3)	
Income (Rp)			0.233 ²
Low: <1.500.000/month	0 (0.0)	1 (7.1)	
Moderate: 1.500.000-2.500.000/month	6 (54.6)	5 (35.7)	
Anthropometrics			
Waist circumference (cm)	93.23 ± 5.50	96.29 ± 8.86	0.327 ¹
Weight (kg)	77.01 ± 6.36	78.81 ± 8.73	0.572 ¹
BMI (kg/m ²)	28.02 ± 2.48	28.62 ± 2.35	0.547 ¹
Lipid profiles (mg/dL)			
Cholesterol	209.09 ± 22.40	180.00 ± 46.16	0.068 ¹
Trigliserida	147.45 ± 46.77	150.29 ± 22.97	0.923 ¹
HDL	54.09 ± 13.45	45.36 ± 14.36	0.134 ¹
LDL	125.45 ± 24.03	104.64 ± 40.71	0.148 ¹

¹ Independent t-test

2 Chi-square

Table 1 describes the characteristics of all subjects. Most subjects were classified as middle adults with an average age of 46.2 ± 5.0 (control group) and 42.6 ± 6.0 (intervention group). The final education level of the subjects is mostly high school graduates and has a family size of ≤ 4 people. Subjects had an average

income with a range of 1 500 000 - 2 5 000 000/month which is classified as moderate economic level. Based on the results of different test analysis, there were no significant differences age, education, family size, income, anthropometrics and lipid profiles between intervention and control group at the baseline of study ($p > 0.05$).

Table 2: Results of statistical analysis of different test anthropometric variables

Variable	Phase	Control	Intervention	p-value ²
Waist Circumference	Before	93.23 \pm 5.50	96.29 \pm 8.86	
	After	90.64 \pm 5.56	93.21 \pm 7.79	
	Δ Mean	-2.59	-3.08	0.632
	p-value ¹	0.005*	0.000*	
Weight	Before	77.01 \pm 6.36	78.81 \pm 8.73	
	After	77.04 \pm 6.45	78.04 \pm 8.75	
	Δ Mean	0.03	-0.77	0.130
	p-value ¹	0.962	0.013*	
BMI	Before	28.02 \pm 2.48	28.62 \pm 2.35	
	After	28.03 \pm 2.46	28.33 \pm 2.38	
	Δ Mean	0.01	-0.29	0.133
	p-value ¹	0.991	0.011*	

*significant $p < 0.05$

¹ Paired t-test ($P < 0.05$ = significant difference in intra-group)

² Independent t-test ($P < 0.05$ = significant difference between groups)

All groups experienced a decrease in waist

circumference and were significantly different after intervention ($p < 0.05$). Intervention groups experienced a significant weight loss ($p < 0.05$) and BMI. meanwhile, the control group tends to experience a weight gain and BMI ($p > 0.05$).

Table 3: Results of statistical analysis of different test lipid profiles

Lipid Profile	Phase	Control	Intervention	p-value ²
Cholesterol	Before	209.09 \pm 22.40	180.00 \pm 46.16	
	After	203.73 \pm 26.46	173.29 \pm 47.82	
	Δ Mean	-5.36	-6.71	0.835
	p-value ¹	0.346	0.100	
Triglyceride	Before	147.45 \pm 46.77	150.29 \pm 22.97	

Cont... Table 3: Results of statistical analysis of different test lipid profiles

	After	158.82 ± 71.04	128.79 ± 17.84	
	Δ Mean	11.37	-21.50	0.050*
	p-value ¹	0.414	0.038*	
HDL	Before	54.09 ± 13.45	45.36 ± 14.36	
	After	43.45 ± 6.12	44.64 ± 9.33	
	Δ Mean	-10.64	-0.72	0.740
	p-value ¹	0.020*	0.854	
LDL	Before	125.45 ± 24.03	104.64 ± 40.71	
	After	126.73 ± 21.55	103.57 ± 39.81	
	Δ Mean	1.28	-1.07	0.807
	p-value ¹	0.868	0.861	

*significant p<0.05

¹ Paired t-test (P <0.05 = significant difference in intra-group)

² Independent t-test (P <0.05 = significant difference between groups)

The result of analysis show that triglyserida level significant decreased in intervention group compared to control group. Futhermore, the other lipid such as cholesterol, LDL and HDL no significant difference between group control and intervention (p>0.05).

DISCUSSION

Rosella beverage was made from roselle extract, water, sukralosa and salt. The beverages that were intervened were selected rosella beverages based on organoleptic tests. This beverage contains 10 g of rosela extract. The anthocyanin content in roselle beverages was 81.16 mg. Anthocyanin is part of flavonoids, considered as an antioxidant, which gives red or purple color to plants⁹. The types of anthocyanins found in rosella were delphinidin-3-glucoside, cyanidin-3-glucoside, delphinidin-3-sambubioside and cyanidin-3-sambubioside, all of which contribute to antioxidant activity¹⁰. Based on the analysis, the antioxidant content of roselle beverage were 64.8 mg vit C/100 g. The antioxidant content of this rosella beverage is higher than other antioxidant beverages such as bran beverages

which have an AEAC value of 28.74 mg vit C/100 g¹¹ and jelly okra beverages with an AEAC value of 10.10 mg vit C/100g¹². Djaeni *et al.*¹³ states that rosella is a plant that has strong antioxidants with IC50 values between 50-100 ppm.

The results of this study found that giving of roselle beverage significantly reduced waist circumference, body weight and BMI compared to before intervention (p<0.05). This result is consistent with the research which proved that 1g/day roselle extract for 90 days could reduce BMI and body weight by 0.4 1g/day and 0.8 kg¹⁴. Several studies in Mexico have concluded the use of roselle extract in weight loss because of its ability to excrete fat absorption and body weight in mice¹⁵. Rosela contains high antioxidants, one of which is anthocyanin. Previous meta-analysis stated that anthocyanin supplementation can reduce weight and adipose tissue in both animal and human subjects¹⁶.

The study also found that the intervention group significantly reduced triglycerides compared to the control group (p<0.05). Meanwhile for other lipid profiles such as cholesterol, LDL and HDL tend to decrease in the intervention group (p>0.05). The occurrence of triglyceride decrease in the intervention subjects was suspected because the anthocyanin content of roselle beverage were 81.16 mg. The role of anthocyanin in reducing triglycerides is by decreasing serum apo-B and

apo-C III. Both serum plays a role in the metabolism of triglycerides to the plasma⁴.

HDL is one of the lipid profiles that are protective against atherosclerosis. Increased cholesterol levels had a positive effect on reducing the risk of non-communicable diseases¹⁷. The results of this study indicated that there was a decrease in HDL levels in each group, but still within the normal range of 35-55 mg/dL¹⁸. The HDL in the intervention group decreased by 0.72 mg/dL (1.6%), but not significant ($p > 0.05$). The control group also significant decreased by 10.64 mg/dL (19.7%) compared to the data before intervention ($p < 0.05$). Increasing HDL level is difficult in several clinical studies, one of which is caused by the subject's lifestyle that has not changed such as lack of physical activity. Although, subjects were given education to increase physical activity and to eat healthy foods, during the study, not all subjects were disciplined, due to age and work pattern as security guards who had not been able to perform physical activities regularly.

Rosella contains anthocyanins which can play a role in reducing LDL by inhibiting cholesteryl ester transfer protein (CETP)⁴. Decreased LDL levels may also be due to the inhibition of triacylglycerol synthesis by hibiscus acid compounds which are the content of rosella¹⁵. Meanwhile, the consumption of 160 mg anthocyanin supplementation twice daily for 24 weeks in subjects with diabetes mellitus 2 significantly reduced LDL levels (7.9%), triglycerides (23.0%) and increased HDL levels (19.4%) compared to the control group¹⁹. The difference in outcomes was due to several factors: the type and number of subjects (healthy subjects or sick subjects), length of study, and number of intervention products. Anthocyanin has a low bioavailability about 12%²⁰. Bioavailability is the ability of active ingredients that can be absorbed by the body. Therefore, anthocyanin intervention should be given in large quantities in order to be absorbed more by the body.

Based on the ANCOVA test, changes in lipid profile levels were not influenced by several covariate variables such as energy and nutrients intake, levels of lipid profiles before intervention and frequency of fried foods. This indicates that the improvement of the lipid profile in the intervention group was thought to be only affected by the intervention of roselle beverage.

CONCLUSION

Intervention of rosella beverage significantly decreased triglyceride level, but there was a tendency to decrease cholesterol, LDL and HDL level. The intervention of rosella beverage also significantly decreased waist circumference, weight and BMI.

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Exposure of Xylene in Working Environment and Methylhippuric Acid in Informal Footwear Worker in Bogor, Indonesia

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ABSTRACT

Introduction: The use of adhesives and paints containing xylene play an important role in footwear manufacturing. Xylene exposure can affect the central nervous system. To determine the level of exposure can be conducted by measuring the levels of methylhippuric acid (MHA) in urine. The aim of this study was to describe the risk of xylene exposure to workers' health.

Method: This study used cross-sectional design and conducted in three footwear workshops in Ciomas, Bogor Regency in September – October 2017. The study sample consisted of 40 urinary workers and 9-point measurements of xylene in indoor air. Especially, urine (MHA) was taken at the end of work hours and analyzed with UPLC MS/MS. Furthermore, xylene measurements were carried out using gas chromatography. For the analysis of the relationships between the concentration of xylene and MHA levels using simple linear regression.

Results: The concentration of xylene in the workshops was 0.00358 mg/m³ (median) with the highest concentration at the sample point 6 (0.03161 mg/m³). MHA in the urine of all workers was 0.000100 g/g of creatinine (median). From the statistical results, there was no statistically significant relationship between xylene concentration and MHA ($p = 0,511$).

Conclusions: There was a positive linear correlation between xylene concentration in indoor air of workplace increased and the level of MHA in urine. It means the higher the xylene concentration, the more MHA level.

Keywords: xylene, methylhippuric acid (MHA), footwear worker, workplace, working environment

INTRODUCTION

One of the volatile chemical compounds is xylene which source from adhesives and paints. Its presence in the footwear industry has proved in several studies. Xylene was detected in indoor air in footwear workshop

in Pulogadung, Jakarta.¹ Similarly, the adhesive substance in footwear workshop in Cibaduyut, Bandung containing xylene solvent has found.² The types and brands of adhesives in Pulogadung and Cibaduyut with Ciomas did not vary as they have similar characteristics. In another medium, it also found in shoe polish products.³ Accordingly, footwear workers are vulnerable to the exposure of xylene while working in footwear workshops. The pattern of their work activities directly contacts with harmful solvents. It will cause health problems later on.

Xylene enters to the human body through inhalation, ingestion, and absorption. Every individual has the distinct reactions of exposure level due to the amount

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of concentration and duration of exposure.⁴ The effects of exposure to xylene are shortness of breath, impaired lung function, heart palpitations, chest pain, abnormal ECG, and possible kidney impairment.^{5,6} Other effects of short or long term of high concentration are affecting the central nervous system in the form of subjective symptoms of poisoning, headache, fatigue, short-term memory disorder, time response disorder, disorder in numerical ability, and alteration in equilibrium and body balance.^{5,7} Likewise, a case report in United Kingdom reported case of fatality in consequence of exposure to high concentration of xylene in painting industry.⁸ There was evidence that xylene generated oxidative stress and organelle damage in lymphocytes.⁹

Biological monitoring (biomonitoring) is a method used to assess the exposure level of the chemical agent by measuring the metabolite or reaction product in a tissue or body specimen. Xylene can be detected in the end-exhaled air (expiration), in blood, and urine in exposed individuals. However, urinary level of methylhippuric acid (MHA), a metabolism product of xylene, is far better to indicate an individual exposed to xylene than blood and exhaled air containing xylene.⁴ In a study in Iran, MHA in urine had a good correlation with xylene in the indoor air.¹⁰ Hence, MHA has recommended as a biomarker for monitoring workers who exposed to xylene.^{7,11} According to biological exposure index (BEI) of American Conference of Governmental Industrial Hygienists (ACGIH), the tolerable MHA is 1.5 g/g of creatinine.¹²

Until now, the use of the adhesive substance containing xylene solvent in the production process has still used because there is no a novel finding which can substitute existed material. Health problems, caused by exposure to xylene or other solvents, have not been a top priority to be addressed, especially in the informal sector. In fact, a vast range of studies has examined the health effects of xylene exposure and the magnitude of the risk. No matter how small the concentration of contaminants in the environment cumulatively can affect the health quality of workers and productivity of the footwear workshop. This study aimed to formulate risk control measures so that workers can work safely.

MATERIALS AND METHOD

This is a cross-sectional study and was carried out between September and October 2017. The sampling frame of the study was 68 workers from three footwear

workshops which registered in the Ciomas Puskesmas (public health center). The sampling method was drawn by purposive sampling since the sampling had similar characteristics or conditions. All participants retrieved from worker list of the workshops.

Inclusion criteria for footwear workshop workers were following this: at least working time was one year and 16 years old; working at the workshop to produce footwear; not in good health during collecting data. Exclusion criteria included employees who worked in their home and urinary volume less than 5mL. Informed consent was taken from the participants ensuring their confidentiality and anonymity before data collection starting. Participants were eligible only 40 workers according to sample criteria.

Xylene concentration in indoor air conducted in 9-point measurements of air sampling, 3 points in each workshop. The collection of air sampling was carried out in every workshop workspace consisting of: 1. workshop A: a. upper and sewing area (point 1); b. Pattern and finishing area (point 2); c. Lower and gluing area (point 3), 2. Workshop B: a. Lower rear corner area (point 4); b. Gluing and lower area (point 5); c. Sewing, paint and finishing area (point 6), 3. Workshop C: a. Pattern and packaging area (point 7); b. Sewing area (point 8); c. Gluing and lower area (point 9). The duration of air sampling was 20 minutes by using the solid sorbent tube. All samples transferred to analyze in Jakarta Hiperkes laboratory with gas chromatography (GC) and carried out according to The National Institute for Occupational Safety and Health (NIOSH) 1501 method.¹³ Every air and urine samples which collected from the workshops would label in alphabetical order.

The urine samples collected in a urinary pot plastic, the minimum volume of 5 mL, bagged and refrigerated at the temperature of 4°C before storage in which they were stable until four weeks.¹⁴ The determination of MHA and urinary creatinine carried out according to NIOSH 8301 method.¹⁵

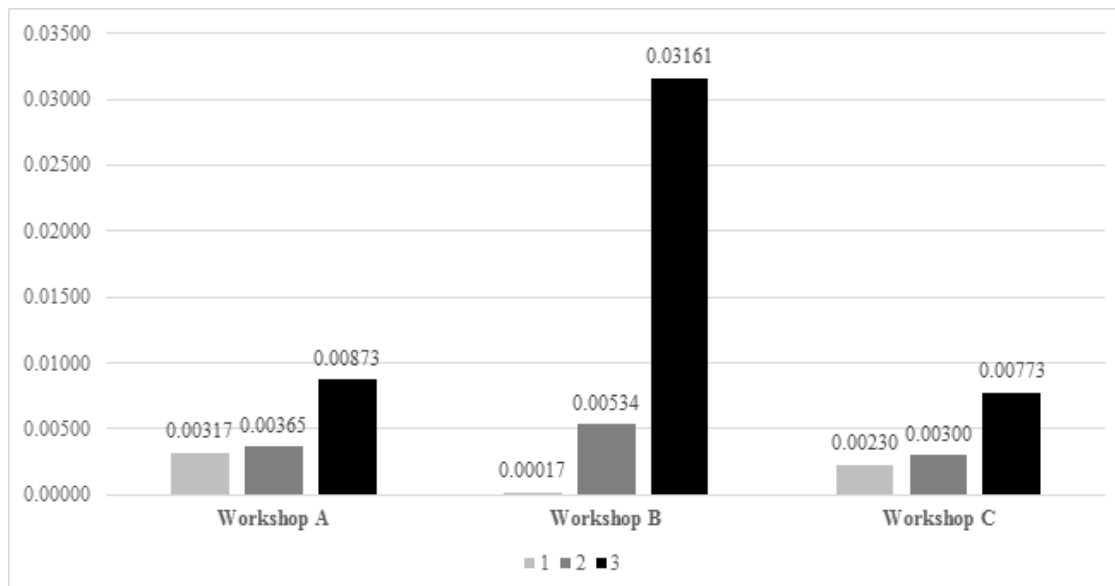
Data analysis used simple regression linear to analyze the association between xylene concentration and MHA in urine. All the data were collected at the end of working hours for the worker's urine and the xylene concentration during the production process.

FINDINGS

Commonly, the workshop buildings did not have

workspace dividers except in the 'C' workshop which separated by the concrete wall. Every workshop produced different footwear products from each other.

The 'A' workshop made casual shoes, the 'B' workshop made military boots and formal work shoes, and the 'C' workshop made women's shoes and sandals.



Graph 1. Xylene Concentration (mg/m³) Based on the Air Sampling Point in Three Workshops

The presence of xylene was detected in all workshops and the value did not exceed the threshold limit value (TLV) in Indonesia of 434 mg/m³ (Permenakertrans No. 13 of 2011 and SNI 19-0232-2005). The highest concentration of xylene was at the sampling point 3 (workshop B) of 0.03161 mg/m³ (graph 1). At this point, there were two main activities, painting and gluing. This process did not do in other workshops because of the different production process. Previous studies in Pulogadung (Jakarta) and Cibaduyut (Bandung) verified the presence of xylene in glue and exposed to workers through inhalation.^{1,2} Xylene in the paint is released through the evaporation process when spraying and the paint layer drying on the painted surface. Its presence, in paint besides adhesive, has been proven.^{3,16} In another study, xylene from paint confirmed in the workspace.^{17,18} Xylene in the paint is released through the evaporation process when spraying and the paint layer drying on the painted surface. Its presence, in paint besides adhesive, has been proven.^{3,16} In another study, xylene from paint confirmed in the workspace.^{17,18} Also, thinner

contained about 30-40% of xylene and mixed in the paint.¹⁴ Thus, the xylene concentration was higher than the other sampling points in this study because there were two sources, paints and adhesives.

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The average of MHA levels for all workers in the three workshops was 9.00E-05 g/g creatinine (table 1). The median value was 1.00E-04 g/g of creatinine. Workers in the workshop B had the highest average of value at 1.33E-04 g/g of creatinine compared with the worker in another workshop. Following that, the MHA level in the workshop A was 8.90E-05 g/g of creatinine. The lowest MHA level was workers in the workshop C at 6.80E-05 g/g of creatinine.

Table 1. The Distribution of Xylene (mg/m³) and MHA (g/g kreatinin)

Workshops	Mean	Median	SD	Min – Max	Skewness*
Xylene					
Workshop A	0.00518	0.00365	0.00364	0.00317 – 0.00873	1.376
Workshop B	0.01238	0.00534	0.01690	0.00017 – 0.03160	1.266
Workshop C	0.00434	0.00300	0.00295	0.00230 – 0.00773	1.327
Whole Workshop	0.00689	0.00358	0.00844	0.00017 – 0.03160	4.129
MHA					
Workshop A	8.90E-05	1.00E-04	8.20E-05	3.00E-06 – 3.00E-04	0.968
Workshop B	1.33E-04	1.00E-04	7.10E-05	1.00E-04 – 3.00E-04	1.404
Workshop C	6.80E-05	7.50E-05	3.40E-05	1.00E-05 – 1.00E-04	-0.728
Whole Workshop	9.00E-05	1.00E-04	6.50E-05	3.00E-06 – 3.00E-04	4.653

*) Skewness value $\leq -2 - 2$ (normal distribution)

Xylene is highly soluble in blood and body tissue and also rapidly biotransformation to be MHA with elimination half-times about 1 hour after exposure.¹⁹ As a result of xylene metabolism, MHA was excreted in urine between 1 – 2 hours after exposure or maximum 24 hours later.^{4,19,20} Its presence cannot be affected by variations of renal physiology, such as urinary pH, diuresis rate, and reabsorption.²¹ Compared with blood, MHA had a strong correlation with xylene exposure. Therefore, it is used for biomonitoring of exposure to xylene or an exposure biomarker.^{4,12} In some studies, both variables had the significant relationship.^{19,20,22–25} In the present study, the value of MHA levels in the urine of all workers was not to be exceeded the BEI value by ACGIH (1.5 g/g of creatinine). However, the highest MHA level was in the B workshop (air sampling point 6) and consistent with the highest xylene concentration.

The data of xylene concentration and MHA level had to transform using log 10 to normalize the distribution prior to analyzing. The correlation between xylene concentration and MHA level in urine showed very weak association ($r = 0,198$) and the pattern showed positive (table 2). It indicated that the higher the concentration of xylene in the air, the more MHA level in urine was excreted. The coefficient value of 0.011 which meant the regression line equation described 1.1% variation of MHA level. There was no statistically significant

relationship between xylene concentration and MHA level ($p = 0,511$).

However, the relationship depicted a positive linear correlation which meant the higher the xylene concentration, the more MHA level. Other factors can determine the urinary excretion of MHA level. According to Inoue et al. studies in China²⁴, smoking and drinking alcohol tend to affect or reduce levels of MHA in the urine. In their findings, after workers exposed to xylene at a concentration of 100 ppm (434 mg/m³), MHA levels in urine would be 1.137 g/g creatinine. This value was below the ACGIH BEI value of 1.5 g/g creatinine (xylene concentration 434 mg/m³) because of the interaction variable consuming alcohol and smoking. Also, the level will vary from day to day and depends on the length of exposure times.²⁵

Table 2. Correlation between Xylene and MHA

Variable	R	R ²	The Regression Line	P Value
Xylene (log ₁₀)	0,198	0,011	Y = -3,994 + 0,076 X	0,511

CONCLUSIONS

This study presented the biomonitoring of

xylene exposure to the worker. As shown, MHA was no statistically significant relationship with xylene concentration in the workshop air. However, the direction of the relationship between these variables can be concluded that MHA level in urine will increase when xylene concentration increase. It is advisable to interested parties in the informal footwear industry to promote occupational safety and health in the workplace. Also, regular health monitoring should be undertaken to control the health effect of xylene exposure. The effect cumulatively after prolongation and continuous exposure will arise.

Conflict of Interest: The absence of a relationship between the researcher and the subject causes no potential conflict of interest in this study.

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Ethical Clearance: This study received ethical clearance from the Commission of Ethic, Research, and Community Service, Faculty of Public Health of University of Indonesia number 476/UN2.F10/PPM.00.02/2017 on August 21, 2017.

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The Analysis of Risk Factors against Malaria in the Tangkiling Public Health Center, Bukit Batu District, Palangka Raya City, Indonesia

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ABSTRACT

Malaria is an infectious disease that is a global concern. This disease is still a public health problem because it has a broad impact on quality of life and economy and is possible as an emerging and re-emerging disease. Some risk factors that support as a chain of transmission that can cause the characteristics, behavior and physical environment of the house and the environment outside the house where the community lives. The purpose of this study was to determine the relationship of characteristics, behavior, physical environment and outside the home with the incidence of malaria. The study design used was case control with a retrospective approach with 60 case group and control subjects who did not suffer from malaria. Data analysis used Chi-Square with calculation of Odds Ratio and logistic regression. The study shows risk factors associated with the incidence of Malaria were age (p: 0.001), Gender (p: 0.000), Employment (p: 0.000), while unrelated risk factors were education (p: <0.05, OR 1.3; 95% CI: 0.3-4.9) physical home (p: >0.05, OR 1.2; 95% CI: 0.5-2.4), home environment (p: >0.05, OR 1.1; 95% CI: 0.5-2.6), Behavior (p: >0.05, OR 1.3; 95% CI: 0.64-2.68). The conclusion are age, gender, occupation and behavior have a malaria risk of 13%.

Keywords: *malaria, characteristics, home environment, behavior*

INTRODUCTION

Malaria is still a public health problem because it has a broad impact on the quality of life and the economy, and is possible as an emerging and re-emerging disease due to import cases and vectors that can spread Malaria. Malaria can affect the mortality and morbidity of infants, toddlers and childbirth and can reduce the productivity of human resources. The malaria morbidity rate nationally or API is still 1.69% slightly decreased compared to 2011 (1.75%). Furthermore, from 33 provinces that exist, there are still 14 provinces in Indonesia with the category of medium and high endemicity areas, while the number of malaria endemic districts is 149 of the 513

districts/cities that exist. Central Kalimantan is one of 14 provinces, with moderate levels of endemicity. In 2012 morbidity of malaria or malaria API recorded 3.39% and is seen to decline in 2013 with a figure of 2.35%.¹

The city of Palangka Raya includes malaria endemic areas in Central Kalimantan Province. The activities that have been carried out by Malaria Mitigation and Management Program in Palangka Raya City Health Office in controlling malaria include: MBS (Mass Blood Survey), distribution of LLNs (Long lasting Insecticidal Nets), home contact (surveillance). The number of cases in the past three years namely 2012-2014 tends to decrease, where in 2012: 1,102 cases (API = 5% compared to 2013: 568 cases (API = 3%) and in 2014 became API approximately 2. Selanjutnya. division of service area of work then Tangkiling Public Health Center with the highest contribution from 10 Public Health Center in Palangka Raya City against malaria morbidity rate with API 6 “in 2012 and API 3” in 2013.¹ This API number is still higher than Public Health Center of Sekupang (0.3%), Tanjung Sekupang (0.2%), Sei Pancur (0.2%) Batam City.² Tangkiling health center when viewed from

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topography conditions and the condition of the area including lowlands and peat soils that are almost flooded for the whole year, coupled with sewage / ditch disposal systems that have not been well organized.

This study took place in the Tangkiling Public Health Center in Bukit Batu Sub-district, Palangka Raya City, with consideration that malaria cases in the area were still high and in residential areas there were forest and scrub areas that allowed high malaria transmission, besides malaria was an infectious disease caused by infection protozoa from the genus plasmodium which are at high risk of death with a relatively fast transmission process.⁴

MATERIALS AND METHOD

This type of research is observational using retrospective study method with the approach of case control studies. The case population in this study were all residents in the work area of the Tangkiling Public Health Center in Bukit Batu Subdistrict, Palangka Raya City, which suffered from malaria which was positive (+) reported to Palangka Raya City Health Office, 2014-2016 period. The control population in this study were all residents of the Tangkiling Public Health Center in Bukit Batu sub-district, Palangka Raya City, who did not suffer from malaria but came to the public health center with complaints of other diseases or showed symptoms of fever, dizziness, vomiting and after being tested for negative (-) malaria.

FINDINGS

Table 1. Proportion of Case and Control Patients according to Risk Factors,

Tangkiling District, Palangkaraya, 2014-2016 (n = 60)

Variable	Case		Control		Total		P value	OR	95% CI
	n	%	n	%	n				
Level of education									
Elementary school	5	8.3	5	8.3	10	8.3	0.408	1	0.2-2.9
Secondary school	29	48.3	22	36.7	51	42.5		1.3	0.3-4.9
High school	26	43.3	33	55	59	49.2		1 *	-
Age (years)									
<21	16	26.7	2	3.3	18	15	0.001*	1 *	-
21-54	40	66.7	48	80	88	73.3		9.6	2 - 44.3
> 54	4	6.7	10	16.7	14	11.7		20	3.1 - 130.1
Work									
Office workers	10	16.7	27	45.0	37	30.8	0.000*	15.1	4.6 - 50.0
Farmer-fisherman	22	36.7	28	46.7	50	41.7		7.1	2.4 - 21.5
Student-household	28	46.7	5	8.3	33	27.5		1 *	-
Gender									
Male	37	61.7	56	93.3	93	77.5	0.000*	8.7	2.8 - 27.2
Female	23	38.3	4	6.7	27	22.5			
Behavior									
Good	32	53.3	28	46.7	60	50	0.465	1.3	0.64 - 2.68
Not good	28	46.7	32	53.3	60	50			
Physical in the house									
Healthy	39	65	37	61.7	76	63.3	0.705	1.2	0.5 - 2.4
Not healthy	21	35	23	38.3	44	36.7			
Physical outdoors									
Healthy	47	78.3	46	76.7	93	77.5	0.827	1.1	0.5 - 2.6
Not healthy	13	21.7	14	23.3	27	22.5			

Notes:

* Referens (using simple logistic regression test)

Test using Chi-Square (χ^2)

Table 2. Logistic Regression Analysis of Relationship between Age, Job, and Variables Gender with Malaria Events, in Tangkiling, 2014 - 2016 (n = 120)

Variabel	Model 1	Model 2
	OR	OR
	95% CI	95% CI
Age		
<21 years	1	1
21-54 years	12.3 (1.2-123.7)	11.4 (2.4-54.7)
> 54 years	19.76 (1.5-255.4)	17.5 (2.6-119.6)
Work		
Office workers	0.7 (0.06-7.91)	-
Farmer-fisherman	1.5 (0.13-17.2)	-
Student-household	1	-
Gender		
Male	9 (0.9-99.8)	9.3 (2.9-30.0)
Female		
N	60	60
R ²	0.326	0.326
-2loglikelihood	132.6	132.6

Based on the logistic regression above, when the variable job was attempted to be issued there was a change in the odds ratio reach 11%. If the change in the odds ratio > 10% then the variable is re-entered into the regression equation. So, in this study that affects the incidence of malaria is the variable age, occupation and gender.

DISCUSSION

The relationship between the characteristics of respondents with the incidence of malaria

Age is a unit of time that measures the time of existence of an object or creature, both living and dead, for example the age of a human being is said to be measured fifteen years from the time he was born until the time of the count was calculated. By this age is measured from attraction only born so that the attraction of the event begins as long as the date (present).³ The results of the study found that respondents aged > 54 years were at risk of getting malaria by 20 times compared to respondents aged <21 years (OR = 20; 95%: 3.1-130.1). This risk is supported by the results of a simple logistic regression statistical test that gets a P value = 0.001 (P value <0.05).

Gender is the difference between women and men biologically since birth. Risk factors for female characteristics (gender) have a risk of getting malaria by 8.7 times compared to male sex. The P value obtained from the statistical test is 0,000 (P value <0.05) which means there is a difference in the proportion of malaria events between male and female.

Education is an effort to develop personality and abilities inside and outside the school and last a lifetime. Based on a simple logistic regression statistical test, it shows a similar condition, namely P value > 0.05, meaning that there is no difference in malaria incidence based on the respondent's education level (P value = 0.408). Despite, respondents had junior high school education, the risk for malaria was 1.3 times compared to those with high school and higher education (OR 1.3; 95% CI 0.3-4.9). In general, someone who has more higher education will usually find it easier to understand information about something including information about malaria because he can read. This is because the information that is available is more found in the media, leaflets and counseling from officers. Education influences the learning process, the higher one's education the easier it is for the person to receive

information. With higher education one will tend to get information, both from other people and the mass media. Knowledge is very closely related to education where it is expected that someone with higher education, then the person will also be more knowledgeable. But it needs to be emphasized that a person with low education does not mean absolute low knowledge. Increased knowledge is not absolutely obtained from formal education, but can also be obtained from non-formal education.

Work is an activity or activity of a person to earn income for his daily life needs. Long work is an individual experience that will determine growth in work. Work in a broad sense is the main activity carried out by humans. In a narrow sense Job terms are used for a task or work that makes money for someone. Characteristic factors (jobs) that were fishermen and farmers had 7.1 times the risk of contracting malaria *diba n dingkan* with students and household (OR = 7.1; 95% CI: 2.4 to 21.5). Based on statistical tests obtained P value = 0,000 (P value <0.05). Work related to the incidence of DHF. There are 58.8% of sufferers in Donggala are those who do activities outside the house at night. The work as a peasant farmer causes them to stay in the forest until the afternoon, even though they rarely stay there for a few days or weeks to farm, while they become fishermen laborers must start fishing from the afternoon until the dawn is in the open lake, the river in the fish auction this condition gives a big risk to be bitten by mosquitoes, including *Anopheles Sp.*⁵

The relationship between physical environmental factors of the house and the incidence of malaria

Socio-culture also affects the incidence of malaria, such as: the habit of going out late into the night, where the vector is exophilic and exophagic will facilitate contact with mosquitoes. The level of public awareness about the dangers of malaria will affect the willingness of the community to eradicate malaria such as environmental sanitation, using mosquito nets, installing wire netting on the house and using insect repellent.

The results of the analysis that the home environmental factors obtained values (OR: 1.2; 95% CI: 0.5-2.4). This was supported from a statistical test which states that there is no relationship between the physical environment of the house and the incidence of malaria (P value > 0.05).

The relationship between environmental factors

outside the home and the incidence of malaria

Environmental conditions have a major effect on the presence or absence of malaria in an area. The presence of freshwater lakes, rainwater pools, rice fields, forest clearing, fish ponds and mining in an area will increase the likelihood of malaria, because the place is a breeding place for malaria mosquitoes, temperature and rainfall are also important.⁶ The results found that the state of the physical environment outside the home also showed no significant difference (OR = 1.1; 95% CI: 0.5-2.6). This is supported by a statistical test which states that there is no relationship between the physical environment outside the home and the incidence of malaria (P value > 0.05).

There is a significant relationship with the incidence of malaria p: <0.005 (use of gauze and type of house) with the incidence of Malaria in the area of Sarmi City Public Health Center Sarmi Regency. The analysis of risk factors for malaria in Bengkulu which states that ventilation using gauze, the habit of using mosquito nets, the use of mosquito repellent affects the incidence of malaria. Some factual reasons, why there is no relationship between the physical factors of the house, according to information from the person in charge of Malria Tangkiling Public Health Center that some malaria cases were found were infort cases (malaria because of working as sawait plantation laborers, traditional community mining) when they were sick home Tangkiling Public Health Center. Various human activities such as dam building, road building, mining and the construction of new settlements/transmigration often result in environmental changes that benefit malaria transmission.⁶

The relationship between behavioral factors and the incidence of malaria

Behavior is a response or reaction to a person's stimulus (external stimuli). This behavior occurs through the process of a stimulus to the organism and then the organism responds. Health behavior is a person's response (organism) to a stimulus or object related to illness and disease, health care system, food, and drink and the environment. Based on statistical analysis that behavioral variables obtained OR value 1.3 means that respondents who have poor behavior are more at risk of being exposed to 1.3 times compared to respondents have good grades, but this risk is not supported by

statistical tests which state that there is no relationship between behavioral factors with Malaria incidence is $P = 0.465$ ($P > 0.005$). Another reason was due to malaria control activities at the Tangkiling Public Health Center since 2013 such as: Mass Blood Survey, Long Lasting Insecticidal Distribution (LLINs) in bulk together with routine MCH and Immunization activities, housing contracts through a positive Malaria survey, so that health behaviors can be accepted by the community. The risk of malaria can occur because of the poor habits and attitudes of the community is a supporting factor in the spread and facilitate the occurrence of malaria such as the habit of being outdoors at night, sleeping habits do not use anti-mosquito drugs during sleep.

CONCLUSION

The results of the study showed risk factors related to the incidence of malaria, namely age ($p: 0.001$), gender ($p: 0.000$), occupation ($p: 0.000$), while unrelated risk factors were education ($p: >0.05$; OR 1.3; 95% CI 0.3-4.9), physical home ($p > 0.05$; OR 1.2; 95% CI: 0.5-2.4), home environment ($p > 0.05$; OR = 1.1; 95% CI: 0.5-2.6), Behavior ($p > 0.05$, OR = 1.3; 95% CI: 0.64-2.68).

Ethical Clearance: Before conducting the data retrieval, the researchers conducted a decent test of ethics conducted at the Polytechnic of Health, Ministry of Health, Republic of Indonesia, Palangka Raya to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to

continue. The feasibility of the research was conducted in an effort to protect the human rights and security of research subjects.

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Conflict of Interest: The authors declare that they have no conflict interests.

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Correlation between Micronutrient intake and Hemoglobin Preconception Women

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ABSTRACT

The preconception period is the time to prepare for pregnancy, and it is prone to anemia. While iron deficiency is considered the main cause of nutritional anemia, changes in vitamin B6, vitamin B12, folic acid and zinc status are also associated with the formation and hemoglobin levels. This study aims to determine the relationship between intake of iron, vitamin B6, vitamin B12, folic acid and zinc with hemoglobin levels in preconception women in Banggai Regency from October 2016 to April 2017. This study was cross-sectional study design. Using data from a 24-hour food recall assessment, measuring the daily intake for each respondent of 132 preconception women in three sub-districts in Banggai Regency. Micronutrient intake was obtained by comparing nutritional intake with the table of the Nutrient Adequacy Rate (NAR) 2013. Hemoglobin levels were measured by the *cyanmethaemoglobin* method. The result of this study, the proportion of RDA is below-estimated average needs. As a result, the average hemoglobin level was 12.67 ± 1.24 g/dl. There were 20% anemia, from anemia respondents suffering from mild anemia (16%) and moderate anemia (4%). With the Pearson correlation test, there was no significant relationship between iron ($r=0.056$), vitamin B6 ($r=0.06$), vitamin B12 ($r=0.085$), folic acid ($r=0.062$) and zinc intake with hemoglobin levels. In conclusion, the most preconception women are still at risk of lacking micronutrients such as iron, zinc, folate, vitamin B12, and vitamin B6. Prenatal counseling about the importance of nutrition for the health of pregnant women and their babies are needed.

Keywords: *preconception women, micronutrient intake*

INTRODUCTION

Globally, around 32 million pregnant women and 273 million children under five suffer from anemia in Southeast Asia, the burden of anemia is very high and more than 1 in 4 women suffer from anemia during pregnancy. The causes of anemia vary, but iron deficiency has been identified as the most common and has been associated with an increased risk of maternal and perinatal death and poor birth outcomes¹.

Banggai Regency in Central Sulawesi Province, Indonesia has a high prevalence of anemia of 36.6% in women² compared to the prevalence of anemia on the national scale recently 22.7%³ prevalence rate anemia is higher in Banggai Regency. The study was conducted in three sub-districts, namely Luwuk, North Luwuk and South Luwuk sub-districts in Banggai Regency, to determine the prevalence of anemia in preconception

women. Anemia has been associated with poor health outcomes such as cognitive impairment, reduced work capacity, increased maternal morbidity and mortality, low birth weight, and increased fetal and neonatal mortality.

Anemia is a wide public health problem associated with an increased risk of morbidity and mortality. Among many factors, good nutrition (such as vitamins and mineral deficiencies), non-nutrients (such as infections and *hamoglobinopathies*, blood loss, and metabolic disorders) that contribute to the onset of anemia^{4,5}. Although iron deficiency is a major cause of anemia, especially in women of reproductive age, anemia can also be caused by a lack of folic acid, vitamin B12, vitamin B6 and zinc status is also associated with the development and control of heme formation⁵. The point of determining *hemoglobin* for the diagnosis of anemia

in women of reproductive age <12 g / dl.

In the human body iron deficiency is very common as the most common cause of anemia throughout the world. To better understand iron deficiency anemia, for the production of erythrocytes requires iron. Need a large amount of strong iron for erythrocytes and its precursors, further for the production of hemoglobin and heme. Iron is very important for the structure and function of hemoglobin⁶.

The prevalence of anemia is still highly influenced by micronutrient deficiency as one of the factors in heme synthesis in the body. Vitamin B6 deficiency can block the initial enzymatic steps of heme synthesis and use of iron in *erythropoietic* cells. Vitamin B6 deficiency of the aminolevulinate synthase enzyme can cause iron refractory⁷. This study aims to determine the relationship between micronutrient intake and hemoglobin levels in preconception women.

MATERIAL AND METHOD

This research was conducted in Banggai Regency in 3 sub-districts; Luwuk, North Luwuk and South Luwuk from October 2016 to April 2017. This research was an observational study with cross-sectional design. The study population consisted of 132 pre-conception women who were included in the inclusion criteria, aged between 18-35 years, had never been pregnant and did not suffer from an infectious disease. The research population has been registered to be married at the Office of Religious Affairs (ORA) of Banggai Regency, Central Sulawesi. Mothers come to sign an informed consent, are willing to take part in the research, and attend the recruitment process. The research data used a questionnaire which included the average intake of micronutrients for iron, folate, vitamin B6, vitamin B12, zinc and Hb examination as primary data.

The research data was obtained from the study population who entered the inclusion criteria by interviewing using a questionnaire. Data collection on the average intake of micronutrients (iron, folate, vitamin B6, vitamin B12, zinc) using in-depth interview methods for daily food consumption, 24-hour recall of food, namely quantitative methods of food consumption surveys that can provide information about food and drinks consumed by the subject for 24 hours. The 24-hour Food Recall method is used to assess the consumption of food eaten and drunk for the past 24

hours, since waking up yesterday morning to sleep at night, a 24-hour recall should be done repeatedly and not consecutive days. Food consumption intake data can represent respondents' eating habits.

The respondents' micronutrient intake data were then processed using Nutrisurvey software, compared to the adequacy of micronutrient consumption based on the table of NAR 2013. The NAR is a reference for nutritional intake for Indonesia aimed at knowing the right daily nutritional intake for individuals in Indonesia. To see the level of adequacy of micronutrients respondents used two categories of inadequate if <77% NAR and adequate if $\geq 77\%$ NAR⁸. The next step is measuring the hemoglobin level of the subject using the cyanmethemoglobin method.

Research data is processed and analyzed statistically. Univariate analysis was carried out by entering data and then explained the mean and standard intake of iron, zinc, folate, vitamin B6, vitamin B12, *hemoglobin* levels in preconception women. The relationship of each intake of micronutrients with Hb levels was analyzed using bivariate Pearson correlation test analysis.

RESULTS

Data obtained from the results of the study showed that some respondents did not suffer from anemia by 80% with an average hemoglobin level of 12.67 ± 1.24 g/dl. A total of 27 respondents (20%) suffered from anemia, and most of the anemia respondents had mild anemia of 77.8% while moderate anemia was 22.2% (Table 1).

Table 1: Distribution of hemoglobin levels of respondents

Category	n	%
Anemia (Hb<12g/dl)	27	20
Non Anemia (Hb>12g/dl)	105	80
Total	132	100

Table 2 shows the mean intake of micronutrients among study participants. There is no correlation between micronutrient intake and haemoglobin level of the respondents. However, Vitamin B12 shows the highest adequacy levels while folic acid is the lowest.

Table 2: Average intake of micronutrients and respondents, and the results of the correlation with hemoglobin levels

Variable	Mean \pm SD	Min	Max	Adequacy Levels (%)	p
Fe	6.29 \pm 4.2	1.98	24.39	48.38	0.52
Vit B6	0.92 \pm 0.38	0.38	2.63	70.76	0.49
Vit B12	2.92 \pm 2.18	0.10	2.91	121.66	0.33
Folic Acid	97.80 \pm 48.18	22.0	283.30	24.25	0.48
Zinc	6.04 \pm 2.61	2.12	19.85	46.46	0.99
Hb level	12.68 \pm 1.24	7.3	15.9		

DISCUSSION

Women of childbearing age have low iron reserves, so women tend to be more vulnerable to iron deficiency when iron intake is reduced or when demand increases. If the intake of too little food contains iron and iron in the consumption of low bioavailability and iron reserves in the body are used continuously to meet the required iron requirements, the stored iron will be depleted and the body will be deficient in iron⁹.

The form of iron consumed and other constituents in food greatly affect the absorption of iron. Iron derived from plant products is often consumed, while iron with bioavailable higher in heme iron is often consumed in small amounts. Non-heme iron is often poorly absorbed¹⁰. Haem iron can be obtained about 40% iron in meat, fish, poultry and is well absorbed by the body, about 60% of iron is obtained from animal tissues (liver). Iron from plants (fruits, vegetables, grains, beans) non haem iron forms is relatively difficult to absorb. The average iron intake of respondents is still less than the recommended NAR and the level of adequacy is adequate, reaching only 48.38%. After being processed using Nutrisurvey software, it turns out that the consumption deficit of iron, so that the process of hemoglobin synthesis still uses iron reserves in the body. The 24-hour recall results stated the lack of iron consumption in respondents because the majority of iron sources were obtained from non-haem iron, namely vegetables, fruits, cereals (rice, corn) and consumption of haem iron from fish and ungags. The average consumption of iron negatively correlates with hemoglobin levels. Respondents who were not anemic, the consumption of iron deficit and the possibility of respondents still having iron stores of ferritin in the liver

for hemoglobin synthesis.

The results showed that the average intake of vitamin B6 from respondents was insufficient, still less than the recommended NAR and only reached 70.76% (<77% NAR). 24-hour recall analysis showed that vitamin B6 intake on average was lower, and consumption of vitamin B6 did not correlate significantly with hemoglobin. Vitamin B6 deficiency can block the enzymatic steps of initial heme synthesis and use of iron in erythropoietic cells. Vitamin B6 deficiency of the aminolevulinate synthase enzyme can cause iron refractory Vitamin B6 acts as an enzyme cofactor in the process of heme biosynthesis. This vitamin must be sufficient for hemoglobin synthesis so that the heme formation process runs well, when its availability in the body is low it will interfere with globin synthesis and is not available for erythropoiesis⁷.

The average intake of vitamin B12 respondents was good, and reached 121.66%. The results of a 24-hour recall show that the food source of vitamin B12 consumed by respondents is eggs, fish, and poultry. Further analysis showed that vitamin B12 intake did not correlate significantly. Although vitamin B12 intake is good, but it does not directly increase hemoglobin levels, because micronutrients interact with each other to increase hemoglobin levels. Vitamin B12 plays a role in various metabolic as a coenzyme. Vitamin B12 (cobalamin), the active form of cobalamin as methylcobalamin, coenzyme synthase methionine, an enzyme involved in the synthesis of methionine and tetrahydrofolate from methyl tetrahydrofolate and homocystein. This is where the folate and cobalamin (vitamin B12) metabolic pathways meet and are called

“folate traps” Cobalamin deficiency is usually caused by poor absorption of folate in the digestive tract¹¹.

Food sources rich in folate are wheat germ, yeast, innards (especially liver), cereals, and leafy vegetables. The folate content in food will decrease significantly when it takes too long to cook vegetables. Folate is a sensitive molecule that can be degraded by heat and oxidation. This is what causes folate deficiency to occur¹². Lack of consumption of folate by respondents. Because of the lack of sources of food consumption of folic acid from respondents such as liver, and meat, which is not a habit of the respondent’s diet. The results of 24-hour recall, the average intake of folate respondents was inadequate, still less than the recommended and only reached 24.25% (<77% NAR). Analysis showed that folate intake did not correlate significantly with hemoglobin NAR. Because folic acid is not biochemically active, folate is converted to tetrahydrofolate acid and methyltetrahydrofolate. This form of folic acid is transported by receptor-mediated endocytosis in cells to maintain normal erythropoiesis. Lack of folate and cobalamin (vitamin B12) ultimately causes thymidylate deficiency. DNA contains 2 pyrimidine bases (thymine and cytosine) and 2 purine bases (adenine and guanine). When thymidylate or thymine is deficient in position in the strand the DNA will be replaced by uracil. When uracil units in the structure of DNA, repair enzymes know and try to repair DNA. If it fails to repair DNA abnormal DNA synthesis or apoptosis will occur, which will cause erythropoiesis to be ineffective¹¹.

Foods that contain lots of zinc come from animals, especially meat. Other foods rich in zinc are legumes, whole grains, nuts, and seeds. Heme formation can be disrupted if the body suffers from zinc deficiency and this usually occurs due to insufficient need for zinc¹³. The average zinc consumption of respondents was less than the recommended NAR and the level of adequacy was inadequate because it only reached 46.46% (NAR <77%). The results of the 24-hour recall analysis showed that respondents consumed fish, poultry and peanut groups as sources of zinc food. Zinc intake did not correlate significantly with hemoglobin. Zinc is involved in the synthesis of hemoglobin through the activity of zinc-dependent enzyme systems, namely aminolevulinic acid dehydrase which plays a role in heme synthesis, which occurs in the cytosol cell¹⁴.

CONCLUSION

Preconception mothers are mostly at risk of lacking micronutrients such as iron, zinc, *folate*, vitamin B12, and vitamin B6 which can interfere with the formation of hemoglobin. Understanding the importance of nutrition is needed, through prenatal counseling about the importance of nutrition for the health of pregnant women and their babies.

Ethical Clearance: This study received ethical approval from Ethical Committee, Faculty of Medicine, Hasanuddin University.

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Antibiotic Susceptibility Profile and Molecular Characterization of Quinolones Resistant *Klebsiella pneumoniae* Isolates: First Report from Iraq

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ABSTRACT

Background: In recent years enormous use of quinolones leads to increasing resistance towards multiple antimicrobial agents, by various pathogens in different geographical regions with the varying rate.

Objective: In this study, we report the antibiotic susceptibility profile and molecular characterization of Quinolones resistant *Klebsiella pneumoniae* isolates originated from Iraq province.

Methodology: *Klebsiella pneumoniae* isolates grown from various clinical sources were phenotypically confirmed by a pool of biochemical tests and reconfirmed using gene sequence of *rpo* housekeeping gene. Antibiotic susceptibility biogram was carried by disc diffusion agar method, quinolones resistant isolates were subjected to ciprofloxacin MIC testing and cartwheel method was used to determine the screening efflux pump activity in resistant isolates. All resistant isolates were subjected to molecular screening to detect resistance genes *gyrA*, *parC*, *qepA*, *qnrB*, *qnrS* and *aac(6)Ib*.

Results: Forty-three *K. pneumoniae* isolated were identified by biochemical testing and confirmed by *rpo* gene sequence. Antibiotic susceptibility results showed a high rate of resistance to Ceftriaxone, gentamicin ciprofloxacin, and Levofloxacin antibiotics. Ciprofloxacin MIC results revealed 96.1% isolates had value above 256 µg/ml. Ciprofloxacin mixed with EtBr at various concentrations resulted in a decrease of MIC. Genetic detection revealed the predominance of *gyrA* and *aac(6)Ib* gene. The phylogenetic trees showed the high clonal diversity among isolates.

Conclusion: The high percentage of resistance towards different types of antibiotics including fluoroquinolones is considered to be problematic for public health and represents a serious challenge to infectious disease specialists worldwide.

Keyword: MDR *K. pneumoniae*; quinolones resistance gene; PMQR; cartwheel test.

INTRODUCTION

Antimicrobial agents' quinolones prescribed as the best treatment for community and hospitals acquired infections¹ including multidrug-resistant Gram-negative bacteria such as *Klebsiella pneumoniae* which is a

member of the notorious "ESKAPE" group organism^{2,3}. Quinolone is one of most used and effective antibiotic for the treatment of multidrug-resistant bacteria which has broad-spectrum antimicrobial activity. *K. pneumoniae* resists antibiotic action through several mechanisms which includes drug inactivation, target alteration, increased efflux pump activity and decreased cell permeability¹. Resistance to quinolones is mediated by mutation occurred in chromosomal genes encoding to DNA gyrase and/or topoisomerase IV additional to mutation occurred in regulatory genes that regulate efflux pumps activity⁴, otherwise, resistance to quinolones

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occurred in bacteria basically by a chromosomal mutation in *parC* and *gyrA* genes of QRDR region^{3,5}.

The previous assumption was that quinolones resistance is due to bacterial chromosomal mutations. It was later in 1998 they described plasmid-mediated genes in *K. pneumoniae*, named *qnr* which encodes pentapeptide repeat family plays role in binding and protecting DNA gyrase and topoisomerase IV from the repression of ciprofloxacin^{4,6,7}. Later four major groups *qnr* genes *qnrA*, *qnrB*, *qnrC* and *qnrS*, were identified together with two plasmid-mediated quinolones resistance (PMQR) genes *aac(6')-Ib-cr* and *qepA* encodes various aminoglycoside transferases that modify ciprofloxacin to facilitate an efflux pump protein⁸. Bifunctional acetyltransferase protein is coded by *aac(6')-Ib-cr* acetylate amino nitrogen in piperazine of fluoroquinolones such as norfloxacin, ciprofloxacin, and aminoglycoside such as amikacin and kanamycin⁹. This gene commonly exists in the multi-resistance plasmid as a cassette in integron, and may also have other PMQR genes additional to ESBL CTX-M-15^{7,10,11}. Hydrophilic fluoroquinolones such as norfloxacin and ciprofloxacin can be decreased by plasmid-mediated efflux pump *QepA* which is the major group of facilitator family, exist in plasmid encoding to aminoglycoside ribosomal methylase *rmtB*^{12,13,14}. Increasing prevalence of PMQR have been reported worldwide in clinical isolates of *K. pneumoniae*, however, there is no report evaluating the quinolone resistance epidemiology in Iraq. This would be the first study where we characterized predominant of quinolones resistant gene in the capital of Iraq (Baghdad city).

MATERIAL & METHOD

Isolation & identification of *K. pneumoniae*:

Forty-three bacterial isolates from *Klebsiella pneumoniae* were collected between June and December 2016. These isolates were obtained from patients attending medical care services in Baghdad hospitals, Medical city hospital, Ibn Balady hospital, Al-Zahra hospital and Al-Yarmok hospital in Baghdad city. Bacterial species identification was based on the morphological and biochemical test, followed by using *rpo* gene sequence analysis. The sequence of oligonucleotides of *rpoB* gene specific design for this study as listed in the table (1).

Antimicrobial susceptibility test and Minimum

inhibitory concentration (MIC) for ciprofloxacin

Susceptibility to various antimicrobial agents was performed using the disk diffusion method and Mueller-Hinton agar according to the CLSI guidelines¹⁵. MIC was performed against all 27 resistance isolates according to the CLSI¹⁵ criteria following a standard agar dilution method started with 1024µg/ml and applied two serial dilutions. *Escherichia coli* ATCC 25922 was used as quality stander strain (Central Public Health Laboratory, Baghdad).

Efflux pump detection-cartwheel method (screening method)

Phenotypic detection of Efflux Pumps mechanism was performed by EtBr-agar cartwheel (EtBrCW) method in MHR agar plates using Ciprofloxacin and EtBr stain¹⁶. EtBrCW was done by EtBr stain at various concentration (5, 10,15,20,25 µl/ml) on MHA agar plates containing ciprofloxacin ranging from 16 to 1024 µg / ml which prepared on the same day for the experiment. The minimum concentration of EB that produced fluorescence of the bacterial mass was recorded¹⁷. In the study, we used *Escherichia coli* ATCC 25922 strains as negative controls.

Genotypic analysis: Quinolones resistance genes detection

The DNA extraction was performed for all isolates according to genomic extraction kit following Manufacture instruction (wizbio/ Korea). All the isolates were subjected to molecular screening by PCR amplification technique to detect Quinolone Resistance genes, Different primers were used as listed in (table 1), PCR products were sent for sequencing, which was carried out by Macrogen DNA Sequencing (Seoul, Korea) and compared with NCBI (<https://www.ncbi.nlm.nih.gov/>).

RESULTS

Isolation & identification

The isolates were collected from various clinical samples such as wound infection (n=13), bloodstream infection (n=8), urinary tract infection (n=8), burn (n=5), ear (n=4), sputum (n=3), and one each from the fluid, and bronchial infection. All the isolates were confirmed as *K. pneumoniae* by phenotypic identification using a set of biochemical test, followed by the Vitek 2 system,

then re-confirmed by gene sequence analysis of *rpoB* gene (β -subunit of RNA polymerase).

Antibiotic susceptibility test

The resistance pattern differs from being highly resistant to CRO 86.04% (37/43), followed by GM (69.7%; 30/43), CIP & LEV (60.4%; 26/43). Isolates showed moderated resistance to AUG & NOR & FOX (55.8%; 24/43), IMI (53.4%; 23/43) and AK (48.8%; 21/43) as compared ATH (44.1%; 19/43).

The results of the MIC test showed that n all isolates were completely resistant to Ciprofloxacin with MI(C higher than 16 $\mu\text{g/ml}$. , while 25/ 27(96.1%) of isolates had MIC above 256 $\mu\text{g/ml}$, 23/27 (83.4%) of isolates showed 512 $\mu\text{g/ml}$ and 9/27 (34.6%) of isolates showed 1024 $\mu\text{g/ml}$ of MIC to Ciprofloxacin alone. While, when we mixed Ciprofloxacin with Ethidium bromide (EtBr) for detection in efflux pump by agar cartwheel method (screening method) the results showed a decrease in resistance rates. The study isolates showed 100% resistance to at 16, 32 and 64 $\mu\text{g/ml}$ of EtBr, while decrees to 92.3% (24/ 27) when used with 128 and 256 $\mu\text{g/ml}$ with EtBr. Resistant was further decreased to

69.2% (18/ 27) in 512 $\mu\text{g/ml}$ of EtBr. With the use of 1024 $\mu\text{g/ml}$ EtBr, this resistant was seen only in 19.2% (5/ 27) isolates. **Figure 2** showed the accumulation of fluorescent chromophore by efflux pump activity of isolates, furthermore, table (2) showed the distribution of efflux activity with a verity concentration of EtBr (Table 3).

Results of Genetics detection for antibiotics resistance genes revealed that 27 isolates harbor more than one mechanism of resistance to quinolones and modification enzymes in aminoglycosides. The most predominance genes was *aac(6)-Ib* gene 25(92.5%), followed by *parC* gene 20/27 (74.1%), *gyrA* gene 18/27 (66.6%), and *qnrB* gene 14/27 (51.8%), while show low percentage predominance of *qepA* gene 11/ 27(40.7%) and *qnrS* gene 10 (37.03%) was also observed. Table (2) illustrates the distribution of the resistance gene among *K. pneumonia* (27/43) isolates. The phylogenetic tree was built depending on antibiotic susceptibility; the isolates showed high clonal diversity as it appears in **figure 1a & 1b**.

Table (1): The primers used in the current study for PCR amplification

Name of genes	Primers 5 ---- 3	Size products	Tm	References
<i>gyrA</i>	F-AAATCTGCTCGTGTCTGG-3 R- GCCATACCTACAGCAATACC-3	349bp	52 C	2
<i>parC</i>	F-AAGCCCGTACAGCGCCGATT-3' R'-AAAGTTATCTTGCCATTCGCT-3'	327bp	60	2
<i>qepA</i>	F- AACTGCTTGAGCCCGTAGAT -3' R - GTCTACGCCATGGACCTCAC - 3'	596bp	54 C	18
<i>qnrB</i>	F-GATCGTGAAAGCCAGAAAGG -3' R- ATGAGCAACGATGCCTGGTA - 3'	476bp	52 C	18
<i>qnrS</i>	F- GCAAGTTCATTGAACAGGGT- 3' R- TCTAAACCGTCGAGTTCGGCG- 3'	428bp	60 C	18
<i>rpoB</i>	F- GGC GAA ATG GCW GAG AAC - 3' R- GAG TCT TCG AAG TTG TAA - 3'	1056 bp	50 C	This study
<i>aac(6')-Ib-</i>	F- TTG CGA TGC TCT ATG AGT GGCTA R- CTC GAA TGC CTG GCG TGT TT	482bp	56	19

Table (2): Determination of efflux activity at varying concentrations of ethidium bromide as fluorochrom

No. of Resistance isolates	Concentration of EtBr+ Ciprofloxacin at which bacteria started to fluoresce (µg /ml)	Efflux activity
1	1024	+
3	512	+
6	512	+
9	64	-
12	1024	+
13	512	-
15	512	+
17	512	+
18	1024	-
19	512	-
20	512	-
21	512	-

Cont.. Table (2):

23	512	-
25	512	-
26	256	-
27	512	-
28	512	-
29	256	-
30	256	+
31	512	-
32	64	-
33	512	+
35	512	+
36	512	-
41	512	-
42	512	-
43	1024	+

Table (3): Distribution of quinolones resistance genes according to the source of

Klebsiella pneumoniae clinical isolates (N=27)

Quinolones Resistance Genes	No. of isolates	wound	blood	sputum	burn	UTI	ear	bronchial
<i>gyrA</i>	18(66.6%)	5	3	1	3	5	1	0
<i>parC</i>	20(74.1%)	7	3	1	3	4	1	1
<i>aac (6)-Ib</i>	25(92.5%)	8	3	1	6	5	2	0
<i>qepA</i>	11(40.7%)	3	1	1	2	2	1	1
<i>qnrB</i>	14(51.8%)	4	3	0	4	2	1	0
<i>qnrS</i>	10(37.03%)	1	1	1	3	2	1	1

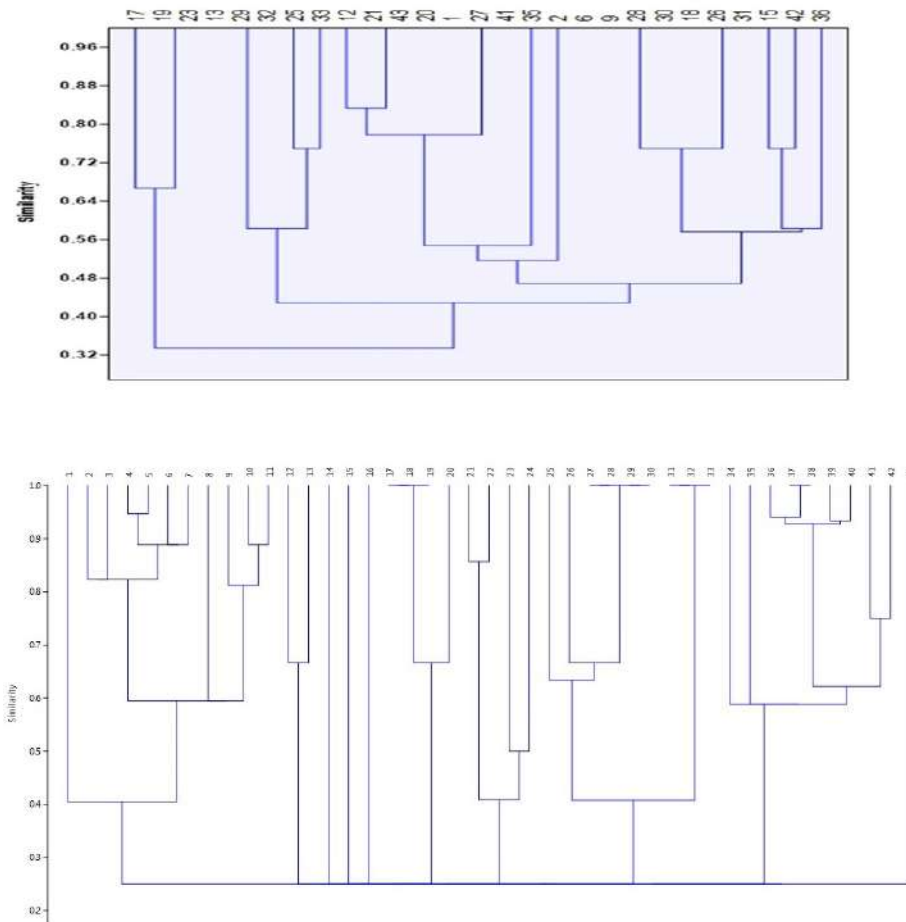


Figure 1a & b. The phylogenetic tree was built depending on antibiotic susceptibility; the isolates showed high clonal diversity

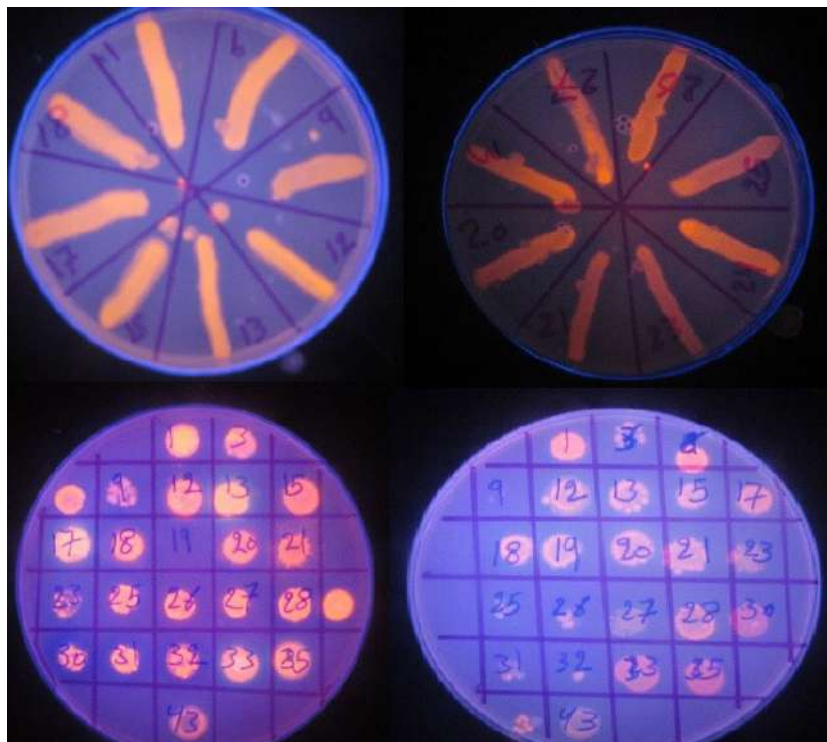


Figure 2. The presumptive overexpressed of efflux pump activity was shown by EtBr-agar cartwheel method

DISCUSSION

In the present study, results showed frequency of *K. pneumonia* isolates was in good numbers from different sources of infections. It considered as problematic organisms belong to its ability to resist different types of antibiotics including fluoroquinolones due to having several mechanisms of resistant.² This study revealed that *Klebsiella* isolates harbored more than one resistance gene,^{15,16} similar to Al-Najaf city study in which it was reported that 14/34 (41.14%) of *Klebsiella* isolates harbored *aac(6)Ib* gene. In this study, the harboring percentage with this gene was up and reached 25/27(92.5%). All 25 isolates appeared resistant to Amikacin and gentamycin in a phenotypic test; the mechanism of resistance was due to modification in aminoglycoside enzymes groups. The earlier study stated¹⁷ the predominant of this gene was common in Enterobacteriaceae. Further *aac(6)Ib* gene seems to coding resistance phenotype for gentamycin, tobramycin, kanamycin, and amikacin which explains why there is a high percentage of resistance in present in *Klebsiella pneumonia*. On the other hand, *parC* gene appeared in 20/27 (74.1%) and *gyrA* in 18/27 (66.6%) of *Klebsiella* isolates. These genes codes for resistance to quinolones which causes mutation at positions of Ser80 of *parC* and Ser83 of *gyrA* leading to high level of resistance^{16,17}. Therefore it can be said that multiple mutations in *parC* and/ or *gyrA* were required to expression high level of resistance in *Klebsiella pneumonia*¹⁷. Single alteration of *gyrA* protein may cause low-level ciprofloxacin resistance while a double mutation in *gyrA* protein may lead to high-level ciprofloxacin resistant. Interestingly most of the study isolates had *parC* & *gyrA* genes which explains the reason of high-level ciprofloxacin resistance. However, the eleven out of twenty-seven isolates in the current study display a single alteration in *parC* and *gyrA* genes with high-level ciprofloxacin resistance.

The tripartite complex consists of an inner membrane protein (IMP) of the resistance nodulation cell division (RND) family, outer-membrane protein (OMP) and a periplasmic membrane fusion protein (MFP) which connect the other two proteins¹⁴. Efflux-mediated drug resistance is more complex due to the molecular architecture of the cell envelope in gram-negative bacteria which compounds from tripartite complex outer-membrane protein OMP, inner membrane protein IMP and MFP periplasm-mic membrane fusion

protein which connects between them. These belong to resistance nodulation of cell division RND family, and tripartite proteins play role in pump out antibiotics from the cell, furthermore efflux pumps of the RND family are prominent in clinically significant MDR Gram-negative bacteria¹⁴.

Efflux systems have a critical role in the development of mechanistic drug resistance in Gram-negative bacteria, this pump solutes out of the cell, permitting microorganism to adjust their internal environment by getting out toxic substance like metabolite, antimicrobial agents and quorum sensing signal molecules. In this study, we have employed PAN, reported to be one of the first inhibitors of RND pumps. The EtBr-agar cartwheel screening method showed efflux activity in 27 strains. Also, the dendrogram showed the clustering of these isolates belong to antibiotics resistance and gene distribution in it. Our study reveals the emergence of efflux pump-mediated drug resistance in MDR Gram-negative bacteria in the Middle East, especially in Iraq.

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Conflict of Interest: Authors declare nothing to disclose

*Ethics approval and consent to participate

This study was designed and approved by institutional ethical committee, Mustansiriyah University. All the participants gave the prior written consent for this study.

*Consent for publication

Ethics committee has provided permission for data publication related to this study.

*Competing interests

Authors declare nothing to declare.

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Joint Effect of Obesity and Cigarette Smoking Against Hypertension Stage 1 among Men Adults: Finding from the Indonesian Family Life Survey-5

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ABSTRACT

The association of obesity and cigarette smoking against hypertension has been known but still rarely performed a joint effect of obesity and cigarette smoking in causing hypertension stage 1. This study aims to evaluate the joint effect of obesity and cigarette smoking against hypertension stage 1 in Indonesia. This is a cross-sectional study. Subjects in this study were the age group ≥ 18 years old who were followed by the interview. We investigated factors related to hypertension stage 1 in Indonesia associated with obesity and cigarette smoking by controlling other confounding variables. The prevalence of hypertension stage 1 was 19.84% among participants. Multivariate analysis showed that people who smoked and obese had a 2.61 greater risk of having hypertension stage 1 compared with obese and non-smokers 2.41, and people not obese and smoking 1.18. People with obesity and smoking have a greater risk of developing hypertension stage 1. Substantial effort must be made to raise awareness about controlling blood pressure regularly and early treatment especially in people who were smoked and obese.

Keywords: Joint Effect, Obesity, Cigarette Smoking, Hypertension Stage 1, Indonesia

INTRODUCTION

The prevalence of hypertension will continue to increase every year and it was predicted that by 2025 as many as 29% of adults worldwide will get hypertension.¹ According to WHO 2013, there were 9.4 million deaths each year caused by hypertension, of which 1.5 million deaths occur in Southeast Asia that can cause an increase in health costs.² In Indonesia according to Basic Health Research (Riset Kesehatan Dasar) 2013 the prevalence of hypertension in Indonesia is 25.8%.³

Epidemiological studies have shown that obesity can trigger hypertension. Obesity accounts for 65-75% of the risk of primary hypertension. Increased renal tubular sodium reabsorption disrupts natriuresis pressure and plays an important role in initiating hypertension due

to obesity.⁴ Jiang et al study showed that obesity was a risk factor for hypertension.⁵ A prospective cohort study conducted by Li et al 2017 also shows that obesity was a risk factor for hypertension with a risk of 3.34 times.⁶

In addition to obesity, there were many other factors that play a role in increasing the risk of hypertension, including smoking behavior. Smoking can cause hypertension due to chemicals contained in cigarettes that can damage the inner lining of the arterial wall, so that the arteries were susceptible to plaque accumulation. This is mainly due to nicotine which can stimulate the sympathetic nerves to make the heart work harder and cause constriction of blood vessels and increased blood viscosity.⁷ Study by Li, et al (2017) on the relationship between smoking behavior and blood pressure in men in China showed that the prevalence of hypertension was higher in smokers than in people who had never smoked (OR 2.36; 95% CI: 1.67-3.34).⁸ Looking at the above problems, the joint effect of obesity and smoking on hypertension stage 1 in Indonesia need to be evaluated.

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METHOD

The IFLS-5 survey procedures had been approved by Institutional Review Boards (IRBs) in the United States at Rand Corporation, Santa Monica, California and in Indonesia at Ethics Committees of Gadjah Mada University. This study uses a cross-sectional design using data from the Indonesian Family Life Survey-5.⁹

The surveys collected information on individual, household and community level data using multistage stratified random sampling. IFLS is a longitudinal household survey involving both questionnaire and anthropometric measurements, and which was collected under the supervision of the Rand Corporation. IFLS-5 was conducted in 13 provinces in Indonesia.¹⁰

IFLS-5 was conducted in September 2014-March 2015 on 16,204 households and 50,148 individuals.¹¹ The study population was the population who became the subject of IFLS-5 research in 2014. While the sample was the age group ≥ 18 years who followed the interview and had questionnaire data on important variables and complete blood pressure examination. Respondents who took hypertension drugs, female and were in hypertension stage 2 excluded in this study.

We include demographic information, individual characteristics and behavioral factors as confounding. We categorize the level of education completed by respondents to low, high and other levels of education, while marital status was classified as unmarried, married, or divorced. We include smoking behavior as an indicator of health risk and respondents who were categorized as not smoking and smoking.

Physical activity was assessed through a series of questions (a brief form modified from the International Physical Activity Questionnaire (IPAQ)) on the type and time of physical activity involved in, in all parts of life: work, home and exercise and then classified as sufficient and less physical activity.¹²

History of Diabetes Mellitus is assessed through questions ever diagnosed or not done by doctors or paramedics as well as a history of high cholesterol. We also measured respondents' fiber consumption in the past week, which was seen from the consumption of fruits and vegetables.

Body mass index (BMI < 27 kg/m²: normal weight; and ≥ 27.0 kg/m²: obesity derived from the height and weight measured during the physical examination, these criteria were determined based on the Ministry of Health of the Republic of Indonesia in 2013. Height measured by the Seca plastic height board model 213 and weight was measured using Camry model EB1003 scale. In this study the measurement of body weight and height was carried out by the interviewer or enumerator who was competent in their field and had received previous training.

Blood pressure was measured 3 times at an individual age of ≥ 18 years, using Omron meter HEM 7203. The first measurement was done at the beginning of the interview with the next two steps taken during the interview. The average of the 3 measurements was used for the current analysis. According to the JNC 7 blood pressure was categorized into 4 levels, namely normal ($< 120 / 80$ mmHg), prehypertension (120-139 / 80-89 mmHg), hypertension stage 1 (140-159 / 90-99 mmHg), and hypertension stage 2 ($\geq 160/100$ mmHg). We classify respondents as hypertension stage 1 if their blood pressure 140/90 mmHg-159/99 mmHg based on the criteria of JNC 7. Blood pressure measurement was carried out by the interviewer or enumerator who was competent in their field.¹³

Only respondents with complete information and blood pressure measurements were taken 3 times and were in normotensive or hypertension stage 1 included in the analysis. Logistic regression was performed to calculate the risk in all age groups. This study includes age, education level, marital status, history of Diabetes Mellitus, history of high cholesterol, fruit and vegetable consumption and physical activity as potential confounders variables by including them in multivariable analysis between obesity and cigarette smoking to Hypertension stage 1. If there is a difference of more than 10% between POR crude and POR adjusted then these variables were considered as confounding variables and not included in the next model. The same procedure was used to estimate adjusted odds ratio (and 95% confidence interval) for hypertension stage 1.¹⁴ Finally, the joint effect (and 95% confidence interval) of obesity and cigarette smoking, individual effect of obesity among non-smoker, and effect of smoking among non obese person on hypertension were evaluated.

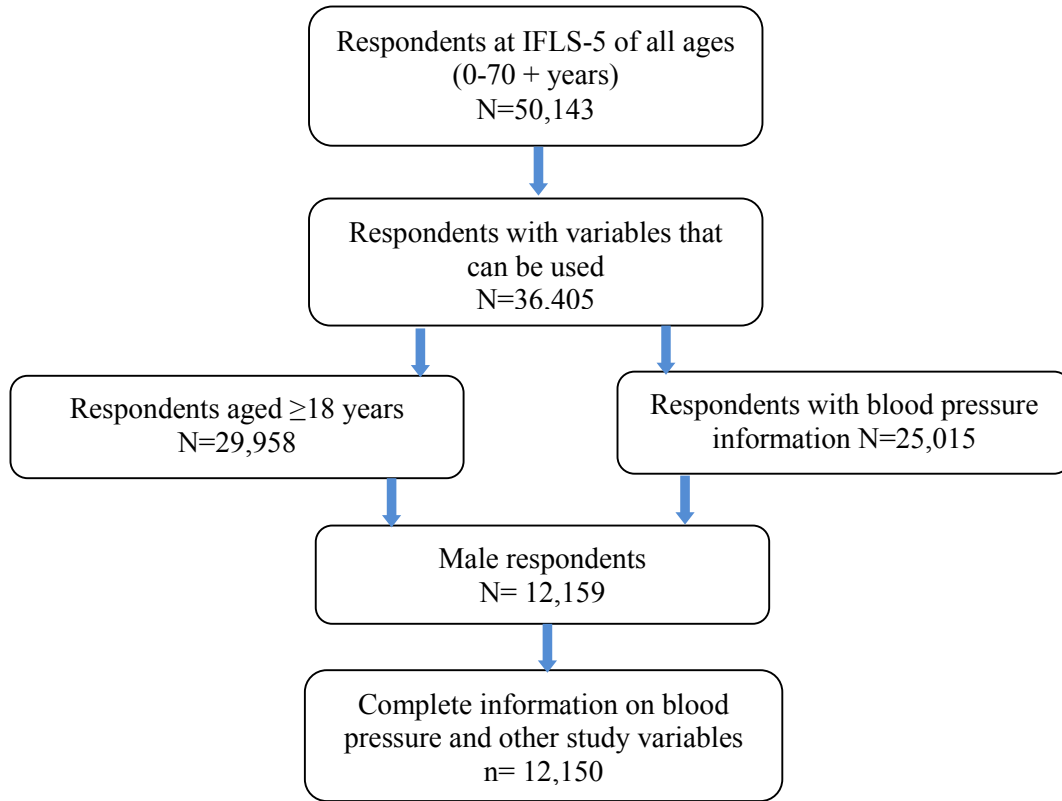


Figure 1. Selection of Study Sample Flowchart

RESULTS

The description of each study variable can see in Table 1. Of the 12,150 adult male respondents, the proportion of hypertension stage 1 in Indonesia was 19.84%. While the proportion of obesity and cigarette smoking was 18.78% and 36.43%, respectively.

Table 1. Frequency of Hypertension Stage 1 According to Individual Characteristics

Characteristics	Hypertension Stage 1		Non Hypertension		Total
	n = 2411	%	n = 9739	%	
Age Category (years)					
18-27	233	9.66	2901	29.79	3134
28-37	473	19.62	3397	34.88	3870
38-47	577	23.93	2018	20.72	2595
48-57	551	22.85	914	9.38	1465
>57	577	23.93	509	5.23	1086
Education Level					
High	829	34.38	4783	49.11	5612
Low	1531	63.50	4670	47.95	6201
Other	51	2.12	286	2.91	337
Marital Status					
Single	474	19.66	1861	19.11	2335
Married	1708	70.84	6988	71.75	8696
Divorced	229	9.50	890	9.14	1119
Diabetes Mellitus History					
Yes	91	3.77	137	1.41	228

Cont... Table 1. Frequency of Hypertension Stage 1 According to Individual Characteristics

No	2320	96.23	9602	98.59	11922
Physical Activity					
Enough	1463	60.68	6449	66.22	7912
Less	948	39.32	3290	33.78	4238
High Cholesterol History					
Yes	171	7.09	328	3.37	499
No	2240	92.91	9411	96.63	11651
Smoking Status					
Yes	939	38.95	3487	35.80	4426
No	1472	61.05	6252	64.20	7724
Obesity					
No (BMI <27,0)	1676	69.51	8192	84.12	9868
Yes (BMI ≥27,0)	735	30.49	1547	15.88	2282
Fruit and Vegetable Consumption					
Enough	1791	74.28	7141	73.32	8932
Less	620	25.72	2598	26.68	3218
Combination of Obesity and Smoking					
Non-obese + Non-smoking	1004	41.46	5237	53.77	6241
Obesity + Non-smoking	468	19.41	1015	10.42	1483
Non-obesity + Smoking	672	27.87	2955	30.34	3627
Obesity + Smoking	267	11.07	532	5.46	799

Note: BMI: Body Mass Index

Based on the table 1 it can be seen that the proportion of obesity is higher in hypertension stage 1 people (30.49%) than those non-hypertension (15.88%). Hypertension stage 1 at age > 57 years was higher (23.93%) than non-hypertension (5.23%), as was 48-

57 years of age higher (22.85%) than non-hypertension (9.38). Hypertension stage 1 in obese and smoking people was higher (11.07%) than non-hypertension ones (5.46%). Hypertension stage 1 in low education was higher (63.50%) than non-hypertension ones (47.95%).

Table 2. Final Model Joint Effect of Obesity and Cigarette Smoking against Hypertension Stage 1

Combination of Obesity and Smoking	Hypertension Stage 1		Non Hypertension		POR (95% CI)
	n	%	n	%	
Obesity + Smoking	267	11.07	532	5.46	2.61 (2.22-3.07)
Obesity + Non Smoking	468	19.41	1015	10.42	2.41 (2.11-2.74)
Non Obesity + Smoking	672	27.87	2955	30.34	1.18 (1.06-1.32)
Non Obesity + Non Smoking	1004	41.46	5237	53.77	1.00 (Referant)

Note: Adjusted by age, education level, marital status, diabetes mellitus history, high cholesterol history, physical activity, fruit and vegetable consumption

Based on table 2, it was known the final model of the relationship of obesity and cigarette smoking to the hypertension stage 1 after being controlled for age. The risk of hypertension stage 1 of respondents classified

as obese and also smoking was the largest, which was 2.61 compared to those who were not obese and did not smoke (95% CI; 2.22-3.07). While the risk of hypertension stage 1 in respondents classified as obese but not smoking was 2.41 greater than in the non-obese and non-smoking group with 95% CI; 2.11-2.74. Then, the risk of respondents who were classified as non-obese

but smoking was known to be 1.18 greater than those who were not obese and do not smoke to experience hypertension stage 1 (95% CI; 1.06-1.32).

DISCUSSIONS

Based on the results of the analysis, it was known that the combination of obesity and smoking together was a risk factor that is associated with an increase in the proportion of hypertension stage 1. The results of this study showed that the proportion of hypertension in stage 1 in respondents classified as obese and smoking was 2.61 compared to who were not obese and do not smoke. While the risk of hypertension stage 1 in respondents classified as obese but not smoked by 2.41 was greater than in the group that was not obese and does not smoke. Then, the risk of respondents who were classified as non-obese but smoking was known to be 1.18 greater than those who were not obese and do not smoke to experience hypertension stage 1.

Based on previous study, mentions a significant relationship between obesity with hypertension stage 1. The relationship of obesity has long been known and has been widely reported by many researchers, but the mechanism of the occurrence of hypertension due to obesity was not yet clear. Most researchers focus on the pathophysiology on three main things, namely autonomic system disorders, insulin resistance and abnormalities in the structure and function of blood vessels. These three things can influence each other.¹⁵

Weight loss was the most instrumental element in the prevention and treatment of hypertension. Hypertension patients were encouraged to lose weight if they were obese and this will affect blood pressure.¹⁶ Every 1 kg of weight gain had Hazard Ratio to suffer from hypertension at 1.36 (95% CI: 1.29-1.45).¹⁷ In addition, based on the results of previous studies showed that every kilogram of weight loss can reduce systolic blood pressure by 1.05 mmHg and diastolic by 0.92 mmHg.¹⁸

The results of this study also showed that obesity has a significant relationship with the hypertension stage 1. The results of bivariate analysis showed that respondents who were obese (BMI > 25) were at risk 2,008 times (95% CI: 1.261-3.198) to suffer from hypertension stage 1 compared to respondents who were not obese. So that there was a large relationship of obesity with hypertension stage 1 which is 1.681 times (95% CI: 1.049-2.696), meaning that respondents

with obesity have a risk of 1.681 times to suffer from hypertension stage 1 compared to those who were not obese after controlled age variables, history of diabetes mellitus and physical activity.¹⁹

According to WHO recommendations, a person was declared hypertension, it needs to be re-evaluated about 1 or 2 weeks. However, in this study only assessed at one time (only implemented once), so that the possibility can lead to a measurement bias. To minimize bias measurement of hypertension stage 1 variable, among others, by measuring blood pressure carried out by trained medical personnel and determining the diagnosis of hypertension was done by a doctor. In addition, routine calibration was carried out against tensimeters before use.

CONCLUSIONS

The proportion of hypertension stage 1 in Indonesia who became respondents in IFLS-5 is 19.84%. The combination of obesity and cigarette smoking have a risk of 2.61 times to suffer from hypertension stage 1 compared to those who not obese and not smoking. Obesity and cigarette smoking together show a greater association with hypertension stage 1 than obesity or smoking alone. Given the high prevalence of hypertension it was necessary to increase health promotion efforts including the addition of nutrition counseling and counseling as well as joint sports activities (gymnastics) in integrated coaching activities. The government and all health workers were more optimizing the implementation of Integrated Non-Communicable Disease Development Post. Communities, especially those classified as high-risk (obesity and cigarette smoking) can realize the importance of independently performing hypertension stage 1 screening in this case was general obesity of body weight and height, and smoking as a first and foremost step to prevent the emergence of the incidence of hypertension stage 1.

Conflict of Interest: Both author declared that no conflict interest.

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Comparison of Various Obesity Indices against the Occurrence of Stage 1 Hypertension in Indonesia

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ABSTRACT

Background: Hypertension is one of the most important causes of premature death worldwide. Several studies had explored which obesity indices were more strongly associated with hypertension but the results were still varies. This study aimed to compare various obesity indices that has more strongly associated with stage 1 hypertension in Indonesia.

Method: A total of 8240 respondents aged 40-69 years were investigated. Design of the study was a cross sectional using data from Indonesian Family Life Survey (IFLS) round 5 in 2014. Cox regression was applied for the analysis.

Results: Prevalence of stage 1 hypertension among the study participants was 25.98%. The obesity indice that showed the strongest association with stage 1 hypertension in both men and women was WHtR (PR 1.89, 95% CI 1.73-2.07). After stratified by sex, the obesity indices that showed the strongest association in men was WC (PR 1.73, 95% CI 1.53-1.97) while in women was WHtR (PR 1.76, 95% CI 1.5-2.05).

Conclusion: WHtR performed better than BMI, WC, WHR for predicting the occurrence of stage 1 hypertension across sexes. WC was the best obesity indice in men while in women was WHtR. The appropriateness of selection obesity indices helps in maximizing screening for the occurrence of stage 1 hypertension.

Keywords : *stage 1 hypertension, obesity, BMI, WC, WHR, WHtR*

INTRODUCTION

Hypertension is one of the most important causes of premature death worldwide. Hypertension is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke ¹. Hypertension kills nearly 8 million people every year in worldwide and nearly 1.5 million people each year in the South-East Asia (SEA) Region. Approximately one-third of the adult population in the SEA Region has high blood pressure, and in 2025, an estimated 1.56 billion adults will be living with hypertension ². Based on Basic Health Research (Riskesmas) in 2013, prevalence of hypertension in

Indonesia is 25,8% ³.

Obesity had been well recognized as the wide health risks including hypertension ⁴. Many studies showed that the high incidence of hypertension was associated with increasing prevalence of obesity ^{5,6}. Data from *World Health Organization* (WHO) in 2016 estimated that more than 650 million adults in worldwide were obese ⁷. Obesity can be defined by different anthropometric indices. Body mass index (BMI) is commonly used in many epidemiologic studies on obesity, however it was criticized for measuring body fat distribution inefficiently especially abdominal fat mass ⁸⁻¹⁰. Some studies found statistical evidence that supports the superiority of measuring abdominal fat mass over BMI were using waist circumference (WC), waist-to-hip-ratio (WHR), waist-to-height-ratio (WHtR) ¹¹⁻¹².

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Some studies had explored which obesity indices are more strongly associated with hypertension but the capability of these obesity indices in predicting the hypertension risks still was debated. Study of Qian Wang et al reported that BMI was the best obesity indices for predicting hypertension in both men and women⁸. A prospective cohort study by Joung Won Lee et al revealed that WHtR in women and WC in men had the strongest association with hypertension¹³. But study of Nyamdorj et al indicated that BMI, WC, and WHR had the same association with hypertension in both men and women¹⁴.

Due to difference of previous study results, this study aimed to compare various obesity indices that has more strongly associated with stage 1 hypertension in Indonesia and find out its possible sex differences.

METHOD

Ethical Consideration

This study used Indonesian Family Life Survey (IFLS) round 5. The IFLS survey procedures had been reviewed and approved by Institutional Review Boards (IRBs) in the United States (at Rand Corporation, Santa Monica, California) and in Indonesia (Ethics Committees of Gadjah Mada University, Yogyakarta). Informed consent was obtained from all respondents before data collection was carried out.

Study Design and Participants

This study was an analytic observational study with a cross sectional design. This study used data from Indonesian Family Life Survey (IFLS) round 5. Data collection was conducted in 13 provinces in Indonesia in late 2014 and early 2015: 16.204 households and 50.148 individuals were interviewed¹⁵.

The study population in this study were respondents aged 40-69 years and participated in IFLS 5. The study sample was all respondents who met the inclusion and exclusion criteria. Inclusion criteria in this study were respondents aged 40-69 years and had complete blood pressure measurement, anthropometric, and interview data. While the exclusion criteria were respondents who were taking hypertension medication, were pregnant, had stage 2 hypertension, and had incomplete blood pressure measurement, anthropometric, and interview data.

At first there were 11.440 respondents aged 40-69 years, but as many as 2.152 respondents suffered from stage 2 hypertension, 358 respondents were taking hypertension medication, and 691 respondents had incomplete data so they could not be included in the study. The number of respondents who could be analyzed in this study were 8.240.

Data Collection

The dependent variable measured in this study was stage 1 hypertension. Blood pressure were obtained from the average results of three measurements and classified according to Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure 7 (JNC 7) guidelines. Respondents suffered stage 1 hypertension if they had systolic blood pressure 140-159 mmHg and/or diastolic blood pressure 90-99 mmHg¹⁶. Blood pressure measurements using digital Omron sphygmomanometers type HEM-7203 and performed by trained interviewer.

The independent variables measured were obesity indices (BMI, WC, WHR, and WHtR). BMI was calculated by comparing body weight with height squared (kg/m^2). BMI was classified based on WHO standards for asian adults and obese was a $\text{BMI} \geq 25 \text{ kg}/\text{m}^2$ ¹⁷. Measurement of weight using a digital Camry scale model EB1003 that can measure to the nearest tenth of a kilogram. Height measurement using Seca plastic height board that can measure heights to the nearest millimeter. This measurements was carried out by trained interviewer.

WC is a measure of waist circumference at the midpoint between the lower border of the rib cage and the end point of the arch of the pelvic bone. The cut off points used in accordance with WHO standards for asian adults, it was chosen as a WC in women $\geq 80 \text{ cm}$ for women and $\geq 90 \text{ cm}$ for men¹⁷.

WHR was calculated as waist circumference divided by hip circumference. The cut off points used in accordance with WHO standards for asian adults, it was considered as a $\text{WHR} \geq 0.85$ for women and $\text{WHR} \geq 0.90$ for men¹⁸. Measurement of waist circumference and hip circumference using a measuring tape that can measure to the nearest millimeter.

WHtR was calculated as WC divided by height. The cut off points was considered ≥ 0.5 for both women and

men¹⁹.

We collected demographical characteristics of respondents by performing interview using structured questionnaire and conducted by trained interviewer. Respondent data collection included sex (male, female), education level (low, high), smoking status (current smoker, ex-smoker, nonsmoker), physical activity according to the International Physical Activity Questionnaire / IPAQ standard (low/<600METs, medium/600-3000METs, high/>3000 METs), and vegetables and fruits consumption during the last week (less, enough).

Data Analysis

Multivariate analysis was used to estimate the risk of stage 1 hypertension based on BMI, WC, WHR, WHtR after being adjusted by covariate variables. This study used multivariate analysis with modified cox regression.

The use of modified cox regression was carried out to obtain an estimate of prevalence ratio (PR) and 95% confidence interval (CI)²⁰. Covariate variables used in multivariate analysis were age, education level, smoking status, physical activity, and vegetables and fruits consumption. Statistical testing for confounders was done by comparing the PR crude with PR adjusted. If the PR difference was more than 10% then the variable was a confounder.

RESULTS

The study revealed that 2.141 (25.98%) respondents had suffered stage 1 hypertension (table 1). The proportion of stage 1 hypertension were higher in those aged 60-69 (28.43%), male (30.73%), had low education level (28.57%), ex-smoker (48.52%), had high physical activity (28.23%), less in consuming vegetables and fruits (39.35%), obese based on BMI (34.05%), obese based on WC (34.61%), obese based on WHR (33.24%), and obese based on WHtR (37.34%).

Table 1. Proportion of Stage 1 Hypertension Based on Demographical Characteristic

Variables	Stage 1 Hypertension		No Hypertension	
	n = 2141	%	n = 6099	%
Age (years)				
60 – 69	294	28.43	740	71.57
50 – 59	635	26.32	1778	73.68
40 – 49	1212	25.29	3581	74.71
Sex				
Female	860	21.12	3212	78.88
Male	1281	30.73	2887	69.27
Education Level				
Low	1009	28.57	2523	71.43
High	1132	24.04	3576	75.96
Smoking Status				
Current Smoker	941	31.36	2060	68.64
Ex-smoker	246	48.52	261	51.48
Non Smoker	954	20.16	3778	70.84
Physical Activity				
Low	750	25.51	2190	74.49
Medium	1310	26.16	3698	73.84
High	81	27.74	211	72.26
Vegetables and Fruits Consumption				
Less	874	39.35	1347	60.65
Enough	1267	21.05	4752	78.95
BMI				

Cont... Table 1. Proportion of Stage 1 Hypertension Based On Demographical Characteristic

Obese (≥ 25 kg/m ²)	1210	34.05	2344	65.95
Non Obese (<25 kg/m ²)	931	19.87	3755	80.13
WC				
Obese ($\sigma \geq 90$ cm, $\phi \geq 80$ cm)	1381	34.61	2609	65.39
Non Obese ($\sigma < 90$ cm, $\phi < 80$ cm)	760	17.88	3490	82.12
WHR				
Obese ($\sigma \geq 0.9$, $\phi \geq 0.85$)	1181	33.24	2372	66.76
Non Obese ($\sigma < 0.9$ cm, $\phi < 0.85$)	960	20.48	3727	79.52
WHtR				
Obese (≥ 0.5)	1303	37.34	2187	62.66
Non Obese (<0.5)	838	17.64	3912	82.36

Multivariate adjusted estimates were shown in table 2, table 3, and table 4. After being adjusted by covariate variables, the obesity indice that showed the strongest association with stage 1 hypertension in both men and women was WHtR (table 2). Men and women who were obese based on WHtR were 1.89 times more likely to have risk of stage 1 hypertension in comparison to men and women who were not obese (PR 1.89, 95% CI 1.73-2.07).

When stratified by sex, the obesity indice that showed the strongest association in men was WC (table 3). Men who were obese based on WC were 1.73

times more likely to have risk of stage 1 hypertension in comparison to men who were not obese (PR 1.73, 95% CI 1.53-1.97). In women, the obesity indice that showed the strongest association was WHtR (table 4). Women who were obese based on the WHtR were 1.76 times more likely to have risk of stage 1 hypertension in comparison to women who were not obese (PR 1.76, 95% CI 1.5-2.05). Among of four obesity indices, WHR showed the weakest association in both men and women.

Table 2. Comparison of Adjusted Prevalence Ratio of Stage 1 Hypertension Based On BMI, WC, WHR, WHtR In Both Men And Women

Obesity Indices	Stage 1 Hypertension n (%)	No Hypertension n (%)	Adjusted PR* (95% CI)
BMI			
Obese	1210 (34.05)	2344 (65.95)	1.64 (1.50 – 1.79)
Non Obese	931 (19.87)	3755 (80.13)	1
WC			
Obese	1381 (34.61)	2609 (65.39)	1.76 (1.61 – 1.93)
Non Obese	760 (17.88)	3490 (82.12)	1
WHR			
Obese	1181 (33.24)	2372 (66.76)	1.49 (1.36 – 1.65)
Non Obese	960 (20.48)	3727 (79.52)	1
WHtR			
Obese	1303 (37.34)	2187 (62.66)	1.89 (1.73 – 2.07)
Non Obese	838 (17.64)	3912 (82.36)	1

*Adjusted for age, education level, smoking status, physical activity, vegetables and fruits consumption

Table 3. Comparison of Adjusted Prevalence Ratio of Stage 1 Hypertension Based On BMI, WC, WHR, WHtR In Men

Obesity Indices	Stage 1 Hypertension n (%)	No Hypertension n (%)	Adjusted PR* (95% CI)
BMI			
Obese	836 (35.02)	1551 (64.98)	1.63 (1.45 – 1.84)
Non Obese	420 (23.58)	1361 (76.42)	1
WC			
Obese	918 (36.94)	1567 (63.06)	1.73 (1.53 – 1.97)
Non Obese	338 (20.08)	1345 (79.92)	1
WHR			
Obese	857 (35.04)	1589 (64.96)	1.55 (1.37 – 1.74)
Non Obese	379 (22.27)	1323 (77.73)	1
WHtR			
Obese	851 (37.34)	1428 (62.66)	1.65 (1.47 – 1.87)
Non Obese	405 (21.44)	1484 (78.56)	1

*Adjusted for age, education level, smoking status, physical activity, vegetables and fruits consumption

Table 4. Comparison of Adjusted Prevalence Ratio of Stage 1 Hypertension Based On BMI, WC, WHR, WHtR In Women

Obesity Indices	Stage 1 Hypertension n (%)	No Hypertension n (%)	Adjusted PR* (95% CI)
BMI			
Obese	935 (38.19)	1513 (61.81)	1.56 (1.37 – 1.76)
Non Obese	357 (21.98)	1267 (78.02)	1
WC			
Obese	938 (38.35)	1508 (61.65)	1.45 (1.25 – 1.69)
Non Obese	354 (21.77)	1272 (78.23)	1
WHR			
Obese	324 (29.27)	783 (70.73)	1.38 (1.15 – 1.64)
Non Obese	581 (19.46)	2404 (80.54)	1
WHtR			
Obese	925 (38.00)	1509 (62.00)	1.76 (1.52 – 2.05)
Non Obese	367 (22.41)	1271 (77.59)	1

*Adjusted for age, education level, smoking status, physical activity, vegetables and fruits consumption

DISCUSSION

This study analyzed various obesity indices in relation to stage 1 hypertension. BMI was an indicator of general obesity while other obesity indices such as WC, WHR, WHtR more indicated the condition of abdominal obesity.

The results of this study indicated an obesity indice that had the strongest association with stage 1 hypertension in both men and women was WHtR.

Studies done by Saeed et al and Norfazilah et al stated that WHtR was the best obesity indice in relation to stage 1 hypertension in both men and women adults population²¹⁻²². Meta-analysis conducted by Ashwell et al and Savvas et all also concluded that WHtR was better indice for predicting cardiometabolic risk compared to BMI²³⁻²⁴.

This study also analyzed the association of various obesity indices with stage 1 hypertension based on sex. The obesity indice that showed the strongest association

in men was WC while in women was WHtR. These findings supported the results of a prospective cohort study conducted by Young Won Lee et al. Study of Young Won Lee et al that carried out in a population of men and women aged 40-69 years founded that WHtR has the strongest association with stage 1 hypertension in women and in men indicated by WC¹⁴.

Obesity is not only about the amount of fat but also about its distribution. Abdominal or visceral fat is associated with cardiometabolic risk including hypertension¹⁷. WC can describe the accumulation of visceral fat. Accumulation of visceral fat can have metabolic consequences such as increased production of liver fat and increased insulin. Hyperinsulin causes the body to retain sodium and water so that blood volume increases. Excess volume of water in the body causes increased cardiac output and results in hypertension²⁵⁻²⁶.

In general, height has usually been shown to have inverse associations with cardiometabolic morbidity and mortality and this is probably because height as well as having a major genetic component, can also reflect general early life exposures²⁷⁻²⁸. A recent report from Chile proposes that adverse environmental exposures in critical growth periods in early life programme short stature and predisposition to abdominal adiposity, insulin resistance and other cardiometabolic risk factors in adult life²⁹.

Among of four obesity indices, WHR showed the weakest association in both men and women. WHR is associated with visceral fat but cannot be used to predict accurately changes in visceral fat. This is because the hip circumference is only affected by subcutaneous fat, so the accuracy of WHR in measuring visceral fat decreases with increasing body subcutaneous fat³⁰.

This study used a cross sectional study design so that there was no clear temporal time relationship. In addition, not all variables were examined so that they were still unable to explain thoroughly about other risk factors related to the association of obesity with stage 1 hypertension.

Obesity indices can be used to screen the occurrence of stage 1 hypertension. The appropriateness of selection obesity indices helps in maximizing detection or discovery of stage 1 hypertension patients and provides the best measurement for stage 1 hypertension prevention and control programs.

CONCLUSION

The obesity indice that had the strongest association with stage 1 hypertension in both men and women was WHtR. After stratified by sex, the obesity indices that showed the strongest association in men was WC while in women was WHtR. Obesity indices can be used to screen the occurrence of stage 1 hypertension. The appropriateness of selection obesity indices helps in maximizing detection or discovery of stage 1 hypertension patients and provides the best measurement for stage 1 hypertension prevention and control programs.

Conflict of Interest: Both author declared that no conflict interest.

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The Status of Lipid Peroxidation System in Erysipelas Patients on the Background of Diabetes Mellitus

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ABSTRACT

Background. The erysipelas develops quite rapidly. This infectious disease is characterized by skin inflammation caused by streptococcus. Its progressiveness depends on many factors. The presence of diabetes occupying a leading place in the system of vascular events is one of the most significant factors. In this regard, this article studies the status of a lipid peroxidation system in erysipelas patients on the background of diabetes mellitus.

Method. The experiment was conducted in the Center for Prevention and Control of AIDS and Infectious Diseases (Kabardino-Balkar Republic, Nalchik city). There were two groups participating in the experiment: the first group consisted of 20 erysipelas patients; the second one – of 14 patients, whose erysipelas developed on the background of diabetes mellitus. All patients were taking tablets.

Result. As a result of the experiment, it turned out that lipid peroxidation occurs in biological membranes during the period of erysipelas. This is manifested by an increase in blood MDA level, as well as by a deficit of antioxidant protection and a decrease in the plasma antioxidant (ceruloplasmin).

Conclusion. Recorded changes in considered parameters were more pronounced and returned to normal after treatment on the unfavorable premorbid background – such a serious disease as diabetes mellitus.

Keywords: *ergotism (St. Anthony's fire); diabetes mellitus; antioxidant system; ceruloplasmin level; endointoxication.*

INTRODUCTION

Despite a large number of works devoted to various aspects of erysipelas: pathogenic mechanism, clinical picture, diagnosis, treatment and prevention, it remains one of the most common human infectious diseases. Erysipelas is the fourth most common disease among infectious pathologies and brings great socioeconomic damage¹⁻².

The incidence of erysipelas is on average 12-20 per 10 thousand people in Russia³⁻⁷, and 4.3 per 10 thousand people in Europe⁸⁻¹⁰. There are often recurrent attacks of a disease complicated by necrosis and purulent processes in the tissues and leading to elephantiasis and disability.

The course and consequences depend on the background diseases that lead to degenerative changes in tissues, microcirculation disorders, and result in a violation of skin trophism and lymph circulation. Diabetes mellitus occupying a leading place in the system of vascular events is serious risk factor for disease development. Diabetes mellitus as a background disease significantly worsens the course of and prognosis for erysipelas, promotes recurrence and the emergence of purulonecrotic events. According to published data, erysipelas patients have mainly type 2 diabetes. This

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endocrine pathology is found in 8-12% of erysipelas patients, 1/4-1/3 whereof are patients, whose diabetes was first diagnosed when the erysipelas occurred¹¹⁻¹³.

According to the metabolic theory, microvascular complications are caused by long-term hyperglycemia and metabolic disorders induced by it: non-enzymatic glycation of proteins, oxidative and carbonyl stress, direct glucotoxicity, glycosaminoglycan synthesis disruption. The increased aggregability and reduced deformability of erythrocytes led to an increase in blood viscosity that makes it more difficult for blood to flow. This plays an important role in vascular events development¹².

Normal performance of cellular and subcellular membranes depends on the integrity of their phospholipid structures. Damaged lipid membrane is a stage of necrotic cell death at many pathological processes, including those associated with changes in blood viscosity. As a rule, it is associated with activated lipid peroxidation in biological membranes (LPO)¹⁴.

Usually, LPO in tissues is measured by the amount of malondialdehyde (MDA) or other products giving a characteristic coloration in combination with thiobarbituric acid (TBA)¹⁵.

LPO is required for the formation of steroid hormones, inflammatory mediators, cytokines and thromboxanes. If the number of chemical reaction data exchange products exceeds the allowable value and peroxides damage the cell organelles, disrupt the synthesis of DNA and proteins, an antioxidant system that reduces the amount of free oxygen radicals and metal ions with variable valence comes into function. Metabolic LPO products can accumulate in tissues and body fluids if the antioxidant system does not manage to utilize them at the required rate¹⁶.

The antioxidant system containing catalase, ceruloplasmin, vitamins E and C, beta-carotene and other components stands against the the damaging effect of LPO products and active oxygen radicals¹⁷.

Ceruloplasmin (CP) is the main antioxidant of

blood. It binds superoxide radicals and prevents LPO in cell membranes¹⁸. Catalase is also an important element of body's antioxidant defense, as it catalyzes the two-electron reduction of hydrogen peroxide to H₂O¹⁹. The pressing task is to study how the status indicators of pro- and antioxidant systems change in case of erysipelas on the background of such an unfavorable factor as diabetes mellitus.

The purpose of this research is to study the status of the lipid peroxidation system in erysipelas patients on the background of diabetes mellitus.

MATERIALS AND METHOD

The research was carried out in the Center for Prevention and Control of AIDS and Infectious Diseases (Kabardino-Balkar Republic, Nalchik city). The patients were divided into 2 groups: 1 group – 20 erysipelas patients (13 women and 7 men aged 45-68); 2 group – 14 patients, whose erysipelas developed on the background of type 2 diabetes mellitus (8 women and 6 men aged 48-70). These patients were taking tablets. They all had a chronic recurrent course of erythematous-bullous form of erysipelas of medium severity. The disease often occurred on legs – only 2 patients had erysipelas manifestations on the face. The control group involved 25 healthy people that match the subjects by sex and age.

Besides the general examination, we have activated LPO in patients to a certain degree according to the number of TBA reactive substances by determining the MDA content based on the method introduced in²⁰. The antioxidant protection was assessed by measuring the CP level in blood plasma using the Ravin's method²¹. We have examined patients that had acute disease episode (when they were hospitalized) and blanching symptoms (5-7 days of hospitalization), as well as early recovered (before discharge from the hospital) and late recovered (in a month after discharge) patients.

All measurements were made with a SF-46 spectrophotometer. The results were statistically processed with Statistics program.

Table 1: Blood MDA level in erysipelas patients depending on a disease period ($\mu\text{mol/L}$)

Group	Period	n	$\bar{X}\pm m$	P	P1
Healthy	-	25	1.3 ± 0.08	-	-
Erysipelas	I	34	3.7 ± 0.12	<0.001	-
	II	34	2.9 ± 0.17	<0.001	<0.001
	III	34	1.7 ± 0.08	>0.05	<0.001
	IV	18	1.4 ± 0.26	>0.05	>0.05

Note: I – acute period; II – blanching period; III – early recovery; IV – late recovery; P – reliability of differences in relation to healthy people; P1 – reliability of differences in relation to the previous period; P2 – reliability of differences in relation to indicators recorded in erysipelas patients without diabetes mellitus in the corresponding period

In the examined patients, we have found a significant increase in MDA level in serum with a maximum value in the acute period ($3.7\pm 0.12 \mu\text{mol/L}$, $P<0.001$). These changes have occurred on the background of basic clinical manifestations of a disease – weakness and fever, and at the height of local disease manifestations. In the blanching period, there was a significant decrease in MDA level as a result of the treatment. However, it still remained higher than in healthy people ($2.9\pm 0.17 \mu\text{mol/L}$, $P<0.001$, $P1<0.001$). In the period of early recovery, the measured index has significantly decreased ($1.7\pm 0.08 \mu\text{mol/L}$, $P>0.05$, $P1<0.001$) and returned to normal (Table 1).

We have measured the CP level at 3 disease periods to assess the status of the antioxidant system in the same group of patients (where the MDA level was measured); CP level at the 4 period was measured only in some patients.

Table 2: Blood CP level in erysipelas patients depending on a disease period (mg/L)

Group	Period	n	$\bar{X}\pm m$	P	P1
Healthy	-	25	403 ± 4.8	-	-
Erysipelas	I	34	318 ± 3.3	<0.001	-
	II	34	356 ± 3.5	<0.001	<0.001
	III	34	413 ± 2.6	>0.05	<0.001
	IV	18	406 ± 5.6	>0.05	>0.05

The majority of examined patients had a maximum decreased index at the acute period ($318\pm 3.3 \text{ mg/L}$, $P<0.001$). At the blanching period, CP level increased ($356\pm 3.5 \text{ mg/L}$, $P<0.001$, $P1<0.001$), but returned to normal after early recovery ($413\pm 2.6 \text{ mg/L}$; $P>0.05$, $P1<0.001$).

Table 3: Blood MDA level in erysipelas patients depending on the presence/absence of a coexisting diabetes mellitus ($\mu\text{mol/L}$)

Group	Period	n	$\bar{X}\pm m$	P	P2
Healthy	-	25	1.3 ± 0.08	-	-
Without coexisting diabetes mellitus	I	20	3.2 ± 0.11	<0.001	-
	II	20	2.6 ± 0.08	<0.001	-
	III	20	1.7 ± 0.09	>0.05	-
	IV	11	1.4 ± 0.1	>0.05	-

Cont... Table 3: Blood MDA level in erysipelas patients depending on the presence/absence of a coexisting diabetes mellitus (µmol/L)

With coexisting diabetes mellitus	I	14	4.4±0.12	<0.001	<0.001
	II	14	3.2±0.09	<0.001	<0.001
	III	14	2.4±0.13	<0.001	<0.001
	IV	7	1.2±0.23	>0.05	>0.05

When patients were divided into 2 groups depending on the presence/absence of a coexisting diabetes mellitus, the following was found. There were significantly higher MDA values recorded in the group of patients with a burdened premorbid background in the form of diabetes mellitus at the acute period (4.4±0.12 µmol/L; P<0,001;

P2<0,001), blanching period (3.2±0.09 µmol/L, P<0.001, P2<0.001) and at the period of early recovery (2.4±0.13 µmol/L, P<0.001, P2<0.001) versus the corresponding periods in the group of patients without diabetes mellitus. In this case, MDA level normalized only at the period of late recovery (1.2±0.23 µmol/L; P>0.05; P2<0.05) in contrast to the first group of patients (Table 3).

Table 4: Blood CP level in erysipelas patients depending on the presence/absence of a coexisting diabetes mellitus (µmol/L)

Group	Period	n	X±m	P	P2
Healthy	-	25	403±4.8	-	-
Without coexisting diabetes mellitus	I	20	332±4.2	<0.001	-
	II	20	359±6.1	<0.001	-
	III	20	394±5.4	>0.05	-
	IV	11	408±7.8	>0.05	-
With coexisting diabetes mellitus	I	14	305±5.6	<0.001	<0.001
	II	14	331±7.1	<0.001	<0.01
	III	14	373±5.6	<0.001	<0.01
	IV	7	401±9.8	>0.05	>0.05

RESULTS AND DISCUSSION

Thus, we have recorded an increase in serum MDA levels in erysipelas patients. MDA is, in fact, an intermediate LPO product that characterizes the degree of endogenous intoxication. In this case, MDA dynamics depended on the presence/absence of a coexisting diabetes mellitus²¹.

CP level analysis depending on the presence/absence of a coexisting diabetes mellitus has showed that a decrease in CP was significantly more pronounced in the group of patients with a burdened premorbid background in the form of diabetes mellitus at the acute period, blanching period and at the period of early recovery the than in the first group (305±5.6 mg/L; P <0.001; P2<0.001; 331±7.1 mg/L; P<0.001; P2<0.001; 373±5.6 mg/L; P<0.001; P2<0.001) .

In the group of patients with coexisting diabetes mellitus, CP level has normalized only at the period of late recovery (401±9.8 mg/L; P>0.05; P2<0.05) (Table 4). This indicates a more pronounced imbalance in pro- and antioxidant systems in patients with diabetes mellitus, when a high level of LPO products is accompanied by a deficit of antioxidant protection, which obviously contributes to more pronounced pathological changes in the body.

CONCLUSION

As a result of the experiment, it turned out that lipid peroxidation occurs in biological membranes during the period of erysipelas. This is manifested by an increase in blood MDA level, as well as by a deficit of antioxidant protection and a decrease in the plasma antioxidant (ceruloplasmin). Recorded changes in considered

parameters were more pronounced and returned to normal after treatment on the unfavorable premorbid background – such a serious disease as diabetes mellitus.

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Environmental Health Risk due to Exposure to Lead in Batteries Smelter Industry- Cinangka Village, Bogor, Indonesia

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ABSTRACT

Lead is one of the toxic chemicals causing dangerous air pollution in the environment and its very dangerous for human health whose toxicity lasts for a lifetime because lead accumulates in the human body. Black lead is one of the components of the battery that is needed as the basic material for making batteries. Used batteries can be recycled by melting the lead contained in the plates into black bars that can be reused as raw material for making new batteries. This research was aimed to assess the magnitude of emerging health risk of ambient air Pb exposure to residence at smelter batteries area. This study uses a design of public health risk analysis or also called *Public Health Assessment*. The subject of this study is the human population at risk of being exposed to Pb in this case the people living around the former battery smelter in Cinangka Village. The smallest Pb concentration recorded in the study is 0.00004 mg/m³ which is outside the used battery smelting industry. While the largest Pb concentration recorded is 0.00091 mg/m³ which is located in the used battery smelting industry area. The results of the RQ values in this study indicate that only 4% of respondent has an unaccepted non carcinogenic risk which required risk management action. Futher research on particle toxicology evaluation is recommended to be carried out in the future.

Keyword : Lead, Inhalation, Public Health Assessment, Ambient Air

INTRODUCTION

At present, the problem of poor environmental quality is causing increasingly complex health problems, including air pollution. Polluted air contains dangerous metals about 0.01-3% of all dust particulates in the air. However, the metal was accumulative and synergistic reactions occur in body tissues. The metal in the air that was inhaled has a greater effect than the same dose that comes from food ⁽¹⁾.

Lead is one of the heavy metals that pollute the air and lead exposure continues to be a serious public health problem and the incident is difficult to know ⁽²⁾. Black lead is one of the components of the battery that is needed as the basic material for making batteries. Batteries are one of the important components for power generation for motor vehicles. With the increasing demand for motorized vehicles in Indonesia, of course there is also an increase in the demand for batteries, where the battery needs are also determined by the life of the vehicle so that there will be accumulation of used batteries ⁽³⁾.

Based on a report on the Worst Pollution Issues in the World in 2016 hold by Pure Earth Blacksmith Institute said that recycling and smelting of used batteries became the top 3 polluting industries were included in the worst polluting industries in the world. This industry collectively places more than 32 million people at risk and reaches 7 million to 17 million Disability-Adjusted Life Years (DALYs) in low- and middle-income countries ⁽⁴⁾. Communities living near the battery recycling industry are at risk of being exposed to lead, and contaminating the soil and surrounding plants ⁽⁵⁾. A review of the published literature on the exposure of formal sector lead-acid battery manufacturing and recycling plants in developing countries found that elevated blood and lead concentrations in the air were common ⁽⁶⁾.

The entry of metal Pb compounds into the body through food, drinks, air and penetration of membranes or layers of skin. Some Pb inhaled will enter the pulmonary blood vessels. The absorption rate is strongly influenced by the particle size of the existing Pb metal

compounds and the volume of air that can be inhaled during breathing. Pb metal that enters the lungs will be absorbed and bound to the blood in the lungs and then circulated to all tissues and organs of the body. More than 90% of Pb metal is absorbed by blood binding to red blood cells ⁽⁷⁾.

In Indonesia, in 2014 cases of lead poisoning occurred in Cinangka Village, Ciampea District, Bogor Regency. Based on the report of Komisi Pemberantasan Bensin Bertimbal (KPBB) that pollution in Cinangka Village comes from smelting of used batteries, with lead levels in the ground reaching 270,000 ppm (part per million), this indicates that lead levels have exceeded the threshold values set by WHO that is 400 ppm. In addition, blood lead levels in the local population reached an average of 36.62 mcg / dL, with the highest level of 65 mcg / dL. This shows that the blood lead level of the local population has exceeded the WHO threshold value of 10 mcg / dL ⁽⁸⁾.

Research conducted by Rizqiana Halim in 2016 about the effect of lead in the blood of pregnant women on infant birth weight in Cinangka Village showed that mothers who were exposed to lead had maximum blood lead levels of 17.2 µg / dl this had exceeded the value the normal threshold set by WHO, which is 10 µg / dl ⁽⁹⁾.

Black lead (Pb) in the air can cause adverse effects on human health, including disrupting the biosynthesis of hemoglobin and causing anemia, causing an increase in blood pressure, kidney damage, nervous system disorders that damage the brain and reduce IQ and concentration and reduce men. fertility through sperm destruction ⁽¹⁰⁾.

METHOD

The design of this study was the Environmental Health Risk Assessment (EHRA) which consists of several steps, that are hazard identification, dose-response analysis, exposure assessment, and risk characterization ⁽¹²⁾. Environmental data taken include air ambient. The sample of this study was 101 residents of Cinangka Village obtained through sample size formula and selected by propogitive sampling. The study was conducted from July to Agust 2018.

The calculation of lead intake is obtained from the calculation of Intake (I), through the following equation $I = \frac{C \times R \times t_e \times f_e \times Dt}{Wb \times t_{avg}}$

Explanation:

I = Intake, mg/kg/day

C = Concentration of risk agent (mg/m³)

R = Rate of intake or consumption (m³/hours)

t_e = Exposure time per day (hours /day) for inhalation

f_e = frequency of annual exposure (day/year).

D_t = Duration of exposure, year (real time or projection, 30 years for residential default value

Wb = Weight (Kg)

t_{avg} = Average time period, 30 years x 365 days / year

(non-carcinogenic) or 70 years x 365 days / year (carcinogenic)

Estimation of the level of health risks derived from calculation using Risk Quotient (RQ) is calculated through the equation ⁽¹²⁾:

$$\text{Risk Quotient (RQ)} = \frac{\text{Intake}}{\text{RfC}}$$

The interpretation of the RQ value obtained from the formula calculation is if RQ>1 means having a helath risk. RfC (Inhalation Reference Concentration) is the amount of chemicals that can be inhaled in a lifetime is not anticipated to non-cancer health effects.

RESULT

General Characteristic of Respondent

Distribution of respondents based on gender, education and type of work in the Cinangka Village, Bogor Regency in 2018 can be seen in table 1.

Table 1. Frequency Distribution of Social, Economic and Demographic Characteristics Of Cinangka Village Residents, Bogor District 2018

Variabel	Total	Percentage
Sex		
Male	19	18.8
Female	82	81,2
Education		
No school	15	14.9
Finished Elementary School	66	65.3
Finished Junior High School	13	12.9
Finished Senior High School	7	6.9
Occupotional		
Smelter	13	12.9
Not Smelter	88	87.1
Total	101	100.0

Based on table 1, the frequency distribution of social, economic and demographic characteristic of Cinangka village residents, most of respondents are woman, namely 80.4%. Most of respondents graduated from elementary school (64.7%). Most of the respondents are not smelter that is equal to 87.1%.

Table 2. Characteristic of Anthropometry of Cinangka Village Residents, Bogor District 2018

Variable	Mean \pm SD	Median	Range	Distribution***
Antropometry				
Weight (Kg)	54.34 \pm 10.69	53.00	37-83	Normal
Height (Cm)	152.26 \pm 7.26	151.00	138-175	Normal
Body Mass Indeks (BMI)	23.48 \pm 3.93	23.06	15.90-34.55	Normal
Intake Rate (R, mg ³ /hour)	0.59 \pm 0.04	0.59	0.51-0.69	Normal

Based on the table 2, the average age of respondents is 40.16 years old with a range of 16 to 75 years old. Average weight of respondents is 54.34 kg with a range of 37 kg to 83 kg. For height, the average height of responden is 152.26 cm with range of 138 cm to 175 cm. For body mass index, the average respondent was 23.48

with a range of 15.90 to 34.55.

Concentration of Pb in The Air

Pb concentration test is carried out in 10 points around the smelting industry of used batteries.

Table 3: Concentration of Pb in The Air, Cinangka Village Residents, Bogor District 2018

Location	Pb of Ambient air ($\mu\text{g}/\text{Nm}^3$)	Pb of Ambient Air (mg/m^3)	Temperature ($^{\circ}\text{C}$)	Relative Humidity (%)
Point 1	0.28 $\mu\text{g}/\text{Nm}^3$	0.00028	33 $^{\circ}\text{C}$	56%
Point 2	0.24 $\mu\text{g}/\text{Nm}^3$	0.00024	33 $^{\circ}\text{C}$	55%
Point 3	0.096 $\mu\text{g}/\text{Nm}^3$	0.00009	33 $^{\circ}\text{C}$	54%
Point 4	0.21 $\mu\text{g}/\text{Nm}^3$	0,00021	33 $^{\circ}\text{C}$	56%
Point 5	0.42 $\mu\text{g}/\text{Nm}^3$	0,00042	33 $^{\circ}\text{C}$	56%
Point 6	0.91 $\mu\text{g}/\text{Nm}^3$	0,00091	33 $^{\circ}\text{C}$	58%
Point 7	0.86 $\mu\text{g}/\text{Nm}^3$	0,00086	33 $^{\circ}\text{C}$	51%
Point 8	0.39 $\mu\text{g}/\text{Nm}^3$	0,00039	33 $^{\circ}\text{C}$	50%
Point 9	0.069 $\mu\text{g}/\text{Nm}^3$	0,00006	33 $^{\circ}\text{C}$	52%
Point 10	0.04 $\mu\text{g}/\text{Nm}^3$	0,00004	33 $^{\circ}\text{C}$	52%

Description: Threshold value 2,0 mg/m^3

Pb concentration in the study site with the number of measuring points in a total of 10 samples scattered in each location near the smelter of used batteries. The smallest Pb concentration recorded was 0.00004 mg/m^3 which outside the used battery smelting industry. While the largest Pb concentration recorded was 0.00091 mg/m^3 which located in the used battery smelting industry. The temperature specified at all points is 33 $^{\circ}\text{C}$. The highest and lowest humidity recorded at the research site, respectively 58% and 50%.

Exposure Analysis and Intake Calculation

In this study, the exposure assessment concept used to measure the amount of exposure to analyze the amount

of exposure, namely by calculating the amount of intake (intake) of lead that enters the body. Calculation of intake amount was obtained by calculation based on intake rate (m^3/hour), exposure time (hours/day), annual exposure frequency (day/year), duration of exposure (real time) in years, weight (kg), average time period (30 years x 365 days / year for non-carcinogens and 70 years x 365 days / year for carcinogens).

Calculation of lead intake in 101 respondents used a computer with Microsoft-Excel program. Calculation of intake of lead concentrations in the surrounding environment is obtained using equations ⁽¹²⁾.

$$I = \frac{C \times R \times t_e \times f_e \times Dt}{Wb \times t_{vag}}$$

The example of intake calculation used one of the following sample data of respondents and default data (US EPA) if known:

C : Concentration Pb = 0.00028 mg/m³

R : Intake Rate (m³/hour)

Normal Intake Rate (EPA, 1997 in Ambrianto, 2004): $y = 5,3 \ln(x) - 6,9$

$Y = (5,3) (\ln(56)) - 6,9 = 14,43 \text{ m}^3/\text{day} = 14,43/24 = 0,6014 \text{ m}^3/\text{hour}$

te : 24 hour/day

fe : 350 (day/year) day

Dt : Real Exposure Duration (year) = 48 Years

Wb : Body Weight = 56 kg

t_{avg} : Average Periode (non carsinogenic = 30 years x 365 day/year = 10950 day/year).

The calculation of non carcinogen intake was:

$I = (0,00028 \text{ mg}/\text{m}^3)(0,6014 \text{ m}^3/\text{hour})(24 \text{ hour}/\text{day})(350 \text{ day})(48 \text{ year})$

$(56 \text{ Kg})(10950 \text{ day}/\text{year})$

$= 0,00011 \text{ (mg/kg)}/\text{day}$

The results of the calculation of intake for non-carcinogens obtained intake was 0.00011 (mg/kg)/day. Using the same formula as the example above, the calculation of non-carcinogenic Intakes in 101 respondents (research sample) was calculated with the Microsoft-Excel program.

Table 4 Intake non-carcinogens

Variabels	n	Minimum	Maximum	Median	Std.Dev.
Intake Non-carcinogens	101	0.000001	0.00071	9.0E-5	1.19E-4

The results of the study showed that intake of lead exposure at 101 respondents in Cinangka Village as shown in table 4 obtained the lowest intake value of non-carcinogen 0.00001 (mg/kg)/day and maximum of 0.00071 (mg / kg) / day with a middle value 9.0E-5 (mg / kg) / day.

Risk Characteristics (Risk Characterization)

Calculation of estimated risk level with non-carcinogenic risk calculation equation (RQ) ⁽¹¹⁾ :

Risk Quotients (RQ) = $\frac{\text{Intake}}{\text{RfC}}$

RfC

The concentration value (RfC) for real time RQ is 0.0004 mg / kg / day (IRIS, 2006). The example of non-carcinogen calculation (RQ) using the intake data of one of the sample workers' data is as follows:

Risk Quotients (RQ)_{real time} = $\frac{0,00011 \text{ mg}/\text{kg}/\text{day}}{0,0004 \text{ mg}/\text{kg}/\text{day}}$

$= 0,277$

Table 5 Result of risk assesment of non-carcinogenic risk on community in Cinangka Village Residents

Risk	Frequency	Percentage
Risk of Non-carcinogen (<i>real time</i>)		
RQ>1	4	4%
RQ≤1	97	96%
Total	101	100%

Based on table 5, 4% of respondent has an unaccepted non carcinogenic risk which required risk management action.

DISCUSSION

Non-regulated, informal recycling practices occur in many countries and have resulted in lead exposure and poisoning, with young children being particularly at risk. This practice was carried out in areas with high

population density, which means that this recycling operation has the potential to affect a number of people. A study conducted in Dakar, Senegal about mass lead poisoning which showed that lead poisoning resulted from informal used lead-acid batteries. Stockpiles contained in car batteries are of particular concern because they contribute as much as 80% of lead consumption worldwide and produce lead waste in almost every country ⁽¹⁴⁾.

Based on the measurement results found in Table 3, the largest recorded Pb concentration is 0.00091 mg/m³ which is located in the used battery smelter industry compared to Threshold Value (NAV) in the Government Regulation of the Republic of Indonesia Number 41 of 1999 concerning Quality Raw Air Pollution Control The environment for lead (Pb) in the air was 2.0 mg/m³, the concentration of lead (Pb) around the former smelter environment of Cinangka Village, Bogor Regency was still below the Threshold Limit Value set for exposure during 24 hours per day.

A study of the level of risk of ambient air lead exposure, said that statistically the wind speed has a significant relationship to lead concentration. Increased wind speed also increases the concentration of lead in the air. When the speed of air becomes calm the air temperature in the upper atmosphere becomes higher than the temperature below it ⁽¹³⁾.

Various stages in the recycling process can result in the release of lead smoke and particles in the air. A study has shown that high lead exposure is located at the location of lead-acid battery recycling ⁽⁷⁾. Air lead concentration has been shown to correlate with blood lead concentration in workers. Lead in the air eventually settles and contaminates the surrounding surface.

The results of the RQ values indicate that 4 (4%) of the respondents have a risk of air lead concentration in Cinangka Village. The RQ value in the table shows that lead exposure is not harmful to public health. This indicates that the concentration does not cause non-carcinogenic effects. From the observation of questionnaires were 54.5% who experienced respiratory complaints. The main lead exposure path was most likely through inhalation of Lead dust that enters the body through the inhalation path in the form of particulates, tightly causing the respiratory tract to disrupt.

CONCLUSION

The frequency distribution of the social, economic and demographic characteristics of the villagers of Cinangka, most of the respondents were women, namely 81.2%. Most of respondents graduated from elementary school (65.3%). The average weight, height, and body mass index was 54.34 kg, 152.26 cm, and 23.48, respectively. Most of the respondents (87.1%) are not work in smelting industry. The highest Pb concentration recorded was 0.00091 mg/m³ which located in the used battery smelting industry. The results of the RQ values indicate that only 4% of respondent has an unaccepted non carcinogenic risk which required risk management action. Futher research on particle toxicology evaluation is recommended to be carried out in the future.

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Ethical Clearance: The ethical clearance of this research taken from Ethics Committee of Faculty of Public Health, Universitas Indonesia.

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Evaluation of Bone Mineral Density in Adult Epileptic Patients Treated with Valproate

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ABSTRACT

Background: There is increasing evidence that chronic treatment with antiepileptic drugs is associated with changes in bone metabolism, increasing the risk of fractures in patients with epilepsy. A few studies have investigated the effect of valproic acid on the bone metabolism and bone mineral density, and there are conflicting results regarding the effect of valproate on the bone mineral density with the majority of studies suggesting that valproic acid reduces bone density.

Objective: To evaluate the effect of long-term Valproate monotherapy on bone mineral density and bone biomarkers.

Method: A case-control study was conducted in forty epileptic patients (22 females and 18 males) on a long-term valproic acid therapy. The control group included forty (22 females and 18) apparently healthy volunteers.

Bone mineral density was measured by dual energy x-ray absorptiometry scan at the lumbar spine (L1-4) and blood samples were obtained for all subjects, and analyzed for total serum calcium, phosphate, vitamin D level and parathyroid hormone.

Results: We found a decrease in the bone mineral density T score (osteopenia and osteoporosis) of epileptic group is about 22.5% compared with its percentage in the control group which is 7% only.

We found significantly lower vitamin D level in epileptic group compared with control group (52.5% for epileptic group versus 30% for the control group; including both deficiency and insufficiency).

Conclusions: Bone mineral density Z- and T-score of the lumbar spine in adult epileptic on long-term valproic acid therapy was decreased as compared with age- and sex-matched controls; this result was inversely correlated with the dose and duration of valproic acid therapy.

Keywords: Epilepsy, valproic acid vitamin D, bone mineral density, osteoporosis.

INTRODUCTION

A standard definition of epilepsy is as a disorder of brain characterized by an ongoing liability to recurrent epileptic seizures. An epileptic seizure is defined as the transient clinical manifestations that result from an episode of abnormal neuronal activity^[1].

The increased risk of bone disease in patients with epilepsy manifests as a 1.3 to 3.8 relative risk of osteopenia, a 1.7 to 3.8 relative risk of osteoporosis, and a 1.7 to 6.1 relative risk of fractures^[2].

Risk factors specific to epilepsy or its treatment have been identified. These include^[3]: 1. Fall-related fractures. Patients with epilepsy are at risk for seizure-related falls in addition to falls caused by ataxia, sedation, and gait instability due to either the neurologic pathology underlying the epilepsy or the side effects of Anti-epileptic drugs (AEDs) used to treat seizures.

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2. Direct effects of AED treatment on bone health.

Calcium and its ionized fraction are regulated by parathyroid hormone (PTH)^[4]. Osteoporosis is characterized by reduced bone strength usually accompanied by a reduction in bone mass^[5].

Secondary osteoporosis occurs in association with medical illnesses or medications that results in bone loss^[6].

The major biologically active metabolite, 1,25-dihydroxyvitamin D, plays a central part in maintaining calcium and phosphate homeostasis, Vitamin D is essential for skeletal health, and severe deficiency is associated with defective mineralization resulting in rickets or its adult equivalent, osteomalacia^[7]. Bone Mineral Density is the amount of bone mineral in bone tissue^[8]. Dual-energy X-ray absorptiometry is considered as gold standard for assessing bone density measurement^[9]. Results are generally scored by two measures, the T-score and the Z-score, negative scores indicate lower bone density, and positive scores indicate higher^[10].

Hepatic enzyme inducers, such as phenytoin, carbamazepine, phenobarbital, and primidone, and non-inducing AEDs such as valproate, are known to be associated with accelerated rate of bone loss and development of secondary osteopenia and osteoporosis with an increase in the risk for fractures^[11].

Cytochrome P450 enzyme inducing AEDs are most commonly associated with a negative impact on bone^[12].

Although VPA is a cytochrome P450 enzyme inhibitor; studies do suggest an effect on bone^[13], but negative effects have been reported in other studies^[14].

VPA has displayed a direct effect on bone cultured bone cells, resulting in increased bone turnover with osteoblastic (bone formation) and osteoclastic (bone resorption)^[14].

Serum concentrations of calcium and bone Gla protein (bone formation marker) and pyridinoline cross-linked carboxy-terminal telopeptide of type-I collagen (ICTP – bone resorption marker) were significantly higher with VPA long term therapy^[15].

It is possible that the inhibition of bioactivation

of vitamin D₃ by VPA causes rickets and osteomalacia, and the site of inhibition is expected to be the cytochrome P-450 mediated reactions in liver mitochondria^[16].

AIMS OF THE STUDY

The aim of this study was to evaluate the effect of long-term VPA monotherapy on BMD by DXA measurements and bone biochemical indices in adult epileptic patients.

To clarify the relationship between BMD with dose and duration of VPA monotherapy therapy.

PATIENTS AND METHODS

Subjects:

A case-control study was conducted on 40 patients (22 females and 18 males) at epilepsy clinic of Baghdad teaching hospital, medical city, collected during the period from february-2017 to february-2018.

Subjects for comparison were 40 healthy and active volunteers (22 females and 18 males) collected in the same period at Baghdad teaching hospital. All study subjects were well matched with respect to age, sex, and BMI.

The inclusion criteria:

- 1- Active epileptic patients aged between 18-45 years.
- 2- Patients treated with VPA as monotherapy for first time.
- 3- The duration of therapy should be more than 6 months.
- 4- Patients body mass index (BMI) range from (18.5 to 30).

The exclusion criteria:

- 1- Subjects with known chronic medical illnesses (hypertension, diabetes mellitus, and renal, thyroid and parathyroid diseases) or neurological disease other than epilepsy.
- 2- Subjects with history of pathological bone fractures.
- 3- Subjects with vitamins supplement,

glucocorticoid, anabolic steroid, calcitonin and other drugs known to effect bone metabolism.

4-History of cigarette smoking or heavy alcohol use.

5- Pregnant women, women with amenorrhea and hysterectomy.

6. Extreme activity life style (Extremely inactive, extremely active).

7- Subjects with diet restriction.

Method

Forty registered epileptic patients in the epilepsy clinic of Baghdad teaching hospital were selected.

Forty control healthy people were selected in an appropriate manner to balance gender, age, physical activity level and BMI differences with epileptic group. Volunteers chosen to participate in this study after clarifying the study objectives and radiation risk. The same exclusion criteria as the epileptic group were applied to control group.

A questionnaire was administered to all subjects and including the following:

1. Demographic information's: about gender, age, and the physical activity.

We assess the physical activity according to (WHO scale)^[17].

2. Epilepsy characters: type of epilepsy (according to *ILAE* classification), duration of epilepsy and control status^[18].

3. Pharmacological information's about type, dose and duration of VPA therapy.

4. Biochemical bone markers: including serum calcium, phosphate, PTH and 25-OHD level.

5. Body mass indices measurements of all subject.

6. Results of DXA scan (lumber spine, T score and Z score).

All subjects had BMD measured by the same validated densitometer (stratos ver.v3.0.8.3 13/01/2014) to eliminate measurement error.

On the same day as bone density evaluation, blood

samples were obtained from all subjects, and analyzed for total serum calcium, serum phosphate, parathyroid hormone and serum vitamin D level (Serum 25-OHD).

Statistical analysis:

The SPSS (Statistical Package for the Social Science) program, version 23, was used for all computerized statistical analyses.

RESULTS

Baseline demographic and clinical characteristic of study subjects were shown on Table1.

Although not presumed as inclusion criteria, all patients enrolled in this study had been diagnosed with idiopathic generalized epilepsy; 31 patients (77.5%) had generalized tonic-clonic epilepsy, 5 patients (12.5%) had juvenile myoclonic epilepsy and 4 patients (10%) had myoclonic-tonic-clonic epilepsy. The mean dose of VPA therapy (742.5 ± 390.2 Mg/day). The mean duration of VPA therapy was (4.9 ± 3.2) years.

The mean serum calcium was (9.1 ± 0.9) and (8.9 ± 0.8) for both epileptic and control group respectively; both values were within normal range and there was no significant statistical difference (p value was 0.4568). Table 2.

The mean serum phosphate was (3.7 ± 1.1) and (3.5 ± 0.6) for epileptic and control group respectively; both values were within normal range and there was no significant statistical difference (p value was 0.3379).

The mean vitamin D levels for epileptic group was in the insufficient range (26.6 ± 12.3); 47.5% had normal vitamin D levels, 52.5% had low vitamin D level; (37.5% of them had vitamin D insufficiency and 15% had vitamin D deficiency), While the mean vitamin D level for control group was in the normal range (32.9 ± 10); 70% had normal vitamin D level, 25% had vitamin D insufficiency level and 5% had vitamin D deficiency. Note that, There was significant statistical difference (p value was 0.0135).

The mean PTH for epileptic group was (56.4 ± 38.4) which was in the upper limit of normal range and significantly ($p= 0.0015$) higher than that of control group which was (35.1 ± 13.5).

For epileptic group (75% had normal serum PTH level, 22.5% had hyperparathyroidism and 2.5% had

hypoparathyroidism.

For control group (97.5% had normal serum PTH level and 2.5% had hypoparathyroidism).

Result of BMD:

There was statistically significant difference between mean BMD Z score of the lumber spine (L1-4) for epileptic and control group. The mean lumber BMD Z score of epileptic group was significantly lower than that of control group. In addition, the mean BMD T score show statistically significant difference between the two groups; Table 3 elucidate the results.

Among epileptic group there was 31 patient (77.5%) had BMD T-score above -1 SD (normal), 8

patients (20%) had BMD T-score between -1 and -2 SD (osteopenic), 1 patient (2.5%) had BMD T-score of -2.7 SD (osteoporotic).

Among control group there was 37 patients (92.5%) had BMD T-score above -1 SD (normal) and 3 patients (7.5%) had BMD T-score between -1 and -2 SD (osteopenic), (according to T-score BMD of lumber spine – WHO definition).

The correlation between BMD Z-score with the dose, duration, vitamin D level and PTH was shown in the table 4; The correlation coefficient (*regression analysis r value*) was used to assess the strength and direction of a linear relationship between two variables on a scatter plot, figures 1,2.

Table 1: baseline characters of study subjects

		epileptic (n=40)		Control (n=40)		P value
Age		30.1 ± 8.2		29.1 ± 7.2		0.6180
Sex		No.	percentage	No.	percentage	1.00
	Males	18	45%	18	45%	
	Females	22	55%	22	55%	
Physical activity level	sedentary	12	30%	5	12.5%	0.178
	Moderate	23	57.5%	25	62.5%	
	Vigorous	7	17.5%	10	25%	
Body mass index (kg/m2)		26.8 ± 3.5		25.1 ± 1.7		0.8475
Type of epilepsy	Generalized	40	100%	----		
	Focal	0	0%	----		
Control status	controlled	27	67.5%	----		
	uncontrolled	13	32.5%	----		
Duration of epilepsy		6.1 ± 2.4		----		
Dose of VPA (mg/day)		742.5 ± 390.2		----		
Duration of VPA therapy (yr)		4.9 ± 3.2		----		

Table 2 biochemical indices for study subjects			
Variable	Epileptic (mean ± SD)	Controls (mean ± SD)	P value
Serum calcium (mg/dl)	9.1 ± 0.9	8.9 ± 0.8	0.4568
Serum Phosphate (mg/dl)	3.7 ± 1.1	3.5 ± 0.6	0.3379
Vitamin D level (ng/ml)	26.5 ± 12.3	32.9 ± 10	0.0135
Parathyroid hormone (pg/ ml)	56.4 ± 38.4	35.1 ± 13.5	0.0015

Table 3 Bone mineral density of the lumber spine.			
Lumbar spine BMD (L1-4)	Epileptic (Mean ± SD)	Controls (Mean ± SD)	P values
BMD Z-score	-0.39 ± 1.1	0.1 ± 0.98	0.0312
BMD T-score	-0.33 ± 1.15	0.15 ± 0.976	0.0434

Table 4 Distribution of factors that related to BMD Z-score		
Variable	r values	p values
Dose (mg/ day)	-0.4	0.002
Duration of VPA therapy	-0.6	0.0001
Vitamin D level (ng/ml)	+0.4	0.002
PTH (pg/ml)	-0.4	0.002

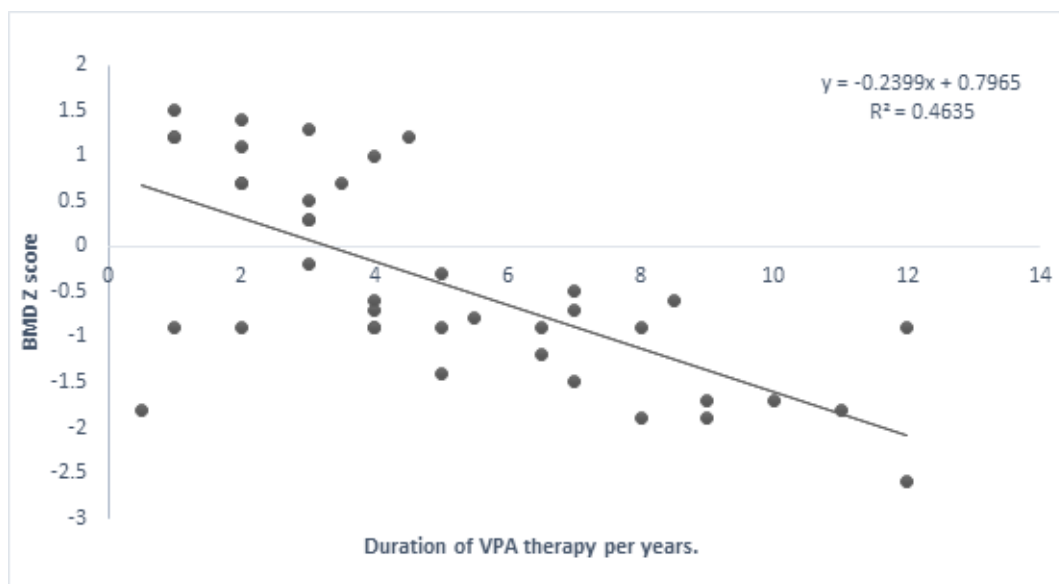


Figure 1: Show significant moderate to strong inverse (negative) correlation between BMD Z-score with the Duration of VPA therapy per year. (r = -0.6 and p = 0.0001).

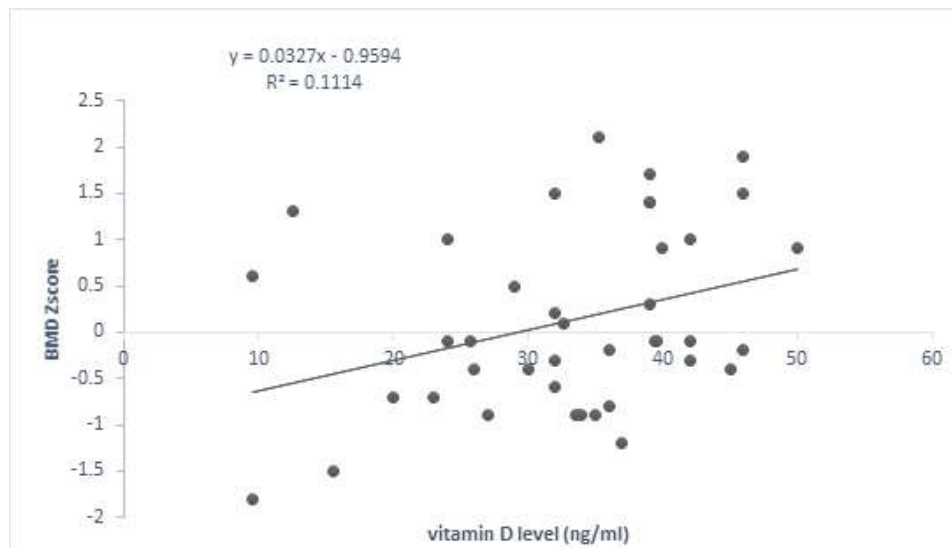


Figure 2: Show significant weak to moderate direct (positive) correlation between BMD Z-score and vitamin D level. ($r = +0.4$ and $p = 0.002$).

DISCUSSION

We found that the mean serum calcium and phosphate, for epileptic and control groups were within normal range, and there are no significant statistical differences between two groups, table 2. This result was consisted with some previous studies^[19].

In the present study, we found significantly lower vitamin D level in epileptic group compared with control group (52.5% for epileptic group versus 30% for the control group; including both deficiency and insufficiency). Both groups were from the same geographical area, so the effect of sunshine exposure is unlikely to have played an important role; this result was consisted with the results of studies conducted by Shellhaas et al.^[20] and Sato et al^[13].

As observed in present study, the mean PTH for epileptic group was within the upper limit of normal range and it was significantly higher than control group; there were nine cases (22.5%) of secondary hyperparathyroidism noted in the epileptic group while no case was noted in control group, this mean that the BMD was decreased with increasing serum PTH level, and this result is consisted with the result of study conducted by Boluk et al^[21].

Secondary hyperparathyroidism in the present study may be explained by decrease level of biologically active vitamin D that leads to decreased absorption of calcium in the gut, resulting in hypocalcaemia and an increase in

circulating PTH^[22]. PTH then increases the mobilization of bone calcium stores and subsequent bone turnover. However, the mean serum calcium in the present study was within normal range and did not correlate with the deficiency of vitamin D; this may be explained by long duration of secondary hyperparathyroidism that lead to correction of serum calcium on expense of bone demineralization^[22].

We found a decrease in the BMD T score (osteopenia and osteoporosis) of epileptic group is about 22.5% compared with its percentage in the control group which is 7% only.

The observation of low BMD in adult epileptic patients in our study was consistent with some previous studies^[21].

CONCLUSIONS

Long-term VPA therapy results in reduction of bone mineral density in adult's epileptic patients.

Low bone mineral density correlated inversely with the dose and duration of VPA therapy.

Low bone mineral density correlated directly with vitamin D level and inversely with parathyroid hormone in the epileptic patients with long-term VPA therapy.

Ethical Clearance-taken from Iraqi Board for Medical Specialization /Ministry of Higher Education And Scientific Research /Republic of Iraq.

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Policy and Role Analysis Integrated Health Education Centers for Non-Communicable Diseases Toward The Prevention and Controlling of Hypertension

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ABSTRACT

Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (Posbindu PTM) is a place of community participation for early detection, preventing and controlling hypertension of non-communicable diseases. *Posbindu PTM* is one of the promotional and preventive health efforts that is implemented in an integrated, routine, and periodic, and the non-communicable risk factors that are found immediately refer to basic health care facilities. It is necessary to examine the role of *Posbindu PTM* in controlling hypertension risk factors.

The study used a combination method approach with sequential exploratory design. Exploratory design was begun with the main qualitative method to know the knowledge, attitude and behavior of members of *Posbindu PTM* to hypertension. The results of qualitative and quantitative methods were analyzed to develop the Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (*Posbindu PTM*).

People feel useful coming to *Posbindu PTM*, so want to come every month. The active community who came to *Posbindu PTM* increased their knowledge about Hypertension and non-communicable disease (PTM).

The community who actively coming to *Posbindu PTM* supported the behavior of preventing and controlling of hypertension. *Posbindu PTM* can play a role in controlling hypertension for active members.

Keywords: *Posbindu PTM, behavior, prevention of hypertension, Analysis Policy.*

INTRODUCTION

Non-communicable diseases (NCDs) has been the leading cause of death in Indonesia 71% in 2012, specially heart, diabetes, cancer and chronic respiratory diseases¹. The non-communicable diseases (NCDs) can be prevented through effective intervention against risk factors, including: tobacco use, unhealthy diet, inadequate physical activity and alcohol use².

Non-communicable disease (NCDs), also known as chronic disease or lifestyle-related illness is not transmitted from person to person³. The effort of prevention and control of non-communicable diseases

under development in Indonesia is Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (Posbindu PTM). The purpose of *Posbindu PTM* is to increase community participation in preventing and early discovery of non-communicable diseases risk factors.. The activities of the post are measurement of body weight, height, body mass index (BMI), abdominal circumference, and blood pressure, physical activity and/joint exercise and counseling.

WHO recommends a healthy lifestyle by eating lots of fruits and vegetables, reducing fat, sugar and salt intake as well as exercise⁴. The developing post is one

of the efforts to prevent and control non-communicable risk factors. The purpose of this research is to know the role of *Posbindu PTM* to increase knowledge, attitude and behavior to prevent and control hypertension and other non-communicable diseases.

MATERIAL AND METHOD

The study used a combination method approach with sequential exploratory design. Exploratory design was begun with the main qualitative method to know the knowledge, attitude and behavior of members of *Posbindu PTM* to hypertension. The finding results were proved by quantitative methods to determine the knowledge, attitudes, behavior of members on prevention and controlling hypertension.

Qualitative Methode: 85 member informants who participated in 10 (ten) *Posbindu PTM* activities. The population in this study was members of *Posbindu PTM* in 10 districts/cities in Bengkulu Province. The number of samples in this study is determined based on the number of members of *Posbindu PTM* in selected districts/municipalities with stratified random sampling cluster sampling technique, based on the number of members of *Posbindu PTM*, mostly medium and very few. The number of members 1580 based on registration each month from 79 posts. The samples to measure hypertension with the criteria of visits at least 6 months regularly every month to *Posbindu PTM*. The number of samples to know the knowledge, attitude and behavior of 472 members with the way insidental sampling at the time of the implementation at *Posbindu PTM*.

RESULTS

Result of qualitative method with case study approach was at 10 *Posbindu PTM*. Preparation for the implementation of was done by cadre and public health center officers. Cadre invited the head of neighborhood association/head of hamlet to mobilize the community to utilize *Posbindu PTM*. The results of interviews with cadre were as follows:

Members *Posbindu PTM* every Friday morning doing gymnastics together in the public health center, integrated counseling post of non-communicable disease was held once a month every Friday on the third of the month. The activities include blood tests, weight measurement, and height once a month (Cadre *Posbindu PTM F*)

The members who actively come to *Posbindu PTM* feel the benefits of following the activities. They got knowledge about the risk factors and prevention of hypertension, and also checked up their health. *Postbindu PTM* activities begin with registration, measurement of height, weight, abdominal circumference, and blood pressure/ tension. Certain members check for instantaneous sugar, cholesterol and uric acid in the blood. Members get counseling who have hypertension risk and counseling about non-contagious diseases for all members. Counseling about the non-communicable diseases conducted every month aims to improve knowledge, change attitudes and behavior of society against hypertension and other non-communicable risk factors. Based on the interview result, one member said:

..The treatment, counseling, examination (height, weight, blood pressure, blood sugar, check up disease, medication, non-communicable diseases/ clean and healthy life behavior, every month comes to *Posbindu PTM* (Informant 2, *Posbindu PTM B*) ...

The Information from participants on the implementation of *Posbindu PTM* can be concluded, all say useful because it can know the condition of health, increase knowledge about hypertension and other non-communicable diseases, so every month trying to come to *Posbindu PTM*.

Qualitative results compiled by dependent and independent variable, knowledge about *Posbindu PTM*, hypertension and other PTM, and attitude, behavior of non-contagious diseases prevention can be seen in Table1.

Table 1: Knowledge, Attitude, Behavior toward Posbindu PTM, Hypertension and other commnucable diseases

Research Variables	Category	Category		p value
		Prevention behavior of PTM		
		Less	Good	
Knowledge of non-coomunicable diseases	Less	72,6%	27,4%	0,000
	Good	30,4%	69,6%	
		Knowledge of PTM (non-communicable diseases)		
		Less	Good	
Behaviour of coming to Posbindu PTM	Less	40,5%	59,5%	0,002
	Good	24,2%	75,8%	

Knowledge of PTM (non-communicable diseases) with behavior of preventing hypertension and other non communicable diseases, statistical test analysis using chi square test obtained results p value 0,000 <p 0.05, with 5% confidence degree. Means there is a relationship of knowledge with behavior to prevent hypertension and other non-communicable diseases.

Bivariate statistical test analysis using chi square test obtained p value 0,000 <p 0.05 with 5% confidence

degree. It means there is a relationship between behavior of coming to Posbindu PTM with behavior to prevent hypertension and other non-communicable diseases..

Multivariate analysis using General Linear Statistical Test Model Repeated Measures one group. The results of this analysis will show the decrease of normal hypertension members of the first month, second, third and so on can be seen in Table 2.

Table 2 : Analysis result of General Linier Model Repeated Measures Toward members with Normal Blood Preasure

Month	Total n	n of Events	N	Percent
1 st	428	0	428	100%
2 nd	428	24	404	94.4%
3 rd	428	64	364	85.0%
4 th	428	80	348	81.3%
5 th	428	109	319	74.5%

Source : Processed Primer Data

DISCUSSION

The role of Posbindu PTM

Knowledge, Attitudes, and Prevention Behavior of PTM

The result of research showed there is correlation of

knowledge with behavior of non-communicable diseases prevention and there is relationship of coming behavior to Posbindu PTM with behavior of prevention to non-communicable diseases. Increased public knowledge facilitatted officers in implementing the program, and improve community utilization. The NICE study (2008), the invasion of community involvement showed

patients were activated to take a larger share and control in managing their own conditions⁵. According to WHO (2015) integrated health services are managed health services and ensure the continuity, including health promotion, disease prevention, diagnosis, treatment, disease management and rehabilitation on different levels of the health system as required⁶. Increased knowledge was associated with behavior to prevent hypertension and other non-contagious diseases. Green in Ashwell and Barclay (2009), said that the health of individuals or communities were influenced by two factors: a) behavioral factors and b) factors outside behavior (non-behavior). Furthermore, behavioral factors according to Green, grouped 3 (three) behavior change factors that predisposing (predisposing), enabling (enabling), reinforcing (reinforcement)⁷.

The Health Belief Model (HBM) was developed to find out why people did or did not use the prevention services offered, and have grown to address new problems in prevention and detection (eg, screening) as well as lifestyle behaviors such as healthy living behaviors and injury prevention. The Health Belief Model (HBM) argued that health behavior was determined by two cognitions: the perception of disease threats and behavioral evaluation to counteract threats. Members who actively come to *Posbindu PTM* increased knowledge about preventing, controlling and the impact of *PTM*, so that the members having behavior to control hypertension.

The concept of Health Belief Model explains⁸, namely: 1) Perceived Severity is the subjective belief of individuals in the spread of disease caused by behavior or believe how dangerous the disease so as to avoid unhealthy behavior to avoid pain. Perceived severity also has a positive relationship with healthy behavior. If the perception of individual severity is high then he will behave in a healthy manner; 2) Perceived Benefits is a belief in the advantages of recommended methods to reduce the risk of disease.

Health Belief model developed on empowerment of *Posbindu PTM* to know whether the members actively use *Posbindu PTM* every month. The Health Belief model is most often applied to preventative and asymptomatic health issues such as cancer detection and early hypertension, and is relevant to interventions to reduce risk factors for cardiovascular disease⁹.

In *Posbindu PTM* activities, members were given counseling about non communicable diseases including hypertension and given special counseling for members suffering from hypertension in detail described hypertension control efforts. According to Alsairafi (2010) the increased risk of physical inactivity in controlling hypertension in our study suggested that general practitioners should be used to prescribe strenuous physical exercise¹⁰. According to Muhamedhussein (2016) tried to show the level of hypertension and know the risk factors that could explain the high prevalence of hypertension¹¹. Beigi (2014) said that educational interventions had a highly desirable effect on lifestyle modification and control of blood pressure. Control hypertension in the population requires public education programs to promote hypertensive awareness and lifestyle modification which it is an urgent need¹².

The relationship of coming behavioral to *Posbindu PTM* with the behavior of preventing hypertension had an impact on the decrease of hypertension members in the first, second, third, forth, and fifth month.. This strategy will address the behavioral and environmental factors associated with the prevention and control of high blood pressure to achieve three sub-goals (prevention, early detection and control of hypertension). There are three main strategies: public health promotion, health care system and system support strategy¹³.

Overall, this study determined the high prevalence of hypertension in the study population. Hypertension is associated with smoking, alcohol consumption, low physical activity, obesity, and diabetes. Community-based approaches to reducing hypertension and risk factors are important. Effective community-based prevention and control strategies can provide the best opportunity to avoid hypertension-driven health and economic consequences in Nepal¹⁴. Researchers recommend: 1) raising awareness of hypertensive patients about hypertensive risk factors is very important to be motivated to adopt healthy lifestyle behaviors in an effort to control the disease; 2) encourage hypertensive patients to change essential lifestyle behaviors including regular physical activity adoption, proper weight control, follow proper diet, stop smoking and alcohol, reduce stress as much as possible; 3) the focus must be on public education in understanding high blood pressure and its impact on public health; 4) understanding the status of patient knowledge and perception for modification of lifestyle behavior as an important factor in the control

of hypertension¹⁵.

Policy Analysis Posbindu PTM

People who come every month follow the activities at *Posbindu PTM*, know the health condition, get knowledge about the effort to prevent, prevent the non-contagious diseases and feel the benefits of the implementation of *Posbindu PTM*. *Posbindu PTM* integrated with mobile public health center could modify factor, cultivate trust and action to take advantage at *Posbindu PTM*. WHO (2015) recommended a more people-centered and integrated health system to help build a more effective health system⁶.

Following the activities of *Posbindu PTM* could modify the knowledge of factor because of counseling was given to the members, early detection of disease by performing measurements and blood tests such as blood sugar, cholesterol and uric acid and other examinations. This study showed that community-based lifestyle interventions delivered by trained field health workers may be a potential solution to combat hypertension and diabetes mellitus among middle-aged and elderly people in resource-poor environments¹⁶.

Posbindu PTM is one of the main containers of the implementation of Healthy Living Community Movement (GERMAS). *Germas* is a systematic and planned action undertaken jointly by all components of the nation with awareness, willingness and ability to behave healthy to improve the quality of life. Most of the activities carried out on the post One of the activities of routine medical examination is the main activity of *Posbindu PTM* which strongly supports *Germas*.

Successful *Germas*, can not only rely on the role of the health sector alone. The role of Ministries and Institutions in other sectors also determines, and is supported by the participation of all levels of society. *Posbindu PTM* increase knowledge and understanding of society to behave “Cerdik” (Health Check periodically, Awake smoke cigarette, Diligent physical activity, Healthy diet with balanced nutrition, adequate rest and Manage stress). Activity *Posbindu PTM* will be able to improve the success of *Germas* which aims to increase awareness, willingness and ability of people to behave healthy, including controlling hypertension in an effort to improve the quality of life.

CONCLUSION

Posbindu PTM aimed to make early detection, prevent and control blood pressure of the members. The activities of *Posbindu PTM* performed the measurement of blood pressure, non communicable diseases including hypertension, counseling for members indicated by non-communicable disease based on examination and measurement results.. Active members felt useful following *Posbindu PTM*, and they always want to come every month. The members who were suffering from hypertension and actively come every month could control blood pressure down to 74.1% of patients in the fifth month. The role of *Posbindu PTM* with the activities of measuring blood pressure, height, body weight, counseling/education, counseling for hypertension indicated members could improve knowledge and healthy behavior to control members with active hypertension. *Posbindu PTM* is one of the main containers of the implementation of Healthy Living Community Movement (GERMAS).

Conflict of Interest Statement: The authors declare that there is no conflict of interest.

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Association of Apolipoprotein E Polymorphism with Cognitive Functions in Elderly

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ABSTRACT

Objective: This study aims to examine the association between apolipoprotein E polymorphism (APOE) and cognitive functions test using Montreal Cognitive Assessment- Indonesian version 2012 (MoCA-Ina) in elderly.

Method: A cross-sectional study of 112 elderly participants from two nursing homes in Jakarta. APOE gene polymorphism was analyzed using polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP).

Results: There are four genotypes: E2/E2 10(8.9%), E3/E3 38(33.9%), E3/E4 46(41.1%) and E4/E4 18(16.1%). The percentage of E2 allele 20(8.9%), E3 122(54.5%), E4 82(36.6%). The cognitive function test, MoCA-Ina \geq 26: 34(40%) participants with genotype E2/E2 3(8.8%), E3/E3 7(20.6%), E3/E4 16(47.1%) and E4/E4 8(23.5%). MoCA-Ina $<$ 26: 51(60%) 51 participants with genotype E2/E2 7(13.7%), E3/E3 14(27.5%), E3/E4 22(43.1%) and E4/E4 8(15.7%). A significant relationship between APOE gene polymorphism with MoCA-Ina-abstractation: E3/E4 vs. E3/E3 p 0.019, E4/E4 vs. E3/E3 p = 0.028, a significant relationship between APOE gene polymorphism with MoCA-Ina-language: E3/E4 vs. E2/E2 p = 0.03, E4/E4 vs. E2/E2 p 0.029, and a significant relationship between APOE gene polymorphism with naming: E3/E4 vs. E2/E2 p = 0.048.

Conclusion: High percentage of APOE allele E4 may be one of the causes of high cognitive function decline. APOE gene polymorphisms associated with the decreased cognitive function; abstraction, language, and naming. Allele E4 may be a potential factor for cognitive function decline.

Keywords: MoCA-Ina, Elderly, polymorphism, APOE, gene.

INTRODUCTION

Dementia is a complex neurodegenerative disease in the elderly with multifactorial causes and characterized by various cognitive abnormalities, which could interfere with daily activities. ^(1,2) Alzheimer's Disease (AD) is one of the most common types of dementia and associated with the aging process. AD results in a gradual decline in cognitive functions and daily activity due to degeneration processes that damage the brain structures and neurotransmitters. ^(1,3) In the AD, the patient's ability to remember, understand, communicate and comprehend causality decreases gradually, which ultimately lead

to death. ^(1,3-5) Many factors can clinically affect the progress of the damage, including brain atrophy^(1,6-8), vascular factor^(1,9) and immunological factor.^(1,10) Currently 35 million people have dementia worldwide, expected to reach 65 million by 2030 and 113 million by 2050. ⁽⁵⁾ The prevalence of dementia in Indonesian older adults aged 65 years is 5% and increases to 20% at aged above 85. ⁽¹¹⁾

A genetic factor that is known to play a role in the development of AD is the APOE gene polymorphism, lies on chromosome 19 and has three alleles: E2, E3, E4 and six genotype variations: E2/E2, E2/3, E2/4, E3/

E3, E3/E4 and E4/E4.^(12, 13) The allele E4 is associated with an increased risk of the AD (14-16), whereas the allele E2 appears to be a protective factor.^(5, 17) Having APOE genotype E4/E4 not only increases the risk of AD but also affects the cognitive symptoms and neuroanatomical forms of the disease. E4 carriers tend to have worse memory decline compared to non-carriers, while the APOE E4 non-carrier tend to have more difficulty maintaining attention, working memory, executive functions, and lexical access.⁽¹⁴⁾

This genetic factor is stronger in the European population⁽¹⁸⁾ and weaker in the African, American and Hispanic community.^(5, 19) Recent studies show that the effects of APOE E4 allele on cognitive functions depend on the age and level of education of the individuals.⁽²⁰⁾ It is still debatable whether APOE E4 is related to cognitive functions or cognitive impairment.⁽²⁰⁾ With polymerase chain reaction-restriction fragment length polymorphism, the association between APOE E4 polymorphism and cognitive function was analyzed.

MATERIALS AND METHOD

Collection of Samples

Participants of this a cross-sectional was 112 elderly aged between 60 - 90 years, consisting of 99 women and 13 men from two nursing homes in Jakarta. The DNA was analyzed to find out APOE genotypes. Cognitive functions examination was carried out on 85 female participants using MoCA-Ina questionnaire and its items (visuospatial, naming, attention, language, abstraction, memory delay, orientation) from the neurology department, University of Indonesia. MoCA-Ina scores divided into normal cognitive function ≥ 26 and cognitive impairment < 26 .

PCR-RFLP Analysis

Blood samples obtained from a peripheral vein using 3 ml vacutainer tubes containing EDTA. The blood samples were centrifuged for 30 minutes at 3000 rpm and separated into serum from sediment. The sediment Examined for APOE genes. DNA is extracted from blood samples using a DNA Extraction Kit (Bioline) according to the manufacturer's instructions.

DNA extraction

200 ul of the blood sample inserted into a 1.5 ml sterile microcentrifuge tube. 20 ul Proteinase K then

added into the tube. The solution is homogenized by pipetting and then incubated at 60 ° C for 5 minutes. Add 200 ul Buffer GSB (Geneid) and vortex the tube. Incubate the tube again at the same temperature for 2 minutes. Add ethanol absolute (96%) and vortex for 10 seconds. Pour the mixture into the spin column and centrifugate at 14,000 xg for 1 minute. Remove the collection tube under the spin column and replace it with a new one. Add 400 ul of buffer W1 and centrifuge for 30 seconds with the same speed. Discard the liquid that is on the collection tube. Add 600 ul of wash buffer (Geneid), centrifuge the mixture for 30 seconds, and dispose of liquid in the collection tube. Centrifuge again for 3 minutes. Remove the collection tube and place a sterile microcentrifuge below the spin column. Next, add 100 ul of Elution buffer. Let the mixture stand for 3 minutes and then centrifuge with the same speed for 30 seconds. The fluid containing the DNA stored in a microcentrifuge tube at -20 ° C and will be used as template DNA for PCR.

The genotype of the APOE gene

The extracted DNA added into PCR Mix, which consists of 5 μ L 5X buffer, 2 μ L MgCl₂, 1 μ L dNTP mix, 1 μ L APOE-F Primer (5'-ACA GAA TTC GCC CCG GCC TGG TAC AC-3'), 1 μ L Primary APOE-R (ApoE-R: 5'-TAA GCT TGG CAC GGC TGT CCA AGG A-3'), 0.25 μ L Hotstart Taq (Qiagen) enzyme, 5 μ L DNA template and free-water nuclease. The total volume is 50 μ L. The amplification process started with one cycle of pre-denaturation at 95°C for 7 minutes. It was followed by 40 cycles of the following steps: denaturation at 95°C for 45 minutes, followed by annealing 65°C for 45 seconds and extension at 72°C for 1 min. The gene polymorphism is determined using PCR-RFLP in 112 subjects, and the APOE gene was successfully amplified at 244 bp band, three alleles and six genotypes could be generated after excavation with HhaI endonuclease restriction (BioLabs).

Data Analysis

The statistical analysis was done to examine the relationship between APOE genotypes and alleles with MoCA-Ina questionnaire and its items (visuospatial, naming, attention, language, abstraction, memory delay, orientation).

RESULTS

MoCA-Ina questionnaire were conducted to determine the number of research participants who had with impaired cognitive function. The effect of APOE gene E4 on the cognitive function is different according to age.⁽¹⁷⁾

Table 1. Relationship between MoCA-Ina score and age

MoCA-Ina	Age (years), Frequency in % (n)		
	60 – 70	71 – 80	81 – 90
≥ 26	38.24 (13)	38.24 (13)	23.52 (8)
< 26	21.57 (11)	45.1 (23)	33.33 (17)

Fisher’s Exact Test Exact: Sig. (2-sided) p 0.239

As shown in table 1; 85 participants divided into three groups: age group of 60-70, 71-80 and 81-90 years. The age group of 60 - 70 years: Percentage of participants with MoCA-Ina ≥ 26: 38.24% (13) and < 26: 21.57%(11). The age group of 71 - 80 years: Percentage of participants with MoCA-Ina ≥ 26: 38.24%(13) and < 26: 45.1%(23). For the age group of 81 - 90 years:

Percentage of participants with MoCA-Ina ≥ 26: 23.52%(8) and < 26: 33.33%(17). These results show an increase in the percentage of impaired cognitive function in the age group of 71-80 years, indicating the highest number of participants with mild cognitive impairments. There was an insignificant relationship between MoCA-Ina and age groups with p = 0.239.

Table 2. Relationship between age groups and MoCA-Ina items

Age Group	MoCA-Ina Item	P-Value (Mann-Whitney)
60-70 vs 71-80	Naming	0.035
	Orientation	0.036
71-80 vs 81-90	Naming	0.018
	Orientation	0.036
60-70 vs 81-90	Naming	0.000

Table 2 shows a significant decrease in the MoCA-Ina item naming when comparing the groups 60-70 vs. 71-80 years with p = 0.035, and the groups 71-80 vs. 81-90 years with p = 0.018. A significant decrease in the MoCA-Ina item orientation is also observed when comparing the groups the 60-70 vs. 71-80 years with p = 0.036, 71-80 vs. 81-90 years with p = 0.036 as well as 60-70 vs. 81-90 with p = 0.00.

Table 3. PCR-RFLP Analysis of APOE gene polymorphism

	Genotype Frequency, % (n)				Allele Frequency, % (n)		
	E2/E2	E3/E3	E3/E4	E4/E4	E2	E3	E4
Total = 112	8.9 (10)	33.9 (38)	41.1 (46)	16.1 (18)	8.9 (20)	54.5 (122)	36.6 (82)

Table 3 shows the APOE gene polymorphism by PCR-RFLP of all 112 participants. Results of shows the distribution of genotypes: E2/E2 8.9%(10), E3/E3 33.9%(38), E3/E4 41.1%(46), E4/E4 16.1%(18). The allele distribution were: E2 8.9% (20), E3 54.5%(122), E4 36.6%(82).

Table 4. Relationship MoCA-Ina score and APOE gene polymorphism

		Genotype frequency, % (n)				Allele frequency, % (n)		
		E2/E2	E3/E3	E3/E4	E4/E4	E2	E3	E4
MoCA-Ina Total= 85	≥26 (34)	8.8 (3)	20.6 (7)	47.1 (16)	23.5 (8)	8.8 (6)	44.1 (30)	47.1 (32)
	<26 (51)	13.7 (7)	27.5 (14)	43.1 (22)	15.7 (8)	13.7 (14)	49.0 (50)	37.3 (38)

Fisher’s Exact Test Exact: Sig. (2-sided) p = 0.704

Table 4 shows the APOE gene polymorphism amongst 34 participants who obtained MoCA-Ina \geq 26: E2/E2 8.8%(3), E3/E3 20.6%(7), E3/E4 47.1%(16), E4/E4 23.5%(8). The 51 participants who obtained MoCA-Ina $<$ 26 consist of: E2/E2 13.7%(7), E3/E3 27.5% (14), E3/E4 43.1%(22), E4/E4 15.7%(8).

Table 5 : Relationship APOE gene polymorphism and MoCA-Ina items

Genotype Comparison	MoCA-Ina Item	P-Value (Mann-Whitney)
E3/E4 vs E3/E3	Abstraction	0.019
E3/E4 vs E2/E2	Language	0.03
	Naming	0.048
E4/E4 vs E3/E3	Abstraction	0.028
E4/E4 vs E2/E2	Language	0.029

Table 5 shows a comparison between the APOE genotypes regarding items from MoCA-Ina in 85 participants. Analysis shows a significant relationship between APOE gene polymorphism and Abstraction: E3/E4 vs E3/E3 with p 0.019, E4/E4 vs E3/E3 with p = 0.028, language: E3/E4 vs E2/E2 with p 0.03, E4/E4 vs E2/E2 with p 0.029, as well as the item naming: E3/E4 vs E2/E2 with p 0.048. The allele E4 may be a contributing factor to the impairment of abstraction, language and naming abilities.

DISCUSSION

Memory seems to be of paramount importance as far as the cognitive decline is concerned, and other symptoms tend to receive less attention. This study shows that the age group 71-80 years is the most susceptible towards dementia with the highest percentage of individuals with impaired cognitive functions and the percentage decreases in the 81-90 years age group. This situation is not common as the risk of dementia increases with age. A significant drop in the item naming when comparing the age groups 60-70 vs. 71-80 with p = 0.035, and 71-80 vs. 81-90 with p = 0.018. A significant decrease is also observed for the item orientation when comparing the age groups 60-70 vs 71-80 with p = 0.036, 71-80 vs. 81-90 with p = 0.036 as well as 60-70 vs. 81-90 with p = 0.00.

The DNA analyzed using PCR RFLP of the 112 study participants found distribution of APOE gene

polymorphism: E2/E2 8.9%(10), E3/E3 33.9%(38), E3/E4 41.1%(46) and E4/E4 16.1%(18). The alleles distribution were: E2 8.9% (20), E3 54.5%(122), E4 36.6%(82). A study in Dong-gu Korea, found distribution of APOE gene polymorphism in the population: E2/E2 0.4%, E2/E3 10.7%, E2/E4 1.3%, E3/E3 71%, E3/E4 15.6% and E4/E4 1%. The alleles distribution were: E2 11.2%, E3 71%, E4 16.6%. Another Korean study in Namwon demonstrated the following genotype distribution: E2/E2 0.4%, E2/E3 10.2%, E2/E4 1.1%, E3/E3 72.6%, E3/E4 14.9% and E4/E4 0.9%. The alleles distribution as follows: E2 10.6%, E3 72.6%, E4 15.7%. The occurrence of the allele E4 in this study (Jakarta) is thus more-than-twice higher than that of the two above mentioned Korean studies. ⁽¹³⁾

The relationship between APOE gene polymorphism and the MoCA-Ina- item abstraction is as follows: E3/E4 vs. E3/E3 p 0.019, E4/E4 vs. E3/E3 p 0.028. Between APOE gene polymorphism and the item language: E3/E4 vs. E2/E2 p 0.03, E4/E4 vs. E2/E2 p 0.029. Between APOE gene polymorphism and the item naming: E3/E4 vs. E2/E2 p 0.048. The E4 may be a potential factor contributing to the impairment of abstraction, language and naming abilities. Naming should receive attention as the dominant symptom of cognitive function decline. In a study by Coleman et al in Frontotemporal Dementia and Related Disorders patients with MoCA-Ina questionnaires, the sub-item naming and delay memory were most frequently detected in MCI / mild cognitive impairment patients. ⁽²¹⁾ This corresponds to the conclusion drawn by David A. Wolk et al. that APOE gene polymorphism has a significant effect on cognitive functions and brain anatomical abnormalities. ⁽¹⁴⁾

CONCLUSION

This study found that Decade seventh is the vulnerable group with the highest percentage with impaired cognitive functions. A high percentage of APOE allele E4 may be one of the causes of steep cognitive function decline and a higher risk for dementia. In determining the symptoms of dementia/ decline in cognitive function should not be fixated on memory loss but may be preceded by other symptoms, e.g., abstraction, language, orientation and especially naming.

Ethical Clearance - Taken from Hasanuddin University Ethics Committee, approval number: 130 /

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Designing Instrument for Early Stimulation, Detection, and Intervention for Growth and Development of Children based on Android System

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ABSTRACT

One of the factors that is thought to be the cause of the lack of success in child growth and development monitoring programs is the use of instruments that are less practical. This study aims to make a more practical instrument that is Android-based child development detection software, considering that Android-based gadgets are a popular communication tool for health workers. The design stages included: 1) provision of hardware, software, brainware, and material books; 2) frame making, material compilation, material integration into the frame; 3) evaluation of the quality of instruments through FGDs with users, and 4) giving recommendations. Evaluation of the quality of the instrument through the 3 stages of the FGD showed that content, accuracy, format, ease of use, timeliness, and speed of operation are good. Furthermore, it was recommended for the government to use this instrument as a medium for implementing the ESDIGDC program, as well as for researchers to use and refine this design as an instrument for research on children's growth and development.

Keywords: Child development, Android base instrument

INTRODUCTION

Children in the “golden age” (ages 0-6 years) must get a positive intake, in order to achieve optimal growth and development according to their respective genetic potential. To realize this hope, the government has implemented the program of ESDIGDC (Early Stimulation, Detection, and Intervention for Growth and Development of Children). The program is carried out in a comprehensive and coordinated manner, which is held in the form of partnerships between families (parents, child caregivers and other family members), communities (cadres, professional organizations, non-governmental organizations) with professional staff.⁽¹⁾

In the implementation of the ESDIGDC Program, there are three main components, which at the same time determine the success of the program, first is input

(material, instruments, and implementers); second is the process (planning, implementation, evaluation, and monitoring); and third is output (achievement of reported programs).⁽¹⁾ One of the factors that can be suspected as the cause of the above problem is the use of instruments that are less practical (using many pieces of paper that are fragmented so inefficient), which in turn affects the performance of the ESDIGDC program implementers.

Based on the explanation above, it is deemed necessary to make a more practical instrument, which can be used quickly on all occasions (saving time), not consuming excessive space (saving space), and can be done very easily (saving energy), so that as a whole will reduce the costs that must be spent to implement the program (cost-effective). The practical instrument designed is an Android-based ESDIGDC software that can be operated through gadgets (mobile phones and tablet computers), with the consideration that Android-based gadgets are a combination of hardware and software as a communication tool that is popular in the community including health workers.

To ensure that Android-based ESDIGDC instruments

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are really needed by ESDIGDC program implementers, a second phase preliminary study was conducted through the FGD which was attended by 10 midwives in community health centers, with conclusions: 1) too much use of paper-based ESDIGDC instruments inefficient, 2) ESDIGDC instruments need to be made that can be run using gadgets because this tool is already popular.

It can be predicted that these instruments will be easily accepted and applied by health workers, especially midwives as implementers of the ESDIGDC program.

METHOD

This descriptive research produced e-Health instruments in the field of early detection of child growth and development. In this study, the design of “Android-based ESDIGDC instruments” was made. The design of the instrument was limited to the “detection” aspect of child development, so specifically the production was called “Android-Based Child Development Detection Instrument” (ABCD-DI).

The “ABCD-DI” was a dynamic soft questionnaire about child development that includes four sectors, namely: 1) gross motor, 2) fine motor, 3) speech and language, and 4) socialization and independence. This questionnaire was classified into several age groups, namely: 3, 6, 9, 12, 15, 18, 21, 24, 30, 36, 42, 48, 54, 60, 66 and 72 months.⁽¹⁾ This program was designed to be installed on Android-based gadgets.

The first stage of steps was the identification and provision of design equipment: 1) hardware (computers / laptops, gadgets, printers, blank DVD data, external file storage, and internet service); 2) software (operation system, word processor, data base program, database creator for Android, PDF creator, icon and interface designer, and photo editor); 3) brainware (programmer, technician, and midwives as evaluator); 4) supporting material books about ESDIGDC, e-health and Android-based applications.

The second stage was the development of instrument by programmers and technicians: 1) frame making using interface designer programs; 2) preparation of material in accordance with the frame; 3) integration of material into the frame.

The third stage was the evaluation of the quality of the ABCD-DI through trials to midwives as the main users, which include: content, accuracy, format, ease of

use, timelines, and speed of operation⁽²⁾; with the FGD approach.

The fourth stage was giving recommendations to government institutions as holders of ESDIGDC program policies, and for researchers as developers of child growth and development monitoring instruments.

The study was conducted in 2016 in the Department of Midwifery, Health Polytechnic of Surabaya, while the evaluation of the quality of the instruments was conducted at the Sukorejo Health Center, Ponorogo.

The stages of data analysis were as follows: 1) descriptive presentation of the provision of hardware, software, brainware, and supporting books; 2) descriptive presentation of the results of frame making, material compilation, and material integration into the frame; 3) descriptive presentation of the results of evaluating the quality of “instruments; 4) descriptive presentation of recommendations given based on the evaluation of the quality of the instrument.

FINDINGS

The provision of hardware, software, brainware, and supporting books are as follows:

Table 1. Hardware provided for instrument design making

No	Hardware	Number	Function
1	Laptop: Dell Model Inspiron 114 3000 Series	1	Programming
2	Gadget: OPPO Joy 1	1	Programming
3	Printer: HP Deskjet 1040	1	Programming
4	Blank DVD data: Verbatim	25	Data storage
5	Memory card: SD card	2	Data storage
6	Internet service: Midwifery Department, Health Polytechnic of Surabaya	2	Literature and software searching

Table 2. Software provided for instrument design making

No	Original Software	Number	Function
1	Operation system: Microsoft Windows 8, Android system	2	Basic operating system to run all programs on the computer.
2	Word processor: Wordpad, Ms. Office Sharepoint Designer	2	As a word processor for compiling text material.
3	Database program: Database creator for Android	1	Integration of instrument data into the Android system.
4	Read only file creator: PDF Creator	1	Making read only files about instrument usage instructions.
5	Icon creator: Junior Icon Editor 4.1	1	Making the ABCD-DI program icon.

Table 3. Brainware provided for instrument design making

No	Brainware	Number	Function
1	Programmer	3	Designing programs and materials.
2	Technician	1	Helps programmers compile and run programs.
3	Evaluator	10	Evaluating (testing) the quality of instruments through FGD

Table 4. Books as supporting the design of instruments

No	Book title	Number	Function
1	Guidebook for the Implementation of ESDIGDC	1	Guidelines for making ESDIGDC material
2	ESDIGDC Facilitator Handbook	1	Guidelines for preparing ESDIGDC learning strategies
3	Information System Analysis and Design	1	Programming guidelines

The resulting ABCD-DI frames were: 1) Level I, consisting of: homepage; 2) level II, consisting of: detection of development of children aged 3 months, 6 months, 9 months, 12 months, 15 months, 18 months, 21 months, 24 months, 30 months, 36 months, 42 months, 48 months, 54 months, 60 months, 66 months and 72 months. Figure 1 shows the shape of the frame.

The material consisted of three groups, namely: 1) general instructions (how to operate ABCD_DI); 2) introduction to ESDIGDC; 3) detection of child development which includes four sectors, namely: 1) gross motor, 2) fine motor, 3) speech and language, and 4) socialization and independence. This material was classified into several age groups, namely: 3, 6, 9, 12, 15, 18, 21, 24, 30, 36, 42, 48, 54, 60, 66, and 72 months.

The process of preparing ESDIGDC material was: 1) text or narration made using Wordpad and Microsoft Office Sharepoint Designer; 2) a graphic vector image created and edited using Inkscape 0.48; 3) photographic images edited using Photo Pos Pro 1.87; 4) animated images created and edited using Sothink SWF Quicker 5.3 and Pivot Stickfigure Animator 2.2.6; 5) video edited using Honestech Video Editor 8.0. To change the video file format, the Any Video Converter 3.2.7 program is used; 6) After the frame is filled with complete material, then an icon is created using the Junior Icon Editor 4.1; 7) making read only files regarding instructions for using ABCD-DI using PDF Creator 9.

The next stage was the integration of all material that has been successfully collected into the frame that has been prepared previously (Figure 1).



Note:

Halaman utama = Homepage
Petunjuk umum dan Pengantar SDIDTK = General instruction and introduction of ESDIGDC
Deteksi perkembangan = detect the development of child

Gerak kasar, gerak halus, bicara dan bahasa, sosialisasi dan kemandirian = Gross motor, fine motor, speech and language, socialization and independence
Figure 1. Results of integration of materials into frames (in Indonesian version)

There were two stages of material integration into the frame: 1) filling in the Level I frame (homepage), in this case, the frame homepage is filled with two material namely “General Guidelines” and “Introduction to ESDIGDC” (Figure 2).

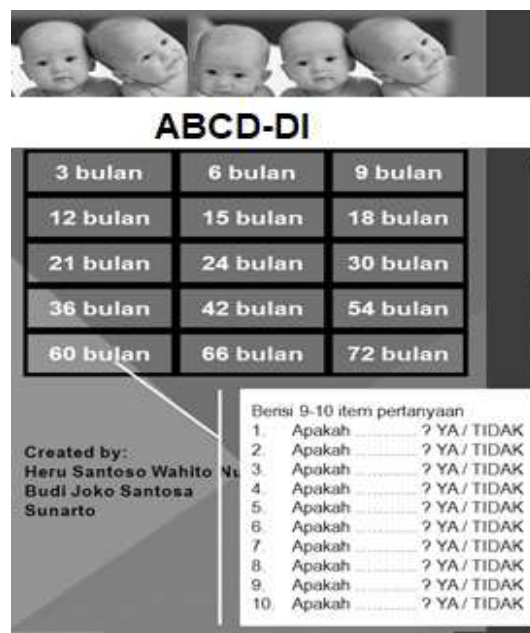


Note:

Halaman utama = Homepage
Petunjuk umum = General instruction
 Berikut ini adalah cara penggunaan = This is the instruction to use
Pengantar SDIDTK = Introduction of ESDIGDC
Program SDIDTK adalah = ESDIGDC program is

Figure 2. The content of Level I (homepage) (in Indonesian version)

At the top of the main page was included general instructions on how to operate the program, then at the bottom is presented about the general concept of ESDIGDC; 2) filling in Level II frames (detection of child development), in this case, the frame of child development detection is filled with the Child Development Pre-Screening Questionnaire, starting from the age group of 3 months, then proceeding sequentially and ending in the 72 month age group (Figure 3).



Note:

3 bulan = 3 months
Berisi 9-10 pertanyaan = contain 9 to 10 questions
Apakah? YA/TIDAK = Is? YES/ NO

Figure 3. The content of Level II (detection of child development) (in Indonesian version)

Questionnaire for each age group consisted of 9-10 items, and each item had 2 answer options “Ya (yes)” and “Tidak (no)”. After all Level II frames were filled in, a calculation formula was made with 3 output categories, namely: a) Development of “*Sesuai* (accordance)”

children if the total “Yes” answer was 9-10; b) the development of the child “*Meragukan* (doubt)” if the total answer “Yes” was 7-8; c) the development of the child “*Penyimpangan* (deviation)” if the total answer “Yes” was 0-6.

The last step was to provide follow-up choices based on the output categories as follows: a) if the child’s development was “accordance”, then the follow-up given was “continue stimulation”; b) if the development of the child “doubt”, then the follow-up given was “do the most test 2 times, with 2 week intervals, if the results are still asking, must be recommended to the health service institution; c) if the development of the child was “deviation”, then the follow-up given was “recommended to the health service institution”.

In accordance with a predetermined plan, a quality evaluation of “ABCD-DI” was conducted through an FGD on 10 midwives at the Sukorejo Health Center, Ponorogo. The topic of evaluation refers to the assessment of system quality or information technology-based applications according to Chin & Lee, which included 6 dimensions: 1) content, 2) accuracy, 3) formats, 4) ease of use, 5) timelines, and 6) speed of operation.⁽²⁾ Evaluations were carried out in 3 stages, and improvements are made after the first and second stages of evaluation. The results of the third stage of the evaluation showed that overall, the instrument has been assessed as being of high quality.

The recommendations given were: 1) the government as the holder of the ESDIGDC program policy (Ministry of Health of the Republic of Indonesia, Provincial Health Office, District / City Health Office and community health center) utilizes “ABCD-DI” as a medium for implementing ESDIGDC programs for health workers; 2) researchers use “ABCD-DI” as a research instrument, or develop it into a better research instrument.

DISCUSSION

Provision of the ABCD-DI drafting device can run smoothly, despite several obstacles. Obstacles to meeting hardware needs are more likely towards the problem of limited availability of funds. Some hardware is not purchased with available funds. Provision of hardware is indeed one of the obstacles for making information technology-based application designs. This is in line with Al Fatta’s statement that one of the obstacles in

the development of information and communication technology-based applications is the lack of hardware. As a solution, most hardware is prepared by borrowing.⁽³⁾

During the design process, there were obstacles to getting high compatibility web creator software. Initially researchers have prepared two selected software: 1) Microsoft Frontpage; 2) Drupal; but programmers and technicians lack the mastery of how this software works.

As a solution, researchers are constantly looking for suitable software, namely Microsoft Office Sharepoint Designer that is not commercialized, so it can be downloaded for free via the internet. Microsoft Office Sharepoint Designer Service Pack 1 provides stability and performance improvements that are important to customers, also ensures security for users.⁽⁴⁾

Brainware needs as a support for the design process can be adequately fulfilled because the three research teams can act as programmers, so they do not require additional external programmer work. A researcher focuses on the activity of making frames and integrating material into frames, while the other two researchers focus more on making material that will be integrated into the frame. Technicians as a companion programmer mainly focus their activities on the process of making materials, especially photographic, animation, and graphic materials, which are then integrated into the ABCD-DI frames.

Evaluator staff were taken from 10 midwives at the health center, whose role was to try out the system that had been designed. Each midwife is tasked with studying the ABCD-DI system that has been given to them for 1 x 24 hours. Their next task is to provide a critique of the shortcomings found in the instrument, while providing input for system improvement, through the FGD.

Supporting material books for design can be fulfilled, but there is one problem, namely that the basic reference book that is up to date is only available towards the end of the research process. The book is the Guidebook of ESDIGDC Implementation 2012. The books used in the previous design process were books published in 2007.

The results of the ABCD-DI quality evaluation indicate that midwives have given a “good” assessment of this instrument. The six dimensions of quality that refer to the quality dimension according to Chin & Lee⁽²⁾

have all been assessed well by midwives as users.

With the status of a “good” assessment of the overall dimensions above, it can be said that “ABCD-DI” has been qualified according to the user’s perception. This is in accordance with the definition of quality according to Moeliono, namely “the level of good and bad things”.⁽⁵⁾ “ABCD-DI” has been rated well by users, meaning “ABCD-DI” has been rated as having high quality in the eyes of users. The quality of “ABCD-DI” according to user perceptions is the most realistic quality. This is based on the statement of Simamora which expressly states that in the concept of “perceived quality”, consumer perception is reality. In this case, the most important thing in quality assessment is the perception in the view of consumers. This is similar to Kotler’s statement in Simamora that quality is the totality of features and characteristics of a product or service that enables the product or service to satisfy customer needs.⁽⁶⁾

CONCLUSION

Based on the results of the study, it can be concluded that the procurement of equipment and the development of the “ABCD-DI” design as a developmental detection instrument can be carried out properly, and is considered quality based on the results of evaluation by health personnel as users.

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Effectiveness of the Training Model to Increase the Knowledge, Attitude, and Practice of Traditional Birth Attendants about Early Initiation of Breastfeeding in Bogor District, Indonesia

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ABSTRACT

The proportion of women assisted by TBAs during delivery is still high. It is necessary to transform their role from delivery attendance to an agent of change to deliver health messages. One of the important health messages will be on Early Initiation of Breastfeeding (EIBF). The aims of this study is to determine the impact of TBA-Friendly Training model on TBAs' knowledge, attitude and practice (KAP) to enhance their role as agent of change in the EIBF practice. The quantitative approach used applied quasi-experimental design and a qualitative used Rapid Assessment Procedure (RAP). Results revealed that the training can enhance the KAP of EIBF among TBAs. TBAs who got the training have higher level of knowledge, attitude and practice than those who did not receive training (p value: 0.000). The qualitative findings that TBAs are happy and feel fortunate for being trained. More than half of the TBAs' clients have good EIBF KAP, meaning that the TBAs are able to apply the skills trained and to promote EIBF practice. Findings of this study suggest that there should be a policy to adopt and use such a TBA-Friendly Training model for EIBF implementation.

Keywords: *Traditional birth attendants, Early initiation of breastfeeding, Training model, Agents of change*

INTRODUCTION

In Indonesia, only three quarter (73%) of deliveries assisted by health provider. Data from the 2010 Basic Health Survey showed that 43.2% mothers gave birth at home, and among them around 40.2% were assisted by TBA. One of the reasons behind the high proportion of delivery assisted by TBA in Indonesia is because of the number of village midwife is still very lacking. In Indonesia, the ratio of midwife to population is 27.3 per 100,000 populations, whereas the ideal ratio is 100 midwives per 100,000 populations. West Java is one example of areas with very low availability of midwives; its ratio is 9.3 per 100,000 population.¹

TBAs have a meaningful role when talking about culture, empathy, and psychosocial support during labor, with important benefits for mothers and babies. This made the TBAs playing a great role in maternal health care and also as extension of maternal and child health system in the rural areas.^{2,3} By this situation as the background, TBA could be formed as “an agent of change”.⁴

One way to reduce the IMR is through Early Initiation of Breastfeeding/EIBF.⁶ EIBF is a process of which the baby is breastfed immediately after birth, by let the baby to seek for their mother's nipple or the baby's mouth is not being put directly to the mother's nipple.⁷ In regard to the importance of EIBF, recently it has become a program promoted by the Government of Indonesia.

Based on the above description, the objective of this research is to determine the effect of “TBA Friendly Training” Model in improving the Knowledge, Attitude, and Practice of TBA who has the potential to be “an

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agent of change” in the implementation of EIBF in Bogor District.

MATERIALS AND METHOD

This research was conducted using both quantitative (Quasi-Experimental design) and qualitative approaches (“*Rapid Assessment Procedure*” (RAP)). The research was conducted in Ciampea and Ciseeng Sub-districts in Bogor District of West Java, during from February to August 2010. The population is all TBAs in Bogor District and sample needed for the intervention and control area was 53 TBAs each. Thus the total number of sample was 106 TBAs. In addition, interviews were also conducted to 77 of the TBAs’ clients. Informants for the qualitative consisted of village midwives, midwives coordinator, head of health centers, and the TBAs.

Quantitative data were collected through interviews with TBAs and pregnant women who were the clients of the TBAs. Interviews also conducted to representatives from some relevant institutions, such as the District Health Office and Health Center. Qualitative data were

gathered through focused group discussions, in-depth interviews, and also observations.

Univariate, bivariate, and multivariate analysis were done using the quantitative data. Qualitative data were treated using theme analysis.

RESULTS

Demographic characteristics of the TBAs were not statistically different between the intervention and control groups. Overall, TBAs in both groups were old and low educated. The highest education among the TBAs was elementary school and do not have other job other than becoming TBA.

Effect of Intervention to TBAs’ Knowledge about EIBF

At the beginning of intervention did not show any difference in knowledge score between intervention and control groups (p -value= 0.324) (Table 2). Following the training and mentoring, an increase the knowledge score within the intervention group was apparent (Table 1).

Table 1. The Score of Knowledge, Attitude, and Promotion Practice of TBAs in Bogor District, 2010

Variable	Intervention		Control	
	Mean / Median	Min – Max	Mean / Median	Min – Max
Knowledge Score				
Pre Test 1	1.81/1.00	0 – 9	1.81/1.00	0 – 0
Post Test 1	9.57/10.00	4 – 10		
Pre Test 2	9.34/10.00	5 – 10		
Post Test 2	9.72/10.00	6 – 10		
Measurement 3	9.49/10.00	5 – 10	1.30/0.00	0 – 0
Attitude Score				
Pre Test 1	0.83/0.00	0 – 5	1.49/0.00	0 – 5
Post Test 1	4.77/5.00	0 – 5		
Pre Test 2	4.87/5.00	1 – 4		
Post Test 2	4.92/5.00	2 – 5		
Measurement 3	4.94/5.00	3 – 5	1.00/0.00	0 – 5
Promotion Practice Score on EIBF				
Pre Test 1	1.26/1.00	0 – 3	1.55/1.00	1 – 4
Post Test 1	1.92/4.00	0 – 4		
Pre Test 2	3.72/4.00	0 – 4		
Post Test 2	3.74/4.00	0 – 4		
Measurement 3	3.70/4.00	0 – 4	1.51/1.00	0 – 4

Within the intervention group, increase of knowledge score between the baseline, midline, and endline measurements showed significant difference (*p value*=0.000). Comparison of endline measurements between intervention and control groups also showed significant difference (*p value*=0.000).

Table 2. Association between “TBA-Friendly Training” with Knowledge Attitude, and Promotion Practice on EIBF by TBAs in Bogor District, 2010

Variable	Knowledge	Attitude	Promotion Practice on EIBF
	p value	p value	p value
Intervention			
Pre 1 – Pos 1	0.000	0.000	0.009
Pre 1 – Pos 2	0.000	0.000	0.000
Pre 1 – Measurement 3	0.000	0.000	0.000
Control			
Pre Test 1^ - Measurement 3^	0.044	0.130	0.934
Intervention - Control			
Pre Test 1 – Pre Test 1^	0.324	0.199	0.567
Measurement 3 – Measurement 3^	0.000	0.000	0.000

Note: ^=control group

The increase of the respondents’ knowledge in the intervention group could also be explained using the qualitative findings which showed that following the training most TBAs had acknowledged the advantage of EIBF, such as for mother and baby’s health, reduce bleeding, lessen pain during delivery, and warm the baby because there is skin to skin contact between the mother and baby.

“..make the placenta easy to deliver, reduce bleeding, lessen the pain, because the baby’s skin meet the mother’s skin then the baby become warm..” (FGD of TBAs, Ciampea Health Center).

“..it is indeed different ma’am, if doing the EIBF

the breast milk is instantly flowed. Without EIBF, the breast milk will be flowed after 3 days..” (FGD of TBAs, Ciampea Udik Health Center).

Other benefits perceived by the TBAs were that EIBF increases the volume of breast milk and make the baby becomes more independent. In addition, according to the TBAs, baby’s kick on mother’s abdomen stimulates the placenta to deliver sooner.

The variables that have effect on TBAs’ knowledge in implementing the EIBF was intervention of “TBA-Friendly Training” (RR=6.212; 95% CI=1.908-20.229) and belief on EIBF (RR=2,654; 95% CI=1,111-6,343), after controlling for other variables studied (Table 3).

Table 3. Binomial Logistic Regression Analysis of Variables Associated with TBAs’ Knowledge on EIBF

Step	Variable	B	p value	RR	95 % CI
1	Education		0.901		
	Education (1)	-0.198	0.678		
	Education (2)	-0.086	0.849		
2	Number of deliveries assisted	0.072	0.853		

Cont... Table 3. Binomial Logistic Regression Analysis of Variables Associated with TBAs' Knowledge on EIBF

3	Length of becoming TBA	0.107	0.739		
4	Age	0.093	0.743		
5	Partnership	-0.219	0.562		
6	Number of clients	0.249	0.428		
7	Belief that could inhibit the implementation of EIBF	0.976	0.028	2.654	1.111 – 6.343
8	“TBA-Friendly Training”	1.826	0.002	6.212	1.908 – 20.229

Effect of Intervention to TBAs Attitude about EIBF

The finding was different in the control area where there was no change in the score between the baseline and the 3rd measurement, of which the score remained 0.0 (Table 1). Result of the differential test on TBAs' attitude toward EIBF in the intervention group showed significant result between before and after training. The difference was consistent between before 1st training and after 1st training, 2nd training and at endline measurement.

The above finding is consistent with the qualitative result showing that after receiving EIBF training, TBAs had positive attitude toward EIBF compared to before their clients do the EIBF. Their attitudes such as feeling

more relax and having faith that the EIBF must have benefit and usefulness.

The positive attitude arose because they saw the benefits and proofs that are in accordance to what have been explained during EIBF training, such as breast milk is easier to flow and increase its volume, baby looks healthier and more lively, and the baby refuse other milk than breast milk.

Variables affected TBAs' attitude to EIBF was training and mentoring (RR=4.339; 95% CI=1.559-12.076), and belief toward implementation of EIBF (RR=2.407; 95% CI=1.052-5.511), after adjusting other variables (Table 4).

Table 4. Binomial Logistic Regression Analysis of Variables Associated with TBAs' Attitude on EIBF

Step	Variable	B	p value	RR	95 % CI
1	Age	-0.003	0.870		
2	Number of deliveries assisted	0.095	0.813		
3	Partnership	0.117	0.771		
4	Education		0.763		
	Education	-0.313	0.490		
	Education	-0.155	0.720		
5	Length of becoming TBA	0.163	0.562		
6	Number of clients	0.256	0.410		
7	Belief that could inhibit the implementation of EIBF	0.879	0.038	2.407	1.052 – 5.511
8	“TBA-Friendly Training”	1.468	0.005	4.339	1.559 – 12.076

Effect of Intervention to TBAs Practice in Promoting EIBF

In the later stage, there was an increase in the score within the intervention group after the 1st training, which the median score increased to 4.0. This score remained the same at measurement before and after the 2nd training. While measurement in the control group did not show any changes between the first and last measurement, of which the score remained 1.0.

Furthermore, result of the differential test on EIBF promotion practice by TBAs in the intervention area showed significant difference between before and after the 1st training, before the 1st training and after the 2nd training, before the 1st training and the final measurement (p value < 0.05). Result of the differential test for EIBF promotion practice by TBAs in the control area did not show any significant difference between the first and final measurement (p value=0.934). Comparison of attitude score between intervention and control areas at the endline showed significant difference (p value=0.000).

The quantitative result in the intervention area was supported with findings from the qualitative study. TBAs who had been trained and mentored were mostly promoted EIBF to their families, neighbors, and clients. Their promotion approaches varied. For example, by direct explanation through storytelling, lending EIBF pocket book, lending and playing the EIBF video, followed with persuasive and even slightly intimidate their clients to do the EIBF.

“..explained by me...I brought the CD, played it because she had (the CD player)..” (FGD of TBAs, Ciampea Udik Health Center)

According to the TBAs, families are usually involved in influencing and taking care of the mother, thus promotion on EIBF was also done by TBAs to parents and families of the mothers who gave birth thus the families will not be surprised. After controlling for all variables, result from the analysis showed that variable that affected the EIBF promoting practice was training and mentoring (RR=4.455; 95% CI=2.316-8.566).

Table 5. Binomial Logistic Regression Analysis of Variables Associated with TBAs’ Practice for Promoting EIBF

Step	Variable	B	p value	RR	95 % CI
1	Education		0.819		
	Education (1)	0.232	0.623		
	Education (2)	0.299	0.528		
2	Partnership	0.086	0.818		
3	Number of deliveries/month	0.122	0.751		
4	Belief that could inhibit the implementation of EIBF	0.466	0.180		
5	Number of clients	0.416	0.183		
6	“TBA-Friendly Training”	1.494	0.000	4.455	2.316 – 8.566

DISCUSSION

Effect of Intervention to TBAs’ Knowledge about EIBF

This study shows significant difference on knowledge about EIBF between TBAs who attended “TBA-Friendly

Training” and those who did not. This is consistent with the Meta-Analysis conducted by Sibley which concluded that training for TBAs was significantly associated with improvement on knowledge, attitude, and practice of trained TBAs, as well as advice provided by the trained TBAs to mothers, compared to non-trained TBAs.⁵

Similar result was found by Okubagzhiin a study aimed to determine the impact of TBA training to improvement of maternal and child health indicators in Ethiopia.³ Improvement in maternal and child health indicators was apparent after training was conducted to TBAs, which resulted in behavior changes among the trained TBAs in assisting delivery and providing infant and maternal care.

Effect of Intervention to TBAs' Attitude about EIBF

In this study, TBAs in the intervention group were given "TBA-Friendly Training" package where they listened, watched video on EIBF, performed simulation, and obtained information about EIBF. Measurement result on the attitude of TBAs between baseline and endline in the intervention group showed significant difference. This result is consistent with Innovation Diffusion Theory, that after listening and knowing the information, TBAs formed positive attitude toward EIBF.⁹ There was significant difference between group of TBAs who received the "TBA-Friendly Training" and those who did not (p value=0.000). TBAs' attitude toward EIBF was affected by training and mentoring, as well as belief on EIBF.

Effect of Intervention to TBAs' Promoting Practice on EIBF

Providing advice to mothers about antenatal and post-natal care was one of the many roles of TBAs.² Moreover, during care delivery a TBA could also play a role in providing advice or promoting various health messages.¹⁰ This is also similar to previous findings in Zimbabwe that TBAs could play their role as "Guru" for the community or as healers. TBAs' role in Pradesh, India, was to provide support for breastfeeding mothers and to encourage immunization for the baby.¹¹

This study shows improvement in the practice of promoting EIBF by TBAs in the intervention group. In the contrary, promotion by TBAs in the control group did not show any change toward improvement. There was significant difference in terms of EIBF promotion between TBAs in the intervention and control groups. EIBF promotion done by TBAs could be confirmed through information from clients of the trained TBA. Approximately 71.40% of the clients knew EIBF from the TBAs and almost all of them (91.70%) mentioned that TBAs were the first person encouraged them to do EIBF.

The Role of TBA as Agent of Change

The success of TBA as agent of change is mostly affected by their ability to influence and convince the pregnant women to seek and learn about appropriate newborn care.¹²

In addition, TBA also has a high sense of empathy to pregnant women, as supposed to be owned by agent of change. This sense of empathy resulted in common understanding between pregnant women and the TBA which eventually lead to good relationship later during the process when the pregnant women learn and comprehend EIBF information delivered by TBA to the women.¹³ The potential of TBA as agent of change in the implementation of EIBF could be seen from the improved KAP among TBAs in the intervention group, compared to TBAs in the control group.

CONCLUSION

The "TBA-Friendly Training" model was proven to have an effect in improving the Knowledge, Attitude, and Practice of TBAs who had the potential as *agent of change* in the implementation of EIBF.

Conflict of Interest: There was no conflict of interest of this study.

Source of Funding: Source of the fund for this study was by SEAMEO, Indonesia.

Ethical Clearance: Ethical review was conducted in accordance with the procedures at the Faculty of Public Health of the Universitas Indonesia and was approved by the Health Research Ethics Committee of the Faculty of Public Health of the Universitas Indonesia

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Evaluation Cystatin C Levels and Some Factors of Renal Function in Hypertensive Patients

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ABSTRACT

The aim of the study is to valuation some biomarker biochemical parameters that play important role in evaluating functions renal for hypertensive. The study was obtained. Included ninety-one. 35(38.46 %) of the subjects were males and 56 (61.54 %) were females. forty-two (42) subjects were selected as control and forty nine (49) suffered only from essential hypertension with high mean body mass index (Mean 35.70±3.38 S.E) (Kg/m²). The data of the study indicate a significant ($p \leq 0.05$) raise in the rate of age (Mean 49.89±10.36) (years), body mass index (Mean 35.70± 3.38 S.E) (Kg/m²), SBP(Mean 14.77±0.75 S.E) (mmHg) and DBP(Mean 9.69±0.72 S.E) (mmHg) for patients with hypertensive compared with healthy people. As for the biochemical parameters the results showed a significant ($p \leq 0.05$) increase in concentration serum Cystatin C (Mean 1.21 ± 0.44 S.E) (mg/L) , Creatinine(Mean 1.062±0.36 S.E) (mg/dl) , urea (Mean 7.76±0.55 S.E) (mmol/l) and uric acid(Mean 4.77±0.82 S.E) (mg/dl). As for the Correlation coefficient of linear regression analysis of diastolic blood pressure with the biochemical parameters did not show any significant correlation, while the results linear regression analysis showed positive correlation between systolic blood pressure with cystatin C ($y = 0.38 * x - 4.38 * SBP$), Creatinine($y = 0.37 * x - 4.37 * SBP$) and uric acid ($y = 0.1 * x - 10 * SBP$).

Keywords: *cystatin C , uric acid , creatinine, urea, hypertensive.*

INTRODUCTION

Hypertensive which the cases that estimated number about a world more than 1.1 billion¹. It is a state that be finically to define over years, So many organizations were interested in defining hypertensive of them “a recent lancet commission report “classify individual as hypertensive (when they continuous cross the blood pressure threshold. also Guideline committees and scientific societies have proposed definition that are depend on blood pressure value, prolonged risk , and treatment effects ². Hypertensive has increased in adult from 594 million in 1975 to 1.13 billion in 2015 ³ where considerably disappearing no symptomatology

approximately half of patient with hypertensive reside undiagnosed for this referred to as “(the silent killer)⁴. Hypertensive considerable a indication of chronic kidney disease (CKD) and independent threat factor for progression cardiovascular diseases ⁵ also elevated body mass index is one of the robust danger factors for CKD .the occurrence of obesity attached glomerulopathy has rise 10 fold in recent where a compensative hyperfiltration take place to meet the raise metabolic demand of the higher body weight the excess in intraglomerular pressure can injury the kidney and increase the hazard of evolution CKD in the long term ⁶. There are some biochemical biomarker play an important role in diagnosis of renal function like uric acid , creatinine and urea ⁷ ,also cystatin C is a useful investigation the hypertensive renal target organ damage since reflect glomerular filtration rate (GFR)⁸. Uric acid is form by the liver ,it is the end output of endogenous and dietary purine metabolism in human an mainly excreted by intestines (25%- 35%) and kidney

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(65%-75%)⁹. while urea is produced in the liver too from ammonia emitted by deamination of amino acid¹⁰. non protein nitrogen is excreted as urea majorly by the kidney in proportion over 75% small amount are lost through the skin and gastrointestinal¹¹. whereas, creatinine is product in muscle by break down of creatine phosphate⁷ with a weight of 113 Da¹² measurement the amount of creatinine and blood urea are points main of a normal functioning kidney and increment in the serum are indication of kidney dysfunction¹³ As for Cystatin C is produced by all the nucleate cell, its production rate is persistent and autonomous of gender, age, diet and weight¹⁴.

MATERIALS AND METHOD

The project was conducted in Hilla Specialized Education Hospital with the Health Center at Babylon University in Babil province/Iraq for the period from September to November 2017 (The approval of the institutional research ethics committee and signed written consent of every patient. the study was obtained. Included ninety-one, all of them were above 22 to 65 years of age. 35(38.46%) of the subjects were males and 56 (61.54%) were females. forty-two¹⁴ subjects were selected as control and forty nine[49] suffered only from essential hypertension with high mean body mass index (Mean 35.70±3.38 S.E) (Kg/m²). (Body mass index (BMI) was calculated using the formula BMI= weight (kg)/ height² (m)² and classifying normal weight (BMI 18.5- 24.9)Kg/M², obesity (BMI 30-39.9) Kg/M² and morbid obesity (BMI > 40) Kg/M² (40). "Hypertension was defined as systolic blood pressure (SBP)≥140 mmHg and/or diastolic blood pressure (DBP)≥90 mmHg without the use of anti-hypertensive drugs, Blood pressure in the right arm was measured twice in the supine position, using a manual sphygmomanometer after at least 10 min of rest. About five milliliters of venous blood were collected from each subject, serum urea concentration was measured by the enzyme methodology employed in this reagent is based on the reaction first described by Talke and Schubert¹⁵. To shorten and simplify the assay, the calculations are based on the discovery of Tiffany et al¹⁶. That urea concentration is proportional to absorbance change over a fixed time interval, using parameters for photometers assay Erba kit. The DetectX® Serum Creatinine kits are measure creatinine present in serum samples by using the absorbance of the colored product is read after 1 minute in a microtiter plate reader capable of measuring 490nm wavelength.

The statistical analysis of the study was accomplished by using SPSS program (Version 18.0) and the data are expressed as the Means and the correlation coefficient and Linear regression was made with the calculators the BMI and estimated biochemical parameters. Values were considered statistically significant if the associated P values were lower than 0.05.

RESULTS AND DISCUSSION

The results of the study indicate a significant ($p \leq 0.05$) increase in the rate of age (Mean 49.89±10.36 (years)), body mass index (Mean 35.70± 3.38 S.E) (Kg/m²), SBP (Mean 14.77±0.75 S.E) (mmHg) and DBP (Mean 9.69±0.72 S.E) (mmHg) for patients with hypertensive compared with healthy people, as shown in table (1). As for the biochemical parameters the results showed a significant ($p \leq 0.05$) increase in concentration serum Cystatin C (Mean 1.21 ± 0.44 S.E) (mg/L), Creatinine (Mean 1.062±0.36 S.E) (mg/dl), urea (Mean 7.76±0.55 S.E) (mmol/l) and uric acid (Mean 4.77±0.82 S.E) (mg/dl), as shown in table (2). As for the Correlation coefficient of linear regression analysis of diastolic blood pressure with the biochemical parameters did not show any significant correlation, as shown in table (3), while the results linear regression analysis showed a strong correlation between systolic blood pressure with cystatin C ($y = 0.38 * x - 4.38 * SBP$) (P value ≤ 0.008), Creatinine ($y = 0.37 * x - 4.37 * SBP$) (P value ≤ 0.009) and uric acid ($y = 0.1 * x - 10 * SBP$) (P value ≤ 0.03) as in Fig (1, 3 and 4). while the results showed no significant correlation between systolic blood pressure with urea as revealed in Fig (2). Hypertensive remains incompletely understood, in spite of decades of research in clinical practice the pathogenesis (17) The outcome of the present study showed a significant increase in the rate of body mass index for patients with hypertensive, compared with healthy, this is agree to study Hall ME and et al in 2014 where obesity can lead by various mechanisms, such as hypertension to renal dysfunction (18) on the other hand obesity may be lead to a number of the harmful renal result of mediated by accompanying status such as hypertension or diabetes mellitus (19) Accordingly, the diagnosis Chronic kidney disease, is established chiefly on biomarkers that estimate kidney function. Glomerular filtration rate (GFR) the typical marker of kidney function (20) Our present data display a significant excess in the concentration of both serum cystatin C, serum creatinine, serum urea and serum uric acid for hypertensive patients compared to

healthy. This finding is consistent with the finding of several recent studies such glomerular filtration rate (GFR) estimation based on cystatin C. or creatinine has been recommended to assess GFR in CKD patients²¹. also a study of Salvador Lopez-Giacoman & Magdalena Madero) in 2015 showed GFR is commonly evaluated from that take into account endogenous filtration markers serum cystatin C (CysC) and creatinine (SCr)²⁰.

The studies suggested that increase serum cystatin C concentration in hypertensive patients, is connected with stiffness of large arteries in older adults, and also with cardiac functional and structural variation^{22,23}. nevertheless, recent studies reported that CysC levels could be affected by gender and age^{24,25} and obesity (26). As for Serum uric acid is consistent with the finding of several studies which Serum uric acid has shown to be a predictor of renal disease advancement in generality but not all studies²⁷. While our results are not

consistent with the study (Isra'a H. AL-Hamdani) 2010 no significant difference in serum uric acid between hypertensive patients and control group²⁸, as well as the Correlation between some Biochemical parameters and DBP(mmHg) in Hypertensive group no significant correlation was shown, however of systolic blood pressure (SBP) mmHg with Cystatin C, Uric acid and Creatinine for hypertensive group a significant positive correlation was observed, the results of urea were the opposite of the other criteria, showing no significant association with of systolic blood pressure (SBP)(mmHg) for hypertension patients. While observed in his study The result of multivariate analysis showed that the incidence of serum uric acid in patients with primary hypertension had significant relationships with diastolic blood pressure and systolic blood pressure²⁹. In the same way, high levels of serum uric acid (SUA) is reported to be a indicator for lower renal function³⁰ and a risk factor for hypertension^{32,33}.

Table 1. Comparison the baseline of study participants

General characters	Hypertensive group(n=49)	Control group(n=42)	Pvalue
Age(years)	49.89±10.36	30.14±7.33	0.03* ^a
BMI(Kg/m ²)	35.70±3.38	23.64±2.53	0.018* ^a
SBP(mmHg)	14.77±0.75	10.84±0.51	0.013** ^a
DBP(mmHg)	9.69±0.72	7.13±0.83	0.001** ^a

Table 2. Serum concentrations of some Biochemical parameters for renal function in both Hypertensive and control groups.

Biochemical parameters	Hypertensive group(n=49)	Control group(n=42)	P value
Serum Cystatin C (mg/L)	1.210±0.44	0.73±0.18	0.001** ^a
Serum urea (mmol/l)	7.76±0.55	6.11±0.77	0.02* ^a
Serum uric acid(mg/dl)	4.77±0.82	3.70±0.89	0.04* ^a
Serum Creatinine(mg/dl)	1.062±0.66	0.68±0.21	0.001** ^a

Table 3. The Correlation coefficient of linear regression analysis with the ANOVA table between some Biochemical parameters and DBP(mmHg) in Hypertensive group

Biochemical parameters	Hypertensive group(n=49)	
	DBP(mmHg)	
	r ^a	P value
Serum Cystatin C (mg/L)	0.13	0.38
Serum urea (mmol/l)	0.08	0.57
Serum uric acid(mg/dl)	0.07	0.65
Serum Creatinine(mg/dl)	0.03	0.82

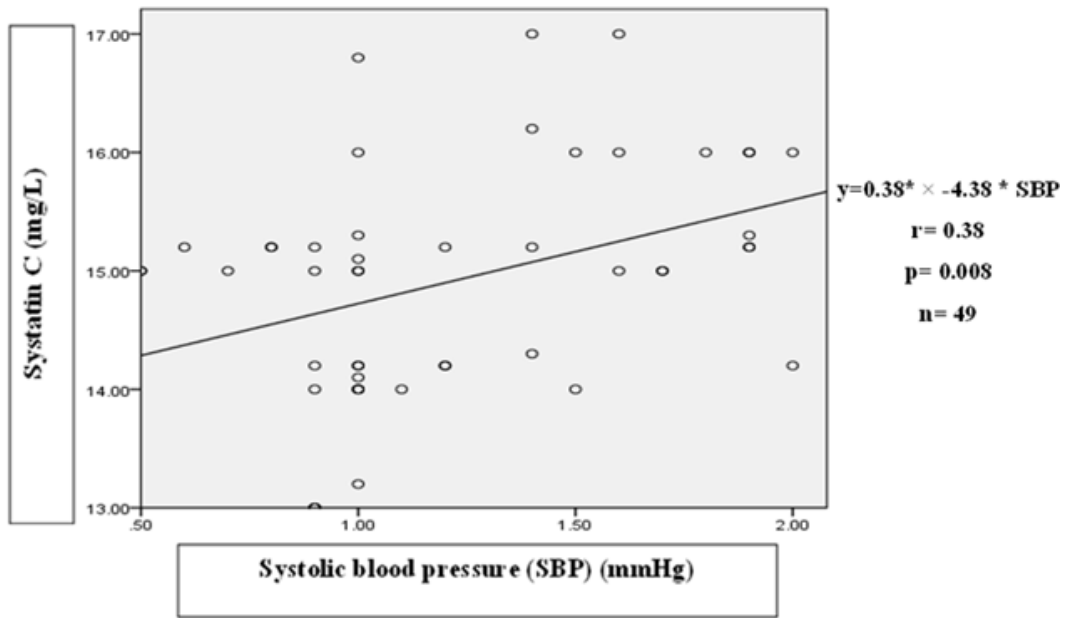


Figure 1. The linear regression analysis of systolic blood pressure (SBP) mmHg with Cystatin C (mg/L) for hypertensive group.

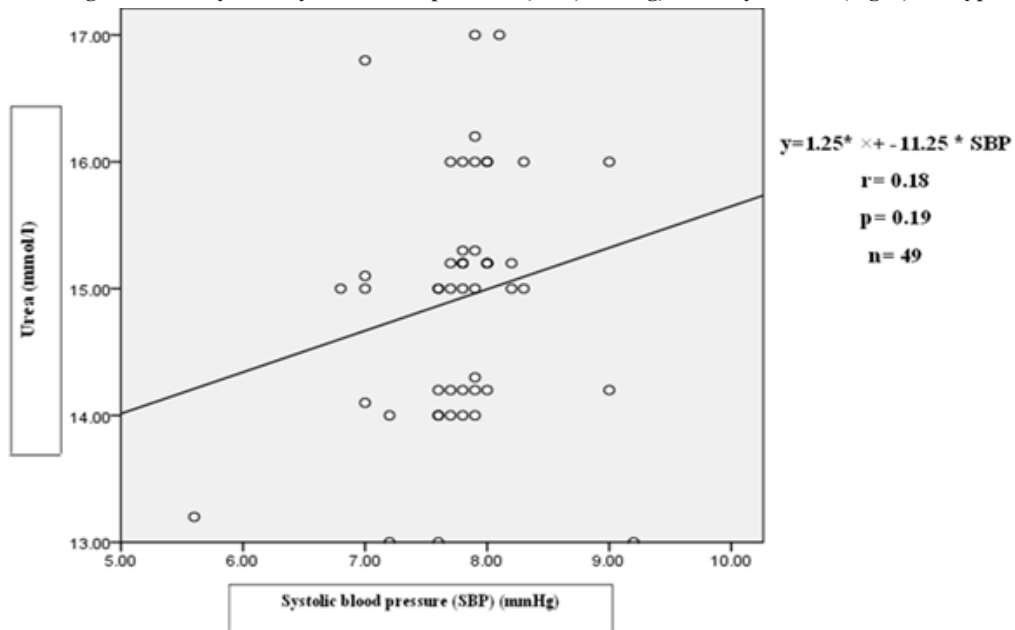


Figure 2. The linear regression analysis of systolic blood pressure (SBP) mmHg with Urea (mmol/L) for hypertensive group.

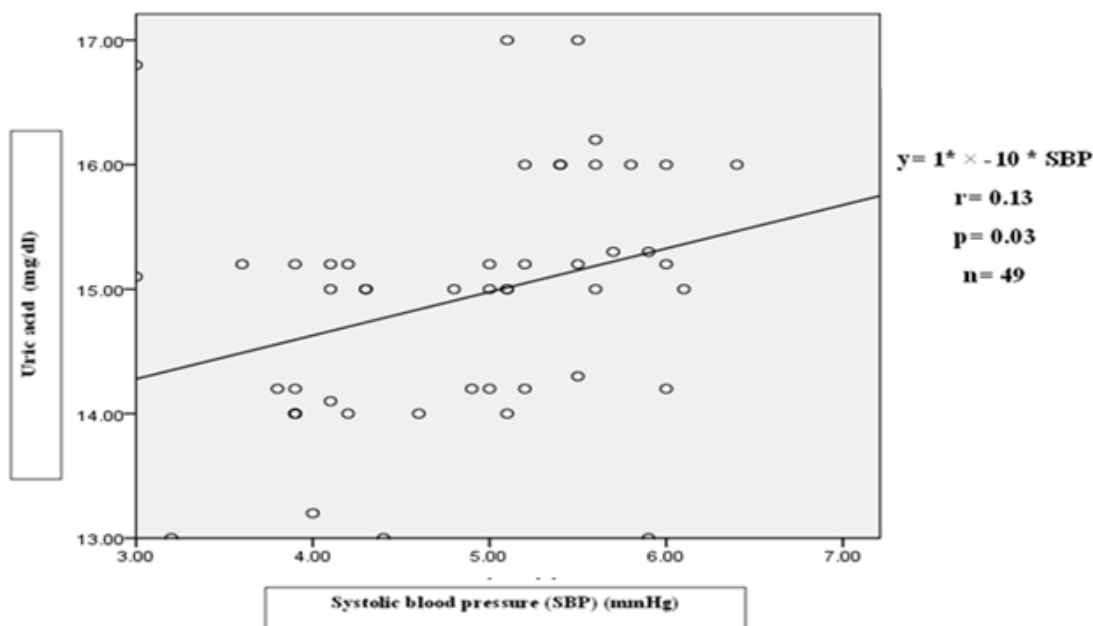


Figure 3. The linear regression analysis of systolic blood pressure (SBP) mmHg with Uric acid (mg/dl) for hypertensive group.

CONCLUSION

Serum creatinine (Cr) is a perfect biomarker of early phase CKD be a generally used indicator for detecting little changes in glomerular filtration rate (GFR) (33) Another study showed serum creatinine and urea levels were significantly increase in CKD subjects of hypertensive (34) this study showed it found there are a significant raise in the mean values of serum creatinine and urea in hypertensive patients compared with control .also the common factors that caused either upper synthesis or lesser excretion of uric acid can marker serum uric acid levels dramatically increase such as big blood cell depletion(35), the consuming of purine-rich foods (36), obesity (37), and renal diseases (38) other research found that SBP was significantly correlated with SUA, and multiple regression analysis also showed that both diastolic and systolic blood pressures were independently associated with SUA (39).

The current study showed that serum CystatinC , is no less important than Uric acid , Creatinine and Urea In the early renal dysfunction is identified forpatients with hypertensive. We recommend using a larger sample size and studied at the molecular level to know the genes responsible for renal dysfunction with hypertensive.

Financial disclosure

There is no financial disclosure.

Conflict of interest

None to declare.

Ethical Clearance

All experimental protocols were approved under the Environmental Research and studies centers\ Babylon University, and all experiments were carried out in accordance with approved guidelines.

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A Comparison of Satellite Carbon Monoxide Measurements from MOPITT and AIRS over Iraq during the Winter and Spring of 2012

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ABSTRACT

Atmospheric Carbon monoxide (CO) volume mixing ratios (VMR) retrieved by the Measurement of Pollution in the Troposphere (MOPITT) and Atmospheric Infrared Sounder (AIRS) instruments were used to monitor local emissions and compared over Iraq during the winter and spring of 2012. A comparison and cross reference are necessary to understand the impacts of these two data sets to the scientific conclusions developed from them, due to their simultaneous measurements of CO. The monthly CO VMR from MOPITT surface and AIRS 800 hpa are compared between the two instruments over Iraq for both direct comparison and the comparison using the same a priori profile for the period from 1 January to 31 December 2012. The CO VMR examination of the fluctuated, related to the mean CO background measured by each instrument, shows large-scale serendipitous spatial properties develop along the year. The regional CO VMR differences between two instruments were 5-35 ppbv and it's large for higher CO plumes and smaller for clean pristine desert environment. Both instruments observed enhancements of CO over the mountains and agreed with low CO over the southern region. Also, the time series of the monthly CO anomalies reveal a seasonal cycle signal, with high in winter and low in summer, due to meteorological condition, geographic nature of the regions and characteristic of the lower and upper troposphere to which MOPITT and AIRS are respectively sensitive to. This comparison demonstrates that there is a general consistency when considering the different vertical sensitivities of the instruments. The satellites observation efficiently shows the spatial and temporal variations of CO for the considered study area.

Keywords: Carbon monoxide, Satellite, Remote sensing, MOPITT, AIRS.

INTRODUCTION

The CO is an a significant pervasive atmosphere trace gas affecting to the climate and not considered a direct greenhouse gas (GHG's) due to its weak absorption of infrared radiation from the Earth and influences on the budgets of hydroxyl radicals (OH) and Ozone (O₃). It's having an average lifetime of 2-4 months in the atmosphere, and a product of incomplete produced by combustion of biomass and fossil fuel. The anthropogenic sources produce about 50% of world-wide of CO emissions with the remainder from oxidation and biomass burning ¹. Because of the human population and industry are much greater in the northern Hemisphere, so its concentrations are much greater than in the southern Hemisphere. A little CO

density as 400ppm (0.04%) in the air can be fatal ². The normal carboxyhemoglobin scales in an average person are less than 5%, and cigarette smokers may have to levels up to 9% (two packs/day) ³. The CO can direct monitor from space because of its strong absorption properties in the solar shortwave infrared (2.3 μm) and the thermal infrared (4.7 μm). During past decades the CO data easily obtained by a number of satellite instruments available at infrared wavelengths to measure globally tropospheric CO, such as SCanning Imaging Absorption spectroMeter for Atmospheric CartographY (SCIAMACHY) ⁴, Atmospheric Chemistry Experiment-Fourier Transform Spectrometer (ACE-FTS) ^{5,6}, Infrared Atmospheric Sounding Interferometer (IASI) ⁷, AIRS ⁸, Tropospheric Emission Spectrometer (TES) ⁹, and

MOPITT. These satellite retrievals data overcome the problem notable by commercial aircraft and ground observations^{10,11}. In this work, to facilitate satellite validation, the CO in situ measurements were collected coincident with overpasses of Aqua and Terra. The Satellite CO data from AIRS and MOPITT were used to monitor local emissions, the transport of polluted air masses, and compared to assess the temporal and coherence behavior of large scale spatial features evident in the observed distributions over Iraq (27.5 – 38.5 N, 37.5 – 48.5 W) during the winter and spring of 2012. The regional CO mixing ratios measurements from both AIRS (800 hpa) and MOPITT (surface) amount, are compared between the two instruments. Also presented the comparisons over the four stations; Baghdad, Mosul, Basrah and Rutba that are measured by AIRS, MOPITT, and in situ CO Measurements. A comparison and cross reference are required to understand these two data sets and their effects to the scientific conclusions developed from them. AIRS is a first continuously operating cross-track scanning sounder using thermal Infrared spectral radiometer, consisting of a telescope that feeds an echelle spectrometer, on-board the Aqua satellite launched May 4, 2002. The AIRS acquires 2378 spectral samples, ranging from 1086 to 1570 (bands: 3.74 μm to 15.4 μm) includes spectral features of CH₄, CO, O₃, and CO₂. It designed by NOAA and NCEP' research programs to decide the factors that control the global energy and water cycles, enhance numerical weather prediction, discover the effects of increased CO₂, CH₄, O₃ and other GHG's, estimate climate variations and feedbacks, and investigate of atmosphere-surface interactions. The Aqua spacecraft orbit is polar sun-synchronous with an orbital period of 98.8 minutes, repeat cycle period is 233 orbits (16 days), and a nominal altitude of 705 km [Manning and Friedman, 2016]. The MOPITT is the first sounding sensor to observe tropospheric CO flying at 705 km above the Earth's surface on NASA's EOS Terra spacecraft launched December 1999. The Terra satellite orbit is polar sun-synchronous, makes observations every 0.4 seconds, with swath width of about 640 km cover the Earth after three days and repeat cycle period every 16 days, or 233 orbits. To calculate CO profiles and total column amounts in the lower atmosphere, the MOPITT use an eight-channel gas correlation spectroscopy using Pressure Modulation Cells (PMC) and Length Modulation Cells (LMCs) at nadir with pixel resolution 22 km by 22 km and measures IR radiation in both the 2.4 μm and 4.7 μm spectral bands¹².

METHODOLOGY

This research has been carried out for 24 months (12 AIRS and 12 MOPITT) data from January to December 2012. The AIRS and MOPITT datasets have been used for this research. Four stations were selected at dispersed across Iraq; Baghdad, Mosul, Basra, and Rutba, as shown in Table 1, to evaluate and analysis the comparison and distribution of CO over the study area. All monthly data basis are in a Hierarchical Data Format (HDF) format containing the location along of satellite track and corresponding time. The geographic information system (GIS) software was used to conduct the Maps of the study area to analyse the CO data distribution and direct comparison between two satellites. The CO data were obtained from 1° × 1° (latitude × longitude) spatial resolution ascending orbits. Also the SigmaPlot software were used to analyse the relationship between the independent variable (months) and the dependent variable (monthly CO) over four stations Baghdad, Mosul, Basra, and Rutba.

RESULTS AND DISCUSSION

The CO volume mixing ratios (VMR) from MOPITT (surface) and AIRS (800 hpa) are averaged over the winter and spring periods and for each 1° by 1° latitude and longitude. Figure 1 shows the monthly mean CO VMR (800 hPa for AIRS and surface for MOPITT) measured by each respective instrument, over Iraq, for (winter) January and February 2012. The regional CO VMR differences show obvious biases with MOPITT (surface) higher than AIRS (800 hPa) by 5–30 ppbv over most of the study area, except over the northern region in April, May and June. The differences are larger for higher CO plumes over the regions of biomass emissions, such as over northern region above latitude 34°, as a results of the excessive use of combustion thermal heaters and Influence of the contaminants from neighboring countries¹³, and smaller for clean pristine desert environment in the western and southwest regions. The elevate CO values also seen by both instruments over the industrial and congested urban zones, i.e., Baghdad, Basrah, and Mosul. In winter, negative CO VMRs are observed in both data sets over the southern east regions down to the latitude 32°. Similarly, both instruments also observe enhancements over the mountains area and western desert and plateaus near the Syrian border. Over the northerly westerly states, Mosul, Dohuk, Erbil, Sulaymaniyah and Kirkuk, there is strong disagreement,

as AIRS detecting CO emissions from altitude more than 1000 meter from these mountains area and cloud-cleared radiances are available, since MOPITT removes cloudy pixels while AIRS uses reconstructed cloudy pixels¹⁴, whereas positive CO VMRs are observed by MOPITT (surface). The enhancement over the northern Mountains is evident in both data sets, progressing into February, though an especially large positive signal over central area is solely observed by MOPITT. The persistent marshes low area to the south-east is still not visible in the AIRS data but both agree on low CO VMRs over the southern region. Figure 2 shows, on the left side, the regional monthly maps of April (2012) for the CO VMR at 800 hPa for AIRS (top), surface for MOPITT (middle), and the differences (AIRS-MOPITT, bottom), respectively. Similarly, the monthly CO VMR densities for May (2012) are shown in Figure 2 (right). The AIRS-MOPITT VMR CO differences are larger, in a range of 5–35 ppbv, at high latitudes up to 34° when the VMR CO amounts are very high (145 ppbv from MOPITT). However, AIRS CO is smaller than MOPITT CO over northern regions when the VMR CO amount is relatively high. This pattern of differences is in part because of the poor of measurement sensitivity in the lower atmosphere for down-looking spectrometers such as AIRS. At these levels, the retrieved CO concentrations are heavily weighted by the first guess, and therefore proper first guess data in the retrieval algorithm is critical¹⁵. In April there are both striking differences and similarities. Over much of the Iraq central and southern regions there is clear agreement between MOPITT and AIRS over the significant positive and negative VMR relative to the background. In addition, there are coincidental low VMRs over the pristine desert environment (southwest regions). On the other hand, over much of the south-eastern area the noticeable low CO observed by AIRS is not seen

by MOPITT. The enhancements in the Iraq central and southern regions however are weakened (especially in the AIRS data) when considering only observations below 33° N. These indicate that the enhancement is partly because of the lower VMR above 33° N (reduction in using of combustion thermal heaters) rather than as a result of, for example, increased emissions over this region, especially over capital Baghdad. By May the positive CO VMR over the northern and northwest Iraq regions have all but disappeared in both sets of data, with the exception of MOPITT again witnessing higher values over the central cities. Over the southern area low values are still observed. Noticeably, the anomalies are occur about three months (March, April and May) with AIRS higher than MOPITT over Mosul and Rutba stations. This may be due to a number of factors including that the AIRS shows much higher CO values (5–15 ppbv) than the MOPITT a priori in the mid to lower atmosphere. Over other regions the reason that MOPITT shows higher CO than AIRS may be due to two factors, one is that MOPITT's measurements closed to surface, hence MOPITT's retrieval propagates higher CO values from the surface layers. The second reason is that AIRS lacks sensitivity in the lower atmosphere more than MOPITT.

Table 1. Stations GMD.

Name	Longitude	Latitude	Country
Baghdad	44.36	33.31	Iraq
Mosul	43.16	36.35	Iraq
Basra	47.78	30.50	Iraq
Rutba	40.25	33.03	Iraq

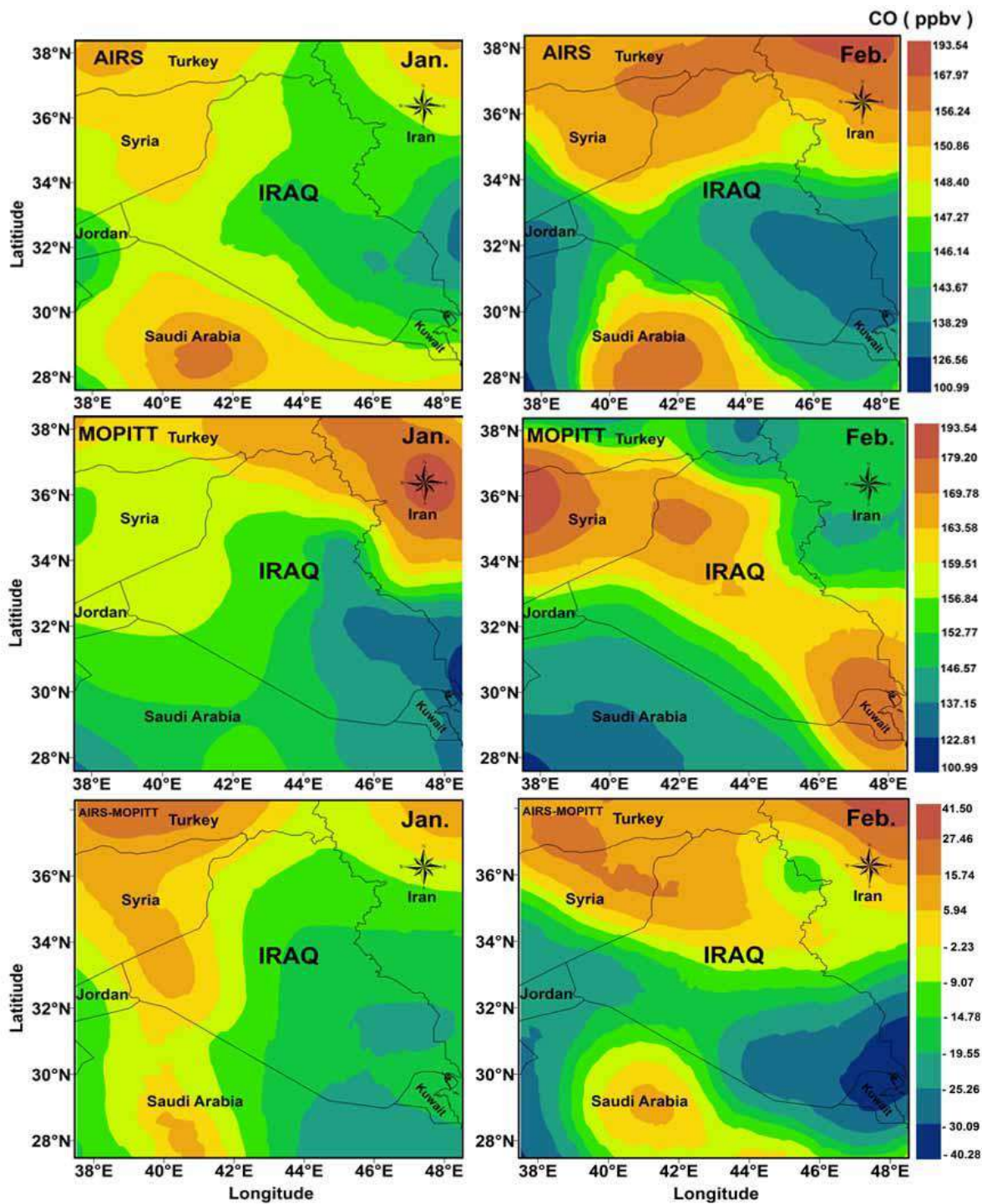


Figure 1. The monthly CO VMR maps for January (2012) over Iraq from AIRS 800 hPa (top), MOPITT surface (middle), and the differences (AIRS-MOPITT, bottom), respectively. Similarly: the monthly CO VMR for February (2012) (right).

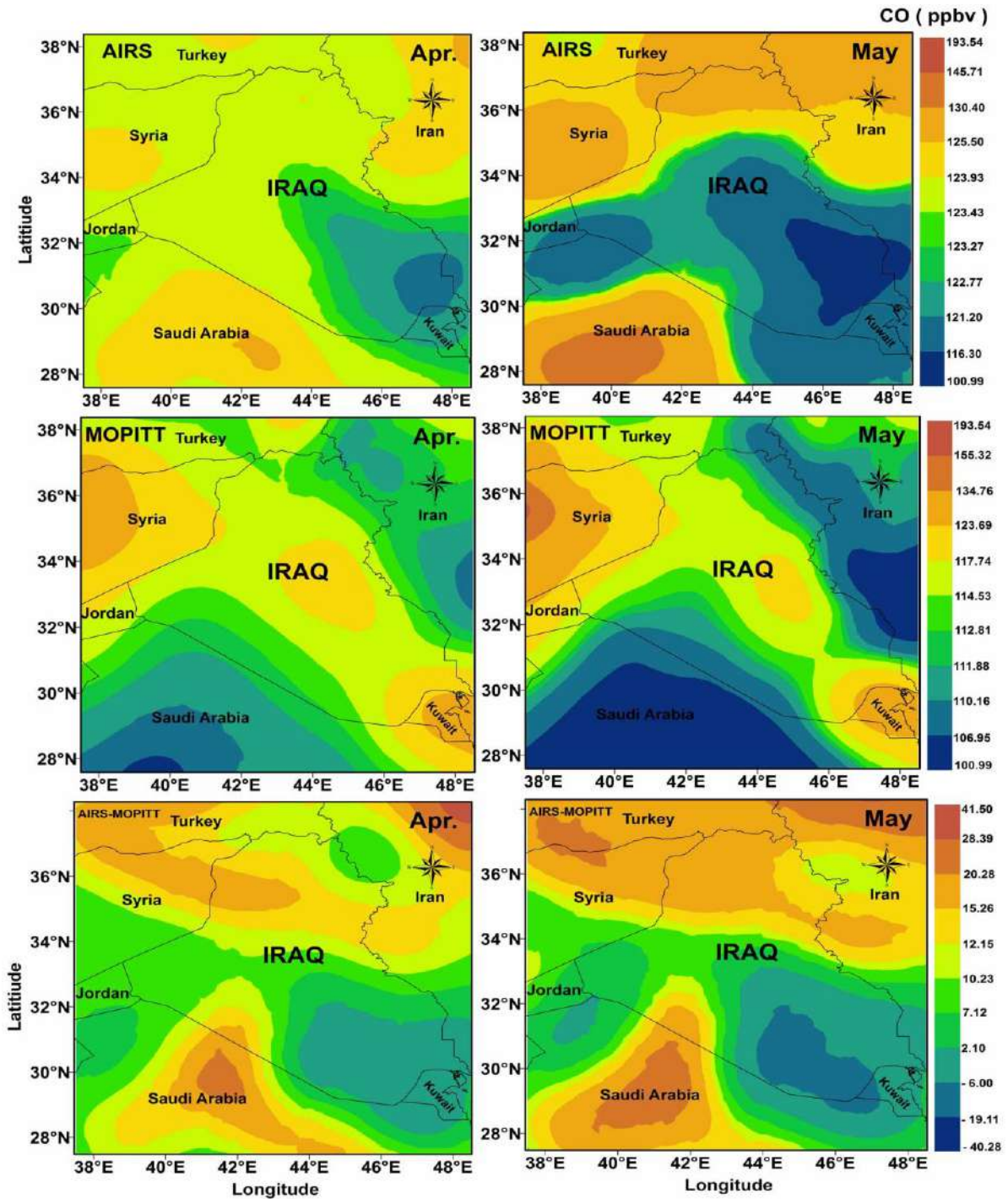


Figure 2. The monthly CO VMR maps for April (2012) over Iraq from AIRS 800 hPa (top), MOPITT surface (middle) and the differences (AIRS-MOPITT, bottom), respectively. Similarly: the monthly CO VMR for May (2012) (right).

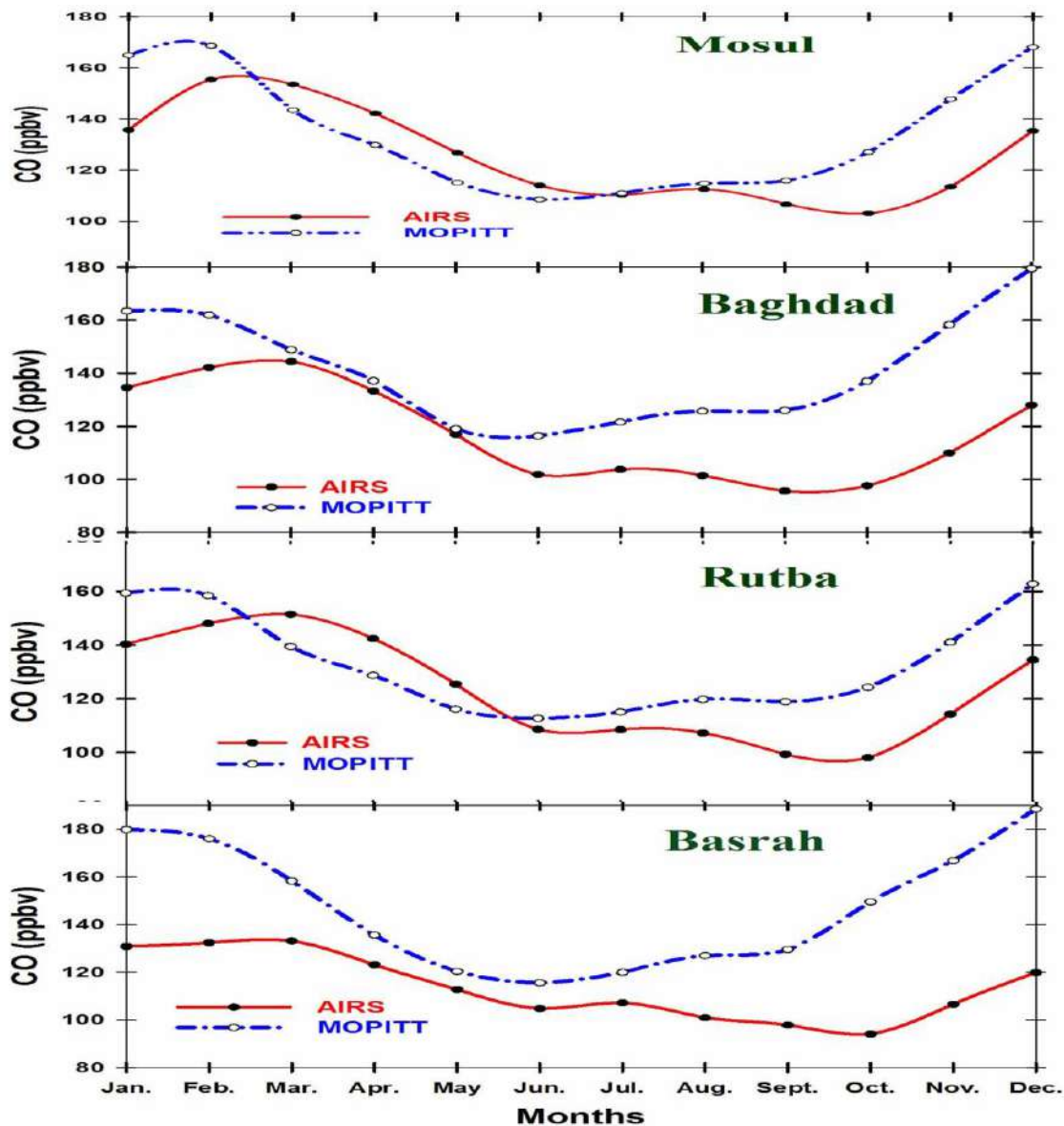


Figure 3. CO VMR anomaly over Iraq detected by AIRS (red) and MOPITT (blue) from January to December 2012.

CONCLUSION

In this study, we have assessed the quality of the two current satellite instruments capable of measuring atmospheric CO VMR from space are MOPITT and AIRS during the winter and spring 2012. Using the surface MOPITT a priori profile as AIRS' 800 hpa provides regional improvements to the agreements between CO retrievals from these two instruments. In summary, comparison of the monthly averaged CO VMRs retrieved by each instrument over Iraq during 2012, relative to their mean background, reveal similar coincidental large scale features that develop and evolve with time. Due to different level observation used in this research, AIRS detecting CO emissions from altitude

more than 1000 meter and MOPITT from surface, there was disagreement between two instruments (5-35 ppbv), and its large for higher CO plumes and smaller for clean pristine desert environment. Both instruments observed enhancements of CO over the mountains, agreed with low CO over the southern region, and detecting the same large scale variations. From temporal trends analysis, the seasonal variations of CO VMR fluctuated between winter and summer seasons with higher values in winter and lower in summer season. Elevation of CO values have seen over industrial and congested urban zones by both instruments. The work presented, the first time demonstrate consistency between CO distributions retrieved by two different space-borne instruments. This comparison study will be extended to include the

comparison with other similar sensors such as IASI on EUMETSAT's METOP, TES on EOS/AURA, and others.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance

All experimental protocols were approved under the College of Education, Department of Physics, Nineveh, Iraq and all experiments were carried out in accordance with approved guidelines.

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Association between Serum Calcium level and the size of Hematoma in Intracerebral Hemorrhage

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ABSTRACT

Calcium (Ca), which is an essential factor for human life, could play a role in pathophysiology of spontaneous intracerebral hemorrhage (ICH). Aim of study: to evaluate the relation between serum Ca level and size of hematoma in ICH. Patients and Methods: This study was conducted at intensive care units (ICU). We included ninety patients with spontaneous ICH. All patients were subjected to thorough history taking, general and neurological examination. National Institute of Health Stroke Scale (NIHSS) was done on admission to assess stroke severity. Initial Computed Tomography (CT) scans were done for all patients within the first 24 hours of admission to calculate the hematoma volume. Serum Ca level was measured on admission for all patients. Among the 180 cases of ICH, (14.4%) had low serum Ca on admission. Patients with low serum calcium level had a significantly larger initial hematoma volume and higher scores on NIHSS in comparison to ICH patients with normal Ca level. Serum Ca was inversely correlated with hematoma volume ($p < 0.001$), stroke severity ($P < 0.001$) and stroke outcome according to modified Rankin scale. low serum Ca level on admission was associated with large initial hematoma volume.

Keywords: intracerebral hemorrhage, ICH, serum Ca level, hematoma.

INTRODUCTION

Intracerebral hemorrhage (ICH) is serious form of stroke leading to high morbidity and mortality¹. It affects more than a million people around the world annually and accounts for 20-30% of all strokes². ICH is a significant public health issue as no effective treatment is now available. Therefore, exploring biomarkers that associated with ICH contributes to early detection and risk stratification for this deadly disease, which is very important for improving the clinical outcome. Serum calcium is essential nutrient for human life, and with phosphate play physiological roles in the multiple pathomechanisms underlying cerebral ischemia^{6,7}. Calcium influences the molecular pathways of ischemic neuronal death.⁸ The element has also been studied with regard to its relationship with stroke risk factors, and high dietary calcium intake has been associated with reduced

stroke risk. Ca^{++} plays a key role in many physiological functions including skeletal mineralization, muscle contraction, impulse transmission in neurons, hormone secretion, and the coagulation cascade¹². In the blood and extracellular fluid, Ca^{++} is found in three forms. The most common Ca^{++} is the ionized or free-state (~ 51%) followed by protein-bound (~ 40%) and an anion-bound complex (~ 9%). Ionized Ca^{++} (iCa^{++}) is the only active form contributing to physiological processes¹³. The incidence of low serum Ca^{++} level ranges from 24–26% in ischemic stroke¹⁴⁻¹⁶ and 10–14% in ICH^{16,17}. Higher serum Ca^{++} on admission has been accompanied by lesser stroke severity, smaller cerebral infarct volume, and better functional outcome^{14,15}. Furthermore, elevated admission serum Ca^{++} level has been associated with good outcomes at discharge and 3 months among acute ICH patients¹⁰. Conversely, lower serum Ca^{++} level has been significantly related to higher presence of cerebral micro bleeds in ischemic stroke patients with atrial fibrillation and/or rheumatic heart disease¹⁸.

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MATERIALS AND METHOD

Study Design and Patient Selection

This study was conducted on 180 patients with primary intracerebral haemorrhage (ICH) who were admitted in Intensive Care Unit (ICU) and stroke Unit of Neurology Department during the period from July 2016 till April 2018. Patients were selected according to the following criteria: patients with ICH who were admitted within 24 hours of symptoms onset. Intracerebral haemorrhage was defined as a new and acute (< 24 hours) neurological deficit with compatible brain imaging showing the presence of intracerebral bleeding¹⁹. All patients were subjected to the following: detailed medical and neurological history taking from either patients or relatives with stressing on stroke risk factors, complete general and neurological examination with assessing stroke severity using National Institute of Health Stroke Scale (NIHSS) [20] which was done on admission. Brain Computed Tomography (CT) scans was done within the first 24 hours of symptom onset to diagnose ICH and to calculate the volume of intracerebral hematoma. Hematoma volume was measured on the initial head CT scan with the use of the ABC/2 equation²¹. Laboratory investigations including Complete Blood Count, blood glucose level, liver and kidney functions, lipid profile and Assessment of total serum calcium level was done on admission for all patients from venous blood samples. Low calcium level was considered when total serum calcium was less than 8.6 mg/dl.

Clinical Variables

Demographic and clinical data were systematically collected through interviews with patients and family members and through a retrospective review of hospital medical records. We assessed the presence of a medical history of hypertension, diabetes, hypercholesterolemia, antiplatelet therapy, oral anticoagulant treatment (OAT); systolic and diastolic blood pressure on admission; and time from symptom onset to baseline NCCT^{22,23}. Elevated BP was managed according to the American Heart Association/ American Stroke Association Guidelines^{24,25}.

Statistical Analysis:-

We used SPSS version 20 software package²⁶ for data analysis. Quantitative variables were expressed as mean \pm SD whereas qualitative variables were expressed as number and percentage. Comparison between groups was done using Chi-square test (χ^2 test) or Fisher exact for categorical variables and Student t-test for continuous

variables. Correlations between continuous variables were assessed by Spearman correlation coefficient. P-value < 0.05 was considered significant. The association between calcium level and ICH expansion was examined in a multivariable logistic regression analysis, adjusted for known predictors of hematoma expansion^{28, 27}. An individual patient's predicted probability of ICH expansion was derived from individual data and from the binary logistic regression model estimates and was expressed as a continuous variable ranging from 0 to 1. P < .05 was considered to be statistically significant. All analyses were performed using the statistical package SPSS version²⁹

RESULTS AND DISCUSSION

A total of 180 patients with a mean age of (68.11 \pm 10.79 years) were included in our study, 102 were men and 78 were women. According to the serum Ca level, we had two main groups: a group of ICH patients with low calcium level < 8.6 mg/dl which included 26 patients (14.4 %). The other group consisted of patients with Ca level \geq 8.6 mg/dl. Baseline demographic and clinical characteristics according to Ca levels were listed in Table 1. There was no significant difference between two groups regard (sex, age or stroke risk factors). Mean hematoma volume was significantly higher in hypocalcemic than in the normocalcemic group (68.23 \pm 7.54 versus 24.07 \pm 19.52 respectively). The mean NIHSS scores at admission were higher in those with low Ca level than normocalcemic groups denoting that patients with low serum Ca had a severe stroke and more neurological deficit (27.38 \pm 5.0 versus 12.23 \pm 7.06 respectively). There was a significant inverse correlation between serum Ca levels in all cases of ICH and the following: hematoma volumes ($r = -0.778$, $P > 0.001$); stroke severity ($r = -0.698$, $p > 0.001$). Primary ICH has been reported to be the most devastating form of stroke. It has no proved specific therapy to improve the outcomes according to the results of randomized clinical trials [30]. In the current study we investigated the relation between serum Ca level and both of the initial hematoma volume, as we included (180) patients who were presented with symptoms and CT evidence of ICH and admitted to ICU units within 24 hours of symptom onset. This study demonstrated that patients with low Ca level had large initial hematoma volume than did those with normal serum Ca. Furthermore, On studying the correlation between serum Ca in patients with ICH and hematoma volume a significant inverse

correlation was observed. Also, the stroke severity was significantly higher in the hypocalcemic than did the normocalcemic group according to the results of admission NIHSS scores. In addition, a negative correlation was observed between serum Ca level and stroke severity scores as assessed by NIHSS. The relation between serum Ca and stroke outcomes has been studied previously. It was observed that poor outcome in patients with ischemic stroke was related to lower serum calcium on admission ^{6,15,16}. Moreover, previously D' Erasmo and colleagues ³¹ recorded that low serum Ca was associated with in-hospital mortality among ischemic stroke patients. Furthermore, data from large epidemiological studies ^{9,31} had showed that dietary calcium intake was associated with reduced mortality after stroke. Morotti and colleagues ¹⁷ consider several mechanisms by which calcium levels might affect ICH volume and the risk of expansion. One relates to an effect of calcium on blood pressure. Lower calcium levels can lead to vasoconstriction and elevated blood pressure, which could cause increased bleeding and increase the risk of hematoma expansion. [34] They discount this mechanism because their study cohort did not show a link between blood pressure on admission and hematoma size ¹⁷. Furthermore, the volume of a deep hemorrhage (which is typically related to hypertension) is not related to a low calcium level. Other studies have failed to find an association between blood pressure and ICH expansion ³². Thus, the cerebral circulation is relatively protected from changes in systemic blood pressure, making any changes in blood pressure less likely to directly affect the cerebral circulation. Morotti and colleagues ¹⁷ also postulated a subtle coagulopathy as another mechanism by which calcium levels might affect bleeding. Although calcium is an integral part of various steps of the coagulation cascade and platelet activation, it has never been directly attributed to either a bleeding or thrombotic disorder. It is assumed that there is never a significant deficiency of calcium, either

acute or chronic, that might lead to impaired hemostasis. Although hypocalcemia is common during or following massive transfusion of blood and blood components, this is thought to be an effect of citrate (an anticoagulant) present in the blood products leading to chelation of calcium. Acute hypocalcemia is observed during therapeutic apheresis, especially during autologous peripheral hematopoietic stem cell collections in patients with thrombocytopenia. However, this has not been associated with hemorrhagic diathesis despite symptoms related to reduced ionized calcium levels. Apart from the observation by Morotti et al, there are a Few recent, similar observations published. In one study, [36] hypocalcemia was associated with increased Mortality among patients who were severely bleeding and required a massive transfusion. A study by Ho and Yip showed decreased clot strength in thromboelastography measurements in patients with a decreased ionized calcium level who were either bleeding or were at risk for bleeding. They suggested that hypocalcemia could make an existing coagulopathy worse. However, chronic hypocalcemia has not been systematically studied. There are patients with mild bleeding tendencies who have normal coagulation parameters and platelet function. You et al., ¹¹ in (2015). They studied a total of 365 patients with primary ICH and assessed the relation between serum Ca on one hand and short and long-term outcomes on the other hand. They demonstrated that elevated admission serum Ca level was positively associated with excellent outcome at both discharge and three months after acute ICH. Appel and colleagues ¹¹ had studied 784 consecutive patients with acute strokes including both ischemic and hemorrhagic types. They demonstrated an association between the baseline serum Ca level and stroke severity and outcome. In addition, they concluded that serum calcium concentrations could be considered as a marker of mortality in acute stroke patients.

Table 1. Demographic and clinical Characteristics of the studied patients:

Variables	ICH with Ca <8.6 (N= 26)	ICH with Ca ≥8.6 (N= 154)	P- value
Age	67.85±10.52	68.37±11.06	0.87
Sex (M\ f)	14/12	82/72	0.96

Cont... Table 1. Demographic and clinical Characteristics of the studied patients:

Risk factor:			
HPN, n	8	30	0.12
DM, n	6	26	0.38
Dyslipidemia, n	6	30	0.62
Smoking, n	5	28	0.33
At admission :			
Systolic Bl .p	170.43±20.12	168.79±23.54	0.86
Diastolic Bl. P	95.78±10.51	94.95±11.64	0.79
Laboratory findings:			
TG	130.80± 41.28	122.40± 36.57	0.49
T. cholesterol	190.66± 33.50	194.34± 27.40	0.71
HDL	37.64±11.92	39.15±12.57	0.67
LDL	117.48 ± 40.82	123.83 ± 35.63	0.29
INR	1.12±0.8	1.10±0.57	0.93

CONCLUSION

Low Serum Calcium level in the setting of ICH is an indicator of large hematoma volume. Hence serum Ca level could be one of the laboratory biomarkers of prognostic significance in the setting of primary ICH. Thus this study recommends starting modifying calcium levels of patients with ICH arriving in the emergency department as soon as possible to improve the clinical outcome.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Public Health, Maysan Health Department, Maysan governorate, Iraq and all experiments were carried out in accordance with approved guidelines.

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Asthma and Allergic Rhinitis are Potential Risk Factors for a Migraine in Adolescents

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ABSTRACT

This research was done to determine if asthma and allergic rhinitis are potential risk factors for migraine in adolescents. The research found out that Asthma and Allergic Rhinitis are indeed common diseases that continue to affect people across the globe. Also, people with asthma are at a higher risk to migraine than those suffering from Allergic Rhinitis. Men with asthma are more affected by migraines as compared to those with Allergic Rhinitis whereas for women, those with Allergic Rhinitis are more affected than those with asthma. This is a proof that more men are affected by Migraine as compared to women since Asthma is perceived as a more risk factor for a Migraine as compared to Allergic Rhinitis. Many men are more exposed to risk factors associated with Asthma as compared to women. Age is also a risk factor for both Asthma and Allergic Rhinitis.

Keywords: Asthma, allergic Rhinitis, migraine, Adolescents

INTRODUCTION

Asthma and Allergic Rhinitis are among the diseases which affect many people globally each year. Asthma is a chronic disease which affects the breathing system hence making air inhalation difficult¹. This happens due to the narrowing of the airways which carry oxygen to the lungs. Asthma is characterized by coughing, wheezing, chest tightness, and shortened breath¹. In an advanced stage, Asthma can lead to an inability to talk. Although asthma can be controlled and treated, it still remains one among the most dangerous diseases which affects more than 24 million Americans¹. Allergic Rhinitis is an allergic response to specific allergens. When the body comes into contact with an allergen, it releases a chemical called histamine which is a natural chemical which defends the body from the allergen. Histamine is the main cause of Allergic Rhinitis². This disease is characterized by sneezing, a runny nose, coughing, frequent headaches among others². Allergic Rhinitis is the most common chronic disease among the children in the USA and is the fifth common chronic disease

in the US². America spends more than \$2 annually for diagnosis and treatment of this chronic disease². Migraines are severe, recurring and painful headaches. These types of headaches can be accompanied by signs and symptoms of other diseases³. Migraines affect 12% of the USA population annually³. Among the risk factors for Migraines is Asthma and Allergic Rhinitis³. Other potential causes of migraines include hormonal changes, triggers in the diet, medications, and triggers in the environment. In the USA, 2 in every three people affected by migraines tend to be within the age of 15 to 55 years³. More than half of the people affected by Migraines also have either Asthma or Allergic Rhinitis³. This is proof that Migraines affect more adults and especially those who have Asthma and Allergic Rhinitis in the USA. In another study which included 288 asthmatic outpatients, it was found that 60.4% of the participants had a severe headache⁵.

MATERIALS AND METHOD

This study will be a mixed research. Mixed research is a type of study which involves the methods of both quantitative and qualitative research²³. In this study, there will be a collection of both qualitative and quantitative data and hence a mixed type of research is the most suitable. It is preferred because it will allow the researcher to gain in breadth and depth understanding as

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compared to the use of either qualitative or quantitative research alone¹². It will also allow the validation of the collaborative results which were found in the discussion section. This study will use only the primary type of data. Primary data is that which is collected by the researcher from first-hand sources by use of methods like surveys, experiments, and studies¹³. The primary data will be collected by the use surveys which will be designed and uploaded online for the participants to answer. The selection criteria will be well outlined so that the participants can be able to know who is eligible to participate. Both qualitative and quantitative data will be collected to suit the mixed methods of research¹⁷.

Sample and Sampling procedure

This study will use the purposive sampling method. This is a non-probability sampling method which follows specified rules in sample selection¹⁵. It is applicable while collecting primary data from a survey because it gives room for the sample selection of participants who cannot meet physically. It also gives a room for the participants to be able to understand if they are eligible for selection, unlike the probability sampling methods whereby the selection is only by chance²⁰. This sampling method saves time because few people who are not eligible tend to participate and even those who participate but are not eligible shows that they have some knowledge in the field hence applying the benefit of doubt.

Sample size

The sample size for this research will be 150 participants. The large sample size will be used so that the assumption normality will be upheld in the questions which need quantitative analysis²⁵. This is in line with the central limit theorem which states that, as the sample sizes increase the data tends to approach normality¹⁶. The assumption of normality is vital because it will eradicate biasness during analysis of the data²¹. This enables in the elimination of getting biased results and hence making them more reliable.

Questionnaire design

In order to get non-biased results from the participants, a questionnaire will be designed and uploaded online as a survey. The questionnaire will include both quantitative and qualitative questions depending on the nature of the response required. Also, the questionnaire will be designed to meet all the

requirements which are important to get credible results.

Data collection

This study will collect data from a survey which will be conducted online. Out of all the participants, only 150 will be selected and they will be those who only suffer either Asthma or Allergic Rhinitis. The data will then be downloaded and integrated into an excel file for cleaning. After cleaning, the data will then be moved to SPSS software for analysis. This will be carried out under the guideline of statisticians so that the results will be reliable.

Variables and data analysis

SPSS will be used for data analysis. The analysis will include both nominal and scale data where both numerical and non-numerical analysis will be applied. Correlation and frequencies will be mostly used for the analysis. Correlation will be used for the analysis of numerical data and frequency tabulations will be used for the analysis of non-numerical data. Tables and graphs will be included in the analysis for easy understanding. Graphs will be used for visualization and table for comparisons. This will lay a base for reliable results and scientific conclusion.

RESULTS AND DISCUSSION

The analysis of the data was carried out among the 150 participants whose surveys were selected using the purposive sampling. Out of the 150 participants, 58% (88 out of 150) were males and 41.3% (62 out of 150) were females. This shows that men who have either Asthma or Allergic Rhinitis are more vulnerable to a migraine as compared to women. Also, the significant difference between the two genders suggest that there is a high possibility that most of the men may be more exposed to risk factors of both Asthma and Allergic Rhinitis. The mean age of the participants was 43 years. The minimum age was 12 years of age and maximum was 87 years. This coincides with the earlier studies that adults are most affected by migraines as a result of the complications which come along with either Asthma or Allergic Rhinitis. Among the male participants, only 39.2% had Rhinitis and 62.8% had Asthma. This shows that men are vulnerable to Asthma as compared to Rhinitis. From earlier studies it was found that Asthma is a more risk factor for a Migraine as compared to Allergic Rhinitis. This is a proof why more men are prone to a

Migraine. Women who participated 40.3% had Asthma and 59.7% had rhinitis a proof why women may have medium rate of a Migraine as compared to men.

Allergic Rhinitis and Migraine

Allergic Rhinitis is another risk factor for a migraine. It is perceived as the most common chronic disease among the adults in the USA. This disease is estimated to affect 60 million USA citizens. Allergic Rhinitis is also a huge health problem in Europe. The European Academy of Allergy and Clinical Immunology (EAACI) estimates that more than 150 million Europeans have allergic Rhinitis. Based on the already existing data, it is predicted that 50% of the European population will be affected by this disease in the next ten years. Allergic Rhinitis is believed to be among the main causes of Rhinitis in the USA and Europe. Out of the USA population which has allergic Rhinitis, 3 to 5% visit hospitals daily due to the complications caused by a migraine ⁷. In Europe, more than 65% of the patients of Allergic Rhinitis have a migraine ⁷. This population is said to experience a migraine more than 15 days each month a fact which reduces their production rate and low school turn up among the young children. In another study, it was found that 45% of those people who had allergic Rhinitis had developed a migraine ⁶. In another study which had 5849 participants of which all of them had rhinitis, it was found that 60.1 of them had frequent headache with it being severe among those who had mixed Rhinitis ⁷. Also, in a controlled model within the

study, it was found that headache-disability was directly related to Allergic Rhinitis with an odds ratio of 1:30 in comparison with a control group ²⁴. This shows that the prevalence of people with Rhinitis and who develop a migraine is higher than those who don't have Allergic rhinitis and develop a migraine. From the analysis, it is evident that Asthma and Allergic Rhinitis are potential risk factors for migraine.

The relationship between age, gender, Allergic rhinitis, Asthma, and Migraine

In a survey conducted to estimate the number of people based on age who were affected by Asthma and had Migraine, it was found that most them were aged between 18 to 55 years. The mean age of the participants was found to be 32 years. 92.8% of the participants claimed to have a severe headache as compared to another study of young people who had Asthma and recorded a medium severity of a headache ^{9, 10}. This shows that adults are most affected by a Migraine when they have Asthma. From the analysis, it is evident that women who have Asthma are the most affected by Migraine and men who have allergic Rhinitis are most affected by a migraine. Both Asthma and Allergic Rhinitis, affect adults mostly as compared to children. Also, the two diseases have been found to be potential risk factors for a Migraine with Asthma being the leading risk factor. The estimation of the two risk factors is predicted to increase in the next ten years.

Table 1. Distribution of participants according to gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	88	58.7	58.7	58.7
	Female	62	41.3	41.3	100.0
	Total	150	100.0	100.0	

Table 2. Distribution of participants according to age.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	150	12	87	43.52	19.576
Valid N (list wise)	150				

Table 3. Distribution of participants (male) according to asthmatic or have Allergic Rhinitis.

Males					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asthma	53	60.2	60.2	60.2
	Rhinitis	35	39.8	39.8	100.0
	Total	88	100.0	100.0	

Table 4. Distribution of participants (female) according to asthmatic or have Allergic Rhinitis.

Females					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asthma	25	40.3	40.3	40.3
	Rhinitis	37	59.7	59.7	100.0
	Total	62	100.0	100.0	

Table 5. Distribution of participants according to asthmatic or have Allergic Rhinitis, have you even had a Migraine?

Migraine					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	116	77.3	77.3	77.3
	No	34	22.7	22.7	100.0
	Total	150	100.0	100.0	

Table 6. Distribution of participants according to relationship between age and frequency of a migraine

Correlations						
			Age	week1	week2	week3
Age	Pearson Correlation		1	-.140	-.123	.150
	Sig. (2-tailed)			.089	.134	.066
	N		150	150	150	150
week1	Pearson Correlation		-.140	1	.935**	.150
	Sig. (2-tailed)		.089		.000	.066
	N		150	150	150	150
week2	Pearson Correlation		-.123	.935**	1	.179*
	Sig. (2-tailed)		.134	.000		.029
	N		150	150	150	150
week3	Pearson Correlation		.150	.150	.179*	1
	Sig. (2-tailed)		.066	.066	.029	
	N		150	150	150	150
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

CONCLUSION

This research has been conducted to evaluate if allergic Rhinitis and Asthma. It has been found that Asthmatic people are more vulnerable to Migraine as compared to those people who have Allergic Rhinitis. Men who had Asthma were found to be affected more by Migraine as compared to those who had Allergic Rhinitis. Also, women were found to be affected by Allergic Rhinitis more as compared to men. This proves that more men are affected by Migraine as compared to women since Asthma is perceived as a more risk factor for a Migraine as compared to Allergic Rhinitis. Many men are more exposed to risk factors associated with Asthma as compared to women. Age has also been found to be a risk factor for both Asthma and Allergic Rhinitis. Adults have been found to be more vulnerable to both diseases. However, above the age of 87 years old, it has been found that there are rare cases of both Allergic Rhinitis and Asthma. However, there is no scientific evidence to back up that claim and opens an avenue for future research.

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Conflict of Interest: None to declare.

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Critical Thinking Activities Involve Sufficient English Language Classroom Materials Effects Students Physiological Performance and Biologically

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ABSTRACT

This paper consists of three chapters concerning the sufficient materials and applying activities employing critical thinking strategies. Preparing students to be effective learners by applying the principles of education process. EFL instructors can apply these principles to all aspects of the language classroom by carefully considering the content they select, the activities they engage in, and the type of interactions that occur in their classrooms. Teachers of English can adopt various strategies to increase classroom participation and critical thinking. One strategy that can benefit language learning is taking a thoughtful approach to materials development, this is especially true for the EFL context, where the classroom is often the only source of teaching English language, and materials which play crucial role exposing learners to language and using modern technology tools to ease using the language communicatively and interactively. The goal is to increase students 'activate' participation in the classroom as they develop communication strategies and skills and a scene of responsibility for the learning process.

Keywords: Activity, Critical Thinking, Physiological, Biological.

INTRODUCTION

On one hand, classrooms are filled with resources and from a certain perspective more resources must lead to more opportunities and more opportunities must lead to more possibility of gain. On the other, students and teachers have limited attention and resources may entail distractions and opportunity costs¹. It is believed that some learners want to learn English in order to work in fields such as business, accounting and tourism, therefore; they are naturally interested in text which deal with these fields. Others may want to learn English to improve their own careers, or change their professions, while so many of them maybe interested in learning languages and cultures. The most important thing here in this paper is the 'Teaching Methods' which help teachers as well as learners to master the

usage of the target language. In terms of method, the researcher is conducting a research which may help EFL /ESL teachers as well as learners ask and find answers or address groups. Teachers of English as a foreign language in Iraq could not envisage incorporating the traditional formats of theories investigation concerning the process of teaching English as a foreign language in most of Arabic countries, especially Iraq with all of the current events in it. The subject area, teachers who work closely with the language teaching classes, in the process of materials development, can assist a great deal in accommodating these students need. Teachers should be well educated and equivalent to make the process succeed and to gain the aims of teaching EFL in the Iraqi schools which were deprived from being in contact with all the world around us.

METHODOLOGY

The analytical method which lies in analyzing and classifying traditional and contemporary methods of teaching English as a foreign language; and the comparative method aimed at comparing advantages

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and disadvantages of various methods and approaches to language study.

Critical thinking skills

Critical thinking means making reasoned judgments that are logical and well-thought out. It is a way of thinking in which you don't simply accept all arguments and conclusions you are exposed to, but rather have an attitude involving questioning such arguments and conclusions. It requires wanting to see what evidence is involved to support a particular argument or conclusion. People who use critical thinking are the ones who say things such as, 'How do you know that? Is this conclusion based on evidence or gut feelings?' and 'Are there alternative possibilities when given new pieces of information?' Additionally, critical thinking can be divided into the following three core skills. Curiosity is the desire to learn more information and seek evidence as well as being open to new ideas. Skepticism involves having a healthy questioning attitude about new information that you are exposed to and not blindly believing everything everyone tells you. Finally, humility is the ability to admit that your opinions and ideas are wrong when faced with new convincing evidence that states otherwise. Using Critical Thinking Skills. self-help with a difference. A lot of self-help is produced by people without much knowledge of theory. This paper is rooted in what we know from academic studies and philosophical ideas, and tries to communicate this in a vivid and accessible way. Many people decide to make changes in their daily lives based on anecdotes, or stories from one person's experience. For example, let's say that your aunt told you that she takes a vitamin C supplement every day. Additionally, she told you that one morning she was running late for work and forgot to take her vitamin C supplement. That afternoon, she developed a cold. She now insists that you take vitamin C every day or you will get sick, just like she did in her story. Many people hearing this story would just accept this and think, 'To avoid getting sick, I should take vitamin C.' Although this type of logic is very common, it lacks critical-thinking skills. If we examine this anecdote a little more carefully, you should be able to understand why. For starters, we don't know where the idea of vitamin C stopping illness even came from. Why did your aunt decide to take vitamin C rather than vitamin D or any other vitamin? Also, there was never any indication given that there exists a direct link between not taking vitamin C and developing a cold. At

first glance, it may seem that way. However, there could be many other variables involved that have nothing to do with vitamin C. Maybe she was already developing a cold and that particular day it just happened to manifest itself. Maybe a sick person sneezed on her in the elevator that morning. Any number of possibilities could have happened, and from just this story, we simply do not have enough information. All of this speculation as to the validity of this particular observation is considered skepticism. (Educational Psychology: /Psychology Courses Study.com.) Considering the learning process, one faces different language uses that respond to different contextual requirements². Students lack the critical thinking skills necessary to express their points of view. Researchers believe that these factors are interrelated and can be explained by cultural differences to authority that results in passive learning. Although there is one strategy that can benefit language learning is taking a thoughtful approach to materials development, this is especially true for the EFL context, where the classroom is often the only source of teaching English language, and materials which play a crucial role exposing learners to language and using modern technology tools to ease using language communicatively and interactively^{3,4}. Teachers are advised to develop materials multidisciplinary teams. These teams should be composed of both novice and experience teachers of English and should include teachers from other subject areas. Teachers prefer materials that deal with topics such as human cloning, globalization, and the effect of global warming. However adding fiction to the mix genres. Marshall and Rowland (1998) describes how critical thinking produces joy, release, relief, and exhilaration as Learners and teachers break through or new ways of Looking at personal, work, and political worlds. Fact from opinion, texts with factual mistakes in them, Corroborating information, Supported opinions from unsupported opinions, conflicting information within and between texts. Mastery of "words", the vocabulary of a foreign language is also bound by actual experience and takes time. Master of mastering vocabulary will not be enough to be active thinker (Fries, 1963:7). There are no short cuts to a control of a complete vocabulary of a foreign language. Of course it is possible to find the few hundred lexical terms most useful in a particular situation and really master these items first rather than try to assimilate all types of vocabulary at once. Children do not readily accept the substitution of a machine for a person in the give and take of talk.

This fact should give pause to those who recommend courses on television for children in the elementary and primary school. Visual aids photos, pictures, are the most effectively employed at this level but audile devices are of limited usefulness in EFL. Virtually all students are motivated in one way or another. One student may be keenly interested in classroom subject matter and seek out challenging coursework, participate actively in class discussions, and earn high marks on assigned projects. Another student may be more concerned with the social side of school, interacting with classmates frequently, attending extracurricular activities almost every day, and perhaps running for a student government office. Still another may be focused on athletics, excelling in physical education classes, playing or watching sports most afternoons and weekends, and faithfully following a physical fitness regimen. Yet another student perhaps because of an undetected learning disability, a shy temperament, or a seemingly uncoordinated body—may be motivated to avoid academics, social situations, or athletic activities.

Suggested sample' Ways 'To Improve Learner's Memory

The researcher suggests some ideas learned which the researcher had already experienced over the years of working as a teacher of English at Arabic schools for example Pair Work. Students may prefer to work with each other:

A teacher could ask students to work in pairs twice every lesson. It is really nice to build pair work or even small groups working with vivid lesson activity. Pair students with speakers of other languages than their first language. This is not always possible, but pairing students who speak different languages forces English communication. Students who speak the same L1 are easily tempted to drop their native language.

Trying to change pairs, but not for every exercise. It's important to get all the students work together, but don't switch too often, some of them who work well together feel unease. Switching too much means students may get frustrated with each other. Perhaps, once every two activities is a good way.

Switching, at the same level, between pairing students and students at different levels. In some activities exercises, it's great to have the cleverer students help weaker students, this is especially true

in grammar activities. However, when it comes to conversational skills students at a similar level will feel more comfortable speaking with students at their level.

Provide pair work tasks with clear objectives.

Activities or instructions clearly state how students should interact and behave inside the classroom.

Vague instructions such as "talk about your hobbies" can lead to discussion, but, especially in lower level classes, discussion and learning tend to need more structure.

Keeping an eye on your pairs. Teacher will be able to spot trouble areas, provide needed support just in time, and keep a tab on much more student progress than if you lead a classroom activity.

CONCLUSION

One strategy that can benefit language learning is taking a thoughtful approach to materials development, this is especially true for the EFL context, where the classroom is often the only source of teaching English language, and materials which play crucial role exposing learners to language and using modern technology tools to ease using the language communicatively and interactively. The goal is to increase students 'activate' participation in the classroom as they develop communication strategies and skills and a sense of responsibility for the learning process.

Financial Disclosure: There is no financial disclosure.

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Depressive Symptoms among Hemodialysis Patients at Teaching Hospitals in Baghdad City

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ABSTRACT

Depression is one of the most common psychological problems among hemodialysis patients. And is associated with important aspects of the clinical course, including mortality, increased number of hospital admissions, and reduced compliance with drugs and reduced quality of life. Objective: Assess the levels of depressive Symptoms in hemodialysis patients and identify the relationship between depressive Symptoms with some Socio-demographic and Clinical characteristics. Non- probability (purposive) sample of 100 cases (43 Male and 57Female) selected from who's their patients were diagnosed with CKD and who are attending these hospitals in Baghdad City that contain hemodialysis units. The data collected from 2nd February 2017 –22thFebruary 2017. A structured interviewing constructed with hemodialysis patients who were attended these hospitals in Baghdad City by questionnaire through using the Beck depression scale. The data analyzed by using descriptive statistical measures and inferential statistical measures. All patients with hemodialysis have depressive symptoms in different levels. Most of them were (20-51) age group, females, married, have Secondary school graduate, and they were housewives. Results indicated that there were relationship between patient's age & marital status with levels of depressive symptoms. Conclusion: Depressive symptoms level effected hemodialysis patient's significantly especially Secondary school graduate patient, housewives, government employee. There are relationships between Depressive symptoms and their patient age& marital status.

Keywords: *hemodialysis, Depressive symptoms*

INTRODUCTION

Chronic Renal failureChronic Condition whereby the kidney failure requires artificial means of excretion for survival. Primary means to achieve this are by peritoneal dialysis or hemodialysis (done several Times weekly) ¹. While HD does not cure renal disease, its use does allow patients with ESRD to survive ². Nevertheless, HD is a lifelong treatment that significantly and sometimes adversely affects patients both physically and mentally ³. Commonpsychological effects include depression,

anxiety; fatigue, decreased quality of life (QoL) and increased suicide risk ⁴. Depression is the most common psychological complication which has serious impact on the quality of life of hemodialysis patients and their caregivers, affecting negatively their social, economic and psychological well-being ⁵⁻⁷ they showed that ESRD patients on chronic (HD) with depression are twice as likely to die or require hospitalization within a year as compared with those without depression, and are at risk for a 30% increase in both cumulative hospital days and number of hospitalizations.

OBJECTIVES OF THE STUDY

Assess the levels of depressive Symptomsamong hemodialysis patients.

Identify the relationship between levels of depressive Symptoms with Sociodemographic characteristics.

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Identify the relationship between levels of depressive Symptoms with clinical characteristics.

METHODOLOGY

A descriptive correlation study (non- probability) used to assess the level of depressive Symptoms among hemodialysis patients at Teaching Hospitals in Baghdad City. Data collection was carried out through the period from 2nd February 2018 – 22th February 2018. To achieve the purpose of the study; Data collection was started after obtaining permission from the Teaching Hospitals in Baghdad City that contain Kidney dialysis units. This setting was chosen for study because they are serving many Patients with chronic renal Failure, these Hospitals were: Baghdad teaching hospital, Surgical Specialties hospital, AL Kindi General Teaching Hospital Al-Imamian Al-Kadhimiyyain Medical City and Al Karama Teaching Hospital, a questionnaire was included two parts: Part I. Sociodemographic Data: which include Age, marital status, Education, Occupation, Monthly income of family. Part II. The Beck Scale for depression has been published by Asma Abdul Aziz Al-Hussein and translated by Mohamed A.G. (2002) which consists of 21 items that evaluate depressive symptoms, with each question being scored from 0 to 3. The Validity of the questionnaire has been determined through (15) a panel of experts; Reliability of the Questionnaire was developed by Alpha correlation coefficient (Test –retest reliability) It was 0.86. Interview was conducted to collect information from patients; The interview has been taken place at the room where the patient stayed with during dialysis place. Before collecting data the objective of the research was explained to the participants to obtain their agreement to participate in it. Data are analyzed through using the Statistical Package of Social Sciences (SPSS, Version 16) performed through the use of descriptive statistical data analysis approach; such as frequencies, percentages, and inferential statistical data analysis approach; such as Chi-Square test.

RESULTS AND DISCUSSION

Table (1) shows the demographic characteristics of hemodialysis patients. It refers that (57 %) of patients were female, (66%) of them were in the age group (20-51) (74%) were married, (1%) of them were widowed; in regard to their educational level the table indicates that the highest level (36%) were Secondary school graduate (25%) of the sample were Self-employed from male

while (35%) from female were Housewife before disease while (18%) were Self-employed from male while (35%) from female were Housewife. About monthly income for them (50%) their income was Somehow Sufficient income while (30%) were Insufficient. Table (2) shows the Clinical characteristics of hemodialysis patients. It refers that (61%) of patients their Duration of illness were (1-3) years and (63%) number of dialysis at week were (two). The finding indicated that there was (33.0%) of the cases have Severe level of Depressive symptoms and (36.0%) of the cases have Moderate level of Depressive symptoms. It appears from this table that there was relationship between the depressive symptoms Level in cases with respect to their Age ($p=0.004$) & Marital status ($P=0.025$) at $P > 0.05$ and it appears from this table that there was no Relationship between in the Depressive symptoms Level in cases with respect to their gender, Education level, Monthly income, occupation, Occupation after disease number of dialysis at week and Duration of illness at $p > 0.05$. Table (1) shows that more than half (57%) of patients were female and more than half are in age group (20-51). This result disagreed with ⁸ who found that (59.7%) male and (40.3%) females. And ⁹ show that most of the patients attending hemodialysis were male ($n=81$, 62.3%) compared to females ($n=49$, 37.69%). The mean age of patients undergoing hemodialysis were 53 years \pm 13.9, and the mean age of male was 52.79 years \pm 13.9 and female were 53.37 years \pm 12.89 appears to be same. Most of them belonged to age group of 40-60 years. Here there were no differences between male ($n=31$, 23.84%) and female ($n=30$, 23.07%) patients. According to Marital status, the majority of the sample (74%) were married, (1%) of them were widowed; in regard to their educational level the table indicates that the highest level (36%) were Secondary school graduate. These findings coincide with the finding of, ⁸ who found that (75.6%) are married and 35 (40.7%) male 21 (36.2%) female had completed education Secondary. About monthly income for them (50%) their income was Somehow Sufficient income while (30%) were Insufficient (11) mentioned that Depression and anxiety are the common non-psychotic mental disorders experienced most frequently by women living in resource-constrained low and lower-middle-income countries. According to the occupation (25%) of the sample were Self-employed from male while (35%) from female was Housewife this result agree with studies (9) who reported that most common occupations for mothers are working in the home. Table

(2) shows the Clinical characteristics of hemodialysis patients. It refers that (61%) of patients their Duration of illness were (1-3). (9) mentioned that (84.61%) duration of disease in years (>5 years). (9) the results showed mean 2.99 years±3.12, with mean duration of males is 3.23±3.5 years and female is 2.57 years±2.2. Majority of the patients (n=113, 86.92%) had undergone dialysis for <5 years out of which 55% patients being males and 32% being females. and (63%) number of dialysis at week were (two) .¹⁰ mention that most patient were number of dialysis at week were (two) . The table (3) shows Distribution of hemodialysis patients according to their Level of Depressive symptoms that the highest level (36%) of them were with Moderate level while (33%) of them were with Severe Level. This result was agreement with result¹² who found the incidence of depression is 73% and most of the patients are included in the category of moderate to severe depression.,¹³ Conclusion at HD is a life-sustaining treatment for patients with ESRD; however, it adversely affects patients' mental status. Increasingly, depression is being recognized as a substantial comorbid illness in these patients. Anxiety, feelings of fatigue, and decreasing QoL are also significant psychological symptoms, and they may be interrelated. Depression and anxiety particularly increase patients' suicide risk. Mental illnesses may have underlying biological and psychological causes. There is considerable evidence that these psychological effects are associated with adverse outcomes in HD patients with ESRD., (14) conclusion that the majority of patients in this study Reported negative feelings experienced as a result ESRD. Anxiety, depression, and in some cases, suicidal ideation were discussed by the patients in this sample. Some patients also spoke about experiencing grief for the loss of their kidney.¹⁷ this study has shown high rates of depressive symptoms in patients with CKD,¹⁵ Conclusion that depression occurs more frequently in patients with CRF mainly between the third to ninth year of treatment and affects females with greater frequency. Also, depression manifests mainly with sadness, anxiety, depressed mood, poor self-esteem, pessimism about the future, decreased libido, sleep disorders and limited appetite. Table (4) shows Chi-Square tests for Depressive symptoms Level and patients Socio- Demographic Characteristics and clinical Characteristic. The present study found that there is: Relationship between Age (p=0.004) & Marital status (P=0 .025) with levels of Depressive Symptoms The table (4-4). This result supported by¹⁶ who was reported

that depression among dialysis patients increased with age.

Table 1. Distribution of hemodialysis patients by Socio- Demographic Characteristics

Socio- Demographic Variable		Socio- Demographic Variable			
Gender	F	%	Level of education	F	%
male	43	43%	illiterate	10	10%
female	57	57%	Primary	34	34%
Total	100	100%	Secondary	36	36%
age (year)	F	%	academic	20	20%
<20	2	2%	Total	100	100%
20-35	36	36%	Monthly income	F	%
36-51	30	30%	Sufficient	20	20%
52-67	25	25%	Somehow Sufficient	50	50%
68-83	7	7%	Insufficient	30	30%
Total	100	100%	Total	100	100%
marital status	F	%	Occupation	F	%
single	16	16%	Employee	23	23%
married	74	74%	Self-employee	25	25%
widowed	9	9%	Housewife	35	35%
divorced	1	1%	Retired	14	14%
Total	100	100%	student	3	3%
			Total	100	100%
Occupation after disease	F	%			
Employee	15	15%			
Self-employed	18	18%			
Housewife	35	35%			
retired	8	8%			
Without work	21	21%			
student	3	3%			
Total	100	100%			

Table 2. Distribution of hemodialysis patients sample according to clinical variables

No	Duration of illness	F	%	Number of dialysis at week	F	%
1	<1	21	21.0	one	9	%9
2	1-3	61	61.0	two	63	%63
3	4-6	12	12.0	three	27	%27
4	7-9	4	4.0	two-three	1	%1
5	≥10	2	2.0			
	Total	100	100.0	Total	100	%100

Table 3. Distribution of hemodialysis patients according to their Level of Depressive symptoms.

level of depressive Symptoms	Cut off point	Frequency	Percent
Mild	6-22	31	31.0
Moderate	23-31	36	36.0
Severe	32-53	33	33.0
	Total	100	100.0

Table 4. Chi-Square tests for Depressive symptoms Level and patients Socio- Demographic Characteristics and clinical Characteristic.

Demographic Characteristic	Depressive Symptoms		
	Df	χ^2	Sig.
Gender	2	2.861	.2390
Age	8	22.492	0.004
Marital status	6	14.437	0.025
Education level	6	4.669	.5870
Monthly income	8	9.563	.2970
occupation	4	1.463	.8330
Occupation after disease	10	13.041	0.221
Number of dialysis at week	6	8.067	0.233
Duration of illness	8	7.840	0.449

CONCLUSION

The majority of hemodialysis patients were Females, most of the sample their age (20-51), most of the patients were married, they have Secondary school graduate, they suffer from Somehow Sufficient income, According to the occupation (25%) of the sample were Self-employed from male while (35%) from female were Housewife. Most of the sample they have duration of illness (1-3) years. The present study concluded that all patients with CRF have depressive symptoms in different levels. There is Relationship between Age & Marital status with levels of Depressive Symptoms.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Psychiatric Nursing Department, College of Nursing, University of Baghdad, Baghdad city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Determination of Menopausal Symptoms among Women Attending Babylon Teaching Hospital in Al-Hilla City

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ABSTRACT

Objectives: To determine the patterns of menopausal symptoms and to find out the association between the menopausal symptoms with women's socio-demographic characteristics and their reproductive parameters. A descriptive analytic study design was conducted on (269) menopausal women was selected throughout the use of non-Probability sampling approach. The sample of the study includes menopausal women who attended at teaching hospital in Al-Hilla city. A questionnaire has been used as a tool of data collection for the period of (13th February - 30th July 2018) and; including: Socio Demographic, Reproductive Characteristics, and Menopausal Symptoms. The results of the study revealed that (43.5%) of women aged (56 - 60) years with Mean \pm SD (54.57 + 4.424). (74.0%) of participants are married. (33.5%) of them are graduated from institute and above. The highest percentage (39.4%) among those have body mass index (30-39.9kg/m²). Forty two percent of study participants their economic status were sufficient to certain limit. Concerning reproductive information, (53.2%) had (4-7) parity, age of the last parity composed (67.3%) aged at (31-40) years old, (48.7%) of them have not been aborted throughout their reproductive periods, (79.2%) of sample under study have breast fed their babies.

Keywords: Determination, Menopausal Symptoms, Women

INTRODUCTION

Women all over the world now have to spend almost 1/3rd of their lives in menopausal years. Therefore, menopause now is a concerning problem to maintain and improve women's health¹. Naturally onset varies women worldwide, age between 44.6–52 years is the international range of stopping menses but in US the average of menopause was 51 years, 50 years old is the average age in Europe, onset developed natural menopause, as well as 54.25 years is the median of age in "Africa" the ages are younger, in "Morocco" 48.4 years a median age of, but at "Alexandria", a average age \pm "standard deviation" of 46.7 \pm 5.44². Therefore, menopause now is a concerning matter to maintain and improve women's health. Menopause happens in period of women's life which regarding the critical because a portion of social transition and it overlaps with the

"Empty nest syndrome", as offspring leave home and women find themselves without help from their also bigger incidence of psychosomatic symptoms¹. Women who smoke cigarettes more dangerous for reach the earlier menopause than who not smoking, in adding to genetic factors, regardless of other harm factors like marital state, number of delivery, and body weight, although is unknown the causes, but it may be due to the damage of irreplaceable primary "oocytes" by "benzo(a) pyrene" as well as toxic materials smoke of the cigarette³. Outcomes of study in altered Arab countries originate to be consistent with studies of Asian countries found discomfort in the head, vertebral of the neck, as well as aches in "muscle" and "joints", among menopausal women in UAE but most complain painfulness joint also muscle pain among Jordanian menopausal female had 89% incidence². Dangers for some chronic health complaints in menopausal age, for example "osteoporosis cardiovascular disease" and damage of thinking role⁴. Accumulation their affect on mood, with feelings of sadness, "hopelessness, emptiness as well as dysphoria", impact on the way of think, interfering with concentration and decision making. Lastly, they

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affect their behavior, with increased irritability and loss of temper, social withdrawal, and a drop in their desire to occupy in pleasurable activities⁵. In order to decrease severity of” menopausal “symptoms for womens in their later life .The health care provider must take a vital role in increasing women’s awareness also in dealing with menopausal health problems to Promote good physical and psychological health⁶

METHODOLOGY

A descriptive analytic study design was conducted on (269) menopausal women was selected throughout the use of non-Probability sampling approach .The sample of the study includes menopausal women who attended to Babylon hospital for maternal and Children , Al-Emam Al-Sadiq teaching hospital, and AL-Hilla teaching hospital in Al-Hilla city. A questionnaire has been used as a tool of data collection for the period of (13th February – 30th July 2018) and consists of three part ;including : Socio demographic characteristics which included (5)items, Reproductive Characteristics which covered(3)items, and Menopausal Symptoms which consist of (6) items, these items are rated according to four level scale (None, Mild, Moderate, severe), and scored(1,2,3,4) with length class (0.74). Their assessment by None (score 1-1.74), Mild (score 1.75-2.49), Moderate (score 2.50-3.24) and Severe (score 3.25 and more). A pilot study has been carried between((1st-10th February 2018) on (19)menopausal women at Al-Hilla Teaching Hospital to test the reliability of the questionnaire and content validity has been carried out through a panel of(21)experts . Descriptive statistical and Inferential analyses are used to analyze the data. Data were analyzed using the Statistical Package for Social Sciences (SPSS version 20). This result of the present study indicated that the highest percentage of the study sample (43.5%)were within ideal menopausal age group(56-60) years .This result is advocated with⁽¹⁾study who found that menopausal women in India (57.27%) were in the age group (56-65) years. Moreover⁷. Have reported that the greater age of menopausal women were between (55-60) among their study participants, the present study revealed that the highest percentage of study sample were married, which recorded (64.7%) out of the study participants. The outcome of this study was in the same line with ⁽⁷⁾study in Egypt conducted on 250 menopausal women ,they reported(65.2%) of them were married , in addition the greatest percentages of sample graduated institute and above level of education

.This findings is in agreement with⁸ study done in Korea that found the higher percentage of women Beyond high school (47.8%),the highest percentage recorded among participants who have (30-39.9) BMI and classified within obese, it constituted (39.4%). This result is in consistent with⁹ study done in Baghdad that showed more than half of the women (58.8%) were obese, (40.4%) of them were menopausal. Moreover the result of the present study found that the (42.0%) of study participants were within moderate economic status. This result is in agreement with¹⁰ study that found (56.3%) of their study participants were within moderate socioeconomic status . Regarding menopausal symptoms , (Hot flushes, sweating) the highest percentage of the sample under study (46.1%) were having sever flushes. This result is advocated with¹² study done in Erbil that found among (500) of menopausal (357) suffered of hot flushes and (345) of participations have night sweats. Relative to (Heart discomfort), represent the highest percentage of the sample (36.1%) were having severity of this symptom. This result is in agreement with¹³ study done in India that found rapid heartbeat was the highest in postmenopausal women. The highest percentage of the sample under study (44.2%) were suffering from severity of this symptom . This results is contradicted with¹⁴ study that found 67(51.5%) of participants had moderate of this problem. Relative to sexual problems, the highest percentage of the participants (49.4%) were suffering moderate of this symptoms. This result is advocated with¹⁵ study that found (34.6%) of menopausal women mentioned that sexual desire decreased. In regard to bladder problems, the present study distribution found the highest percentages of study sample (39.0%) were having these symptom. This result is agreed with⁷ study that found the highest percentage of their sample (36.0%) were having sever bladder problems. Concerning Joint and muscular discomfort, the present study found that the majority of participants (61.7%) were having severe symptoms. This study is in consistent with¹⁶ study that reveals majority of menopausal women experienced joint and muscular discomfort (86%). The overall assessment of present study were suffering moderate of these symptoms .This result is in agreement with¹⁷ study that found the highest percentage of women (36.8%) were having mild climacteric symptoms, (56.3%) moderate and (6.9%)severe. Relative to relationship between demographical variables and symptoms,the result of present study showed that a high significant association with the women’s age (p-value 0.000),this

result is in agreement with¹⁸ study that found high significant association between age of studied subjects and postmenopausal symptoms in regard to depression (n=1101) p-value (<0.001). Concerning the marital status, the findings of the present study showed that there was a significant association with the women's social status (p-value 0.001). This result is advocated with¹⁹ study that found significant association between sexual problems, heart discomfort, sleep problems and irritability with marital status. Concerning the educational level, the findings of the present study showed that a high significant association was found with the women's level of education of (p-value 0.000). This result is advocated with²⁰ study that found

significant association between (urinary incontinence in type, duration and degree) and women educational level . Also findings of the present study showed that there was a significant association between menopausal symptoms and BMI, this result is advocated with²¹ study that found positive associations between the severity of physical menopausal symptoms and BMI such as vaginal dryness and hot flashes. Regarding the Economic status ,result of the present study reported that there was a significant association between economic status and symptoms .This result is advocated with²⁰ study that found statistically significant association between M.S. (urinary incontinence) include(type, and degree of urinary incontinence) and economic status.

Table 1. Distribution of the Sample According to Their Socio - Demographic Characteristics

Socio Women's Characteristics	Rating	Frequency	Percent
Age (years)	46 to 50	65	24.2
	51 to 55	87	32.3
	56 to 60	117	43.5
	Total	269	100
	Mean + Sd.	54.57 + 4.424	
Social Status	Married	199	74.0
	Widow	50	18.6
	Separated	2	0.7
	Divorced	18	6.7
	Total	269	100
Educational Level	Not read & write	70	26.0
	Read and write	53	19.7
	Primary	28	10.4
	Secondary	28	10.4
	Institute and above	90	33.5
	Total	269	100
BMI	18.5-24.9 Normal	71	26.4
	25-29.9 Overweight	62	23.0
	30-39.9 Obese	106	39.4
	Extreme obesity >40	30	11.2
	Total	269	100
Economic Status	Not Sufficient	56	20.8
	Sufficient to some extent	113	42.0
	Sufficient	100	37.2
	Total	269	100

Table 2. Distribution of Women by their Reproductive Information

Reproductive Information	Rating	Frequency	Percent
No. of Parity	0	31	11.5
	1 to 3	60	22.3
	4 to 7	143	53.2
	8 to 11	31	11.5
	12 to 15	4	1.5
	Total	269	100
Abortion	No found gravidity	31	11.5
	No	131	48.7
	Yes	107	39.8
	Total	269	100
Breast feeding	No found gravidity	31	11.5
	No	25	9.3
	Yes	213	79.2
	Total	269	100

Table 3. Distribution of Woman by Their Menopausal Symptoms

List	Menopausal Symptoms	Scale	F	%	M	S.D.	Assessment
1	Hot flushes, sweating (episodes of sweating)	None	29	10.8	3.06	1.037	Moderate
		Mild	49	18.2			
		Moderate	67	24.9			
		Sever	124	46.1			
		Total	269	100			
2	Heart discomfort (unusual awareness of heart beat, heart skipping, heart racing, tightness)	None	36	13.4	2.88	1.049	Moderate
		Mild	58	21.6			
		Moderate	78	29.0			
		Sever	97	36.1			
		Total	269	100			
3	Mental exhaustion(impaired memory, decrease in concentration, forgetfulness)	None	44	16.4	2.98	1.113	Moderate
		Mild	37	13.8			
		Moderate	69	25.7			
		Sever	119	44.2			
		Total	269	100			
4	Sexual symptoms (desire in sexual changes ,problems in activity of sex Also not satisfaction)	None	45	16.7	2.64	0.938	Moderate
		Mild	49	18.2			
		Moderate	133	49.4			
		Sever	42	15.6			
		Total	269	100			

Cont... Table 3. Distribution of Woman by Their Menopausal Symptoms

5	Bladder problems (difficulty in urinating, increased need to urinate, bladder incontinence)	None	54	20.1	2.84	1.151	Moderate
		Mild	41	15.2			
		Moderate	69	25.7			
		Sever	105	39.0			
		Total	269	100			
6	Joint and muscular discomfort (pain in the joints, rheumatoid complaints)	None	13	4.8	3.41	0.866	Sever
		Mild	29	10.8			
		Moderate	61	22.7			
		Sever	166	61.7			
		Total	269	100			
Overall symptoms	Mild Moderate Sever Total	None	23	8.6	3.10	0.966	Moderate
		44	16.4				
		85	31.6				
		117	43.5				
		269	100				

Table 4. Showing the Association between Menopausal Symptoms and Women's Socio - Demographic Characteristics

Socio-Demographic Characteristics	Rating	Menopausal Symptoms				D.F	Mean Square	F	Sig.
		Non	Mild	Moderate	Sever				
Age (years)	46 to 50	14	18	15	18	3	8.289	14.934	0.000 HS
	51 to 55	6	17	35	29				
	56 to 60	3	9	35	70				
	Total	23	44	85	117				
Social State	Married	21	38	66	74	3	4.658	6.009	0.001 S
	Widow	2	6	15	27				
	Separated	0	0	0	2				
	Divorced	0	0	4	14				
	Total	23	44	85	117				
Educational Level	Not read & write	3	7	22	38	3	20.943	8.443	0.000 HS
	Read and write	0	7	17	29				
	Primary	1	2	13	12				
	Secondary	4	8	6	10				
	Institute and above	15	20	27	28				
	Total	23	44	85	117				
BMI	18.5-24.9 Normal	7	1	12	51	3	7.315	8.026	0.000 HS
	25-29.9 Overweight	3	15	24	20				
	30-39.9 Obese	10	20	41	35				
	Extreme obesity >40	3	8	8	11				
	Total	23	44	85	117				
Economic Status	Not Sufficient	2	11	11	32	3	3.396	6.493	0.000 HS
	Sufficient to some	4	16	39	54				
	Sufficient	17	17	35	31				
	Total	23	44	85	117				

Table 5. Association between Menopausal Symptoms and Women's Reproductive Information

Reproductive Information	Rating	Menopausal Symptoms				d.f	Mean Square	F	Sig.
		Non	Mild	Mordent	Sever				
No. of Parity	0	2	3	16	10	3	2.320	3.098	0.027 S
	1 to 3	12	17	15	16				
	4 to 7	9	20	40	74				
	8 to 11	0	3	12	16				
	12 to 15	0	1	2	1				
	Total	23	44	85	117				
Abortion	No found	2	3	16	10	3	0.511	1.178	0.319 NS
	No	15	21	36	59				
	Yes	6	20	33	48				
	Total	23	44	85	117				
Breast Feeding	No found	2	3	16	10	3	.815	1.823	0.143 NS
	No	5	7	6	7				
	Yes	16	34	63	100				
	Total	23	44	85	117				

CONCLUSION

In general, assessment of menopausal symptoms were moderate suffering. There is significant relationship $P \leq 0.05$ between Menopausal symptoms and all socio demographic characteristics while there were non-significant association between menopausal symptoms and women's reproductive information at p-value (> 0.05) except the number of parity have been significantly associated with menopausal symptoms at p-value (≤ 0.05).

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Community Health Nursing, College of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effect of Oral Simvastatin Therapy on Patients with Plaque Psoriasis Treated with Potent Topical Steroid

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ABSTRACT

To evaluate the effect of simvastatin as an adjuvant with topical steroid on disease severity on patients with chronic plaque psoriasis. In a double blind study, 50 patients with plaque psoriasis have been randomly classified in two group, for each group 25 patients. Group one received placebo plus topical steroid (Betamethasone dipropionate 0.5 mg /g and salicylic acid 30 mg /g) for 8 weeks and group two received simvastatin tab 40 mg once daily plus topical steroid for 8 weeks. PASI score was measured before and after treatment. Psoriasis area and severity index reduced significantly in both groups, but the decline of psoriasis severity in simvastatin group was more significant ($P < 0.001$). In addition significant decrease of IL-17 and TNF- α ($P < 0.001$).

Keywords: *Simvastatin, psoriasis, Topical steroid.*

INTRODUCTION

Psoriasis is considered a common chronic skin disease with global distribution. The prognosis is unpredictable and relapse is a rule regardless of the kind of treatment. Treatment kinds are classified into local and systemic treatments. Topical treatments including steroids, retinoids, dithranol, coal tar whereas systemic treatments including methotrexate, phototherapy and many other types of treatment, which is associated with numerous adverse effects¹. The lesions of psoriasis are spread symmetrically on the scalp, elbows, knees joints, nails, and any area of the body may be affected. Psoriasis is a chronic inflammatory disorder with unpredictable course, with susceptibility for recurrent and remission². The global prevalence of psoriasis is valued to be nearly 2%-3% of the populace. The pathology of psoriasis includes numerous classes of T-cells and their interactions with dendritic cells (DCs) and cells involved in innate immunity such as neutrophils and keratinocytes. The most common observational appearances of psoriasis are sharply demarcated, scaly and erythematous plaques;

infrequently, sterile pustules are seen³. IL-17 and TNF- α play important role in pathogenesis of psoriasis⁴. Simvastatin is antihyperlipidemic agent which inhibit 3-hydroxy-3-methyl glutaryl COA reductase enzyme, additionally it has confirmed anti inflammatory and immunomodulatory effects⁵. Statins have been revealed to modulate to modulate several immunological parameters⁶.

MATERIALS AND METHOD

The present study was conducted from period between October 2017 and July 2018. The study was approved by Kufa university / Medical college Ethical Committee for clinical trial. Samples were collected from the out patients clinic of dermatology in Merjan hospital in Hilla city. The patients below 20 and above 60 years of age, pregnant and lactating women, patients received any topical treatment within 4 weeks or systemic agents within 3 months and any patients with hepatic and muscle disorder are excluded from research. Patients in group one take placebo capsule 40 mg once daily with topical steroid for 8 weeks, patients in group two take simvastatin capsule 40 mg once daily with topical steroid. The psoriasis area and severity index, LDH, LFT, CPK, IL-17 and TNF- α were estimated for all patients before and after 8 weeks of treatment.

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Data analysis

Statistical analysis was carried out using SPSS version 20. Paired t-test was used to compare means for paired readings. Correlation coefficient (r) was used to find the relationship between two continuous variables. A p-value of ≤ 0.05 was considered as significant.

RESULTS AND DISCUSSION

All 50 patients complete the study. There was no significant differences between sex ratios in both group ($P=0.571$) as well as there is no significant change in age of both group($P=0.319$). In group one average baseline PASI score 11.69 which is declined to 7.87 after 8 weeks of treatment ($P=0.01$) group two, average baseline PASI score 11.88 which is declined to 3.85 after 8 weeks of treatment ($P<0.001$). In group one average baseline level of IL-17 44.42 which is declined to 40.6 ($P=0.03$), in group two average baseline 46.1 which is declined to 18.8($P<0.001$). While TNF- α baseline for group one 52.36 which is declined to 47.2 ($P=0.01$), in group two average baseline about 51.76 which is declined to 22.34 ($P<0.001$). There is a significant positive correlation between PASI and TNF- α after 8 weeks of treatment for simvastatin group ($P<0.05$). Also there is a significant positive correlation between PASI score between PASI score and IL-17 after 8 weeks of treatment for simvastatin group ($P<0.001$). Psoriasis is considered common recurrent Th1mediated chronic troublesome disease ⁷. The recent studies indicated the anti-inflammatory and immunomodulatory effects of statins and used for treatment autoimmune disease , therefore encouraging used of statins for treatment psoriasis ⁵. In the present study, oral simvastatin plus topical steroid were both effective in treatment patients with plaque psoriasis.

Our study agrees with study done by Naseri et al who documented a significant declined of psoriasis severity (PASI score) in patients after received simvastatin with topical steroid for 8 weeks⁸. In addition agrees with Vasiuk et al who reported a significant decrease in PASI score after 6 months of Atorvastatin therapy⁹. In our study , there is a significant decline in serum levels of TNF- α and IL-17, to best of our knowledge there is no previous research to compare our result with it. This study agrees with Tikiz et al who documented a significant decrease of TNF- α , C-reactive protein and improved endothelial function in patients with long term rheumatoid arthritis after received simvastatin therapy as compared to patients take quinapril for 8 weeks¹⁰. Also agrees with study done by Vasiuk who reported a significant reduction of TNF- α in patients with psoriasis and arterial hypertension after received atorvastatin therapy⁹. Our study agrees with Qin et al who reported that IL-17 significantly reduction in lupus nephritis kidney tissue of rats, The effect of simvastatin on IL-17 related to inhibit autoimmune response¹¹. The study done by Pereira et al who reported a significant decline of IL-17 after used simvastatin therapy in patients with rheumatic arthritis as compared to control¹². Statins inhibit the production of proinflammatory cytokines TNF- α , INF- γ , IL-8 and IL-6 , in addition block induction of inducible nitric oxide synthase ¹³. Activated inflammatory cells and proinflammatory mediators play important role in development of psoriasis lesions as well as in atherogenesis and breakdown of atherosclerotic plaques. Psoriasis is connected with an increased cardiovascular risk as compared to general population ¹⁴. There is some evidence reported that statins exert anticancer effect ¹⁵.

Table 1. Study variables of both groups (placebo and simvastatin) post treatment.

Study variable	Group	N	Mean	SD	P-Value
PASI score	Placebo	25	7.87	4.6	<0.001
	Simvastatin	25	3.85	2.34	
TNF- α pg/ml	Placebo	25	47.2	6.3	<0.001
	Simvastatin	25	22.34	5.6	
IL-17 pg/ml	Placebo	25	40.6	5.8	<0.001
	Simvastatin	25	18.8	2.6	

CONCLUSION

This study proved that simvastatin used as an adjuvant with topical steroid decreases disease severity in patients with plaque psoriasis via inhibiting inflammatory process and modifying immune response.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Pharmacology and therapeutics/College of medicine/ University of Kufa, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effect of ZnO Nanoparticles, Fullerene (C60) and Pyocyanin on Imipenem Resistant Gram Negative Bacteria Isolated from Hospital Environment

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ABSTRACT

The resistance of bacteria from hospital environments has been less frequently investigated. Twenty - seven Gram-negative bacterial isolates were isolated and identify from the hospital environment. The isolates were *Acinetobacter baumannii* (16 isolates), *Pseudomonas aeruginosa* (4 isolates), *Enterobacter cloacae* (3 isolates) *Klebsiella pneumoniae* (3 isolates) and *Escherichia coli* (one isolate). Antimicrobial susceptibility test was performed by disk diffusion method and polymerase chain reaction was used to detect *bla*NDM-1 genes among imipenem-resistant MBL positive isolates. The results showed that the all isolates were imipenem-resistant , cefotaxime resistance was seen in 48.14% of isolates, ciprofloxacin resistance rate was 11.11% , and 25 isolates (92.5 %) were inferred to be MBLs producers. Among these isolates, 11 isolates had *bla*NDM-1 genes. The antibacterial effect of ZnO nanoparticles, fullerene (C60) and pyocyanin against various bacterial isolates from hospital environment was investigated. Preliminary growth analysis data suggest that ZnO nanoparticles and pyocyanin have significantly higher antibacterial effects on bacteria than do fullerene (C60). The nanoparticles reduced the growth of *A.baumannii* and *E. cloacae* higher than that with *P. aeruginosa* and *K. pneumonia*. It was concluded that nanoparticles and pyocyanin have potential as a therapeutic agent against Gram-ve bacteria from the hospital environment.

KEYWORDS: *Nanoparticles, Pyocyanin, Fullerene (C60), hospital environments.*

INTRODUCTION

The rapid emergence of antibiotics resistant microorganisms is occurring worldwide, endangering the efficacy of antimicrobial agents, which have saved millions of lives ¹. The environmental spread of antimicrobial agents resistant microorganisms has been recognized as a growing public health threat ². Hospitals are antibiotic hotspots use and not only play an important role in antibiotics dissemination but also in the growing of antimicrobial resistant bacteria into the environment. The treatment plants of hospital wastewater containing

antibiotic residues can favor the resistance development due to the selective pressure placed on bacteria ³. Carbapenems are the most effective against Gram-ve and Gram +ve bacteria presenting a broad spectrum of antibiotic activity ⁴. Infections due to carbapenem resistant *Enterobacteriaceae* (CRE) are increasingly reported throughout the world and the CDC , USA considers them as an urgent threat to human health. Carbapenem resistance in *Enterobacteriaceae* can be mediated by carbapenemases production ⁵. Carbapenemases can be divided in *Enterobacteriaceae* into Ambler class A β - lactamases , class B metallo- β -lactamases (MBLs) and class D oxacillinases ⁶. New Delhi metallo- β -lactamase-1 (NDM-1), a relatively newly described metallo- β -lactamase, can hydrolyze all β -lactams including carbapenems except monobactam. It was first identified in *Escherichia coli* and *Klebsiella pneumoniae* isolated from a Swedish patient who was

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hospitalized in 2008 in India⁵. Inorganic metal oxides show more constancy robustness and long shelf life than organic antimicrobials that it's the major benefits of application inorganic metal oxides⁷. The use of Zinc Oxide locally improves chronic and acute wounds healing due to antibacterial, anti-inflammatory and increasing re epithelialization properties⁸. The current investigation was aimed to evaluate the antibacterial effect of pyocyanin and nanoparticles against Gram-ve bacteria from the hospital environment.

MATERIALS AND METHOD

Bacterial Isolates: Bacterial isolates were collected from hospital environment (beds, windows and surfaces) in Baghdad Teaching Hospital during April 2018. All isolates were identified using conventional biochemical methods and Vitek 2 system.

Antibiotic susceptibility testing : The susceptibility of isolates to different antibiotics was testing using disk diffusion method following Clinical and Laboratory Standards Institute guidelines (CLSI,2015), cefotaxime (CTX) ,pipracillin(PRL), tetracycline(T) , ceftazidime(CAZ), imipenem (IMP) ; ciprofloxacin (CIP) and aztreonam (AZT) , On Mueller- Hinton agar Plate, using overnight culture at a McFarland standard (0.5) followed by incubation at 35 °C for 18-24 hr .

Phenotypic Detection of Metallo-β lactamase(MβLs): Each imipenem -resistant isolate was tested to investigated the production of MβLs by disk approximation test ,the results were interpreted according to Bashir *et al.*,(2011): Tested isolates were inoculated according to Kirby-Bauer method onto plates of Mueller-Hinton agar media. Two discs of Imipenem were placed on the plate; 5 μl of EDTA solution (final concentration is 0.5M) was added to one of them. The zones of inhibition of the imipenem disc and imipenem with EDTA disc were compared after incubation at 35°C° for 16-18 hrs. An increase in the size of inhibition zone at least 7 mm around the imipenem-EDTA disc more than imipenem disc alone was considered as produced isolates of MβLs.

Molecular detection of *bla*_{NDM1} gene

Detection of *bla*_{NDM-1} gene for imipenem resistant isolates, using the primers for *bla*_{NDM1} according to Nordman *et al.* (2011)⁶. A PCR reactions with specific primers were performed to identify *bla*_{NDM1} forward

(5' GGTTTGGCGATCTGGTTTTC3') reverse(5' CGGAATGGCTCATCACGATC3'). Amplifications were performed by a DNAThermal Cycler (Gradient thermocycler Polymerase Chain reaction, TechNet-5000, USA).The cycling program included 5 minute initial denaturation step at 94°C°, followed by 35 cycles of denaturation for 30 seconds at 94°C°, annealing of primers for 40 seconds at 52°C°, and primer extension for 40 seconds at 72°C° with auto extension. After the last cycle, the PCR tubes were incubated for 10 minutes at 72°C°. PCR products were detected by electrophoresis on 1% agarose gel by staining with ethidium bromide.

Phenotypic detection of Pyocyanin Production

Pyocyanin production was detected for all *Paeruginosa* isolates on King's B medium (9) and Mueller-Hinton agar media by streaking. Using overnight culture followed by incubation at 30 C° for 24 hrs.

The quantitative pyocyanin assay

The quantitative assay of pyocyanin is depending on the absorbance of pyocyanin in acidic solution at 520 nm. Five ml of culture grown in T-broth to production of pyocyanin was extracted with 3 ml chloroform and then re extracted into one ml of 0.2-N HCl to give a pink to deep red solution. The absorbance of this solution was measured and the concentrations, expressed as μg/ml of pyocyanin produced of culture supernatant were determined by multiplying the OD at 520 nm by 17.072¹⁰.

Synthesize ZnO nanoparticles

Precipitation method was used to synthesize ZnO nanoparticles in a surfactant solution (5% polyethylene glycol) by drop wise addition of (0.1M) zinc acetate dihydrate and (0.1M) ammonium carbonate in the same time at room temperature with continuous stirring for 2 hours after completing reactant addition, then ammonia solution and absolute ethanol was used to wash the filtered precipitate. Vacuum furnace was used for drying and calcination the produced ZnO nanoparticles at 100°C for 12 hours and at 450°C for 3 hours respectively. Fullerene C60 was used as it is from (Modern Synthesis Technology (MST), Latvia).

Antibacterial activity of ZnO nanoparticles, Fullerene (C60) and Pyocyanin:Broth dilution method was used to detection the antibacterial activity of ZnO

nanoparticles, Fullerene (C60) and pyocyanin by determine the MIC. Generally, serial doubling dilutions of ZnO nanoparticles Fullerene (C60) and pyocyanin were prepared using Mueller Hinton broth and finally, the culture bacteria was added to each test tube then incubated for 24 hours at 37° C using shaking incubator. Cell growth inhibition was defined by counting the amount of colonies forming units (CFUs) on the agar plates and the turbidities of the cell cultures. The first test tube that showed no change in turbidity were further proved for bacterial culture by spreading 100µl of the broth onto Mueller Hinton agar plates to determine the bactericidal or bacteriostatic effect ¹¹

RESULTS AND DISCUSSION

A total of 27 Gram negative bacilli were recovered from hospital environment (beds, surfaces and windows), the most represented bacteria in hospital environment was *A.baumannii* (59.25%), followed by *P.aeruginosa* (14.81%) and (11.11%) for each *K.pneumoniae* and *Enterobacter cloacae*, the least common bacteria was *E.coli* (3.70%). Resistance rates observed among isolates obtained from environment samples are presented in table 1. Ciprofloxacin was the most active agent against bacterial isolates, while all bacterial isolates recovered showed high resistance rates to imipenem and tetracycline. Antimicrobial agents and antibiotic resistant bacteria are found in surface water, soil, and groundwater, yet their levels are currently unregulated. **Duong et al.** (2008) ¹² tested resistance of ciprofloxacin and norfloxacin in *E. coli* in hospital wastewater of another Hanoian hospital and reported that *E. coli* isolates were susceptible. Imipenem is used to treat infections caused by β lactamase producing bacteria and should be saved to treat infections not readily treated by other antimicrobial agents ¹³. High prevalence of bacterial resistance for carbapenem in clinical isolates in Vietnamese hospitals has been reported ¹⁴. The detection of resistance to these antibiotics in bacterial isolates from wastewater in hospital is of concern, since this can contribute to the spread of resistance among bacterial populations in the environment. The phenotypic detection of carbapenemases was done, the results of this test elucidated through 27 carbapenem-resistant bacteria, 26 (96.29%) were identified as β BL-producing isolates. Twenty seven carbapenem resistant isolates were screened with NDM-1 specific primers, of these 11 isolates (40.74%) were positive for *bla*_{NDM-1}. The increasing prevalence of *Enterobacteriaceae* which

producing carbapenemase is a significant public health concern. NDM β lactamase enzymes, will be difficult to control, and further importation and dissemination are inevitable ¹⁵. Walsh *et al.* (2011) ¹⁶ reported that the *bla*NDM-1 gene could easily transfer beyond the boundaries of the family of Enterobacteriaceae. While the majority of bacterial species implicated were environmental bacteria, reports regarding the presence of the *bla*NDM-1 gene in *A. baumannii*, an opportunistic bacteria causing nosocomial outbreaks, are alarming. Such isolates have already been isolated from India, China and Germany ¹⁷. The *in vitro* antibacterial activity of ZnO nanoparticles, fullerene (C60) and pyocyanin against various bacterial isolates from hospital environment was investigated. Preliminary growth analysis data suggest that pyocyanin and nanoparticles of Zinc Oxide have significantly higher antimicrobial activity against bacteria than do fullerene (C60). The MIC of pyocyanin was 375 µg/ml against *A.baumannii*, 1500 µg/ml against *P.aeruginosa* and *K.pneumoniae* and 187.5 µg/ml against *E.coli*. Nanoparticle metal oxides represent a new class of important materials that are increasingly being developed for use in health-related applications and researches ¹⁸. The nanoparticles reduced the growth of *A.baumannii* and *E. cloacae* higher than with *P. aeruginosa* and *K. pneumoniae*. Antibacterial effects of Zinc Oxide nanoparticles have been indicated toward a wide spectrum of bacteria such as *S. aureus* and *E. coli* ¹⁷. Although, ZnO nanoparticles have been frequently reported with antimicrobial properties but the very limited researches are available to treat the bacterial infections on the *in vivo*. The antimicrobial activity of ZnO nanoparticles is affected by concentration and particle sizes. The antibacterial effect of ZnO NPs directly correlates with their sizes. This dependency is also influenced by the concentration of nanoparticles. ZnO nanoparticles with a smaller size (higher specific surface areas) showed highest antibacterial activity ⁷. Antimicrobial activity of Zinc Oxide related to reactive oxygen species production which destroys bacterial cell wall and thereby causes the death of the bacteria (19). On the other hand, the results of current study showed that the most affected bacteria to pyocyanin were *E. coli*, this finding agrees with results of Abdul Hussein and Atia (2016), they found that *E. coli* isolated from urinary tract was most affected, followed by Bacillus and Staphylococcus at the same level. Baront and Rowe (1981) ²⁰ recorded that bactericidal effect of pyocyanin was dependent upon its concentration and resulted in

decreases in viability of bacterial cells from 1 to 8 log viable cells /ml . All a pyocyanogenic pseudomonads tested were totally pyocyanin resistance, suggesting that pyocyanin resistance may be a characteristic of the

genus. *P. aeruginosa*, was also essentially unaffected by high concentrations of pyocyanin. The Gram+ve bacteria were more susceptible as a group to the antimicrobial action of pyocyanin than were the Gram -ve bacteria.

Table 1. Antimicrobial susceptibility test results of bacterial isolates from hospital environments.

Bacterial isolate	Antibiotic resistance						
	PRL	CTX	CAZ	ATM	IMP	TE	CIP
<i>A.baumannii</i>	2	2	1	1	16	16	2
<i>P.aeruginosa</i>	1	4	4	0	4	4	0
<i>K.pneumoniae</i>	3	3	3	2	3	3	0
<i>E.coli</i>	1	1	1	1	1	1	0
<i>Enterobacter cloacae</i>	3	3	3	2	3	3	1
Total of resistance No (%)	10 (37%)	13 (48.14%)	12 (44.44%)	6 (22.22%)	27 (100%)	27 (100%)	3 (11.11%)

Table 2. Presence of *bla*_{NDM-1} gene in bacterial isolates

Bacterial Isolates	Presence of <i>bla</i> _{NDM-1} gene in bacterial isolates	% of <i>bla</i> _{NDM-1} gene
<i>A.baumannii</i>	8	50
<i>P.aeruginosa</i>	1	25
<i>K.pneumoniae</i>	1	33.33
<i>E.coli</i>	0	0
<i>Enterobacter cloacae</i>	1	33.33
Total	11	40.74

CONCLUSION

The present study has shown the antimicrobial activity of ZnO nanoparticles and pyocyanin on Gram-ve bacteria from the hospital environment. Based on present findings, local application of ZnO nanoparticles may be made for help wound healing processing due to the reduction of bacterial load.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Chemistry, College

of Science, Mustansiriyah University, Baghdad- Iraq and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of Educational Units in the Development of Analytical Thinking

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ABSTRACT

The objective of this research was to define the effectiveness of educational units in the development of analytical thinking. The study was conducted in Iraq, Babylon Governorate. An experimental design was adopted with partial control of two groups. The research community was the third-grade students from the Department of Arabic language at the Faculty of Basic Education, Babylon University. A sample of (62) female student was divided into one experimental and one control group. The sample students were equalized using appropriate statistical means for research procedures (arithmetic mean, standard deviation and the Independent t-test). Four variables were used (age, intelligence, father's academic achievement, and mother's academic achievement). A standardized tool was used to measure the effectiveness of the General Teaching Methods subject to the students in the two research groups, this tool is a post-test. The results of this study showed that there are statistically significant differences between the average mean of experimental and control students' scores at (0.05). Thus, the units of the general teaching methods contributed to raising the level of students achievement, and it was indicated that the effectiveness of the proposed educational units for general teaching methods subject through the use of cognitive maps.

Keywords: *Teaching Methods, Effectiveness, General Teaching Methods, Educational Units, Cognitive Maps, Development of Scientific Thinking.*

INTRODUCTION

Modern education seeks to develop the learner's skills in learning and thinking, and these skills are priorities. It is important to develop the higher mental processes of learners in general and university students in particular, since mental activity should be in constant mobility and vitality, for the purpose of not relying on the minimum issues such as conservation, absorption and memorization only, but the aspiration and development of the higher mental processes such as analysis, rectification, thinking and problem solving. The researchers see the requirements of success as the student's knowledge of his own abilities, his mission and the strategy that contributes to this task. This means the student's knowledge of his cognitive processes and their results, i.e., his awareness of metacognitive. However,

the teaching methods used in the composition of the student/teacher in the faculty of education colleges is characterized by some shortcomings in achieving the desired role, that is the most used methods of training for this material is the lecture, despite the continue invitation of faculty members to the necessity of diversification in teaching methods in education colleges, and follow method of lecture the method of spelling and indoctrination, then dialogue and discussion in the end but, the method of the lecture may be useful with a large number of students, this method has been weakened by some faculty members, which requires the need to introduce modern methods and strategies to train teaching methods material in particular, and educational materials in general, as well as strategies should address the two brain Hemispheres and mental development of students. Education has a role in social upbringing, and one of its basic functions is to provide individuals with the social culture. It is also a deliberate and purposeful process to prepare people to achieve happiness for themselves and for others¹. The educational institutions have an impact in raising the level of society to work,

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progress and cohesion, and it's a mean to solve problems and promote individuals and progress in society², as it is of great importance to humanity today because it is a large-scale scientific revolution, as well as to qualify the community to cope with rapid changes requires a strong base, Therefore, education is the main responsibility because it is the tool capable of developing the potential of learners to deal with these changes³, this was confirmed by Cairo Educational Declaration at the Conference of Arab Ministers of Education (2006), the importance of educational reform, which begins to raise the potential of society for the purpose of dealing with the accelerated progress age culture this is done in a guided educational climate surrounded by additional material and moral potentials, characterized by the interaction of its elements in a harmonious way commensurate with our cultural heritage, and is consistent with the architecture of the future, through the development of creative thinking and problem solving, and development of multiple positive intelligence, this is the work of educational pedagogical programs as it is the means to find the ways of that desired reform⁴. The building and development of modern society require attention to the building of knowledge and focus on brain development, education is the most important pillar of development, especially university education and upgrading requires a parallel pace towards scientific progress⁵. Higher education occupies a prominent role in the development of the society by contributing to the needs development of qualified human resources for development in various aspects of life, especially the development of the student's brain. Therefore, the rethinking of programs or curricula of university education is necessitated by changes taking place in the region and in the world, In order to keep this education the spirit of the age and its requirements, as it plays the largest role in building nations and peoples as attributive the top of the educational ladder, including the colleges and institutes, specialized in different fields of knowledge⁶. The closest example is the developed countries that have made progress as a result of their growing interest in university education and the provision of it to the largest number of their children⁷. The university is the academic community, established to trace knowledge, it is divided into well-known departments and operates in all fields, it is well known that the achievements of the university have the greatest impact in developing the world in all aspects, as well as encouraging creativity and innovation in the students' products⁸. And to adopt educational strategies aimed

to increasing achievement and thinking evolution and brain development, it is difficult to propose strategies that will serve all the objectives and goals, because each one of them have disadvantages and advantages, one of the strategies that the school can choose or use to achieve the goals is the cognitive maps strategy if it has the educational and professional competencies⁹. It is necessary to pre-prepare the unit because it contains a main topic or several topics and contains the facts, concepts, and various activities as well as contains the teaching methods and the educational means concerned to implement the unit and the rectification methods used, the good preparation of the unit provides the opportunity to add any suggestions and new ideas and modify what they deem appropriate to achieve their goals, and the specialists should first select the subject of the unit and determine the stage and the grade that will be studied after that the building of the reference unit in the form of a general structure includes the outline, and students participate with their teachers in the planning and determine the stages of implementation and the time required for each stage as well as identify Activities, methods, and ways of learning¹⁰. Al-Maghrebi, (2009): (Effectiveness of a proposed educational unit based on the method of distance self-learning in the development of applied skills in the methods of teaching techniques curriculum of female students in the Faculty of Education and their tendency towards it). The study aimed to measure the effectiveness of a proposed teaching unit based on the method of distance self-learning in the development of applied skills in teaching methods and techniques subject for female students in the faculty of education and their tendency towards it. The sample of the study included a number of female students from the Faculty of Education, experimental and semi-experimental design were used. The tools included "an achievement test for the educational units and a list of criteria for evaluating the level of student performance in self-learning». It was found that there were statistically significant differences at (0.01%) between the mean scores of the students of the experimental group in the pre and post application of the achievement test for the educational units, it was concluded that the post-application was valid¹¹.

METHODOLOGY

Therefore, the experimental approach was followed in the current research as it is suitable for research procedures.

Experimental Design:

The experimental design includes both an experimental and a control group, both of which have a post-measurement and a high confidence level for results (Al-Hamdani, 2006).

Research Community

Students of the of Arabic language department stage three (morning study), College of Basic Education for the academic year 2017 2018.

Parity of Research Groups

The following variables were used (age, intelligence, father's academic achievement, and mother's academic achievement). A standardized tool was used to measure the effectiveness of the "General Teaching Methods subject", to the students in the two research groups (experimental and control), this tool is a post-test and has been tested honestly and consistently. This factor has been controlled using statistical methods in processing the test data.

Preparation of teaching plans

A daily teaching plan was prepared for the subjects of the proposed educational units for the general teaching methods which were (25) plans and taught to the experimental group, also, daily plans were prepared for general teaching methods which were (25) plans for topics taught to the control group. Appendix 15 illustrates a sample plan for the experimental group, and appendix (16) illustrates a control plan sample for the control group. The building of (Research Tool) a post-achievement test for the proposed educational units for General Teaching Methods subject, the following steps were followed in constructing the test:

Determine the objectives of the test.

The objectives for which the test was based were determined by Bloom's classification according to the following areas:

Cognitive, which includes goals that emphasize intellectual learning outcomes such as: (Remembering, understanding, application, analysis, synthesis, and rectification).

The psychological field includes the goals that emphasize the motion skills which represented by: (drawing, writing, and design).

Determine the type of test

The most appropriate type of tests to measure the effectiveness of the proposed teaching units for general teaching methods is the following test:

The effectiveness of the educational units testing "Post-Achievement Test", one of the objective tests types (multiple choice and sentence supplementation) and essay tests (Al-Dulaimi and Al-Mahdawi, 2000). The test was conducted in 2010 and the amendments were made according to the opinion of the experts and the referees concerned with the measurement and rectification in the Faculty of Education / Ibn Rushd - University of Baghdad, in which the test was presented.

Preparation of a specification table (test map)

The test map is one of the basic applications in the preparation of tests because it ensures the distribution of the test paragraphs on the main topics for the subject content and the objectives that the test seeks to measure according to the relative importance of each one of them, in addition, it is a prerequisite for content validation (Al-Baghdadi, 1980).

To build the test map, the following steps are implemented:

1. Determine teaching units' topic of general teaching methods subject into major topics.
2. Determine the educational objectives for the general teaching methods subject and determine the number of goals for each level of Bloom's classification of educational objectives.
3. Determine the importance of each educational unit through the following relationship:

Number of Topic Objectives

$$\text{Importance Ratio per Topic} = \frac{\text{Number of Topic Objectives}}{\text{Total Number of Subject Objectives}} \times 100$$

4. Determine the importance of each objective level by:

Number of Level Objectives

$$\text{Importance Ratio for each level} = \frac{\text{Number of Level Objectives}}{\text{Total number of Objectives}} \times 100$$

(Al-Baghdadi, 1980).

Determine the total number of questions.

A test map was prepared that included the content of general teaching methods subject as well as included the educational objectives and according to Bloom’s classification: (Remembering, understanding, application, analysis, synthesis, and rectification).

The content importance of each teaching unit for the subject of general teaching methods was calculated with respect to the number of behavioral objectives assigned to each educational unit. As well as determining the relative importance of each level of Bloom’s classification for objectives. The following table shows the detailed test map:

Statistical Methods

SPSS program was used through this research

RESULTS AND DISCUSSION

After the end of the experiment according to the research procedures, the results are presented to analyze the data statistically for the post-test according to the research hypothesis, the results are presented as follows: To verify the validity of the research, the arithmetic mean, the standard deviation and the (t-test) value of the experimental and control group students’ scores in

the post-test was calculated. **Table (2)** shows that the mean grade of the experimental group students was (63.39) with Standard deviation (8.38), as well as mean grade of the control group was (51.83) with standard deviation (6.29), and by using t-test for two independent samples to identify significance differences between the two means and the table shows that the difference is statically significance as the calculated t-value was (4.179) which is greater than the tabulated t-value (2.000) with degree of freedom (59) and significance level (0.05), which indicates that there are statistically significant differences between the average mean of experimental and control students’ scores for the benefit of the experimental group and for the effectiveness of the educational units. Through the results, it was indicated that the Effectiveness of the proposed educational units for general teaching methods subject through the use of cognitive maps. This is evidenced by the high scores on the achievement and the post-test. Thus, the experimental group which studied the educational units has succeeded on the control group that studied the general teaching methods book subjects. This result was because the educational units have several characteristics like clarity, ease of implementation, acceptance by the students, their interests, abilities, and training in planning, working, group learning, and collaborating among them during the learning process.

Table 1. Shows the experimental design of the research

Group	Independent variable	Dependent variable
Experimental	Educational units of the general teaching methods by Constructivism theory	Post achievement test
Control		Post achievement test

Table 2. Shows the test map.

Edu. Unit No.	Edu. Unit Address	No. of Behavioral Objectives	Relative weight	Behavioral Objectives Levels						Sum
				Remembering 30%	Understanding 27%	Application 15%	Analysis 13%	Synthesis 9%	Rectification 6%	
First	Terminology	20	25%	5	5	4	3	2	2	20
Second	Common used Teaching methods	20	25%	6	5	3	2	3	2	20
Third		20	25%	6	6	3	2	2	1	20
Fourth		20	25%	7	6	3	2	1	1	20
Sum	Four Edu. Unit	80	100%	24	22	13	10	7	5	80

CONCLUSION

From this research the following conclusion was made: The units of the general teaching methods in this study contributed to raising the level of students achievement.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Evaluation of Shear Bond Strength of Metal Brackets in Total Dryness and Partial Dryness Conditions

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ABSTRACT

This study aimed to evaluate the shear bond strength of metal brackets in total dryness field and in partial dryness field to overcome the moisture problem during brackets bonding especially in posterior area. Thirty extracted premolar teeth were divided arbitrarily into two groups. Each one of these groups consisted of 15 teeth framed in an acrylic block. After standard enamel etching procedure, in group (A) the bracket bond in total dryness field and in group (B) the bracket bond in partial dryness field by curing only one side and after that moisture the tooth by distal water and complete the bonding of the other side. The results show that the shear bond strength of bracket with total dryness (41.9 MPa) was more than partially dryness (28.7 MPa) but statically there is no significant between these two groups. The orthodontists can bond the brackets using partial dryness that give him/her the time to complete the bonding and overcome the moisture problem especially in posterior area.

Keywords: Shear bond strength, Metal brackets, total dryness, Partial dryness.

INTRODUCTION

Fixed orthodontic appliance need precise bracket position also with enough shear bond strength to withstand the occlusal force and orthodontic forces and in the same time the brackets can be removed with minimal damage to enamel¹⁻³. The orthodontic brackets bond to tooth enamel by composite, there are many techniques to bonding the brackets. Previously and rarely now the chemical curing composite has been used to bond the brackets, more recently the orthodontists use light-curing composite to bond the brackets to tooth enamel. one of the advantages of use of light-cured composite material is easier in use and give time for precise bracket position, so its use in orthodontic treatment become very popular^{4,5}. The big challenge with the use of light-cured composite is the bond of the bracket with this composite need dry field to get optimal shear bond strength, in addition to that it need long curing time which consider

unsuitable for both orthodontist and patient^{3,6}. For that reason, decrease the curing time by using device with high intensity of light to enhance polymerization as there is no statically significant between high intensity and less time device and low intensity and longtime device⁵. Also to overcome the dryness and wetness problem, there are some methods used like use Assure universal bonding resin. The Assure universal bonding resin is fluoride-releasing properties, and this product has been reinforced with a resin cement, also it has hydrophilic properties, and has the capacity to bond to light-cured or dual-cured adhesives. The Assure hydrophilic resin system, it has been evaluated under wet conditions, Bond strength of Assure adhesive resin decreased significantly in the presence of saliva contamination compared with dry bonding conditions⁶⁻¹⁰. There is no any study compare the shear bond strength in complete dryness and partially dryness and the partially dryness refer to bonding the one side of bracket in dry condition and complete the curing after wetting the tooth enamel, the aim of this study is to compare the shear bond strength between dry field bonding of brackets and partially dry bonding of the brackets using heavy intensity LED curing unite.

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MATERIALS AND METHOD

For this study, previously extracted premolars have been used from patients demanded orthodontic treatment, after extraction each tooth was cleaned and washed to remove blood and remnants of soft tissue and kept in jug with distilled water at room temperature, and to avoid bacterial growth we change the water periodically. There are some standards put to select the samples, and the sample should be;

- The enamel of buccal surface should be intact.

- Should be don't treated with chemical products (e.g., H₂O₂), -Should be caries free.

A total of thirty stainless steel orthodontic brackets (STRATUS Bracket Systems) the surface area provided by the manufacturer company (Fairfield Orthodontics, USA), the base was directly bonded with Resilience® Light-Activated Orthodontic Bonding Systems (Ortho Technology, Inc, USA). In this study we use heavy intensity with short time curing unite as we previously proved there is no significant difference between light intensity with long time and heavy intensity with short time, so prefer to use heavy intensity to save time.⁵

The sample divided in to two groups according to type of curing;

Group A; in this group 15 brackets bonded to tooth surface by orthocomposite and curing mesial and distal surfaces for about 3 seconds (total 6 second) by using light curing device with intensity equal to (5000-6000 mW/cm), by using (The FlashMax P3 460 4W, CMS Dental A/S Ragnagade 7 DK - 2100 Copenhagen Denmark.

Group B; in this group 15 brackets bonded to tooth surface by orthocomposite and curing only mesial surfaces in dry condition for about 3 seconds after that wet the tooth by distal water for 10 seconds and complete the bonding by curing the distal surface for about 3 seconds (total 6 seconds) also use curing device with intensity equal to (5000-6000 mW/cm) by using (The FlashMax P3 460 4W, CMS Dental A/S Ragnagade 7 DK - 2100 Copenhagen Denmark.

Preparation the sample;

Every tooth should be mounted in acrylic block, and for that use aluminum container and the tooth built in this container by using sticky wax and the teeth

placed so that the middle third of the buccal surface is positioned to be parallel the container, the container is dyed with a thin coat of separating medium (Vaseline) also to increase retention of tooth in container we made grooves on the roots to enhance retention.

We use self-curing acrylic to mounting the teeth in the container, after mixing the appropriate amount of liquid and powder, the mixture poured around the tooth to the height of the cemento-enamel junction.¹¹⁻¹³

After complete setting of acrylic, the samples were removed and coded and stored in distilled water. The buccal surface of each sample of each group before bonding was polished by means of non-fluoridated pumice and water mix with and by using rubber cup attach to a low speed head piece for about 10 seconds. Then each tooth was washed with water spray for 10 seconds then dried by oil free air for 20 seconds^{14, 15}. Shear bond strength measurement were done with (Microcomputer control Electronic Universal testing machine, model WDW-5, time group INC, china) with a crosshead rate of 0.5 mm/minute^(16,17) the force value were recorded in Newtons. The force was divided by the surface area of the bracket base to obtain the stress value in Mega Pascal units. The gathered data were statistically analyzed by utilizing Statistical Package for Social Sciences (SPSS) program. The tests used include, Descriptive analysis; minimum, maximum, mean, standard deviation and T- test.

RESULTS AND DISCUSSION

As showed in table (1), the mean of shear bond strength of group A was 41.9 MPa, and the minimum value was 23 MPa which is consider acceptable clinically as it is over 8 MPa because the minimum shear bond requires to withstand occlusal and orthodontic force must be over 8 MPa^{18,19}. The mean of shear bond strength of group B was 28.7 MPa and the minimum value was 14.1 MPa and also consider acceptable clinically as it is over 8 MPa^{18,19}. The table 2 show the difference between group A and group B. in spite of the mean value of group A (41.9 MPa) was greater than the mean value of group B (28.7 MPa) there no statically significant between these two groups (t-test = -1.71 and P-value= 0.104). Although the advantage of use light curing composite in bonding orthodontic brackets, there is a problem with dryness especially in posterior area, there are many methods suggested to overcome these problems

including use materials with hydrophilic properties^{3,20} also these materials show that the shear bond decreased significantly with moisture in compare with dry field⁶⁻¹⁰. In this study we use heavy intensity curing unit to decrease chair time to patient and orthodontist⁽⁵⁾ also use new technique in bonding the brackets to control the moisture and dryness during bonding procedure, as we can cure one side of each brackets in dry field and then after patient take rest or oven loss the dryness can complete the curing other side of brackets. According to this study, the mean of shear bond strength group A (dry field) is more the group B (partially dry) but statically insignificant (t-test = -1.71 and P-value= 0.104) as P –

value less than 0.05. There is no study compare between total dryness and partial dryness on shear bond strength of brackets, there are many studies compare the shear bond strength in dry and in wet condition (saliva or water contamination). Some of these study found the share bond strength had been increase after saliva or water contamination²¹⁻²³, and some other studies found no difference²³ also some studies found the shear bond strength decrease significantly after contamination²⁴. The large differences between these studies are may be due to type of artificial saliva that be used in study or the method and units used in curing and bonding and lastly may be due to method of assessment of shear bond strength.

Table 1. Descriptive statistic for each groups.

group	Mean(MPa)	N	Std. Deviation	Minimum(MPa)	Maximum(MPa)
group A	41.9	15	16.7	23	67.6
group B	28.7	15	18.7	14.1	65.1
Total	70.6	30	35.4	37.1	132.7

Table 2. t test between group.

group	Mean(MPa)	Sample size	Std. Deviation	t-test	P-value	Sig.
group A	41.9	15	16.7	-1.71	0.104	N.S
group B	28.7	15	18.7			
Statistically significant difference (P < .05).						

CONCLUSION

In spite of the the shear bond strength in total dryness is more than the partial dryness, it is statically non significate, so the orthodontists can bond the brackets using partial dryness that give him/her the time to complete the bonding and overcome the moisture problem especially in posterior are.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance All experimental protocols were approved under the Faculty of Dentistry, University of Babylon, Hillah city, Iraq and all experiments were

carried out in accordance with approved guidelines.

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Generalized Power-Law Model of Magnetohydrodynamic Blood Flow with Heat Transfer

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ABSTRACT

Unsteady non-Newtonian blood flow characterized by the generalized power-law model subjected to an external magnetic field together with heat transfer through stenosed artery has been developed. The arterial segment is assumed to be a cylindrical tube and the arterial wall is considered to be flexible having cosine shaped stenoses a condition due to the abnormal narrowing of a blood vessel. The full equations comprising the governing equations of motion, heat equation, the initial and the boundary conditions are solved using numerical procedure involves the discretization of the equations using the Marker and Cell (MAC) method, where pressure along the artery is calculated iteratively using the Successive-Over-Relaxation (SOR) technique. The results demonstrated through the simulations that under the influence of magnetic field, the blood temperature distribution over the entire arterial segment increases. The present results also predict the effects of the generalized power-law index and the Prandtl number on the distribution of blood temperature.

Keywords: Numerical study; magnetohydrodynamic; pressure correction; heat transfer.

INTRODUCTION

Most of diseases influence temperature changes; this variation of temperature is in reality of great importance in a biological system. Lack of proper investigation of temperature could lead to loss of life. On the other hand, it is well known that the purpose of using magnetohydrodynamic (MHD) in the hyperthermia therapy is to enhance the temperature exceeding a therapeutic value 42°C, while keeping the surrounding temperature in the range of sublethal temperature. So we need to have a better understanding to control blood temperature in such conditions. Based on this assumption, Khanafer *et al.* in ¹ studied the influence of pulsatile laminar flow on temperature distribution in a single blood vessel receiving hyperthermia treatment ². investigated the dynamic response of heat transfer in blood flow through artery under stenotic condition,

considering blood as Newtonian fluid.³ studied numerically the MHD-micropolar fluid flow with heat and mass transfer through a porous medium. The impact of heat transfer on the blood flow in a stenosed artery under the optically thin fluid assumption has been presented by^{4,5} investigated the impact of heat and chemical reactions on blood flow through a tapered artery, treating blood as Walters B fluid ⁶. presented a mathematical model to study the dynamic response of heat and mass transfer in the blood flow through stenosed bifurcated artery ⁵. Investigated the effect of heat transfer on Herschel-Bulkley fluid through an inclined tube. They observed that the temperature profile reduces with the increase in the Prandtl number. Then ⁸ studied the heat and mass transfer impact on the biomagnetic Newtonian fluid of blood flow through a stenosed tapered artery. Li and Huang in ⁹ studied heat transfer on blood flow in a stenosed artery subject to a steady spatially varying magnetic field. Blood is considered as a biomagnetic fluid in the Cartesian coordinate and the electrical conductivity and the varying viscosity is concerned with their model. They reported that the magnetic field modifies the field of the flow and temperature considerably ¹⁰. presented

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numerical solutions for steady MHD blood flow through a bifurcated artery with mild stenosis in parent lumen with heat transfer assuming blood as couple stress fluid ¹¹. Studied the flow characteristics and heat transfer due to the body acceleration for blood through a porous artery exposed to a vibration environment ¹². Studied the Effect of heat transfer on unsteady MHD flow of blood in a permeable vessel in the presence of non-uniform heat source ¹³. Studied the effect of magnetic field on blood flow characteristics and heat transfer, treating blood as a Newtonian fluid. They observed that the magnetic field applied alters the flow pattern; even downstream the stenosis region, raises the wall shear stress at the throat of the stenosis, and increases the heat transfer across the arterial wall. ¹⁴ studied the impact of heat and mass transfer on a generalized Newtonian blood model under the stenotic condition in rigid artery. ¹⁵ investigated the

effects of heat and mass transfer on Carreau fluid model for blood flow through a tapered artery with a stenosis. Most previous studies introduced a mathematical model to characterize the dynamics of blood flow using a given pressure, whereas in reality, the pressure is unknown. Thus the unsteady equations of motion governing blood flow and the heat transfer equations coupled with the appropriate initial and boundary conditions are solved numerically by MAC method.

Formulation of the problem

The streaming blood through the arterial lumen is treated as unsteady, two-dimensional, nonlinear, axisymmetric and fully developed characterized by generalized power-law fluid. The equations governing the flow in cylindrical coordinates system (r, θ, z) may be written in the nondimensional form as

$$r \frac{\partial w}{\partial z} + \frac{\partial(ur)}{\partial r} = 0 \tag{1}$$

$$\frac{\partial w}{\partial t} + \frac{\partial(wu)}{\partial r} + \frac{\partial w^2}{\partial z} + \frac{(wu)}{r} = -\frac{\partial p}{\partial z} - \frac{1}{\text{Re}} \left[\frac{1}{r} \frac{\partial}{\partial r} (r\tau_{rz}) + \frac{\partial}{\partial z} (\tau_{zz}) \right] - \frac{M^2}{\text{Re}} w \tag{2}$$

$$\frac{\partial u}{\partial t} + \frac{\partial u^2}{\partial r} + \frac{\partial(wu)}{\partial z} + \frac{u^2}{r} = -\frac{\partial p}{\partial r} - \frac{1}{\text{Re}} \left[\frac{1}{r} \frac{\partial}{\partial r} (r\tau_{rr}) + \frac{\partial}{\partial z} (\tau_{rz}) \right] \tag{3}$$

$$\frac{\partial T}{\partial t} + w \frac{\partial T}{\partial r} + u \frac{\partial T}{\partial z} = \frac{1}{\text{Pr} \cdot \text{Re}} \left[\frac{\partial^2 T}{\partial z^2} + \frac{1}{r} \frac{\partial T}{\partial r} + \frac{\partial^2 T}{\partial r^2} \right] \tag{4}$$

where p is the pressure, r and z are the dimensionless coordinates, scaled with respect to r_0 , with the z -axis located along the axis of the artery. As there is no secondary or rotational flow so the total velocity is defined by the dimensionless radial and axial components, u and w are scaled with respect to the cross-sectional average velocity U . T is the temperature. The generalized Reynolds number Re , Hartmann number M and Prandtl number Pr are defined as

$$\text{Re} = \frac{\rho r_0^n}{m U^{n-2}}, M = B_0 \left(\frac{r_0^{n+1} \sigma}{m U^{n-1}} \right)^{1/2} \text{ and } \text{Pr} = \frac{m c_p r_0^{1-n}}{k U^{1-n}} \tag{5}$$

where m and n are the consistency and power indices of the generalized power-law model respectively, c_p is the specific heat of the streaming blood at constant pressure and k is the thermal conductivity.

$$\tau_{zz} = -2 \left\{ \left[\left[2 \left(\frac{\partial u}{\partial r} \right)^2 + 2 \left(\frac{u}{r} \right)^2 + 2 \left(\frac{\partial w}{\partial z} \right)^2 + \left(\frac{\partial u}{\partial z} + \frac{\partial w}{\partial r} \right)^2 \right]^{\frac{1}{2}} \right]^{\frac{1}{2}} \right\}^{\frac{1}{2}} \left(\frac{\partial w}{\partial z} \right) \quad (6)$$

$$\tau_{rz} = - \left\{ \left[\left[2 \left(\frac{\partial u}{\partial r} \right)^2 + 2 \left(\frac{u}{r} \right)^2 + 2 \left(\frac{\partial w}{\partial z} \right)^2 + \left(\frac{\partial u}{\partial z} + \frac{\partial w}{\partial r} \right)^2 \right]^{\frac{1}{2}} \right]^{\frac{1}{2}} \right\}^{\frac{1}{2}} \left(\frac{\partial u}{\partial z} + \frac{\partial w}{\partial r} \right) \quad (7)$$

$$\tau_{rr} = -2 \left\{ \left[\left[2 \left(\frac{\partial u}{\partial r} \right)^2 + 2 \left(\frac{u}{r} \right)^2 + 2 \left(\frac{\partial w}{\partial z} \right)^2 + \left(\frac{\partial u}{\partial z} + \frac{\partial w}{\partial r} \right)^2 \right]^{\frac{1}{2}} \right]^{\frac{1}{2}} \right\}^{\frac{1}{2}} \left(\frac{u}{r} \right) \quad (8)$$

The geometrical model of the stenosis considered in this model is the cosine curve

$$R(z, t) = \begin{cases} 1 - \frac{\delta}{2r_0} \left(1 + \cos \left(\frac{\pi(z - z_1)}{z_0} \right) \right) a_1(t), & d < z < d + 2z_0 \\ a_1(t) & \text{otherwise} \end{cases} \quad (9)$$

where $R(z, t)$ is the radius of the artery in the stenotic region and r_0 , in the non-stenotic region, δ is the severity of the stenosis, z_0 is the half length of stenosis and z_1 is the center of the stenosis. The time-variant parameter, $a_1(t)$ is given by $a_1(t) = 1 + k_R \cos(\omega t - \phi)$ where k_R represents the amplitude parameter and ϕ is the phase angle.

Boundary and Initial Conditions

For the boundary conditions, there is no radial flow along the axis of the artery and the axial velocity gradient of the streaming blood may be assumed to be equal to zero, i.e., there is no shear rate of fluid along the axis.

$$\tau_{rr} = -2 \left\{ \left[2 \left(\frac{\partial u}{\partial r} \right)^2 + 2 \left(\frac{u}{r} \right)^2 + 2 \left(\frac{\partial w}{\partial z} \right)^2 + \left(\frac{\partial u}{\partial z} + \frac{\partial w}{\partial r} \right)^2 \right]^{\frac{1}{2}} \right\}^{\frac{1}{n-1}} \left\{ \left(\frac{u}{r} \right) \right\} \quad (8)$$

The geometrical model of the stenosis considered in this model is the cosine curve

$$R(z, t) = \begin{cases} 1 - \frac{\delta}{2r_0} \left(1 + \cos \left(\frac{\pi(z - z_1)}{z_0} \right) \right) a_1(t), & d < z < d + 2z_0 \\ a_1(t) & \text{otherwise} \end{cases} \quad (9)$$

where $R(z, t)$ is the radius of the artery in the stenotic region and r_0 , in the non-stenotic region, δ is the severity of the stenosis, z_0 is the half length of stenosis and z_1 is the center of the stenosis. The time-variant parameter, $a_1(t)$ is given by $a_1(t) = 1 + k_R \cos(\omega t - \phi)$ where k_R represents the amplitude parameter and ϕ is the phase angle.

Boundary and Initial Conditions

For the boundary conditions, there is no radial flow along the axis of the artery and the axial velocity gradient of the streaming blood may be assumed to be equal to zero, i.e., there is no shear rate of fluid along the axis.

$$u(r, z, t) = 0, \frac{\partial w(r, z, t)}{\partial r} = 0, \frac{\partial T(r, z, t)}{\partial r} = 0 \text{ and } \tau_{rz} = 0 \text{ for } r = 0 \quad (10)$$

The velocity of the artery wall is taken as

$$u(r, z, t) = \frac{\partial R}{\partial t} \text{ and } w(r, z, t) = 0, T(r, z, t) = 1 \text{ for } r = R(z, t) \quad (11)$$

The inlet velocity conditions were assumed to have a parabolic velocity profile corresponding to Hagen–Poiseuille flow through a long circular tube in the absence of magnetic-field and Hartmann flow in the presence of magnetic-field which it is provided with evidence by Mustapha *et al.*¹⁶ and may be written mathematically as follows:

$$w(r, z, t) = 2U \left[1 - \left(\frac{r}{R} \right)^2 \right] \quad \text{for } z = 0, M = 0 \quad (12)$$

$$w(x, z, 0) = 2U \left(\frac{I_0(MR)}{I_0(MR) - 1} \right) \left(1 - \frac{I_0(MxR)}{I_0(MR) - 1} \right) \quad \text{for } z = 0, M \neq 0 \quad (13)$$

and

$$u(r, z, t) = T(r, z, t) = 0 \quad \text{for } z = 0 \quad (14)$$

The outlet conditions are given by

$$\frac{\partial w(r, z, t)}{\partial z} = \frac{\partial u(r, z, t)}{\partial z} = 0 \quad \text{and} \quad \frac{\partial T(r, z, t)}{\partial z} = 1 \quad \text{at } z = L \quad (15)$$

Where I_0 the modified Bessel function of first kind and L is the length of the constricted artery under consideration. Moreover, it is assumed that initially no flow takes place when the system is at rest except at the inlet, that means,

$$w(r, z, 0) = 0, u(r, z, 0) = 0 \quad \text{and} \quad p(r, z, 0) = 0 \quad \text{for } z > 0 \quad (16)$$

The complete numerical algorithm to solve the equations already discussed in ¹⁷.

RESULTS AND DISCUSSION

For the purpose of numerical computations of the desired quantities of major physiological significance, the following parameter values involved in the present analysis as follows: . The results are obtained after the steady state achieved in the simulation. Figure 1 illustrates the axial velocity profile behaviour of the blood flow with different Hartmann number M at the downstream of the stenosis $z = 23$ where the flow separation occurs and $Re = 300$ in the constricted artery. This graph shows that the axial velocity in the center of the artery decreases while it increases near the arterial wall with the increase of magnetic-field intensity. The improvement of the axial velocity near the wall grows to be strong enough to prevent any reverse in the pressure gradient and this makes resistance to the flow separation. This observation agrees well with those of ¹⁶ and ¹⁸. Figure 2 illustrated the cross-sectional profiles of the blood temperature distribution at a different n and

different location of the stenosed artery having 48% area reduction with the same $Re = 300$. It appears from this figure that the analogous behaviour of the consecutive curves of the temperature distribution, and the shear-thickening model gives higher temperature at the throat ($z = 15$) and downstream of the stenosis ($z = 23$) while there are no notable changes upstream of the stenosis for all values of n . The temperature variation becomes less significant, gradually nearby the arterial wall. Figure 3 (a) and (b) illustration the effects of increasing area occlusion (stenotic height) on the temperature profiles for different location of the stenosed artery along the radial and axial position respectively. The results show that when there is an increase in occlusion, the temperature profiles decreases at the upstream and at the throat of the stenosis. But the profile gets deviated downstream of the stenosis, that is, in the diverging segment of the stenosed artery ($z = 23$) where backflow occurs and recirculation zones are formed. At this critical position,

the temperature distribution profile seems to have a point of inflexion, unlike in the other locations. These results agree with those of ¹⁹. It is observed that presence of an external magnetic field increases the temperature of the blood. This increment can be attributed to the fact that the applying of the magnetic field to blood gives rise to a resistive kind of force known as Lorentz force. This force bears the potential to enhance the temperature of blood since blood is an electrically conducting fluid. From Figure 4 we can observe that the increase in Hartmann number leads to higher blood temperature.

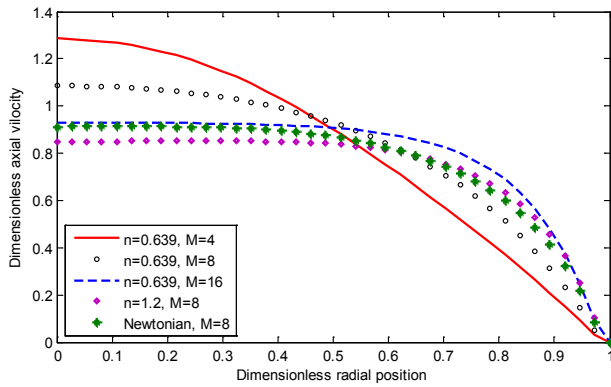


Figure 1 Axial velocity profile for different n and M at the critical point $z=23$.

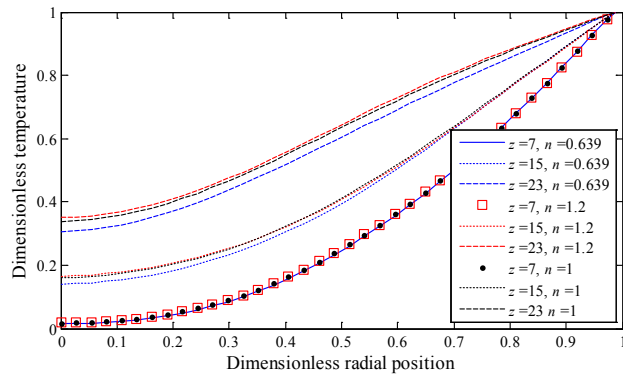
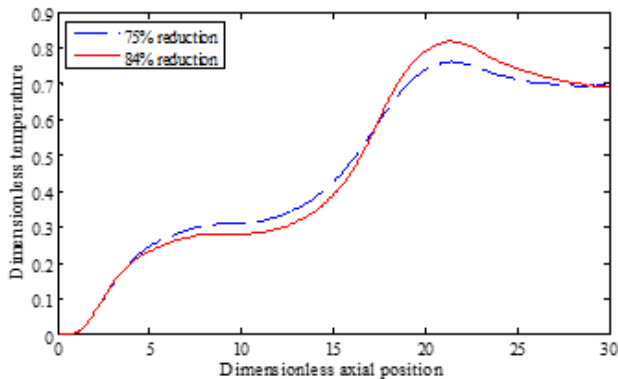


Figure 2 Profiles of the temperature of the stenosed artery at different z for different n .

(a) Along the radial direction



(b) Along the axial direction

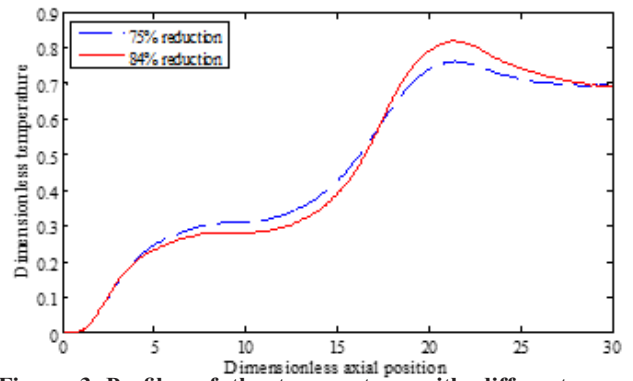


Figure 3 Profiles of the temperature with different area occlusions.

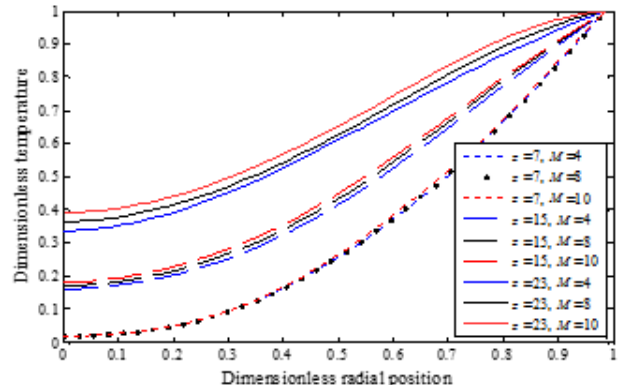


Figure 4 Profiles of the temperature of the stenosed artery with different M .

CONCLUSION

This work deals with a mathematical model representing the dynamic response of heat transfer to blood streaming through a stenosed artery under the effect of magnetic field. The blood is treated to be generalized power law fluid and the arterial wall is considered to be elastic with 48%, 64% and 84% cross-sectional area reduction is represented by mild, moderate and severe stenosis, respectively, occurring at different stages of the development of atherosclerotic disease. The governing equations of motion accompanied by the appropriate choice of the boundary conditions are solved numerically by MAC method. The results focused on the effect of stenoses, the generalized power law index n and magnetic field on heat transfer of blood flow.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Mathematics, College of Science, Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Hydronephrosis and Ureter Dilatation in a Sample of Iraqi Patients Diagnosed and Characterized using Ultrasound Examination

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ABSTRACT

Aim of the study: is to make clear the role of ultrasound in diagnosis and characterization of hydronephrosis in a sample of Iraqi patients. Patients and methods: The present cross sectional study included 60 patients with ultrasound evidence of hydronephrosis selected from a cohort of patients referred from the unit of urology at Al-Hilla teaching hospital. Their age ranges from 21 up to 55 years and the sample included 40 women and 30 men. The study duration extended from 1st of February 2018 to 15th of July 2018. The ultrasonic renal exam did not require any preparation of the patient and was performed with the patient in the supine position. The kidneys were examined in longitudinal and transverse scan planes with the transducer placed in the flanks. A curved array transducer with center frequencies of 3–6 MHz was used. Following ultrasound examination, the major cause of hydronephrosis was pregnancy induced expansion of renal pelvis followed by ureteric stone, inflammatory stricture and benign prostatic hyperplasia. The single patient with benign prostatic hyperplasia was 55.

Keyword: Hydronephrosis, Ureter dilatation, ultrasound

INTRODUCTION

When the collecting system of the kidney gets dilated with the corresponding ureter, the conditions are termed hydronephrosis and hydroureter, respectively. Although, pathologic conditions are associated with hydroureter, the condition sometimes is physiological ^{1,2}. The existence of a pathology that interferes with normal urinary flow may cause obstructive hydronephrosis and hydroureter. This obstruction may be located anywhere along the urinary tract ascending from the urethra up to the pelviureteric junction and may be caused by a pathology in the urethra, prostate, kidney, retroperitoneum and even vascular lesions. These lesions are responsible if they existed for sufficient period for structural and functional changes in the urinary tract that are characteristic of

obstructive hydronephrosis ^{3,4}. Pelviureteric junction (PUJ) obstruction is usually congenital; however, its diagnosis may be missed till adulthood and some cases are acquired because of stone, inflammatory strictures and post-operatively ^{5,6}. Hydronephrosis is detected in 0.5-1% of all new live births, and ureteropelvic junction obstruction (UPJO) is responsible for a substantial fraction of those cases. Obstruction of the urinary tract that happens during early renal maturation affects renal growth, maturation and morphogenesis, which may be accompanied by progressive tubular atrophy and interstitial fibrosis in most severe conditions ⁷. On the other hand, Physiologic hydronephrosis and hydroureter is common during pregnancy. All aspects of kidney physiology are essentially altered during pregnancy. Circulation in general is subjected to an expanded blood volume and significant vasodilation. The rate of glomerular filtration, normally 125 ml/s, increases by half fold compared to that in non pregnant women. The changes in renal tubular function are reflected by glucosuria, lower serum osmolality, proteinuria and decrease serum sodium concentration. For that reason,

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the kidneys become larger during pregnancy and hydronephrosis supervenes⁸. Ultrasound in comparison with CT scan, has the advantage of being free of radiation, and its role in diagnosis and follow up in the field of nephrology is increasingly supported by enormous amount of data published in scientific medical references^{9,10}. Hydronephrosis is easily diagnosed by US and its existence or absence may help surgeons and physicians with the required information to plan for further surgical and or medical interventions. Ultrasound is remarkably sensitive and reliably specific for the detection and characterization of hydronephrosis when comparison is made with CT scan¹¹⁻¹³. Lack of sufficient data of the usefulness of ultrasound examination in Iraqi patients with hydronephrosis and the rarity of Iraqi reports about major causes of hydronephrosis and hydroureter in our population gave us the motive to plan and to conduct the current study to make clear the role of ultrasound in diagnosis and characterization of hydronephrosis in a sample of Iraqi patients.

MATERIALS AND METHOD

The present cross sectional study included 60 patients with ultrasound evidence of hydronephrosis selected from a cohort of patients referred from the unit of urology at Al-Hilla teaching hospital. Their age ranges from 21 up to 55 years and the sample included 40 women and 30 men. The study duration extended from 1st of February 2018 to 15th of July 2018. The location of study was at Al-Hilla city, Babylon province, Iraq. Written informed consent was obtained from all patients enrolled in the present study and the study was approved by ethical approval committee at Al-Hilla teaching hospital. The ultrasonic renal exam did not require any preparation of the patient and was performed with the patient in the supine position. The kidneys were examined in longitudinal and transverse scan planes with the transducer placed in the flanks. A curved array transducer with center frequencies of 3–6 MHz was used.

Statistical analysis was carried out using statistical package for social sciences (SPSS) version 23 and Microsoft Office Excel 2010. Numeric data were expressed as mean and standard deviation, whereas, categorical data were expressed as number and percentage.

RESULTS AND DISCUSSION

Current study included 60 patients who were proved to have hydronephrosis by ultrasound examination. The age range of those patients was 20-55 years with a mean of 31.42 ±8.91 years; majority was females, 40 women versus 20 men, as shown in table 1. The main presenting complain was pain in the flanks which seen in 55% of cases. Other symptoms included urinary frequency, dysuria, supra-pubic pain, fever, nausea and vomiting, as shown in table 2. Following ultrasound examination, the major cause of hydronephrosis was pregnancy induced expansion of renal pelvis followed by ureteric stone, inflammatory stricture and benign prostatic hyperplasia. The single patient with benign prostatic hyperplasia was 55 years old with symptoms of hesitancy and poor stream after careful history review. Hydronephrosis was identified as an anechoic fluid-filled space with enhancement within the kidney sinus, and usually, the enlarged pelvis is easily recognized versus dilated calyces. Majority of patients showed mild to moderate degree dilation of plevicalyceal system and nearby urete, however a single patient showed severe degree of hydronephrosis with marked cortical thinning. This patient gave a history of previous operation (Ureterotripsy) for impacted ureteral stone and hence the most probable diagnosis was ureteral stricture due to previous operation for ureteric stone. The present study showed that hydronephrosis was most commonly physiological as it associated normal pregnancy. Fluid retention and pressure effect by the gravid uterus are the main contributing factors in pregnancy induced hydronephrosis. However, the dilation was mild and corical thickness was normal in all pregnant ladies. It is estimated that hydronephrosis accompanies 80% of normal pregnancies⁸. Hydronephrosis amid pregnancy happens in 43% to 100% pregnant ladies, and it is more predominant with progressing trimester¹⁴. Serial quantitative estimations by ultrasonography show that the maximal rate of hydronephrosis is come to at 28 weeks, with a 63% generally speaking rate of hydronephrosis¹⁵. The widened gathering framework can hold 200 to 300mL of pee, prompting urinary stasis and a 40% expanded hazard for pyelonephritis in pregnant ladies with asymptomatic bacteriuria versus nonpregnant women⁸. In the current study, ureteric stone were seen in 21.7% of cases. Ureteric stones are a typical reason for check of the urinary tract, ordinarily giving well known signs and side effects, for example, intense ureteric

colic and hematuria. Every so often, stones may give non-particular indications, for example, low back agony and stay unidentified, prompting stone development, unending ureteric deterrent and difficulties, for example, hydronephrosis and renal harm¹⁶. One of the main finding in the present study is that Ureterotripsy may be complicated by inflammatory stricture of the ureter and that follow up of those particular patients is mandatory to identify ureter stricture as early as possible before advanced hydronephrosis supervene with subsequent kidney damage, just like the case enrolled in our study. Ultrasound follow up in such patients is easy noninvasive and valid tool to discover ureteric dilation as early as possible. One of the essential signs for referral to US assessment of the kidneys is assessment of the urinary collection framework¹⁷. Amplification of the urinary collection system is normally identified with urinary hindrance and can incorporate the pelvis, the calyces and the ureter. Hydronephrosis is viewed as an anechoic liquid filled interconnected space with improvement inside the renal sinus, and typically, the widened pelvis can be separated from the expanded calyces. A few conditions can result in urinary block. In the two grown-ups and youngsters, masses, for example, abscesses and tumors, can pack the ureter. In kids, hydronephrosis can be caused by ureteropelvic junction obstruction, ectopic ureter, essential megaureter and posterior urethral valve. In the last mentioned, both kidneys will be influenced. In grown-ups, hydronephrosis can be caused by urolithiasis, hindering the outlet of the renal pelvis or the ureter, and pressure of the ureter from, e.g., pregnancy and retroperitoneal fibrosis¹⁸. Urolithiasis is the most well-known reason for hydronephrosis in the grown-up understanding and has a commonness of 10%– 15%¹⁹. Under typical conditions, the ureter isn't seen with US. In any case, in, e.g., urinary deterrent and vesicoureteric reflux with widening of the ureter, the proximal part in continuation with the renal pelvis, and also the distal part close to the ostium can be assessed. The hydronephrosis is regularly evaluated outwardly and can be isolated into five classes going from a slight development of the renal pelvis to end-arrange hydronephrosis with cortical diminishing²⁰. The assessment of hydronephrosis can likewise incorporate measures of calyces at the level of the neck in the longitudinal output plane, of the enlarged renal pelvis in the transverse sweep plane and the cortical thickness, as clarified beforehand¹⁷. On the off chance that the liquid in the enlarged gathering framework has echoes, pyonephrosis ought to be avoided by clinical

exam, blood examination and, in uncommon cases, cut or waste. Hydronephrosis can likewise be caused by non-obstructive conditions, for example, lively diuresis in patients treated with diuretics, in pregnant ladies and in youngsters with vesicoureteral reflux¹⁸.

Table 1. Age and gender characteristics of the study group.

Characteristic	Value
Number of cases	60
Age	
Mean ±SD years	31.42 ±8.91
Range (min.-max.)	33 (20-55)
Gender	
Male, n (%)	20 (33.3%)
Female, n (%)	40 (66.7%)
M:F ratio	1:2"

Table 2. Presenting symptoms

Symptoms	n (%)
Pain in the flank	33 (55.0%)
Frequency	17 (28.3%)
Dysuria	12 (20.0%)
Supra-pubic pain	8 (13.3%)
Fever	4 (6.7%)
Nausea and or vomiting	4 (6.7%)

Table 3. Causes of hydronephrosis

Cause	n	%
Pregnancy	30	50.0 %
Stone	13	21.7 %
Inflammatory stricture	1	1.7 %
BPH	1	1.7 %

CONCLUSION

Ultrasound is a reliable non-invasive investigatory

tool that can identify hydronephrosis, highlights its cause and assess the severity of urinary tract obstruction and the kidney function.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Surgery/ College of Medicine/ Babylon University and all experiments were carried out in accordance with approved guidelines.

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Indirect Effect of Smoking on Liver Function: A Comparative Study among Iraqi Students in Baghdad City

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ABSTRACT

Smoking is a process in which a substance like tobacco is burned to produce smoke that inhaled and absorbed into the bloodstream. The cigarette smoking is one of the greatest causes of illness, such as lung cancer, and premature death. The present study was constructed to evaluate the effect of cigarette smoking on the liver biochemical state. The study includes 50 smokers as patient group and 50 (age and sex matched) non-smokers as control group. The liver functions tests; aspartate aminotransferase (AST), alanine aminotransferase (ALT), total protein and alkaline phosphatase (ALP) were estimated spectrophotometrically. The results revealed that there was a significant reduction in the levels of AST, ALT, serum total protein and ALP of smokers in comparison with the healthy control (non-smokers) group. Also the results revealed the presence of a positive correlation between ALT and AST. To conclude, alterations in liver parameters levels could be attached to the oxidative stress created through the accumulative effect of inhaled smoke as well as the interaction of absorbed toxic chemicals like nicotine. Therefore, the association between smoking attitude and liver functions tests should be carefully analyzed.

Keywords: liver; smoking; ALP; ALT; AST and total protein.

INTRODUCTION

Smoking is a process in which a substance, most commonly is the dried leaves of the tobacco, is burned and the resulting smoke inhaled and absorbed into the bloodstream¹. The use of tobacco cigarette smoking as well as hookahs smoking are become a major aspect of our society. It has been revealed that cigarette smoking is one of the greatest reasons of illnesses and precocious death for human. It is also reported that smoking-related diseases kill about half of long-term and heavy smokers, where it is found that males losing about 13.2 years and females losing about 14.5 years of their life as a result of smoking. In fact, about 4.9 million people per year have been reported to die worldwide as a result of smoking²⁻⁵. Smoking has been found to harm and injury

approximately all parts of the human body. Lung cancer, heart attacks, vascular stenosis and chronic obstructive pulmonary disease are the most common diseases that can occur as a result of smoking⁶⁻⁸. Also, smoking has been found to cause harmful effects on the fetus during pregnancy⁹. Alarmingly, cigarette smoke contains at least 200 toxic substances, 73 known carcinogens, and large amounts of oxidants and free radicals that promote oxidative stress in the human body¹⁰⁻¹². The liver is a large and vital organ of human body. It plays major and substantial roles in the human body, like digestion processes, metabolism, storage of nutrients and detoxification¹³. Therefore, it is extremely important to maintain the health conditions of this vital organ, and everyone should be aware of some things that can cause liver damage. Liver function tests are a set of blood tests that include serum total protein, albumin, total bilirubin (TB), alkaline phosphatase (ALP), aspartate aminotransferase (AST), alanine aminotransferase (ALT) and γ -glutamyl transferase (GGT). They are useful and very important tests in the clinical evaluation of the state of the liver, and to help diagnose and monitor liver disease or liver damage, as well as to monitor

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liver response to treatment. There are many personal and environmental factors that can affect liver function tests including age, sex, drinking alcohol, malnutrition, the suffering of certain diseases (such as heart disease, skeletal muscle, endocrine diseases), as well as liver health¹⁴⁻¹⁶. In fact, there is a lack of information about the influence of smoking on the function of liver. In contrast, alcohol consumption was found to be the most common cause of liver damage in humans. In drinking, the liver focuses mainly on eliminating the potential damage of alcohol by converting it into a less toxic form, where drinking alcohol leads to significant changes in fat metabolism in the liver¹⁷⁻¹⁹. These changes eventually lead to inflammation, steatohepatitis, cirrhosis and liver cancer^{20,21}. Furthermore, it was found that alcohol consumption leads to increased levels of ALT and AST in humans²². Despite that cigarette smoke does not have a direct contact with the liver, it was found that the harmful chemicals in cigarette smoke causes a variety of adverse effects on the liver²³. It has been reported that cigarette smoking increased serum ALP and GGT levels^{24,25}. To date, there is still a delay in the researches that concerned with the full investigation of the influence of cigarette smoking on liver tissue and liver functions. Thus, the present study was constructed on Iraqi students in Baghdad city to evaluate the influence of cigarette smoking on the biochemical state of liver by investigating the most commonly used set of liver function tests.

MATERIALS AND METHOD

Subjects and study design:

This study was conducted in the department of chemistry, college of sciences, Mustansiriyah University, Baghdad, Iraq, between October, 2016 and April, 2017. The study includes 50 male smokers as patients group with age ranging from 19-23 years, and 50 non-smokers male volunteers with age ranging from 18-22 years as control group.

Sample Collection

From each individual patients and control, 5 ml of blood were drawn by vein puncture and placed in a disposable plastic tube. The sample left to clot for about 20 minutes at room temperature and then centrifuged at 3000 g for 10 minutes. The obtained serum was carefully transferred into another tube and then frozen at -20°C for subsequent analysis.

Evaluation of Liver Function Tests

Serum levels of AST and ALT were determined by colorimetric method (Reitman and Frankel) by following the protocol of the commercially available *Randox* kits supplied by Randox Laboratories Ltd. (UK). Serum total protein levels was measured by spectrophotometry according to the colorimetric method protocol of the commercial *BioSystems* kit supplied by Biosystems SA, Barcelona, Spain. In addition, the colorimetric determination of serum ALP activity was carried out according to the protocol of the commercially available *bioMerieux* kit supplied by bioMerieux SA Company, Marcy-l'Etoile. France.

Statistical analysis

Data analysis was performed by Independent-Samples Student *t* test and Pearson's correlation analysis for assessment of mean differences between smokers and non-smokers control groups using the SPSS statistical software, version 20.0.

RESULTS AND DISCUSSION

The collective results for quantitative analysis of the liver function tests (AST, ALT, total protein and ALP) among two study groups are summarized in Table 1. These results indicated that the mean serum levels of AST, ALT, total protein and ALP (13.21 IU/L, 7.62 IU/L, 17.46 g/L and 13.26 IU/L) measured in smokers group were lower when compared to that of the control group (19.55 IU/L, 17.53 IU/L, 75.41 g/L and 59.61 IU/L). This decrease was found to be statistically highly significant ($p < 0.001$). The relationship between all parameters included in this work was tested using Pearson's correlation analysis. Data analysis revealed a positive correlation between ALT and ALP levels only, while no association was found between the other study parameters, see Table 2. We found that the liver enzymes levels in serum of smoker patients differ significantly compared with their levels in non-smoker controls. In fact, ALT and AST have important roles in amino acid metabolism. It catalyzes interconversion of L-alanine and α -ketoglutarate to pyruvate and L-glutamate. While AST catalyzes reversible transamination reaction of aspartate and α -ketoglutarate to oxaloacetate and glutamate. ALP is a hydrolytic enzyme that catalyzes removing of phosphate groups from nucleotides, proteins and alkaloids²⁶. Cigarette smoke contains a wide range of hazard substances that can harm every part of the body either

directly nor indirectly¹⁰. It has been proved that smokers are more likely to be under risk of a lot of deadly diseases such as cardiovascular diseases, respiratory disorders, lung cancer and pancreas cancer²⁷. Indirectly, smoking induces large adverse effects on the liver, however these toxic effects still need to clarify very well. Therefore, and in order to clarify the association between smoking and its effect on the liver, this work is studied the serum levels of AST, ALT, total protein and ALP in smokers and non-smoker persons. The results of the current work showed a significant decrease in the serum activity of AST, ALT, total protein and ALP in cigarette smokers when compared to non-smokers control group. It has been reported previously that there are significant increases in the levels of aspartate aminotransferase, alanine aminotransferase and alkaline phosphatase activities in smokers compared to non-smokers²⁸. These results are inconsistent with the results of the current work. Although cigarette smoke has no direct contact with the liver, however, the indirect effect of certain chemicals in cigarettes may occur over time. Where, these chemicals in cigarette smoke may prevent the

liver from functioning normally. Over time, the liver is become less efficient in detoxifying the body. The results obtained in this study give an impression of dysfunction in liver functions led to a decrease in the ALP, ALT and AST enzymes levels. Or perhaps due to an inhibition of enzyme activity as a result of the presence of nicotine in tobacco smoke. There is an imperious requirement to increase research and investigate the reasons for this decline in enzymes activity. The results obtained in this study on total protein are consistent well with the data in the previous study²⁸, which found that the serum level of total protein in smokers was lower than the levels of healthy control group (non-smokers). Cigarette smoking is associated with increased excessive production of free radicals leading to oxidative stress²⁹. Albumin, bigger part of total protein, has antioxidant properties³⁰. The low level in serum total protein revealed in this study may be due to the decrease in albumin level that involves in the antioxidant defense since the smokers are under higher oxidative stress. Furthermore, the decline in protein levels may be due to increased proteolytic activity or reduce protein synthesis as a result of exposure to cigarette smoke.

Table 1: Serum levels of the liver function tests (AST, ALT, total protein and ALP) in smokers and control groups.

Element	Control group N= 50				Smokers group N= 50				p value
	Mean	SD	Upper limit	Lower limit	Mean	SD	Upper limit	Lower limit	
AST (IU/L)	19.55	4.95	21.93	17.16	13.21	2.81	14.57	11.85	< 0.001
ALT (IU/L)	17.53	2.11	18.54	16.52	7.62	1.62	8.41	6.84	< 0.001
Total Protein (g/L)	75.41	13.06	80.71	68.11	17.46	5.39	19.06	13.86	< 0.001
ALP (IU/L)	59.61	10.08	63.47	53.75	13.26	3.59	13.98	10.53	< 0.001

Table 2. Correlations between variables in patients group (r value).

Parameter	AST	ALT	Total Protein	ALP
AST	1	0.127	-0.105	0.023
ALT	0.127	1	-0.049	0.748**
Total Protein	-0.105	-0.049	1	-0.182
ALP	0.023	0.748**	-0.182	1

CONCLUSION

Data obtained in this work indicate that exposure to cigarette smoke leads to an indirect disturbance in some parameters (e.g. enzymes and total protein) in the liver. Alterations in the concentrations of these parameters may be related to the oxidative stress resulting from the accumulative effect of inhaled smoke as well as the interaction of absorbed toxic chemicals like nicotine. AST, ALT and ALP enzymes and total protein are significantly lower in smoker patients compared to non-smoker controls. According to the results of this study, we can conclude that smokers are more likely to have liver problems than non-smokers. Therefore, the association between smoking habits and liver functions must be carefully analyzed. Further works to understand the mechanisms of these associations are needed to clarify the harmful effects of smoking on the liver. In fact, smoking habit in Iraq among young people is growing strongly. Therefore, smoking in Iraq must be regulated by strict law, as in developed countries. Smoking habits that have spread widely in primary and secondary schools, public transportation, health institutions and cafes should be banned.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Chemistry, College of Science, Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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MRI Findings in Iraqi Patients with Epilepsy: A Cross Sectional Study

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ABSTRACT

Aim of the study: is to evaluate role of MRI in epileptic patients. The study was a cross sectional one that included 51 epileptic patients, 29 children (under 15 years) and 22 adult. Those patients were referred by the neurology unit at Al-Hilla Teaching hospital to the MRI unit in the same hospital, Babylon province, Al-Hilla City, Iraq, during the period from 1st of January 2017 to 4th of June 2018. The MRI procedure was conducted on a 1.5 Tesla magnet (Siemens, Germany). The procedure involved imaging the routine epilepsy protocol of MRI examination relying on 5 mm thickness slices and 2.0 mm interslice gaps in the coronal, sagittal and axial planes with T1 and T2 weighting. Abnormal MRI findings were identified in 21 out of 51 patients (41.2%). In epileptic adults there were 5 (22.7%), 3 (13.6%), and 1 (4.5%) patients with space occupying lesions (mostly brain tumors), medial temporal sclerosis and other organic lesions (brain atrophy) respectively, whereas 1 (3.4%), 8 (27.6%), and 3 (10.3%) epileptic children showed the following lesions: with space occupying lesions (mostly brain tumors), medial temporal sclerosis and other organic lesions (brain atrophy and vascular abnormalities) respectively. The rate of abnormal MRI findings was 41.4% and 40.9% in children and adults respectively. Significant correlation was seen between focality of signs (in neurologic and EEG examinations) and rate of abnormal MRI findings ($P < 0.05$), table 4

Keywords: MRI, epilepsy, Iraq

INTRODUCTION

Epilepsy is diagnosed as a collection of heterogeneous syndromes characterized through extra conditions that coexist with seizures and affects over 50 million humans worldwide¹. Emotional, cognitive and behavioral comorbidities are commonplace. Seizures are generally divided into two most important classes: generalized and partial (focal). Generalized seizures affect both cerebral hemispheres from the onset of the seizure. Seizures produce loss of cognizance, either for lengthy durations of time or briefly, and are sub-categorised into generalized myoclonic, atonic, tonic-clonic or absence

subtypes². Partial seizures have an effect on an area inside one cerebral hemisphere and are the most habitual type of seizure reported through sufferers with epilepsy³. Moreover, focal seizures are subdivided into simple and complex depending on whether consciousness is retained or lost during seizure episode, respectively⁴. The cause of seizure may be organic lesion such as tumor or other sort of space occupying lesion and sometimes no structural abnormality is identified⁵. All patients with epilepsy ought to experience a MRI, aside from those with extremely regular types of primary generalized epilepsy, such as childhood absence and juvenile myoclonic epilepsy, or typical partial epilepsies in children with anticipated EEG findings and clinical features e.g., centrottemporal spikes in benign epilepsy, added to that the response to antiepileptic drugs is satisfactory^{6,7}. There are two essential circumstances in which to practice an MRI in patients with seizures. First of all, patients with recent diagnosis and those having

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longstanding epilepsy and have not been adequately investigated. The second applies to patients with seizures that are refractory to medical treatment and in whom surgery is recommended⁶. Indeed, even those with long standing idiopathic focal epilepsy ought to experience an MRI. Even patients with long-term focal epilepsy of unknown etiology should undergo an MRI. Surgically treatable lesions, even low-grade tumors, have been found in individuals with a history of longstanding epilepsy⁸. Those patients suffering from focal signs during clinical examination should be given the priority for MRI evaluation. Critical imaging tests (MRI or CT scan) need to be performed in patients presented with new onset seizure associated with cognitive changes, a recent history of head trauma, fever, focal neurologic deficits and longstanding headache. In addition, an adult patient with a recent onset of focal seizure is a strong candidate for emergency imaging procedures⁹. The validity of MRI examination in patients with epilepsy is not restricted to characterization of an organic pathology, but also to know whether this pathology is static, such as congenital malformations and ischemic insults, or progressive such as malignant tumors. In addition, treatment modality can be properly selected based on MRI identification of the lesion, besides; MRI can be used to monitor lesion progression following establishment of definite treatment. In surgical planning, the need for three-dimensional (3D) reconstructions, diffusion tensor imaging (DTI) and co examination of variable imaging modalities is mandatory. Lesions detected by MRI are not always associated with seizures and seizures may arise from lesions that are not necessarily structural in nature¹⁰. For that reason, clinical data, neurophysiologic tests and MRI finding should be all taken into consideration in order to judge a given lesion to be a cause of epilepsy. Nevertheless, when EEG finding supports that of MRI in term of seizure zone, post-operative control of that seizure is usually better^{11,13}. Moreover, concerning research programs, MRI provide knowledge that makes our understanding of epilepsy pathophysiology even clearer¹⁴.

MATERIALS AND METHOD

The study was a cross sectional one that included 51 epileptic patients, 29 children (under 15 years) and 22 adult. The age range was from 3 to 45 years. Those patients were referred by the neurology unit at Al-Hilla Teaching hospital to the MRI unit in the same hospital, Babylon province, Al-Hilla City, Iraq, during the period

from 1st of January 2017 to 4th of June 2018. Any patient with a history of acute cerebral insult such as infection, trauma, metabolic abnormalities or vascular pathology was excluded from the study, as well as children with neonatal seizures. The diagnosis epilepsy was established in the neurology unite by at least neurologist taking into consideration the repeated seizure attacks in the absence of an identifiable cause such as trauma and infection. Verbal consent was available for all adult patients enrolled in the present study and also for parents of children. Clinical information included family history, age, gender, finding of EEG examination, whether normal or abnormal, findings of neurologic examination. The MRI procedure was conducted on a 1.5 Tesla magnet (Siemens, Germany). The procedure involved imaging the routine epilepsy protocol of MRI examination relying on 5 mm thickness slices and 2.0 mm interslice gaps in the coronal, sagittal and axial planes with T1 and T2 weighting. Data were collected and transformed into an SPSS (version 23, Inc, USA) spread sheet. Numeric data were expressed as mean and standard deviation whereas nominal data were expressed as frequency and percentage. Chi-square or Yates correction tests were used when settings are appropriate. The level of significance was considered at $P \leq 0.05$.

RESULTS AND DISCUSSION

Current study enrolled 51 patients, 29 children and 21 adults, with a mean age of 21.31 ± 12.75 years and an age range of 3-45 years. The study included 26 male and 25 female patients. Seizures were focal in 36 patients and generalized in 15 patients; 50 patients experienced abnormal EEG findings, as shown in table 1. Abnormal MRI findings were identified in 21 out of 51 patients (41.2%). In epileptic adults there were 5 (22.7%), 3 (13.6%), and 1 (4.5%) patients with space occupying lesions (mostly brain tumors), medial temporal sclerosis and other organic lesions (brain atrophy) respectively, whereas 1 (3.4%), 8 (27.6%), and 3 (10.3%) epileptic children showed the following lesions: with space occupying lesions (mostly brain tumors), medial temporal sclerosis and other organic lesions (brain atrophy and vascular abnormalities) respectively. The rate of abnormal MRI findings was 41.4% and 40.9% in children and adults respectively. Significant difference was neither seen in the rate of abnormal MRI findings nor in the distribution of specific types of these abnormalities between adult and child age groups ($P > 0.05$), as shown in table 2. Although, abnormal MRI findings were more

frequent in patients with focal epilepsy than generalized epilepsy, the difference was not significant ($P > 0.05$), table 3. Significant correlation was seen between focality of signs (in neurologic and EEG examinations) and rate of abnormal MRI findings ($P < 0.05$), table 4. The present study showed that abnormal MRI finding were found in 21 patients. The rate of these findings in children was 12 out of 29 (41.4%) which is higher than that reported by several authors, whereas, the rate in adult was 40.9%; again this rate is higher than reported by several authors¹⁵⁻¹⁹. In addition, in the present study, the rate of abnormal findings was more common in associations with focal lesions; however, the association was not significant, but this finding is in agreement with other authors¹⁵⁻¹⁸. Space occupying lesions were more frequent in adults than in children and the reverse was true regarding medial temporal sclerosis. Amirsalari *et al.*¹⁵ studied the role of MRI in children with epilepsy and concluded that MRI in children with epilepsy is justified in case of focal neurologic signs and or EEG finding; we agree with this opinion since we found significant correlations between rate of abnormal MRI findings and focal signs in neurologic examination and or EEG study, but we disagree with them that MRI examination is expensive and its use should be limited in a small fraction of children that suffer first onset seizure since we and other authors succeeded in finding organic brain lesions in those children and they may benefit surgical intervention. Amirsalari *et al.* themselves described the existence of brain tumors, cystic lesions and vascular abnormalities in those epileptic children. Molla Mohammadi *et al.*¹⁹, also described plentiful of organic brain lesions in epileptic children. On the other hand MRI has proven effective in finding organic lesions in adult patients even more than children enrolled in the present study. Winkler *et al.*,¹⁶ found organic brain lesions in epileptic adults withdrawn from specific population and we see that this finding, although limited to special kind of population, is suggestive of the presence of some sort of organic lesion in almost all patients complaining of epilepsy and that research works should be directed toward improving imaging techniques to discover these lesions as early as possible and to improve surgical intervention so that a wider range of epileptic individuals be able to get benefit from this modality of treatment especially those refractory to medical kind of treatment. In accordance

with opinion, Betting *et al.*,¹⁷ described several kinds of brain organic lesions in patients with idiopathic generalized epilepsy.

Table 1. Characteristics of the study sample

Characteristic	Value
Age	
Range (min.to max.) years	42 (3 to 45)
Mean \pm SD (years)	21.31 \pm 12.75
Children (<15 years), n (%)	29 (56.9%)
Adults, n (%)	22 (43.1%)
Gender	
Male, n (%)	26 (50.9%)
Female, n (%)	25 (49.1%)
Seizure	
Focal, n (%)	36 (70.6%)
Generalized, n (%)	15 (29.4%)
Abnormal EEG, n (%)	50 (98.0%)

Table 2. Epileptogenic lesion according to age

Epileptogenic lesion	Adult n = 22		Children n = 29		P†
Space occupying lesion	5	22.7	1	3.4	0.180 NS
Medial temporal sclerosis	3	13.6	8	27.6	0.567 NS
Others	1	4.5	3	10.3	0.874 NS
No finding	13	59.1	17	58.6	reference

Table 3. Finding in MRI in association with type of seizure (Focal versus generalized)

Finding in MRI	Focal n =36		Generalized n =15		P†
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Positive	16	44.4	5	33.3	0.463 NS
Negative	20	55.6	10	66.7	

Table 4. Correlation of abnormal MRI findings to focal EEG and neurologic examination findings

Characteristic	r	P
Gender	0.023	0.721
Focal neurological symptoms	0.371	0.032
Focal EEG abnormalities	0.401	0.026

CONCLUSION

MRI examination in children and adults suffering from epilepsy is helpful in identifying organic brain lesions in clinically significant fraction of patients and the rate of abnormal MRI findings is more frequent in patients with focal signs in neurologic and EEG examinations.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Surgery/ College of Medicine/ Babylon University, Hilla Teaching Hospital at Radiology Department and all experiments were carried out in accordance with approved guidelines.

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Study of Occupational Health Hazards for Nursing Staff at Al-Hashimiyah General Hospital in Babylon Governorate

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ABSTRACT

The nature of the nursing work environment, responsibilities and duties, nursing is a uniquely hazardous occupation, nurses and health care. Analytic cross-sectional study was conducted throughout the present study to determine the types of work related health hazards among nursing staff due to their work exposure for nursing staff at AL- Hashimiyah General Hospital In Babylon Governorate from September 2017 to September 2018. Quantitative research design was utilized to conduct this study. Non –probability “purposive” sample of (228) nurses who are working in Al- Hashimiyah General Hospital were included in the present study. Data was collected by distributing the Arabic version of the questionnaire that was created and by means of direct with each nurse included in the present study. The data collection process started from (12) March 2018 to (30) April 2018. Findings of the study found that the higher hazard score and rate was found with psychological hazard (21.78%) followed by physical hazards (17.94%) and them chemical hazards (14.47%).

Keyword: Occupational Health Hazards, Nursing Staff, and Al- Hashimiyah General Hospital.

INTRODUCTION

Occupational health hazards refer to work environment activities, substance, materials, processes, or conditions that make it possible to increase the risk of harm, accident or illness. occupational hazard are defined as life-threatening an individual’s work in the workplace¹. Hazards are defined as intrinsic properties of the substances, factors or origin of the energy or condition that are likely to cause harmful or undesirable consequences, but the risk is the potential harm to “life, health or the environment”². Health care services, like other high-risk workplaces, have a high level of exposure to hazardous factors, which seriously threaten the health and lives of workers (health care workers). According to world health organization (WHO), occupational health is defined as a multidisciplinary work aimed at protecting and promoting the health of workers by preventing occupational hazards, accidents

and injuries by eliminating occupational factors and situations that represent a risk to the health of workers in the workplace. Moreover, develop and Improve the health of workers physically, socially and mentally also maintain their practical abilities and support progress, as well as professional and social development in action. In addition, enable workers to lead productive lives and contribute positively to their sustainable improvement³. Nursing are on the frontline of many occupational health hazards and are most vulnerable to occupational health hazards in the work place. In the nursing profession, the types of health hazards encountered are varied. Some have existed since the birth of the nursing industry, but due recognition has only been accorded them recently⁴. The importance of occupational health hazards to health-care workers is due to increased accidents and injuries among exposed health workers. It is estimated that (100,000) people die as a result of occupational health hazards, while (400,000) new cases of occupational health hazards are diagnosed each year⁵. The cumulative effects of occupational diseases and injuries among healthcare providers include physical losses, economic losses and mental disorders such as stress and depression. as a result, they have a negative impact on the health of

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health-care workers, their families and the nation as a whole ⁶.

METHODOLOGY

Study Design : A Quantitative research was used descriptive type of design cross-sectional study the types of work related health hazards among nursing staff , conducted from (26) September 2017 to (2) September 2018.

Study Sample: A Non-probability “ purposive “ sample of (228) nurses were included in the present study, who works in the above mentioned hospital and met the inclusion criteria. The study sample was distributed according to the hospital units.

Demographic Characteristics: This part of the questionnaire contains information includes:

Personnel Information: The first part consists of (7) items that include : (Age, Gender, Marital status, Educational achievement , Monthly income , Residency and number of years of service in the hospital).

Professional Information

Consist of (7)items that include : (Job tittle, Place of work, Number of working hours /working day, Number of additional working hours per day, Daily hours of sleep, Any previous diseases they have before work as a nurse with specification).

Occupational Health Hazards :

The second part of the questionnaire Which include of six domains, Diagnosed chronic diseases (8) items, Physical hazards (21) items, Chemical hazards (4) item ,Biological hazards (7) item , Social hazards (6)items ,and Psychological hazards (15) items.

RESULTS AND DISCUSSION

A total of (228) nursing staff participants were enrolled in this study with a mean age of (33.5 ± 10.3) (range: 20-57) years, moreover, (45.6%) of the study participants aged below thirty years, (52/228) (22.8%) aged (30 – 39) years, (21.9%) aged (40 – 49) years and only (22/228) (9.6%) aged (50) years or more. Male participants were relatively dominant, represented (55.3%) with a male to female ratio of (1.24:1.) Majority (80.3%) of the study participants were married, (52.6%) achieved preparatory nursing education, (36.4%) institute and (11%) achieved

college of nursing level of education. Almost (71.5%) of the participants of urban residence. For the monthly income, more than half, (53.9%), of the participants had monthly income of (400-600) thousands IQD, (26.8%) had (601-800) and (19.3%) had thousand IQD or more. (Table 2) summarizes the diagnosed chronic diseases among participants during their service as a nursing staff, High blood pressure and Diabetes mellitus were more frequent than other diagnosed disease where they reported by (17) (7.5%) and (12) (5.3%), participants, respectively, followed by Allergy (bronchial asthma), Chronic respiratory infections and Heartburn or stomach ulcer with reported by (3.1%), (2.2%) and (1.3%), respectively, thyroid disorder reported by only one participant (0.4%). On the other hand, None of the participant had Cardiovascular disease, Duodenal ulcer. According to these findings the mean total score of hazard of diagnosed chronic diseases ranged between zero and (0.075) giving a percent score of (0%) to (7.46%) and the mean overall total hazard score for this domain was (0.0247) and percent score of (2.47%) giving an evaluation of low hazard for this domain. demonstrates the (21) items of physical hazards, the higher hazard score was reported for the Headache and Severe pain in the back and spinal cord were they reported by (123) and (96) participants, respectively, with a mean hazard score of (0.539) and (0.421), respectively, followed by , severe pain in the body and limbs (mean hazard score; 0.333) and arm, hand and joint pain (mean hazard score; 0.311). However, the mean hazard score for other items ranged between (0.004) for burns in one part of the body to (0.303) for sleep disturbance. The overall mean total hazard score for this domain was (0.179) and the hazard score percent of (17.94%) with a low hazard evaluation. The four items of chemical hazards are demonstrated in (Table 3). The overall chemical hazard was low with a mean hazard score of (0.145) and score percent of (14.47%), however, the higher hazard score (0.342) was reported for the sensitization of eyes, nose or throat due to exposure to chemicals and lower score for chronic poisoning due to long-term exposure to medical substances and sterilization fluids with a mean hazard score of (0.031). The higher hazard score among the social hazards was reported with difficulty in making decisions about personal life (mean total hazard score; 0.162) followed by sensitivity towards hospital staff (mean total hazard score; 0.114) and difficulty in making friendship or social relationships (mean total hazard score; 0.110). The overall mean total hazard score for

this domain was (0.102) and score percent of (10.16%) and evaluated as low hazard, (Table 3). The association between total hazard scores with demographic and personal characteristics of the studied group is assessed for the overall and each domain of hazards and shown in (Table 4) for the significantly associated demographic variables with one or more hazards domain. A significant direct (positive) correlation had been found between age and each of chronic disease hazard, social and psychological, ($P < 0.05$), the direct correlation indicated that hazards scores was significantly increased with advancing age, i.e. older participants were more likely to have more chronic disease, social and psychological hazards than younger participants. **Other demographic and Personal characteristics were insignificantly associated with occupational hazards whether with domains or the overall hazard, and the correlation matrix for insignificantly associated variables are shown in (Table 5).** Therefore a total of (228) nurses were enrolled in the present cross sectional study, the mean age of the studied group was (33.5 ± 10.3) (range:20 – 57), the minimum age of (20) reported among the studied group (table 1) due to the fact that age of employment in Iraq start at (18) years and almost all nurses finished their nursing studies beyond this age, in addition, there is delay in the administrative orders of employment and distribution of workforces by the IRAQI Ministry Of Health (MOH) as the employment and distribution of nurses is centrally controlled by (MOH) in Iraq, Furthermore, lower proportion of the study participants aged (< 50) years, and this was not unexpected because at this age most of employers think do out the retirement law in Iraq. Higher proportion of the study participants were males with a male to female ratio of (1.24), which is very close to the general distribution of nursing staff that reported by Iraqi MOH annual report of (2016) (MOH, 2016)(7). Concerning marital status, Majority of the study participants(80.3%) were married. This result is consistent with the study of Farrington (2011)(8) that found the greatest proportion of respondents were married. Concerning the monthly income, more than half of the participants (53.9%) had monthly income of (400-600) thousands IQD, (26.8%) of them had (601-800) and (19.3%) received thousand IQD or more, This can be attributed that most of those nurses were newly employed and the higher the years of working, the higher the monthly wages. Additionally, More than half of the participants (52.6%) were skilled nurses, (36.4%) technical nurses and only

(11%) were university nurses. This is may be due to newly establishment of nursing colleges in babylon governorate .

Table 1. Socio- Demographic Characteristics of the study participants at AL- Hashimiyah General Hospital/ Babylon Governorate (N = 228) .

Socio- Demographic Characteristics		No.	%
Age groups/ years	20-29	104	45.6
	30-39	52	22.8
	40-49	50	21.9
	≥ 50	22	9.6
	Mean \pm SD*	33.5 ± 10.3	
	Range	20 – 57	
Gender	Male	126	55.3
	Female	102	44.7
	Male: Female ratio	1.24	-
Marital status	Married	183	80.3
	Single	45	19.7
Educational achievement	Preparatory Nursing	120	52.6
	Institute	83	36.4
	College of Nursing	25	11.0
Residence	Urban	163	71.5
	Rural	65	28.5
Monthly income	400-600 thousand IQD	123	53.9
	601-800 thousand IQD	61	26.8
	801 Thousand IQD and more	44	19.3

Table 2. Physical hazards among the Study Participants at AL- Hashimiyah General Hospital/ Babylon Governorate (N = 228).

Physical Hazards	Yes		No		M mean total score	Score percent
	No.	%	No.	%		
Sleep Disturbance	69	30.3	159	69.7	0.303	30.26%
Severe Pain in the Back and Spinal Cord	96	42.1	132	57.9	0.421	42.11%
Severe Pain in the Body and Limbs	76	33.3	152	66.7	0.333	33.33%
Exposure to Radiation	29	12.7	199	87.3	0.127	12.72%
Arm, Hand and Joint Pain	71	31.1	157	68.9	0.311	31.14%
Weakness or Loss of Appetite	45	19.7	183	80.3	0.197	19.74%
Gastrointestinal Disorders(Nausea , Vomiting, Bloating)	59	25.9	169	74.1	0.259	25.88%
Visual Disorders and Eye Problems	54	23.7	174	76.3	0.237	23.68%
Hearing Disorders and Ear Problems	17	7.5	211	92.5	0.075	7.46%
Rotor (Dizziness)	65	28.5	163	71.5	0.285	28.51%
Skin Rash	3	1.3	225	98.7	0.013	1.32%
Falling During Work	18	7.9	210	92.1	0.079	7.89%
Sprain Ankle or Foot	25	11.0	203	89.0	0.110	10.96%
Vertebras Slip	29	12.7	199	87.3	0.127	12.72%
Wounds or Scratches	31	13.6	197	86.4	0.136	13.60%
Burns in one Part of the Body	1	0.4	227	99.6	0.004	0.44%
Electric Shock	4	1.8	224	98.2	0.018	1.75%
Abortion *	8	7.8	94	92.2	0.035	3.51%
Varicose Veins	10	4.4	218	95.6	0.044	4.39%
Anemia	26	11.4	202	88.6	0.114	11.40%
Headache	123	53.9	105	46.1	0.539	53.95%
Overall for Physical Hazards					0.179	17.94%

Table 3. Chemical hazards among the Study Participants at AL- Hashimiyah General Hospital/ Babylon Governorate (N = 228).

Chemical Hazards	Yes		No		Mean total score	Score percent
	No.	%	No.	%		
Sensitization of eyes, nose or throat due to exposure to chemicals	78	34.2%	150	65.8%	0.342	34.21%
Chronic poisoning due to long-term exposure to medical substances and sterilization fluids	7	3.1%	221	96.9%	0.031	3.07%

Cont... Table 3. Chemical hazards among the Study Participants at AL- Hashimiyah General Hospital/ Babylon Governorate (N = 228).

Allergy to rubber material	36	15.8%	192	84.2%	0.158	15.79%
Exposure to mercury, lead or other substances	11	4.8%	217	95.2%	0.048	4.82%
Overall for Chemical Hazards					0.145	14.47%

Table 4. Psychological Hazards among the Study Participants at AL- Hashimiyah General Hospital/ Babylon Governorate (N = 228).

Psychological Hazard	Yes		No		Mean total score	Score percent
	No.	%	No.	%		
Feeling of continuous sadness as a result of work load	69	30.3	159	69.7	0.303	30.26%
Intolerance of many things related to work	89	39.0	139	61.0	0.390	39.04%
Loss of self-confidence	6	2.6	222	97.4	0.026	2.63%
Feeling of emptiness	23	10.1	205	89.9	0.101	10.09%
Loss of self-control	24	10.5	204	89.5	0.105	10.53%
Feeling of continuous failure	8	3.5	220	96.5	0.035	3.51%
Crying for no apparent reason	20	8.8	208	91.2	0.088	8.77%
Willing to sacrifice many important things	111	48.7	117	51.3	0.487	48.68%
Feeling hopeless	20	8.8	208	91.2	0.088	8.77%
Tense Relationships with colleague	14	6.1	214	93.9	0.061	6.14%
Tense relations with officials in the work	58	25.4	170	74.6	0.254	25.44%
Work stress and frequent night shifts	137	60.1	91	39.9	0.601	60.09%
Exposure to threats from patients and their families during work	97	42.5	131	57.5	0.425	42.54%
I feel dissatisfied with the nature of my work	42	18.4	186	81.6	0.184	18.42%
Exposure to Physical attacks by patients and their families	27	11.8	201	88.2	0.118	11.84%
Overall for Psychological Hazards					0.218	21.78%

Table 5. Significant Correlation Matrix of Overall Hazards and each Domain Total Hazard Scores with Demographic and Personal Characteristics of the Study Participants at AL- Hashimiyah General Hospital/ Babylon Governorate (N = 228).

Hazard	Correlation indicator	Age (older)	Gender (female)	Residence (urban)	Monthly income (higher)	Years of service (longer)
Chronic disease	R*	0.375	-0.118	0.046	-0.202	0.381
	P. value	< 0.001	0.076	0.490	0.002	< 0.001
Physical	R	0.102	0.114	-0.017	-0.074	0.065
	P. value	0.125	0.085	0.803	0.267	0.331
Chemical	R	-0.104	0.201	-0.180	-0.194	-0.133
	P. value	0.118	0.002	0.006	0.003	0.045
Biological	R	0.014	-0.076	0.062	-0.018	0.032
	P. value	0.837	0.252	0.348	0.790	0.629
Social	R	-0.222	0.177	-0.068	-0.211	-0.202
	P. value	0.001	0.007	0.304	0.001	0.002
Psychological	R	-0.183	0.085	-0.043	-0.248	-0.199
	P. value	0.005	0.202	0.518	< 0.001	0.003
Overall hazard	R	-0.043	0.137	-0.052	-0.187	-0.066
	P. value	0.521	0.039	0.434	0.005	0.321

CONCLUSION

The main types of hazards working among the study group were psychological hazards, physical hazards, chemical hazards, social hazards, biological hazards and diagnosed chronic disease. The overall hazards was low among nursing staff. The majority of the nursing staff had not exposed to hazardous factors. The higher hazards rate was in psychological hazards followed by physical hazards and chemical hazards, while the lower hazards as factors were social hazards, biological hazards and diagnosed chronic disease.

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The Contributing Factors for Head Traumatic Patients and their Relation to its Outcomes at Al Hilla Teaching Hospital

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ABSTRACT

Head Trauma is a major cause of lifelong disability and death worldwide but is considered a ‘silent epidemic’ as society is largely unaware of the magnitude of the problem. A descriptive analytic study design was carried out to assess the contributing factors to head traumatic patients and its relation to their outcomes at Al-Hilla Teaching Hospital. To achieve the objectives of the study by selected non-probability purposive sample consisted of (100) patients who admitted to the emergency department, the study sample was selected according to specific criteria, data were collected from April 10th, 2018 to June 30th, 2018, by using designed questionnaire through interview method to the patients or their relatives. The questionnaire divided of (4) parts, part one: contained socio-demographical data, part two: divided into section deals with contributing factors of head trauma, part three outcomes of patients Part four: scale to measure the level of conscious, (GCS), bleeding, associated injuries, convulsive, C.T. scan, days of hospitalization, operation and finally Glasgow Outcome Scale. The majority of the study sample (89.0%) were male aged (50.0%) middle adult aged between (18-28) years, with low educational level. These factors were positively and significantly associated with the outcomes the trauma to the head.

Keywords: *Contributing Factors, Head Traumatic Patient, Outcomes.*

INTRODUCTION

Head trauma indicates any injury that causes harm to the scalp, or to the skull or even to the brain. Head trauma can be classified in various different ways according to the types of injury¹. Head trauma is a general term used to describe acquired trauma to the brain². In referring to trauma that effects on the head the term, ‘traumatic brain injury’ prefers to use, because head trauma is the less specific and more generic. A traumatic brain injury not necessary always caused direct trauma to the head³. A traumatic brain injury is a very important reason for morbidity and mortality in the developing countries. In the western countries, traumatic brain injuries considered as the main cause of death in persons who’s less than 45 years old in the world⁴. A traumatic brain injury, a destruction condition often accompany with traffic accidents, it is the main cause to high mortality

rate, according to 2013 World Health Organization reported (countries that recording the second grade of automobile crashes in Iraq and Oman. Main causes to increase the number of occurrence traumatic brain injury is poor road regulations and violent conflicts. Therefore we need to the many of the researches for the traumatic head injury, to prevent the level of disease to reach the sever state, also diagnostic, therapeutic and rehabilitative measures⁵. Many of the people in various countries as Africa, India, and Taiwan reported the high percentage of accidents (automobile accidents or motor vehicle accidents).In the United States, this type of accidents recorded a high percentage of another type of injury by incidence 506.4/100, 000 of the population each year. Mortality from TBI in SA found to be 6 folds than that of the global rates due to the high incidence of RTA. The major risk factors for TBI in the US are the advance in age, being male, and among low socioeconomic status⁶. Traumatic head patients have different health status from one patient to another that be mild, moderate, or severe depending on causes of injury, therefore need to assessment to level of consciousness by Glasgow coma scale, that have three scales: Mild (13-15),

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moderate(9-12), and sever (3-8) depending on patient state (7). Head trauma effect on all status socially, economically, and personally, 10 million of individuals exposed to head injury every year, therefore consider medical problem require to management and prevention to overcome and control on this type of problem (8). Mild head injury is a term that is usually used interchangeably with the terms “concussion” or “mild traumatic brain injury”. Males reported the highest rate from females to experience head trauma, and hospitalization rates are highest for young adults (15 to 24 years) (9). Another type of traumatic brain injury is Severe, defined as head trauma related to Glasgow Coma Scale (GCS) score of 3 to 8, is a critical and challenging dilemma in the critical care unite. Intensive care management to persons suffered from severe traumatic brain injury is an active process, begin before hospital admission, at the time of the accident. Through the first stage of hospital management, the patients may be managed in a many of unites inclusive emergency unite, the radiology unite, and the operating unite pre admission to the ICU. Serial of the acute management, through “GOLDEN HOUR”, from the time of trauma during the begin of definitive care, must be ensured and depend on the guidelines and recommendations previously mentioned ¹⁰.

METHODOLOGY

A descriptive analytic study design was carried out to assess the contributing factors to head traumatic patients and their relation to its outcomes at Al-Hilla Teaching Hospital. To achieve the objectives of the study by selected non-probability purposive sample consisted of (100) patients who admitted to the emergency room, and the study sample selected according to specific criteria, data were collected from April 10th, 2018 to June 30th, 2018, by using a designed questionnaire through direct face- to face interview method. A questionnaire is divided into three parts, Part I: contains demographical data which include (age, gender, level of education, occupation, and residency). Part II: divided into section deals with contributing factors of head trauma which includes: Road Traffic Accidents (R.T.A.) which composed of (automobile, cyclist, truck, pedestrian, and passenger), falls accidents which composed of (fall from high, and other fall or jump), assault accidents which composed of (assault by blunt object, and assault by sharp object), and missiles accidents which are (shell and bullet); the others contributing factors deal with alcohol consumption, drugs abuse, systematic illness and time of

accidents. Part III: Head trauma which includes the level of conscious, bleeding, associated injuries, convulsive, computed tomography (C.T) scan, day’s hospitalization, operation and Glasgow Outcome Scale (GOS). The validity of the questionnaire is obtained by review of (10) experts in different filed, a Cronbach alpha used as a statistical method to calculate the reliability of the study questionnaire which recorded as (0.70) which is statistically accepted, the statistical package (SPSS -version 25) used to analyze data.

RESULTS AND DISCUSSION

This table represents the patients with head injuries their demographic characteristics in frequencies and percentage. Out of (100) subject who share in this study with age group (18-34) years old and constituted half of the study sample. Only. The high ratio of head trauma patients to men, it configures 89% of summed number of the sample. 32% were unable to read and write, versus the fewer ratio were college graduated, it constituted (7%) out the sum of 100 patients. In the same table, it is obvious that (55%) of patients are non-governmental employ and residents in urban areas. percentage very small was (2%) of the sample are residents in counter side areas of Hilla City. Findings in this table demonstrated that the factors contributed to head injuries in frequencies and percentage as a head and subhead, are: Concerning Road Traffic Accidents recorded the highest percentage (78%) compared to the remaining accidents. The highest percentage among those who drive automobiles, it recorded (35%) out the sum number of (78%) gradually followed cyclist (24%), passengers (16%), and pedestrian (3%) respectively. (12%) recorded for fall from high trauma especially falls from highest (11%), and also, jump injuries formed a small proportion (1%) out some number of (24%) among those injuries. Assault injuries recorded only (4%) out the sum of (100), as distributed among assaulted by obtusely object and assaulted by a sharp object (3% and 1%) respectively. In regarding ballistic injuries, were recorded (6%) out some number of the study sample as shelled injuries. In general, most injuries recorded for Road Traffic Accidents then gradually fall from high injuries, missiles injuries, and assault injuries respectively. Analysis of regression refers to find the significant association in causes of head injury and patients their level of consciousness (as mild, moderate, and sever) at p-value (≤ 0.05). As well as Glasgow Coma Scale (as good recovery, moderate disable, severely disabled, vegetative, and death) highly

affected by the causes of head injury (as R.T.A., falls, Assault and missiles) at p-value (< 0.01). The results related to the demographical characteristics of the study sample which is presented in table (1) shows that (50.0%) of the study sample were within (18-28) years of age, (89.0%) were males. These results were consistent with prospective surveillance study which is carried out in Iraq to identify the contributing factors for patients with head trauma. In this study, the results clarifying that most of the patients were male, total No. of male patients were 202 (84.2%) while female patients were 38 (15.8%). Their ages were below 20 years old (11). (32 %) of the study participants were unable to read and write while the lower percent were college graduated, it constituted (7%) out a total of 100 patients ,this study agreement with another study investigated 456 injured motorcyclists as one of RTA most of the drivers (61.7%) had the low level of education (primary school and less). It is obvious that 55 % of patients are non-governmental employee and residents in urban areas. Approximately (98%) of the sample are residents in urban areas of Hilla City. It is possible to think that head trauma may be a phenomenon of urbanization. Pertaining to these results the people who were freelancers and live in these areas are more prone to accidents than others due to the fact that they often go out and use transport more and they must catch their business ¹¹. Concerning Road Traffic Accidents recorded, the highest percentage (78%) comparatively with the remaining accidents. The highest percentage among those who automobiles, it recorded (35%) out the sum number of (78%) gradually followed cyclist (24%), passengers (16%), and pedestrian (3%) respectively. 12 % recorded for injuries especially falls from highest (11%), and also, jump injuries formed a small proportion (1%) out the sum number of (12%) among those injuries. Assault injuries recorded only (4%) out the total of (100), as distributed among assaulted by the obtuse object and assaulted by a sharp object (3% and 1%) respectively. In regarding ballistic injuries, were recorded (6%) sum a total number of the study sample as shelled injuries. In general, most injuries recorded for Road Traffic Accidents then falls, missiles, and assault injuries respectively. The above findings supported by another study showed that the percentage of major factors to injury was; fall from height by percentage (40%), followed another factor was automobile accidents by percentage (37%), also assaults (13%), downfall of building (4%), snorkeling by (1%), shell (1%) and another contributing factor (4%).

The percentage of these results reverse the findings of this study ¹³. The sample of the study composed of 277 patients with head trauma. Most of them (85.9%) were male; the average age was 37.7 years old, causes of trauma RTA (60.3%), 40.8% severe head trauma, according to GCS obtained after first care was provided, and mortality rate of 19.1% was noted according to GOS. These findings go inconsistent with the results of the present study by Analysis of regression which refers to significant association in causes of head injury and patients' level of consciousness at p-value (≤ 0.05). As well as Glasgow Coma Scale highly affected by the causes of head trauma at p-value (< 0.01) ¹⁴.

Table 1. Distribution of Study Sample by their Demographic Characteristics:

Demographic Properties		
Age by (years)		
Rating	F	Percent
18-28	50	50.0
29-39	25	25.0
40-50	20	20.0
≥ 51	5	5.0
Total	100	100
Gender		
Male	89	89.0
Female	11	11.0
Total	100	100
Educational Level		
Unable to read & writ	32	32.0
Secondary school	24	24.0
Middle school	21	21.0
Preparatory school	16	16.0
Collage	7	7.0
Total	100	100
Occupation		
Non-governmental employee	55	55.0
Government employee	10	10.0
House wife	7	7.0
Students	1	1.0
Retired	27	27.0
Total	100	100
Residency		
Urban	98	98.0
Rural	2	2.0
Total	100.	100.

Table 2. Distribution of Contributing Factors of Head Trauma Patients:

Contributing Factors		
Rating	Frequency	Percent
R.T.A	78	78.0
Automobile	35	35.0
Cyclist	24	24.0
Truck	0	0
Pedestrian	3	3.0
Passenger	16	16.0
Falls	12	12.0
Fall from high	11	11.0
Other fall or jump	1	1.0
Assault	4	4.0
Assault by blunt object	3	3.0
Assault by sharp object	1	1.0
Missiles	6	6.0
Shell	6	6.0
Bullet	0	0
Missiles	0	0
Total	100	100

Table 3. Causes of Head Trauma in relation to GCS and Glasgow Outcome Scale

Causes of Head Trauma				
	D.f	Mean Square	F	p- value
G.C.S	1	3.867	8.018	0.005 S
G.O.S.	1	34.141	92.555	0.000 HS

CONCLUSION

The type of trauma is different from one society to another according to many factors like geographical construction, religious and cultural background .Adolescents to early adulthood male patients who unable to read and write and non-governmental employee residents urban areas of Babylon Governorate

are more exposed to head trauma and the road traffic accidents recorded the highest ratio in this study. Death is the most likely factor when the patient is exposed to those injuries. Contributing factors to injury in terms of R.T.A., fall, Assault, and Missiles have been influential for the patients and their outcomes.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effect of Post and Brennan Strategy on the Achievement of Fourth Stage Scientific Branch Students in Biology

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ABSTRACT

The study aims to identify the effect of Post and Brennan strategy on the achievement of fourth stage scientific branch students in Biology. The researchers depend on the experimental design of partial control of two equivalent experimental groups and a control one. The study sample includes (80) students male and female students, (40) female students who studied according to Post and Brennan strategy and (4) male students studied according to the regular method. Before applying the experiment, the researchers make equivalency between the two groups including the variables (age by months, intelligence test, previous achievement in biology and test of previous information in biology). The statistics have proved the equivalent of the two groups in these variables. The researchers prepare tools of application on the two groups. After scoring the students' answers, the researchers got the data of experimental and control groups. Data is treated statistically by T- test for two independent samples. The results showed that the experimental group that studied according to Post and Brennan strategy surpasses the control group that studied according to the regular method.

Keywords: *Post and Brennan strategy, achievement, fourth stage scientific branch students and biology*

INTRODUCTION

Despite the development of teaching methods, the dominant feature of teaching nowadays is to use methods that depend on memorization the study materials. This tendency is due to lack of preplanning that is followed in teaching a specific concept by the teacher, which makes teaching follows a similar pattern in most lessons. The aim of this method is to provide students with much information and concept. In the same time, the teacher appears uninterested to relate the lesson in a way to create a case of integration and balance between the method of teaching and the learner's structure. As a result, these ideas and concepts are still scatter in the students' minds and subject to forget. Also, the students are unable to acquire necessary knowledge, develop their mental abilities, creative thinking, meet their needs, tendencies, interests and their manual skills in addition to show the greatness the Creator and

appreciate scientists' contribution in serving humanity. The effective teaching method used by the teacher is a fundamental corner to achieve educational goals because teaching methods have positive effects on the students' thinking and increase their achievement and continuous interaction among them. This method leads to develop the learner's personality and increase their the teacher's abilities to detect facts, information and concepts in the whole curriculum. So, the researcher has to use teaching strategies of multiple paths, which have commonality because it is the source of social interaction among learners inside the class. Moreover, it is a source of information processing and learner's personal experience, and source of adjusting learners' behavior according to modern teaching strategies that make the students more interactive in the class. All these practices lead to develop cooperation spirit among students and in this way the student becomes active and this increases his/ her achievement in his/ her study including biology. The dynamicity of knowledge is continuous and accelerated. So it is necessary to cope with this acceleration through to give a chance to students to recognize the methods that fit their way of thinking. Although modern tendencies

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stress on adapting strategies, methods and teaching techniques, they make the student's role central for educational process⁴. The educationalists confirm that education, generally, and teaching sciences in particular is not a matter of transferring knowledge to students, but it is a process concerned with students' development (mentally, emotionally and in skills) and the integration of their personalities. The basic mission of teaching biology is to learn students how to think rather than how to memorize their classes without understanding or employing it in life¹⁶. In sciences teaching, problem-solving strategies can be adopted to help learners to realize the solution of the problem and propose other solutions. In addition to control his thinking and develop his/her ability to understand, perception, planning and management⁸. Since one of the most important goals of teaching sciences including biology is to increase thinking level through problem-solving, so there are different models and strategies to accomplish this method as (Post and Brennan) strategy of problem-solving¹¹. Post and Brennan strategy in education and learning links between thinking in scientific manner to solve human problems including everyday life problems and complex social ones. The ability to solve them is the most important result of learning⁵. So Post and Brennan strategy is chosen as one of the modern teaching methods, which may have an impact on the achievement of students in biology/ 4th year, scientific branch. The study of (Sachet 2018) aims to identify the effectiveness of Post and Brennan strategy in the achievement of Geography and develop reflective thinking of the 5th year students/ literary branch. The study sample includes (62) students distributed to two groups, an experimental group (31) studied according to Post and Brennan strategy and a control one³¹ studied according to regular method. The researcher prepares two tools, the first is achievement test of (40) items of multiple choice and (10) items are essay type items. The researcher prepares a test for reflective thinking of (40) items. The researcher uses T-test for two independent samples and Pearson's correlation coefficient, difficulty and easiness coefficient. There are differences of statistical significance at the level (0.05) among the means of students grades of the experimental group who studied Geography according to Post and Brennan strategy and between the means of grades male students in the control group who studied according to the regular method in their achievement test. There are differences of statistical significance at the level (0.05) among the means of students grades of the experimental

group who studied Geography according to Post and Brennan strategy and between the means of grades male students in the control group who studied according to the regular method in the post reflective thinking.

METHODOLOGY

It includes the procedures that are used to achieve the study goals starting from the study method, experimental design, identify the population and the sample, the equivalency of the two groups (experimental and control), prepare the study tools, procedures of applying the experiment, introduce the used statistical tools:

Experimental Design of the study:

The independent variable includes (Post and Brennan strategy) and (regular method) and the dependent variable (achievement).

The study population and sample

The study population includes all students of the 4th grade/ scientific branch in the governmental secondary and preparatory schools/Morning study that belong to Al-Qadisiyah directorate of education for the academic year 2017-2018. The number of classes of this stage is no less than two classes. The study sample is selected randomly from Al-Daghara preparatory co- school) in the centre of Al-Daghara. The researchers find that the school has three classes of 4th year/ scientific branch (A, B and C), the researcher chooses class (A) by random lot to be the experimental group in which it has (40) female students who will study according to Post and Brennan strategy. In the same method, the researcher selects by random lot class (B) to represent the control group, which includes (40) male students who will study according to the regular method.

Equivalence of the study groups

The researchers have made a statistical equivalence between the experimental group and the control one regarding some variable that affect the experiment results. Although the researchers select the two groups by random lot and the students have similar economic and social environment, they keep to make equivalence in the following variables: age (by month), 1st semester grades, intelligence test and test of previous information in biology. The researchers make equivalence between the two groups in these variables Table (1).

Controlling internal variables

Although the researchers verify the equivalence of the two groups in some variables, they attempt to avoid the effect of some internal variables that may change the experiment results. The following are the variables and how to control them: (concomitant events: the experiment does not have any urgent condition, experimental depreciation: there is no discontinuation or students transferring along the period of the experiment, sample selection: the two groups are selected randomly and their equivalence is verified, maturity factor: since the period of the experiment is the same and the age as well, growing older will on the same level for both groups, so this factor does not affect the experiment, the effect of experimental procedures: the researcher attempts to limit the effect of the experimental procedures that may affect the dependent variable during the experiment.

Preparing the study requirements

The study requirements are: identify the scientific material: the scientific material is the last four chapters of biology textbook of 4th stage/ scientific branch, 2017-2018, behavioural goals: the researchers drafted (194) behavioural goals of the four chapters biology textbook of 4th stage/ scientific branch according to Bloom's taxonomy in the cognitive domain distributed on six levels (knowledge, understanding, applying, analyzing, synthesizing and evaluation), preparing teaching plans: the researcher s have prepared several teaching plans for the two groups, the experimental and the control in light of the content of the last four chapters (7th, 8th, 9th and 10th) of biology textbook of 4th stage/ scientific branch, 2017-2018. There are (24) plan for each group, (3) lessons per week. The teaching plans are prepared in a way that fits with the independent variable (Post and Brennan strategy) for the experimental group and the regular method for the control one.

Test instructions

Test guidelines and instructions of answering questions have been drafted as (selecting one alternative for an item, answer all items, time for answer, writing triple name, class and section in appropriate place).

Scoring test items

A specific standard has been assigned to score the items where each correct answer of an item has one mark, zero for the wrong item, the left item and the item

that answered with more than one answer. Eventually, the maximum mark is (50) marks and the minimum is (zero).

Validity of the test

The face validity and content validity of the test have been verified. The results show that face validity has %73 of the arbitrators' and specialists' agreement while the content validity shows that the test items are statistically significant. So, the achievement test is considered valid in measuring the 4th year / scientific branch students' ability to understand and apprehend biology.

Applying test tool

Before a week, the two groups (experimental and the control one) have been notified of the date of the achievement test. It is applied at the same time after the completion of teaching the textbook for the two groups. The researchers supervise applying the test.

Statistical Tools

The researchers use T- Test for two independent samples for the equivalency of the two groups in the following variables (age by month, students' achievement in mid-year/ biology, Otis-Lennon intelligence test and the test of previous information). Also, the researchers use Pearson's equation to correct correlation coefficient between the two parts of the test (odd and even marks) after getting Pearson's correlation coefficient.

RESULTS AND DISCUSSION

Achievement test is prepared for the two groups after completing the scientific material, which the researcher teaches in the school, the results show that the experimental group surpasses the control one as seen in the table 2. The table shows that the experimental group surpasses the control one in the achievement test so there are differences of statistical significance at the level of significance among the means of students' marks of the experimental group who studied according to Post and Brennan strategy and the marks of the control groups students who studied according to the regular method. The results show that Post and Brennan method has a positive effect on understanding information, scientific facts and problem- solving and lead to elevate the students' level of achievement. The results of statistical treatment show that the students of experimental group

who studied according to Post and Brennan strategy surpass the students of the control group who studied according to the regular method in the achievement test. The reasons can be attributed to the following: Post and Brennan strategy is one of the modern teaching strategies due to its procedural steps that allow the students to interact with each other and with the scientific material that has a relation with their life and this increases their motivation to learn and search for solutions of their problems in addition to discuss these solutions and test their validity. Increase the positive participation of the students, the interaction among them, trust in themselves and encourages self- learning. Post and Brennan strategy contributes to make scientific material more attractive and digestible for the experimental group, and this increases the students' interaction with the information that they memorize for a longer period because it focuses on relating science with the real life of students.

Teaching according to Post and Brennan strategy makes students more interesting and interactive with biology than teaching according to regular method. This strategy makes the students the hub of the educational process. They have the major role to discuss, inquire and search for answers, solutions and deduce creative ideas. It helps students to enrich their scientific information and increase their achievement in this subject through relying on themselves instead of dictating them. Also, it gives students the chance to discover, discuss and encourage to ask questions and express themselves. These results agree with the results of the previous studies that depend on achievement as a dependent variable in teaching process in which experimental groups surpasses the control one. (Sachet, 2018) study shows that the experimental group that studied (Geography) according to Post and Brennan strategy surpasses the control group that studied according to the regular method.

Table 1. T-Test results for female students of the two groups

variable	group	Sample size	mean	Deviation standard	Freedom degree calculated	t- value		significance
						tabular		
Age (by month)	experimental	40	193,5	18,45	78	0,48	1,99	insignificant
	control	40	191,8	12,37				
1 st Semester grades	experimental	40	75,275	16,21	78	0,85	1,99	
	control	40	72,45	13,29				
Intelligence Test	experimental	40	34,625	8,49	78	0,43	1,99	
	control	40	33,85	7,81				
Pervious information test	experimental	40	14,15	2,75	78	0,85	1,99	
	control	40	13,625	2,76				

Table 2. Experimental group surpasses the control.

group	No. of students	mean	Standard deviation	Freedom degree	T- value		significance
					calculated	tabular	
experimental	40	37,05	6,48	78	2,39	2,01	significant
control	40	33,1	8,19				

CONCLUSION

In light of the study results, the researchers have reached the following conclusion: (the effectiveness of Post and Brennan strategy to increase the level of achievement compared to the regular group).

Financial Disclosure There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Babylon University/ College of Basic education/ dept. of Teaching Sciences, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effect of Teaching General Methods of Teaching on the Dimensions of Structural Theory in the Holistic Thinking of College Students

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ABSTRACT

The current study aims to identify (The Effect of Teaching General Methods of Teaching on the Dimensions of Structural Theory in the Total Thinking of College Students). To achieve the aim of the present study, the following null hypothesis has been formulated: (there is no statistically significant difference between the students' mean scores of performance of the experimental group which is taught methods of General teaching within the dimensions of the constructivism and that of the control group which is taught which is taught holistic thinking according to traditional method of teaching). The experiment was conducted in Iraq-Babylon province. The researcher follows the experimental approach as the appropriate one to such research. The population of the research was the third grade in the departments of the college of basic education, University of Babylon. The sample is selected randomly, it involves 92 third stage students from department of geography. Both groups are equalized in some variables such as age and level of parents education. The researcher uses the T-test for two independent variables, Chi - square and the Pearson correlation coefficient. The results show that the experimental group is higher than that of the control group.

Keywords: *Dimensions of Structural Theory, Methods of Teaching, Holistic Thinking, General Teaching Methods, College of Basic Education.*

INTRODUCTION

When the student arrives at the university, they are used to indoctrination and memorization, this is what they have in learning processes and fear of discussion, errors to become ridiculed in front of their mates and that the university student enrolls in the university to keep in progress in his university education thinking of his own case to get his aim, but after a certain period of time, we find that he has reduced his motivation towards learning¹. The lecturers used to lecture in a rhetorical fundraising way which is still the most common teaching method nowadays in addition to the lack of learning materials in some subjects or they are scattered. So, the lecture will be the main or probably the only source of information². The lecture is closely related to university education,

so that we hear university lectures, students and administration, whether they repeat the word "lecture" continuously in their teaching. The lecture is a teaching method that is one of the oldest and most widely used teaching methods in the teaching of human and scientific subjects³ Thinking is one of the most powerful abilities that distinguishes human beings from other creatures. It is one of the important needs that one cannot live up to and cannot abandon it except in the absence of mind. As a person needs to think at all stages of life in order to manage his/her lifestyle to generate new ideas that help in solving the problems they face⁴. The generation of ideas as a capacity is one of the important activities that distinguishes man from other creatures, which means finding a way to overcome a difficulty or an obstacle to get an achievement of the desired goal. Thus, the generation of ideas contributes to the development of the civil and cultural aspects of human life⁵. Holistic thinking is a comprehensive and balanced ability to develop the individual's ability and to promote self-awareness and social awareness to realize that it is part of a world in which different issues are intertwined⁶.

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Holistic thinking occupies researchers in different countries and that the beginning of interest in the subject of holistic thinking in the field of research and theorizing began with the beginning of the adoption of (American Society of Human Psychology). Holistic thinking helps individuals to explore their own environment and solve the problems they face and to find appropriate solutions to these problems by looking at them in a comprehensive manner, leading to the generation of new ideas that help solve the problems they face, leading to successful social communication in the environment they live⁷. Blosser (2002) notes that holistic thinking is an individual's ability, teachers can develop this ability for students to develop their education. Blosser finds that students who are categorized as holistic thinkers are active within their peer group and have many factors to help others. It deals with generalities that help the individual to solve the problems they face. Berenfeld notes that individuals with holistic thinking are not interested in detail in their search for problems but rather rely on generalities and are cheerful and adaptable to the social environment in which they live. That holistic thinking is an organization-based ability and provides the individual in a way that helps him/her to arrange and prepare the information necessary to solve the problems facing the individual and it prepares the mind of the individual to receive information and organize it in a multi-directional manner and this information does not comply with any order or system and the individual is a comprehensive thinker is an individual ability to handle multiple information and experiences independently of each other at the same time. Holistic thinking also has to do with organizational behavior. Individuals with holistic thinking have the ability to succeed in their assigned work, have organizational behavior and adapt themselves creatively to solve the problems they face in their work.

METHODOLOGY

This chapter includes a description of the procedures carried out by the researcher. The current study requires the researcher to follow a scientific research methodology that complies with the researcher's steps and has relied on the experimental approach because it is suitable for achieving its objectives.

Experimental Design

There is no one model for experimental design

suitable for all research. The nature of the problem that the researcher takes and the conditions of the sample the researcher chooses are the ones that determine the type of design. Therefore, there are many experimental designs and vary between them. One model of experimental design is suitable for all research. The nature of the problem that the researcher takes and the conditions of the sample he chooses are what determine the type of design. There are many experimental designs and vary between them.

Experimental Design of the Study

The experimental group is the group whose members are exposed to the independent variable, which is the dimension of structural theory. The control group is the group that teaches general teaching methods in the traditional method of teaching.

Population of the Study

Population refers to individuals or things all have certain characteristics can be observed, the only touchstone for society is a common property among its members, the community properties called observable features of population. The researcher chooses the students of the College of Basic Education to study it, and then chooses a third stage students in the same college-Babylon University. The current study population is (594) students, and the following table (1) shows the number of students in the research population.

Sample of the Study

The sample of the study is one of the important steps of the research. When the researcher wants to collect the data about a whole population, the researcher can not include all the members of the population. Rather, the researcher uses a sample of this one to help her collect the data in accordance with the researcher's potential. Part of a population with common characteristics, the purpose of which is to generalize its findings to a larger society. The researcher chooses a sample of (92) male and female students, represented by students of the third stage in the Department of Geography and that the researcher lectures in the mentioned department.

Equalization of Research Sample

The researcher equalizes the members of the research sample before the implementation of the experiment as the researcher was sure that the sample is homogeneous

and there are no significant differences between the members. The researcher equalizes the previous achievement variable and the achievement of parents and the researcher conducts a statistical equivalence in the age (measured in months) and the groups were equal in the mentioned variables.

Controlling the Extraneous Variables

David, (1990) One of the most important characteristics of experimental design in its scientific concept is that it is a valid study. Controlling of non-experimental variables is one of the important procedures in experimental study, so that the researcher can attribute most of the variance in the dependent variable to the independent variable and not to other variables. Therefore, the researcher sought to control the non-experimental extraneous variables that consider to affect the experiment:

1- Experimental Extinction:

It means the leak of some of the sample subjects and not to continue in the experiment, which leads to the impact of the negative or positive results, as this factor enters the independent variable in the results, thus reducing the internal validity of the experiment. (Atiya, 2009: 185). The researcher excludes the repeaters that may affect by the experiment this variable.

2- Synchronic Incidents:

The research experiment did not expose to any incident during the implementation period of the process of experiment.

3- Maturity

Maturity refers to the occurrence of biological, psychological or mental changes on the same person who is submitted to the experiment during the trial period such as fatigue and growth so that positively or negatively affect the results of the research, which does not allow the attribute of the search results to the experiment only.

Statistical Tools:

The researcher uses the following statistical tools in their research procedures and achieves to the results by using the Statistical Program (SPSS):

1. The (t.test) for two independent variables: The

researcher uses this equation to know the significance of statistical differences between the two study groups at the statistical equivalence and in the analysis of the results.

Where :

X_1 = the mean of the experimental group.

X_2 = the mean of the control group.

N_1 = the size of the experimental group.

N_2 = the size of the control group.

S_1^2 = the variance of the experimental group.

S_2^2 = the variance of the control group (Al-Bayati, 2002: 2008).

2- Chi- square test (χ^2):

This method was used to determine the significance differences between the subjects of the research sample at the statistical equivalence in the parental achievement variable (parents).

$$\chi^2 = \sum [\frac{O}{E}]^2$$

Where :

O= observed frequency

E= expected frequency (Al-Bayati, Zakaria, 1977: 293).

Pearson correlation coefficient

Pearson correlation coefficient was used to calculate the stability of the correction under the sample of the survey sample by way of re-application:

R=

Where:

r= Pearson correlation coefficient

n= Number of subjects

x= First test terms' marks

y= Repetition test terms' marks

(Al-Bayati and Zakaria, 1977: 183) (Shayeb, 2012: 147).

RESULTS AND DISCUSSION

This chapter includes a presentation of the search result and an interpretation for it. This chapter also includes the findings, recommendations and suggestions of the research as follows: To verify the effectiveness of the experiment that the researcher tried on a sample of third stage students in the Department of Geography / Faculty of Basic Education / University of Babylon, and sought to verify the hypothesis of the research as the researcher reached a way of balancing between the mean scores of students of the experimental group in the test of holistic thinking using the (t-test) test for two independent variables. There is no statistically significant difference between the students' mean scores of performance of the experimental group students who study teaching methods material within the dimensions of the constructivism and that of the control group students who study in the traditional method of teaching in a test of holistic thinking" to verify the hypothesis, the researcher used t-test for two independent variables, table 2 shows that. Mean, variance, and t-value (calculated and tabulated), the degree of freedom and the statistical significance of the difference between the students' mean scores of experimental group and the control group. Through the presentation of results associated with the hypothesis in table 2, the mean score for the experimental group (24.670) and standard deviation (5.35502), and the mean score for the control group (19.1333) and standard deviation (3.82337), calculated t-value (5.631) at (0.05)level of significance, and the degree of freedom (90), which is the larger than the tabulated value (1.980), This indicates the

superiority of the experimental group's students to the control group students in the holistic thinking test. Thus, the null hypothesis is rejected, i.e. there is a statistically significant difference for the benefit of the experimental group. In the light of the results presented, the researcher considers that the reason for the superiority of students who studied general teaching methods may be due to the following reasons: The dimensions of structural theory contributed positively to the improvement of the level of students in holistic thinking. Teaching in the dimensions of structural theory allows freedom of expression in students and drawing ideas freely and easily. Teaching the dimensions of structural theory helped in the transformation of the teacher to a positive teacher and effective material and teaching methods of public interest for students.

Table 1. Number of the students of College of Basic Education- University of Babylon (Morning Studies)

No.	Department	No. of Students
1	Arabic Language	98
2	English Language	130
3	History	86
4	Geography	92
5	Science	116
6	Private Education	72
7	Mathematics and Computing	0
8	Total	594

Table 2. t-test for two independent variables

Group	Sample	Mean	Standard Deviation	Degree of freedom	T- value		Level of Significance 0.05
					Computed	Tabulated	
Experimental	47	24.6170	5.35502	90	5.631	1.980	
Control	45	19.1333	3.82337				

CONCLUSION

The dimensions of structural theory help to increase the skills of holistic thinking of students in the general teaching methods. The level of students who study general teaching methods has increased for students who study the same subject in the traditional way, thanks to

the teaching of the exclusion of structural theory. The dimensions of structural theory can be applied at all times and on all classes because students interact with them in a positive way to increases their abilities and their comprehension of the material. The dimensions of structural theory is a useful tool in the teaching of general

teaching methods, helps in the process of education and the consistency of information.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Ultrasound Finding in a Cohort of Iraqi Patients with Hematospermia: a Cross Sectional Study

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ABSTRACT

The goal of this article is to demonstrate the lesions which were detected by TRUS in sufferers with hematospermia. This cross sectional study included 60 Iraqi patients suffering from urogenital manifestation and all has been diagnosed to have macro- or microscopic hematospermia. The age range of those patients was 39 to 67 years. The study started at June 2017 and ended at May 2018. Those patients were attending the urology unit at Al-Hilla Teaching hospital, Babylon province, Al-Hilla City, Iraq. They were all examined by trans-rectal ultrasound (TRUS). The ultrasound examination revealed the following causes with their corresponding rates: Benign prostatic hyperplasia (BPH), inflammatory conditions whether prostatic, seminal vesicle or both, calculi in the ejaculatory ducts or the inside the prostate and cystic lesions whether lateral, midline or para-median, 43.3%, 36.7%, 13.3% and 6.7%, respectively.

Keywords: Hematospermia, transrectal ultrasound, Iraq.

INTRODUCTION

Hematospermia, additionally called hemospermia, is a probably alarming incidence. The definition of hematospermia is presence of blood inside the seminal fluid. The blood is every now and then visible to the naked eye, however the time period hematospermia also covers microscopic amounts of blood in the ejaculate, as now and again detected by the way in a spermogram. The effect of blood on the coloration of the ejaculate may depend on how a great deal time has elapsed because the bleeding event. sparkling blood might be light crimson to brownish in shade, while darker, even darkish brown or black clots commonly suggest that a while has surpassed on account that hemorrhage occurred. In most cases hematospermia is painless. Hematospermia may also arise only once, however will also be sporadic or continual. It frequently is going left out and is typically self-limiting, so the exact incidence is unknown. Quantification is likewise tough due to

the fact most men do now not frequently examine their ejaculate¹⁻³. Hematospermia is notion to make up about 1% of all urological symptoms (three). Its prevalence is expected at approx. 1: 5000 urological patients⁴. In a series of 26 126 men with a mean age of 61 years who underwent routine prostate most cancers screening, 0.5% reported hematospermia⁵. Those affected are normally more youthful men beneath the age of forty, as proven in six massive collection each including over 500 sufferers⁶. In a specific group of patients at a big andrological branch in 2015, erythrocytes have been detected through microscopy inside the ejaculate of 13.8% of the men who had their semen tested—usually due to infertility “(non-public verbal exchange, Prof. Dr. Frank Sommer, President of the German Society for men’s health; Deutsche Gesellschaft für Mann und Gesundheit e. V.)”. Erythrocytes also are regularly discovered whilst semen is harvested through rectal electrical stimulation of the accent glands, but are then usually simply a contaminant with no pathological value. The analysis of hematospermia is typically worrying for the men or couples affected, because they’re worried about sexually transmitted sickness (STD) or malignancy. Historically, hematospermia turned into regarded as a result of “both prolonged sexual

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abstinence and excessive sexual pastime. Even in current many years, the precise etiology turned into unknown in over 70% of instances^{1,6,7}. Because of advances in diagnostics, but, the etiology of hematospermia has in recent years been recognized in maximum cases. Routine or persistent hematospermia, specifically, might also end result from a selection of etiological elements: tumor, infection, trauma, congenital anomalies, iatrogenic reasons, inclusive of prostate biopsy and other urological interventions, systemic illness and deviant sexual habits². Non-invasive imaging is vital in the diagnostic algorithm-up of guys with hematospermia. Distinctive imaging modalities have been used within the analysis. CT imaging isn't beneficial due to bad visualization of the distal duct architecture⁸. MR imaging supplemented by an endorectal coil is able to recognize the distal duct structure, but it's far expensive⁹⁻¹¹. "Transrectal ultrasound (TRUS)" is more correct in the visualization of the distal duct structure and the numerous abnormalities which can offer diagnosis and etiological elements of hematospermia¹²⁻¹⁶. The goal of this article is to demonstrate the lesions which were detected by TRUS in sufferers with hematospermia.

MATERIALS AND METHOD

This cross sectional study included 60 Iraqi patients suffering from urogenital manifestation and all has been diagnosed to have macro- or microscopic hematospermia. The age range of those patients was 39 to 67 years. The study started at June 2017 and ended at May 2018. Those patients were attending the urology unit at Al-Hilla Teaching hospital, Babylon province, Al-Hilla City, Iraq. They were all examined as following: TRUS examination was achieved (AU5, Esaote Biomedica, Italy) the use of an excessive frequency (7.5 MHz) bi-aircraft endorectal probe. All examinations had been done by means of a radiologist with 15 years' experience in TRUS examinations. Sufferers were told to self-administer a cleaning enema the night time earlier than the examination. Examination was carried out with the bladder 1/2-complete and the patient in left lateral decubitus position and the hips completely flexed. The prostate, ejaculatory ducts and seminal vesicles have been examined in axial and sagittal planes. Statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) version 23. Numeric data were expressed as mean, range and standard deviation (SD), whereas, categorical data were expressed as number and percentage out of total. Chi-Square test was used

to assess association between any two categorical variables whereas, independent samples t-test was used to compare mean of numeric variables between any two groups. The level of significance was considered at *P* less than or equal to 0.05.

RESULTS AND DISCUSSION

General characteristics of the study sample are shown in table 1. Sixty cases were enrolled in this study with an age range of 39-67 years and a mean age of 56.34 ± 7.78 years, 45 patients resided in urban areas while 15 patients were from rural residency, 75% versus 25%, respectively. According to occupation, 30 (50%), 15 (25%) and 15 (25%) were retired, employed and unemployed, respectively. All enrolled patients were married. The ultrasound examination revealed the following causes with their corresponding rates: Benign prostatic hyperplasia (BPH), inflammatory conditions whether prostatic, seminal vesicle or both, calculi in the ejaculatory ducts or the inside the prostate and cystic lesions whether lateral, midline or para-median, 43.3%, 36.7%, 13.3% and 6.7%, respectively, as shown in table 2. The detection of BPH by ultrasound mainly resides on estimation of its volume using standard formulas¹⁷. The detection of calculi was in the form of bright echogenic foci with posterior acoustic shadows, Inflammatory lesions appeared as multiple hyperechoic areas associated with hypoechoic areas scattered within the prostatic parenchyma and around the ejaculatory ducts, with enlargement of both seminal vesicles and hypo and hyperechoic areas and dilated thick walled ejaculatory ducts, whereas, cystic lesion were detected as thin or thick walled elliptical cysts or multiple small sized cysts. No significant association was found between any of the characteristic of patients and cause of hematospermia, as shown in table 3. Transrectal ultrasonography (TRUS) can help within the detection of seminal vesicle and prostatic pathology. The TRUS exam lets in extraordinary visualisation of the seminal vesicles, prostate and adjacent systems. Diverse research has proven its benefit in this regard – namely the findings of cysts, calculi, prostatic varices, mullerian duct remnants and inflammatory conditions^{18,19}. TRUS-guided cyst aspiration has also been defined. If ultrasonography is entirely ordinary and the signs are chronic, it can be advisable to continue with other imaging modalities like magnetic resonance imaging (MRI) – both traditional and endorectal coil – and computerised tomography (CT) to enhance visualisation of the anatomy of the

pelvic organs²⁰. Any suspicious testicular swelling is investigated with an urgent ultrasound examination²¹. In our study, the commonest reason for hematospermia was BPH. Hematospermia can happen for some reasons, for example, irresistible or provocative scatters, prostate tumor or cystic injuries, or it might be idiopathic. A few investigations of hematospermia did utilizing TRUS have uncovered that the commonest reason for hematospermia is prostate calculi. Different causes incorporate chronic prostatitis, cystic lesions, prostatic hypertrophy and neoplastic malignancies¹²⁻¹⁶. In spite of the fact that imaging may uncover the fundamental reason for haematospermia there is regularly little that can be offered as ordinary treatment. The essential point of the administration is to avoid genuine conditions like prostate and bladder malignancy and treat some other hidden reason. In the event that no serious pathology is discovered, at that point it is essential to relieve the uneasiness and console the patient²¹. Indeed, one of the main reasons that justified the conductance of the current study is the rarity of Iraqi literatures dealing with subject of trans-rectal ultrasound characterization of causes of hematospermia.

Table 1. General characteristics of the study sample

Characteristic	Value
Number of cases	60
Mean age \pm SD (years)	56.34 \pm 7.78
Age range (Minimum-maximum) (years)	39-67
Residency	
Urban; n (%)	45 (75%)
Rural; n (%)	15 (25%)
Occupation	
Retired; n (%)	30 (50%)
Employed; n (%)	15 (25%)
Unemployed; n (%)	15 (25%)
Marital status	
Married; n (%)	60 (100%)
Unmarried; n (%)	0 (0.0%)

Table 2. Causes of hematospermia.

Cause	n	%
BPH	26	43.3
Inflammation (prostatitis and seminal vesiculitis)	22	36.7
Stones in the ejaculatory ducts or seminal vesicle	8	13.3
Cystic lesions	4	6.7

Table 3. Association between cause of hematospermia and general characteristics of patients

Characteristic		BPH	Inflammation	Stones	Cystic	P
Age	Mean \pm SD	55.43 \pm 2.31	49.21 \pm 4.52	51.12 \pm 3.21	48.34 \pm 4.21	>0.05 * (NS)
Residency						
Urban	n	19	17	6	3	>0.05 † (NS)
Rural	n	7	5	2	1	
Occupation						
Retired	n	14	11	8	3	>0.05 † (NS)

Cont... Table 3. Association between cause of hematospermia and general characteristics of patients

Employed	n	6	6	1	1	
Unemployed	n	6	5	1	0	
Marital status						
Married	n	26	22	8	4	>0.05 † (NS)
Unmarried	n	0	0	0	0	

CONCLUSION

TRUS is a non-invasive, safe, inexpensive and radiation-free imaging tool that can be utilized to characterize lesions of the ejaculatory ducts, seminal vesicles and the prostate in patients suffering from hematospermia.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Surgery/ College of Medicine/ Babylon University, Hilla Teaching Hospital at Radiology Department and all experiments were carried out in accordance with approved guidelines.

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Antipsychotics-related Knowledge of Nurses working at Baghdad Psychiatric Teaching Hospitals

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ABSTRACT

Objectives: To assess the nurses' knowledge regarding antipsychotics at Baghdad psychiatric hospitals. The study was carried out in Ibn-Rushed Psychiatric teaching hospital and al-Rashad Psychiatric teaching hospital. Starting from 18th of February 2018 to 1st of December 2018. The data were collected by the using self-reported questionnaire which consists of general information such as age, gender, level of education, experience in hospitals, and training course and a scale that assess nurses' knowledge about antipsychotic medication and consists of 30 items related to knowledge about mechanism of action, indications, names of typical and atypical antipsychotics, and contraindications. The content validity of the instrument was determined through the penal of (18) experts. The study found that male (58.0%) are more than female (42.0), highest percentage of the participants is within 30-39 years old. 36.0% of participants have one to five years of experience in general wards but 42.0% of them have one to five years of experience in psychiatric wards and the majority of them (80.0%) have not participated in training course regarding antipsychotics medications and about half of them are with diploma, Levels of antipsychotic-related knowledge were approximately all of sample were around low.

Keywords: antipsychotics, Knowledge, nurses, Baghdad, hospitals

INTRODUCTION

Treatment of patients with mental disorders by medication is a crucial issue that has significant impact upon the results for patients with mental disorders, several categories of medication used to treat patients with mental disorders, these medications group are called psychotropic and include: antipsychotics, antidepressants, mood stabilizers, anxiolytics, and stimulants, nurse staff should know the mechanism of the actions of these medication, their adverse reaction, their contraindications, and interactions with other medications or foods, Therefore the nursing managements require assisting patients to adhere with medication regimens¹. Historically older or first generation of antipsychotic medications was developed to treat schizophrenic patient were usually associated

with undesirable and uncomfortable adverse effects, like involuntary movements of the body for example tardive dyskinesia, it is higher risk to experience by patients when take these medications, while new generation of atypical antipsychotic medications produce risk or side effects less than older anti-psychotics². Anti-psychotics are a group of medication used to reduce the severity or helping in relieving psychotic symptoms in particular delusion and hallucination. In addition, the indication of administering psychotropic medication mainly used for patients with schizophrenia or mood disorders and other different psychosis disorders, it is classified into main two groups: typical and atypical or first and second generation of anti-psychotic medications, the long-term use of typical antipsychotics cause severe side effects such as rigidity of muscle or spasm, tremor, and tardive dyskinesia, Whereas, side effects among second generation are less than typical antipsychotic³. Nurse roles through management of patients by medication include administering medication and document any side effects as well as management of adverse effects of medications can involve all organism and all systems in the human

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body, patients on atypical antipsychotics are exposure to risk for incidence of metabolic disorders for instance increased blood pressure, increased level of lipids in the blood, weights gain, increased glucose level, and extra pyramidal side effects ⁴ Now antipsychotic medications are the cornerstone for treatment patients with psychotic disorders ⁵. It have been effective in clinical outcomes it reduced risk of relapses rates ⁶. Typical antipsychotics medications first group discovered that used for treating schizophrenia like chlorpromazine that block dopamine receptor there for relieving symptoms of psychosis but they are causing increase of cholinergic effect ⁷. Second generation of antipsychotics medications called “atypical antipsychotics” or newer antipsychotics such as olanzapine, risperidone, and others have been increasingly used in practice within the last 15 years ^{8,9}.

METHODOLOGY

The present study was carried out through the application of quantitative study design which uses the assessment approach, and it was conducted on nurses who are working at – Ibn rushd psychiatric hospitals in Baghdad city from Starting from 18th of February 2018 to 2ed of December 2018. Random sample of (50) nurses working during day shifts comprised of (25) nurses working in Al-Rashad psychiatric hospital and (25) nurses working Ibn-Rushd psychiatric hospital. Selection of nurses who was working at both psychiatric hospitals according to certain criteria such as.

- Nurses have at least one year or more of experience in work at psychiatric hospitals.

- Both gender.

Instrument’s of the study was developed to achieve objectives .It was comprised of two part.

Part I: Demographic characteristics of the study sample.

Part II: Nurses’ knowledge regarding antipsychotics medications.

Test for nurses was conducted at morning shift. It was consisted of 30 items related to nurses’ knowledge about antipsychotic medication about mechanism of action, indications, names of typical and atypical antipsychotics, and contraindications. A pilot study was carried out for nurses to determine the questionnaire reliability by the use of test-retest. 18 Experts in field of nursing and

psychiatric medicine participated to determine validity of the questionnaire. Data analysis was achieved by the use of statistical package social sciences (SPSS) under version (24); descriptive and inferential analysis approaches such as frequency, percent, and correlations.

RESULTS AND DISCUSSION

Descriptive Data Analysis

This consists of description of demographic characteristics of the sample (Table 1). The results of table one show that the male-nurse participants (58.0%) are more than female-nurse participants (42.0%); the study reveals also that the highest percentage of the participants is within the thirties of age (32.0 %); 36.0% of the nurses participated have one to five years of experience in General Wards but 42.0% of them have one to five years of experience in psychiatric wards; 80.0% of them have not participated in any training course regarding antipsychotics medications and finally, about half of the nurses joined in the study are with Diploma level. Distribution of the sample regarding to the levels of antipsychotics-related knowledge (Tables 2 and 3). Table (2) shows that the majority of nurses participated is with low level of antipsychotics-related knowledge (76.0%); 24.0% of the sample is with Fair level of antipsychotics-related knowledge and no one from them is with Good level of antipsychotics-related knowledge. Table three shows that all nurses participated in the present study distributed within only low and fair levels of antipsychotics-related Knowledge because the study reveals that no one from all the participants have good level of this domain in the baseline phase. Therefore, 44.0% of the male nurses and 32.0% of female nurses have low level of antipsychotics-related Knowledge.34.0% of the low level of antipsychotics-related Knowledge is within the third decade of age; 32.0% of the low level is with college level of education; 28.0% and 32.0% of the low level has one to five years’ experience in general wards and psychiatric wards respectively; and 62.0% of the sample, who has not joined in any training course, has low level of antipsychotics-related Knowledge.

Inferential Data Analysis

This consists of association between the levels of Antipsychotic-related Knowledge Domains and demographic characteristics of the nurses (Table 4). Table four shows significant differences between gender and antipsychotics, age and side effects, and work in

psychiatric ward and total domains, but there are no significant differences between other demographic characteristics and knowledge of all domains.

Demographical characterized of the study sample.

According to the results of this study table (1) show that the male-nurse (58.0%) are more than female-nurse; this result was similar to many Iraqi studies, they found male-nurse staff working in psychiatric wards are more than female nurse staff at Baghdad psychiatric hospitals^{10, 11}. With regarding to age of the study sample, results reveals that the highest percentage of the nurse staff within thirties of age (30-39 years old); this result was similar of finding of Al-Ameri¹². This result may explained these ages of nurse staff have more ability to tolerance work situations at psychiatric wards. Concerning experience in hospital 136.0% of the nurses participated have one to five years of experience in general wards but 42.0% of them have one to five years of experience in psychiatric wards; this result supported Iraqi study found the majority of nurse – staff working in psychiatric hospitals at Baghdad City have five years of experiences or less¹¹. Regarding to training about antipsychotic medications the result shows that majority of nurse (80.0%) have not participated in any training course, this results supported by Araki, he found most of nurse-staff not attended in training or workshop regarding antipsychotics medications¹³. Concerning to level of education, the study shows nearly half of the nurse-staff are with diploma level. this result similar to study conducted at Baghdad psychiatric hospitals in 2017 found nurse-staff working in psychiatric wards are with diploma¹⁰.

Knowledge of nurses about Antipsychotic Medications

Results of tables (2 and 4) distribution of the study sample regarding to the their levels of antipsychotics-related knowledge and distribution in levels regarding demographic characteristics of the nurses shows most of nurse staff is with low level of antipsychotics-related knowledge, this results agreement with other studies they reported that the nurses staff have insufficient of knowledge about pharmacology^{14, 15}. However, literature highlights on nurse-staff lack of knowledge about medication¹⁶ such as prescribing¹⁷ and administration¹⁸. Hemingway and others (2011) done study to evaluate the experiences of nurse staff competence for medications they documented that nurses’ knowledge about antipsychotics medications adverse effects was lack¹⁹. According to results of table 3 which reveal that the levels of antipsychotic-related knowledge, side effect-related knowledge, role of nurse-related knowledge, management-related knowledge and total knowledge is not affected by what the gender the nurse is, how old the nurse is, which level of education the nurse has, which ward the nurse is in and has the nurse joined in a training session. For all domains of knowledge the non-significant association could be clarified that these knowledge domains could be not affected by whether the nurse is male or female; whether is younger or older; whether has higher level of education or lower; whether has longer career in general wards or shorter and finally, whether participated in a training course or not. Hajebi and his team (2011) found no relationship between knowledge and variables like age, gender, professional experience, and education²⁰.

Table 1. Demographic characteristics of the nurses.

Gender			Training		
Gender	f	%		f	%
Male	29	58.0	Yes	10	20.0
Female	21	42.0	No	40	80.0
Total	50	100.0%	Total	50	100.0%
Age			Level of Education		
year	f	%	Level	f	%
20-29	7	14.0	Secondary	23	46.0

Cont... Table 1. Demographic characteristics of the nurses.

30-39	16	32.0	Institute	11	22.0
40-49	11	22.0	College	16	32.0
50-59	13	26.0	Total	50	100.0%
≥60	3	6.0			
Total	50	100.0			
Career in General Wards			Career in Psychiatric Wards		
Year	f	%	Year	f	%
1-5 years	18	36.0	1-5 years	21	42.0
6-10 years	11	22.0	6-10 years	17	34.0
11-15 years	9	18.0	11-15 years	9	18.0
≥16	12	24.0	≥16	3	6.0
Total	50	100.0%	Total	50	100.0%

Table 2. Distribution of the sample regarding to the levels of antipsychotics-related knowledge

Antipsychotics	No.	levels of <i>antipsychotics-related</i> knowledge							
		Low		Fair		Good		Total	
		f	%	f	%	f	%	f	%
		38	76.0%	12	24.0%	0	0.0%	50	100.0%

Table 3. Distribution in Levels of antipsychotics-related knowledge regarding demographic characteristics of the nurses

		Levels of <i>antipsychotics-related</i> knowledge							
Demographics		Low		Fair		Good		Total	
f	%	f	%	f	%	f	%		
Gender Male Female Total	Male	22	44.0%	8	16.0%	0	0.0%	30	60.0%
	Female	16	32.0%	4	8.0%	0	0.0%	20	40.0%
	Total	38	76.0%	12	24.0%	0	0.0%	50	100.0%
Age (Years) 30 – 39 40 – 49 ≥50 Total	20 -29	9	18.0%	3	6.0%	0	0.0%	12	24.0%
	30 – 39	17	34.0%	5	10.0%	0	0.0%	22	44.0%
	40 – 49	11	22.0%	2	4.0%	0	0.0%	13	26.0%
	≥50	1	2.0%	2	4.0%	0	0.0%	3	6.0%
	Total	38	76.0%	12	24.0%	0	0.0%	50	100.0%
Level of Education Institution College Total	Secondary	13	26.0%	6	12.0%	0	0.0%	19	38.0%
	Institution	9	18.0%	4	8.0%	0	0.0%	13	26.0%
	College	16	32.0%	2	4.0%	0	0.0%	18	36.0%
	Total	38	76.0%	12	24.0%	0	0.0%	50	100.0%

Cont... Table 3. Distribution in Levels of antipsychotics-related knowledge regarding demographic characteristics of the nurses

Employment (Years)	General Wards	1 – 5	14	28.0%	4	8.0%	0	0.0%	18	36.0%
		6 – 10	8	16.0%	3	6.0%	0	0.0%	11	22.0%
		11 – 15	10	20.0%	0	0.0%	0	0.0%	10	20.0%
		≥16	6	12.0%	5	10.0%	0	0.0%	11	22.0%
		Total	38	76.0%	12	24.0%	0	0.0%	50	100.0%
	Psychiatric Wards	1 – 5	16	32.0%	5	10.0%	0	0.0%	21	42.0%
		6 – 10	14	28.0%	4	8.0%	0	0.0%	18	36.0%
		11 – 15	6	12.0%	2	4.0%	0	0.0%	8	16.0%
		≥16	2	4.0%	1	2.0%	0	0.0%	3	6.0%
		Total	38	76.0%	12	24.0%	0	0.0%	50	100.0%
Training No Total	Yes	7	14.0%	3	6.0%	0	0.0%	10	20.0%	
	No	31	62.0%	9	18.0%	0	0.0%	40	80.0%	
	Total	38	76.0%	12	24.0%	0	0.0%	50	100.0%	

Table 4. Association between demographic characteristics Knowledge Domains

Knowledge Domains										
Domains	Antipsychotics		Side effects		Role of Nurse		Management		Total Knowledge	
Demographics	<i>r</i>	<i>sig</i>	<i>r</i>	<i>sig</i>	<i>r</i>	<i>sig</i>	<i>r</i>	<i>sig</i>	<i>r</i>	<i>sig</i>
Gender	-.076	.031	-.102	.481	-.167	.791	.127	.378	.000	.000 1
Age	.073	.615	-.318*	.024	-.154	.286	-.103	.477	-.134	.355
Level of Education	-.205	.154	.070	.630	.005	.974	.066	.647	.008	.957
Career/General	.106	.464	-.249	.038	.791	-.111	.441	-.194	-.194	.176
Career/psychiatric	.036	.806	-.257	.071	.032	.826	-.002	.989	-.320	.023
Training	-.070	.628	.125	.387	-.153	.288	-.022	.878	.000	1.000

CONCLUSION

Levels of antipsychotic-related knowledge were approximately for all of sample were around low level.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Psychiatric and Mental health Nursing, Ministry of Health, Iraq and all experiments were carried out in accordance with approved guidelines.

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Attitudes of Biological Waste Management among a Sample of Academic Personnel Working in Baghdad

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ABSTRACT

Biosafety and biosecurity of academic and teaching facilities is maintained when the appropriate guidelines for the safe management of biological waste is implemented. Biological waste is a potential source of infections and occupational hazards. Previous studies assessing the awareness of some academic and technical laboratory staff working in Iraq has identified gaps in the awareness of the recommended procedures associated with biological and clinical waste disposal. This study was aimed to determine the awareness and attitude of laboratory staff towards biological waste practices and management policy. A closed end questionnaire was distributed among a number of laboratory staff working in universities in Baghdad and the results were analyzed. Although waste disposal procedures were followed at some degree, but a wider implementation of appropriate waste disposal procedures is necessary. No satisfactory segregation or classification of biological waste was noticed. The results of this study identified the need for each laboratory to have its own code of practice and policy for the management of biological and clinical waste generated in the laboratory. The various biological waste such as clinical samples, tips, tubes, etc, should be classified and an appropriate waste disposal procedure should be outlined for each category.

Keywords: biosafety, waste management, clinical waste, segregation.

INTRODUCTION

Biosafety is defined as the effective preventive measures employed by medical, teaching and research laboratories to avoid contamination with pathogenic microorganisms, and protect individuals and the environment from hazard contamination originating from handling clinical samples, contaminated products and carrying out microbiological tests¹. The last two decades has witnessed raised awareness of the importance of biosafety management due to the increase of emerging pathogens and bioterrorism threats. Efficient biosafety management involves setting biosafety policies which consider basic concept of laboratory management, waste management, air control, suitable physical facilities and appropriate legislations². In 2012, the Iraqi National

Monitoring Authority (INMA) was established with four major functions in its agenda. One of the first proposals of this organization was to establish a national biorisk management system and hence the National Biorisk Management Committee (NBMC) was established in the same year. Among the goals of the NBMC was building laboratory capacity by training laboratory staff on biosafety and biosecurity measures by international organization. Improvement of laboratory biosafety in Iraq require “investment in infrastructure, information technology, and human capital³. This study aims to summaries the attitudes of biological waste management among workers in university teaching and research laboratories.

MATERIALS AND METHOD

A survey was conducted to evaluate the biosafety culture, biosafety compliance, incident reporting and biosafety training programmes among a number of laboratory staff working in colleges and institutions in Baghdad. The survey was designed to address the implementation of the basic concepts in biological

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safety outlined by the WHO and published papers⁴. A questionnaire with closed-ended questions was designed to get quicker response from participants and also to make the questions easier to answer. The survey contained two parts, the first part contained general questions such as gender, educational level, working experience, job category and specialization. While the second part contained 28 close ended questions designed to assess the attitude, knowledge and practices of biological waste management such as biological waste classification and segregation, color coding, methods for biological waste disposal and the presence of a plan for biological waste management in the individual laboratories⁵. The survey was carried out from the 1st of June 2018 to the 30th of June 2018. One hundred questionnaires were distributed among the target group whom worked in either BSL1 or BSL2 teaching and research university laboratories. Confidentiality of all participants was maintained. MS Excel and Graph Pad prism 6 were used to analyze and present data.

RESULTS AND DISCUSSION

One hundred questionnaires were distributed among academic personnel who were either laboratory technicians, teaching staff and researchers working in university laboratories that deal with and generate biological waste. Analysis of the data according to educational level revealed that 1 % had a technical diploma, while 20%, 35% and 44% had BSc, MSc and PhD degrees respectively. Based on previous studies, the overall scores for knowledge, attitude and practice were transformed into percentage score^{5,6}. The response of participants to the questions were considered either “satisfactory/correct” or “unsatisfactory/incorrect” scores. Hence, correct answers were scored as 1, while no answer/incorrect answers were scored as 0. These values were added to generate a single value out of the possible scores. Then the percentage of “satisfactory/correct” answers were calculated. When a participant had a score of 60% or more, the response was considered “satisfactory”. On the other hand, the response was considered “unsatisfactory” when the participant had less than 60% score. Based on the aforementioned scoring criteria, only 33% of the participants in this study gave a satisfactory response, while 67% of participants gave an unsatisfactory response. Participants who gave a satisfactory response, 9.09%, 45.45% and 45.45% respectively had BSc, MSc and PhD degree as illustrated in figure 1. Analysis of the response of the

participants in this study also revealed that only 20% of participants had previously attended a training lecture/course about biological waste management as shown in figure 2. Worldwide awareness regarding effective control and safe handling of biological and clinical waste has increased due to its impact on human health and environment. Sharps waste including hypodermic needles, glass slides, coverslips and tips are considered as hazardous waste. Clinical sharps waste such as hypodermic needles not only causes cuts and punctures but also may infect wounds with the microbes in the contaminated waste. Hence, this type of waste is considered as a waste with increased risk to healthcare workers⁸. Several developing countries suffers from defects in their clinical waste management systems. One of the major problems in these countries is the handling and disposal of clinical waste with non-clinical waste which exposes health care workers and the public to fatal health risks. Such unsafe practice may result in exposure to diseases such as hepatitis, skin infections, tuberculosis, food poisoning, cholera and plague⁹. Studies carried out to investigate the presence of infectious agents in various clinical solid wastes, clinical sharp waste and general waste from hospitals revealed the presence of various pathogenic bacteria. Furthermore, the general waste generated from hospitals contained *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Thus, it is recommended that clinical solid waste, clinical sharp waste and general waste should be sterilized at the point of generation to limit nosocomial infections and possible environmental pollution⁹. During the last couple of years, Iraqi academic institutions have started to focus on the importance of biological and chemical safety in general¹⁰. Some Iraqi scientists have received training to enhance biosafety, and biosecurity standards and procedures from international organizations. Continuous assessment of biosafety practices in hospitals and academic institutions is necessary to evaluate the level of awareness and attitude among technicians, senior scientists and students regarding biological hazards, biological waste disposal and also appropriate management techniques. Recent published data in Iraq have concluded that university laboratories “don’t fit the standard requirements and stressed the need for future plans to develop the aspect of safety and security in all laboratories¹¹. Similarly, the results of the present study show the need to increase awareness towards biological waste management in university laboratories. The reason for the high percentage of unsatisfactory

responses registered in this study is probably due to the lack of appropriate training as only 20% of participants have previously received training for biological waste management. This observation highlights the need for extensive training programmes on the awareness of “biological waste management”. Identifying the gaps in the current biosafety practices and recommending the solutions is the first step to solve any problems that the current systems may have. Iraq was not the only country in the region which suffer from defects in its biological waste management system. An earlier study carried out in Jordan showed that there are no defined methods for the handling and disposal of biological waste. In addition, the mentioned study identified the absence of specific regulations or guidelines for segregation or classification of biological and clinical waste ¹². In conclusion, the high percentage of unsatisfactory responses observed in this study stresses the need for extensive training on biological waste management at regular time intervals. Furthermore, it is vital that each laboratory should have a written code of practice for biological waste management available to the users of the laboratory.

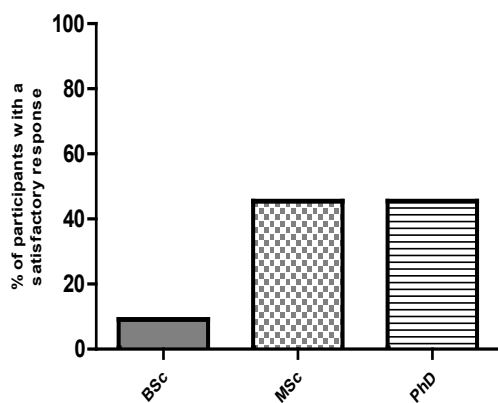


Figure 1. Distribution of participants with a satisfactory response according to their educational level.

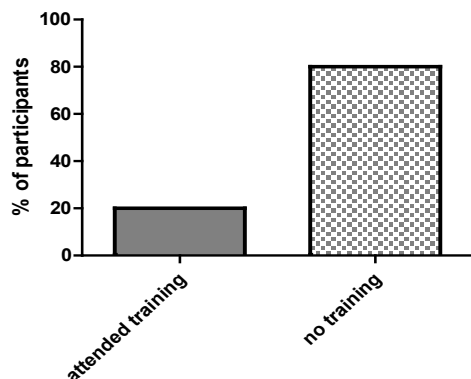


Figure 2. Training status of participants for biological waste management

CONCLUSION

This study was aimed to determine the awareness and attitude of laboratory staff towards biological waste practices and management policy. A closed end questionnaire was distributed among a number of laboratory staff working in universities in Baghdad and the results were analyzed. Although waste disposal procedures were followed at some degree, but a wider implementation of appropriate waste disposal procedures is necessary. No satisfactory segregation or classification of biological waste was noticed. The results of this study identified the need for each laboratory to have its own code of practice and policy for the management of biological and clinical waste generated in the laboratory. The various biological waste such as clinical samples, tips, tubes, etc, should be classified and an appropriate waste disposal procedure should be outlined for each category.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Health and Medical technology, Middle Technical University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Biological Activity of New Hydantoin Derivatives on *Acinetobacter Baumannii* Biofilm Formation Isolated from Clinical Sources

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ABSTRACT

Wholly 538 clinical samples of blood, burns, sputum, wounds and urine were involved in the current study which was done in 4 hospitals. The isolation and diagnosis of fifty-two *Acinetobacter baumannii* isolate 36.54% from blood specimens, whereas wounds specimens constituted 23.08%, burns specimens achieved 17.31%, sputum specimens formed 13.46% and a low percentage was in urine specimens which accomplished 9.62 %. Totally isolates of bacteria were identified via the biochemical, cultural and microbial characteristics and confirmed via VITEK 2 Compact system. It was found that all (100%) of bacteria isolates were resistant to amoxicillin-clavulanic acid and Cefepime, while Tobramycin was the most effective antibiotic. The isolates displayed the ability of biofilm creation via Microtitration plates method (M.T.P), from the whole number (52) isolates, (33) were producers, such as strong biofilm creators were (15) 45.46 % and (18) 54.54% moderate though (19) 36.53% isolates were stately as weak or none biofilm producers. MIC for new hydantoin derivative (C₁₂H₁₃N₃O₂S) was determined against fifteen isolates were active in MIC values equal to 31.25µg/ml gave (7) *A. baumannii* isolates, while in MIC, values equal to 62.5µg/ml gave (5) isolates, and three isolates were active in MIC values equal to 125µg/ml.

Keywords:- *Acinetobacter baumannii*, Hydantoin derivatives, Biofilm, Antibiotics.

INTRODUCTION

Acinetobacter baumannii is a public causative agent of nosocomial infections and it has got a pathogen of augmented clinical importance because of its remarkable capability to cause outbreaks of infections and to gain resistance to nearly all presently used antibiotics, including the carbapenems¹. *A. baumannii* is portrayed via its ability to spread, its capacity to survive on most ecological surface² and its astonishing ease with which it obtains antimicrobial multiple resistances. The previous fifteen years, numerous *A. baumannii* nosocomial strains confined worldwide are exceptionally resistant to every

single accessible family of current antibiotics^{3,4}. Biofilms are arrays of microorganisms, encased in a framework, that function as a helpful consortium. Biofilm way of life is a element open to most microorganisms in natural and therapeutic systems which build up a protected manner of growth that permits survival in hostile environments⁵. Hydantoin derivatives possess important biochemical and pharmacological characteristics have and emerge as a promising new class of antimicrobial agent and conjugated on polystyrene beads are encouraging disinfectants with broad antimicrobial action affected via the gradual discharge of oxidizing halogen in water⁶. Numerous hydantoin derivatives are wielded as antiepileptic drugs. Others were establishing to show antiproliferative action and aldoreductase inhibition⁷.⁸ Hydantoins counteract high-frequency stimulation of the focal point of epileptogenic and furthermore simplify emission of sodium ions, which lessens agitation of neurons and prevents their stimulation upon contact

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with pulses from the center of epileptogenic⁹. While, the formation of biofilm capability in spite of its vital function in the enhancement of resistance of antibiotic and pathogenesis of *A. baumannii* has been poorly examined^{10,11}.

MATERIALS AND METHOD

Samples collection

A whole of 538 clinical samples of blood, wounds, burns, sputum and urine were included in present study which was carried out in 4 hospitals. Through the period ranging from 1 February 2017 until June 2017. Bacterial diagnosis initially diagnostic depending on Gram reaction and morphological characteristics of the colonies based on bacterial growth on MacConkey agar and Blood agar, as well as the number of biochemical test and Api 20 E strip reading. The second technique VITEK 2 compact system. *A. baumannii* was distinguished by the following methods; hemolysin test and IMVC test¹.

Susceptibility of Antibiotic

Experiment disk agar dissemination according to Kirby Baur standardized susceptibility of antimicrobial, single disk way was carried out toward twelve antibiotics. The antibiotic discs were as follows: Ciprofloxacin (CIP, 5µg/disc), Piperacillin (PIP, 100µg/disc) Tobramycin (TB, 10µg/disc), ceftriaxone (CTR, 30µg/disc), Ceftazidime (CAZ, 30µg/disc), Cefepime (CFP, 30µg/disc), Aztreonam (ATM, 30µg/disc), Amoxicillin-Clavulanic acid (AUC, 20/10µg/disc), Amikacin (AK, 30µg/disc), Gentamicin (CN, 10µg/disc), Meropenem (MEM, 10µg/disc) and Imipenem (IMP, 10µg/disc), Bioanalyse (Turkey)¹³.

Biofilm Formation

The bacterial activity for biofilm formation was measured by quantitation of biofilm by microtiter plate (M.T.P): The current study screened the all medical isolates of *A. baumannii* for their capability to biofilm formation via microtitration plates approach as stated by way of¹⁴, with some modification.

The ability of biofilm formation = O.D of test sample - O.D of quality control

Preparation of Experimental of 3-((1-(4-methoxyphenyl) ethylidene) amino)-2-

thioxoimidazolidin-4-one Derivatives of new hydantoin were prepared as said by the literature procedure^{15,16}. In this study, new hydantoin derivative was used compound 3-((1-(4-hydroxyphenyl) ethylidene) amino)-2-thioxoimidazolidin-4-one (C₁₂H₁₃N₃O₂S), and its melting point was detected (205-210°C) and prepared as follows: carbonyl compounds (0.01mole) was dissolved in ethanol (30 ml) and (0.01mole) of thiosemicarbazide was added and then refluxed for three hrs. The resultant mixture was transferred into crushed ice and stirred for 15 min. Then the precipitated crystalline solids were filtered, laundered with water and were recrystallized from ethanol. Moreover, (0.01mole) of compounds 2-(1-(4-hydroxyphenyl) ethylidene) hydrazine-1-carbothioamide were dissolved and their melting point were detected (185-188°C) C₉H₁₁N₃OS and (0.01 mole) of chloroethylacetate in 30 ml ethanol to obtain a mixture. The mixtures were stirred for a few minutes, and then sodium acetate (0.02mole) was additional to the mixture. The mixture was refluxed for 6hrs. After cooling, the precipitate found which is filtered off and recrystallization from dioxane.

Determination of minimum inhibitory concentrations (MICs) of new hydantoin compounds for *A. baumannii* isolates

The antimicrobial efficiency of new hydantoin derivative 3-((1-(4-methoxyphenyl)ethylidene)amino)-2-thioxoimidazolidin-4-one against *A. baumannii* was tested by the standard broth dilution approach. By using serial two-fold dilutions of new hydantoin derivative in concentrations extending from (15.62 mg/ml to 500 mg/ml) the MIC was determined in BHI broth. In present study, the positive control contained BHI broth medium with experienced bacterial concentrations and negative control contained only BHI broth and incubated at 37°C for 24hr. The (MIC) of the new hydantoin derivative for *A. baumannii* was measured at the lowest concentration of the new hydantoin compound required to inhibit the *A. baumannii* growth.

The antimicrobial activity of the new hydantoin compounds for biofilm formation on *A. baumannii* isolates

The antimicrobial activity of the new hydantoin derivative against *A. baumannii* isolates used to be quantified according to the process described via^{17,18}. Briefly, wells of sterile ninety six well-flat bottom

polystyrene tissue tradition dealt with plates had been stuffed with 200µL of the diluted cultures (180 µL BHI+ 1% glucose and 20 µL bacterial culture) serve as a control. While the second well was filled with 100 µl of the hydantoin compound in concentration of Sub MICs with 100 µl BHI containing bacterial culture and covering with parafilm. The plate was incubated for 24 h at 37°C and then washed twofold with distilled water and leftward to dry at room temperature. Then we added 200µL of the crystal violet to all wells and left for twenty min. Sterile water was used to washed wells and left to dry at room temperature for 15 min. Subsequently for removing the crystal violet, wells were washed 3 times with D.W to eliminate boundless dye. Lastly, totally wells were filled via 200 µL ethanol (95%) to discharge the dye from the cells and optical density of stained biofilm was gained through using micro ELISA auto reader at wavelength 595 nm.

% of inhibition of biofilm formation = 1 - (Sample optical density / control optical density) × 100

RESULTS AND DISCUSSION

Isolation and Identification of Bacterial Isolates 07821307014

A total of 538 clinical specimens of blood, wounds, burns, sputum and urine were included in this study, 52 were positive to *A. baumannii* which was isolated in high percentage; 36.54% (n=19) from blood specimens; whereas, wounds specimens constituted 23.08% (n= 12), burns specimens achieved 17.31% (n= 9), sputum specimens formed 13.46% (n= 7) and low percentage was in urine specimens which accomplished 9.62 % (n= 5). All bacterial samples expected to be an *A. baumannii* grown on MacConkey agar and Blood agar as enrichment media, then it occurs as Gram-negative coccobacilli and occasionally arranged in diplococci under the microscope. Then, a number of biochemical tests were carried out and the results showed in table (1). All the above results were identification by Api 20 E strip reading and Vitek 2 compact system (12).

Antibiotics Susceptibility

The susceptibility tests toward (12) antibiotics were carried out which showed that *A. baumannii* clinical isolates had 100% resistance to Amoxicillin-clavulanic acid and Cefepime. Also this study showed the highest resistance to Ceftriaxone (94.23%), Piperacillin

(94.23%), Ceftazidime (90.38%), Aztreonam (88.46%), Gentamicin (86.53%), Ciprofloxacin (82.69%) and Amikacin (73.07%). Imipenem and Meropenem recorded moderate resistance; (55.76%) both them. It is worthy to remark that from 52 clinical isolates of *A. baumannii*, 21 isolates (40.38%) were resistant to Tobramycin.

Biofilm Formation by *A. baumannii*

The capacity of *A. baumannii* to the production of biofilm by all isolates from (blood, wound, burns swab and sputum as well as urine). MTP technique, from the whole number of (52) isolates verified for biofilm formation, (33) were producers, as strong biofilm producers were (15) 45.46 % and (18) 54.54% moderate while (19) 36.53% isolates were considered as none or weak biofilm producers. Many bacterial pathogens, which include *A. baumannii*, can develop either as dispersed (planktonic) cells or as matrix-enclosed communities referred to as biofilms. The probable to biofilm formation is shared amid scientific *A. baumannii* isolates, maybe because the mode of biofilm increase donates to the environmental achievement of this pathogen in the hospital. These consequences are disagreement with a study^{14,15} located that all *A. baumannii* isolates showed the ability to structure biofilms in MH broth. Another study additionally in total, 249 (91%) isolate had been fine for biofilm formation, and 63 (23%) isolates exhibited extra strong biofilm formation.

FTIR Spectrum of hydantoin derivative (C₁₂H₁₃N₃O₂S)

FTIR spectrum of (C₁₂H₁₃N₃O₂S), figure (1), displays band at (3282 cm⁻¹), because of ν(NH) vibration, bands at (3188 cm⁻¹) was allocated to ν(C-H) vibrations of aromatic ring, whereas the band at (3117 cm⁻¹) accredited to symmetric (CH₂) group. Spectrum moreover displays new distinctive band at (1714 cm⁻¹), which is accredited to ν(C=O) vibration, band at (1620cm⁻¹) accredited to ν(C=N) vibration of Schiff's base, whereas the absorption bands of ν(C=C) aromatic was seemed at (1593, 1570cm⁻¹). The strong band noticed at (1390, 1332cm⁻¹), states to asymmetric and symmetric of nitro group, and lastly the absorption band of ν (C=S) seemed at (1085cm⁻¹).

Determination of Minimum Inhibitory Concentrations (MICs) of new hydantoin derivatives on *A. baumannii*

MIC for new hydantoin derivative (C₁₂H₁₃N₃O₂S) was determined against fifteen isolates of *A. baumannii* were multi-drug resistance and biofilm formation with the method (MTP) was the best and the consequences were interpreted after 16-18 hrs.of incubation at 37°C . The compound (C₁₂H₁₃N₃O₂S) showed highly active in MIC values equal to 31.25µg/ml gave (7) isolates, also the numbers of isolates that gave MIC values equal to 62.5µg/ml were (5), while isolates *A. baumannii* that gave MIC values equal 125µg/ml were three isolates. These compounds are capable to action on bacterial membranes, analogous to normal host-defense peptides table (2). Moreover, these hydantoin composites not only destroy bacterial pathogens rapidly but also inhibit the development of methicillin-resistant *Staphylococcus aureus* (MRSA) bacterial resistance below the tested conditions.

The inhibition effect of new hydantoin derivative in Sub MICs concentration on *Acinetobacter baumannii* biofilm formation

The results showed in table (2) the inhibitory influence of the hydantoin compound on biofilm development for fifteen bacterial isolates used in this study with variable inhibitory effect on bacterial isolates . The highest inhibitor effect (98.85) was appeared on the *A. baumannii* isolate number (14) was isolated from blood followed by 98.00%, 97.01%, 91.90% from sputum, wounds, burns, respectively. While the lowest inhibitor effect (79.72) was appeared on the isolate number (32) was isolated from blood. Although results exhibited that there were some differences in the values of the MICs of compound (C₁₂H₁₃N₃O₂S) in resistant of *A. baumannii* isolates ranged from 31.25µg/ml to

125µg/ml. Moreover, the results showed a significant differences (P<0.05) between the Inhibition of biofilm rate and control. *Acinetobacter baumannii* is a public causative agent of nosocomial infections and it has got a pathogen of augmented clinical importance because of its remarkable capability to cause outbreaks of infections and to gain resistance to nearly all presently used antibiotics ².The results for the antimicrobial activity of hydantoin derivatives are presented that it has potential as antimicrobial agent against bacteria.

Table 1. Biochemical test consequences for *Acinetobacter baumannii*

ID	TEST	RESULT
1	Catalase production	+
2	Citrate utilization	+
3	Growth at 44°C	+
4	Hemolysin production	- (γ hemolysis)
5	Motility	-
6	Urease production	-
7	Indole production	-
8	Oxidase production	-
9	Kliglar iron agar (KIA)	Alkaline slant / No change bottom, No gas , No H ₂ S
10	Lactose fermentation	-

Table 2. Biofilm formation and percentage of inhibition of the hydantoin compound (C₁₂H₁₃N₃O₂S) on *A. baumannii* isolates according to source

No. of Isolates	Resource	MIC	Biofilm formation	Inhibition biofilm	% of inhibition
1	Blood	31.25	0.267	0.0186	93.25
3	Wounds	125	0.268	0.008	97.01
4	Burns	62.5	0.269	0.051	81.04
6	Burns	62.5	0.230	0.009	96.08
7	Wounds	125	0.192	0.006	96.87
13	Sputum	31.25	0.200	0.004	98.00
14	Blood	31.25	0.263	0.003	98.85
17	Sputum	31.25	0.240	0.017	90.08

Cont... Table 2. Biofilm formation and percentage of inhibition of the hydantoin compound (C₁₂H₁₃N₃O₂S) on *A. baumannii* isolates according to source

28	Wounds	125	0.207	0.0126	94.20
31	Sputum	31.25	0.223	0.006	97.30
32	Blood	31.25	0.222	0.045	79.72
36	Burns	62.50	0.247	0.020	91.90
39	Wounds	62.50	0.236	0.014	94.06
42	Blood	31.25	0.203	0.023	88.66
49	Wounds	62.5	0.284	0.016	94.36
LSD value	---	---	---	0.0193 *	
* (P<0.05).					

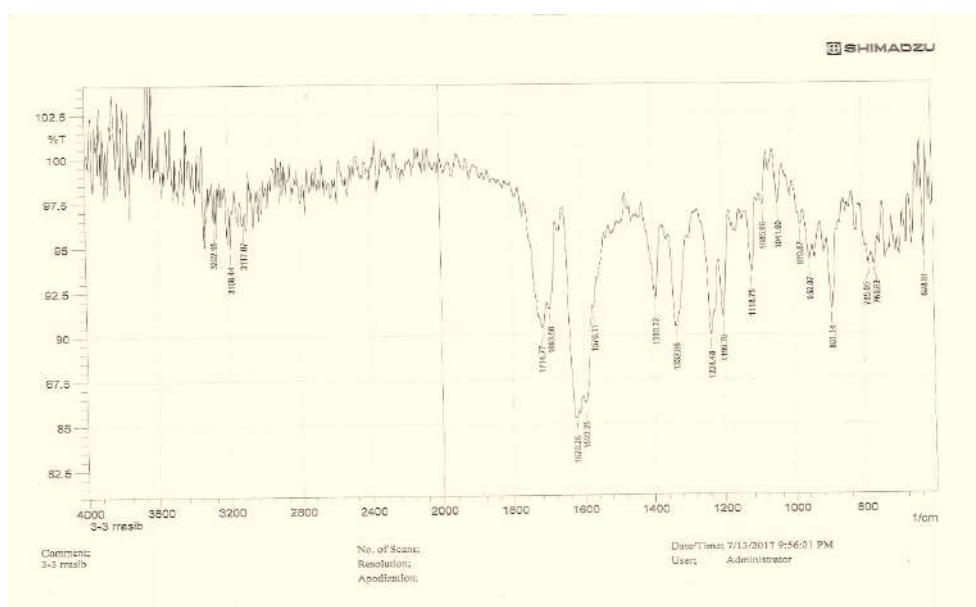


Figure 1: FTIR spectrum of (C₁₂H₁₃N₃O₂S)

CONCLUSION

The results of all *A. baumannii* clinical isolates showed multidrug resistance but the resistance among Beta – lactam were more than among other antibiotics and the antimicrobial activity for new hydantoin derivatives showed great improvement of activity of these compounds against *A. baumannii* biofilm formation.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Dentistry, University

of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Building a Proposed Educational Program Based on the Skills of Close and Backward Thinking in the Creative Writing of the Fifth Literary Students

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ABSTRACT

The problems of accumulated expression have been addressed to add to contemporary problems posed by changes in the social, economic and political aspects. This has been reflected in the growing acceleration in the volume of information. A large number of students in different stages of study suffer from apparent weakness in both oral and written expression. If someone speaks in a proper language, the signs of fatigue appear on his language. He may stop abruptly before he finishes what he wants to say, or maybe he will resort to the colloquial language that feeds his speech or he is unable to complete it. We conclude from the foregoing that writing in general and creative writing in particular need attention from us learners so the researcher finds it necessary to propose a program in creative writing.

Keywords: *building the program, thinking of the convergence of thinking, creative writing*

INTRODUCTION

The Arabic language consists of the arts of listening, speaking, reading and writing. The writing is the fourth of these arts, not because they are the least important, but because they are based on the arts of other language. These arts represent tributaries from which writing draws their material and ideas. It is a mental process that generates, shapes, organizes and then puts them in the final form on paper. Creative writing is a process that allows the production of written text through the development, revision and development of the basic idea^{1,2}. In order to reach the stage of creativity in writing the individual must think in a way commensurate with the creative methods of writing. Thinking is a divine gift given by God Almighty to the exclusively human beings and distinguish them from other creatures to be human in that distinct to aspects of excellence in other psychological aspects. Where this distinction is clearly manifested in the most important function of the

mind, but thinking³. And thinking acquires knowledge and through it solve problems and shows our behavior on the most logical and reasonable and we discover knowledge so that we can control the world in which we live. In order to determine the effectiveness of the proposed program, the researcher chose the sample of the fourth grade students (58) students of fourth grade literary, (29) students per group. The experimental group of the proposed program was subject to the theory of multiple intelligences in the reading course, while the control group underwent the traditional program in the reading course. The researcher prepared two tests, one for measuring critical reading skills, and the other for measuring creative writing. The researcher confirmed their honesty and consistency. The correction of the creative writing test was based on a degree of appreciation for each question based on the relative importance of each skill. The researcher then applied the tests at the end of the experiment) Weeks. The results showed that after the analysis of the data using statistical means there were differences of statistical significance between the average scores of the students of the two groups in critical reading skills, creative writing skills, for the benefit of the experimental group, Attributable to the proposed program.

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METHODOLOGY

This research aims to build an educational program in the creative writing of the fifth grade students, relying on the skills of the thinking of the approach and the secondary. The researcher relied on the descriptive approach. The descriptive research aims at describing specific phenomena, collecting facts and information, describing the specific circumstances, In fact, descriptive research does not stop at this point, but is also concerned with determining what the things and phenomena to be considered should be in the light of certain values or criteria, and suggesting the steps and methods that can be followed to - Search Tool: In order to construct an educational program in the creative writing of the fifth grade students in accordance with the skills of close and backward thinking, and to identify these skills and use them in creative writing, the researcher adopted the following procedures: Directing a questionnaire to a number of experts and teaching assistants in the field of teaching Arabic language and psychology (Appendix 1), which included the integration of the skills of reflection and backward thinking. Study the literature of the methods of teaching Arabic language, psychology, theories of learning and related messages in which the skills of thinking and proximity was determined Based on the above, the researcher has collected (12) skills for cross-rethinking, and skills for reflective thinking. Reach the image that should be In the light of these criteria or values⁴. One of the most prominent activities suggested by the researcher is to give students an idea about the subject of the lesson in the previous lesson, allowing them to access the literature to be able to easily answer the questions of the lesson, which take into account the skills of thinking and proximity to their descendants such as quoting Quranic verses or poetry verses, To freely express their thoughts and feelings. The general objectives of teaching the expression in the preparatory stage: the objectives set by the Ministry of Education.

Develop the ability of learners to chain ideas and build each other on sentences that are coherently coherent.

Enable learners to use language ammunition in clear and proper expression.

Increase the ability of learners, especially gifted ones, to go beyond direct expression to figurative artistic expression.

Develop the ability of learners to capture new meanings and ideas.

Enable learners to express their opinion before others and to make them bold and good performance and modern etiquette.

Develop the ability of learners to express their meanings and ideas with clear words and sound structures.

Enable learners to correct the output of characters from the correct exits

Expand the imagination of the learners and develop their literary taste (the curriculum of the preparatory school, 1990, p. 20).

In 1938, Sushiro was a poor young man. All he wanted was to sell one of his spare parts to Toyota. Which is a very big dream on a young man in the early age, as you see. He is making a lot of effort in the design and manufacturing of this piece. And when he ended up going to the Toyota factory to realize his dream and sell them But Toyota factory refused! Do you feel a failure at the time? Then tried again and spent the night trying to modify this piece. Succeeded and bought it Toyota finally !! The availability of money with our owner, he decided to establish a factory produces auto parts. At that time the Japanese government was preparing for war and the concrete materials are not available. Could not build our own factory .. Did he felt failure at the time? Do you know what our friend did? He decided to invent he and his friends a concrete mix of their own making .. To build the plant that dreams of !!! imagine?? He actually managed to make it and was able to build his factory, which began to produce and generate money for all of them .. But .. During the war bombed US aircraft factory owner. and destroyed most of it !!! Do you feel a failure at the time? He immediately went out of the factory and ordered his staff to try to find out where the planes were landing to change their fuel. He ordered them to take this fuel because it would benefit them in the manufacturing process. They do not find the raw materials needed !!! Is the story over? No .. Our owner was able to rebuild the factory and began to produce again .. But .. hit by a terrible earthquake demolished the factory again ... Did he felt failure at the time? Our owner sold the manufacturing right to Toyota. He had lost everything he owned and was no longer able to continue the idea of the factory .. Did he feel failure at the time ?? Japan

was suffering from a terrible fuel crisis after the war. .. So much so that it was distributing fuel to citizens in equal shares .. But it was not enough so that our owner just drive to the market to buy the needs of his family .. The fuel was not enough and could not move his car in freedom as it was in the past .. Did not feel Time? Our owner decided to try a nice idea .. He had a machine to cut weeds .. Decoding motor and riding in a bicycle had been .. Was the first motorcycle in the world !!! The people liked the idea .. and asked him to make them like .. Make many of these bikes to the extent that he thought of commercial marketing .. Sent to all the shops of bicycles tells them the idea. So many of them .. Expected to make millions of this project. But this did not happen. People refused to use this invention because of the weight of its time and the size of the exaggerated. !! Do you feel a failure at the time? He decided to develop his invention .. He adjusted and adjusts his measurements. Until he succeeded in the end. Earn millions and millions of this invention. Awarded the Emperor for his contributions to the effective community. Established his factory, which is one of the largest factories around the world. Created Factory (Honda) for cars. !! That the name of this man "Honda Sushiro"? What do we benefit from this story? If you watch the life of the successful you will know that the concept of failure has radically different from its concept when the failed .. An important rule: ((There is no failure .. There is an experience learned from them ..)) There is no failure in life .. Life is full of experiences that we have to Learn.

RESULTS AND DISCUSSION

The researcher arrived at a group of skills of thinking and convergence, and these skills were established in two ways: The first is the opinions of experts after agreeing to the process of integrating skills by the questionnaire that was provided to them after the researcher confirmed its authenticity and the other is the literature collected by the researcher all skills , And underwent adjustments, integration and correction.

CONCLUSION

That the skills of thinking and the proximity of the skills necessary to prepare the student, and must be developed according to the program of scientific and educational scheme and this is lacking in the study.

The skills of thinking and the proximity of the research reached by the importance of the integrated approach in the teaching of the Arabic language and its impact on the final achievement of students.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Basic Education, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Cognitive Flexibility and Its Relationship to the Divergent Thinking of Fourth Grade Students

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ABSTRACT

The objective of this research was to define the cognitive flexibility and divergent thinking among scientific fourth-grade secondary school students and to find the relationship between them. The study was conducted in Iraq - Baghdad / Rusafa II Directorate of Education, a sample of (509) students were selected, two scale forms were used, one to measure the cognitive flexibility, and the other to measure divergent thinking of students. Each form has (65) paragraph to answer within (50) minute. Statistical analysis was used with the application of (T. Test) for two independent samples. The T value was an indication of the distinction of each paragraph compared to the tabulated value. All the paragraphs were distinct and thus the scale was composed of (65) paragraphs for cognitive flexibility and (52) paragraphs for divergent thinking. From the analysis, it was indicated that the level of cognitive flexibility of the sample was high. Also, the Pearson correlation coefficient was used as a statistical method in the analysis and indicated the existence of a functional relationship between the two search variables. This indicates a positive statistical relationship between the grades of cognitive flexibility and divergent thinking of students in the fourth grade.

Keywords: Cognitive Flexibility/ Divergent thinking/ Distinction/ Problem solving.

INTRODUCTION

Cognitive flexibility is an important dimension of the human personality. It accepts the conceptual change and perseverance in acquiring new patterns of behavior and abandoning other old and fixed patterns. It is located on one end of the continuum, while the cognitive sclerosis is on the other end ^{1,2}. Cognitive flexibility refers to a person's awareness that in any given situation there are options and alternatives available, willingness to be flexible and adapt to the situation, and self-efficacy in being flexible ³. Mental flexibility is linked to our previous perceptions, emotions, behaviors, and motivations, and the change in the environment, attitude, and behavior in our way of thinking, and flexible thinking does not mean giving up, it is just another way of saying yes to life ⁴. The cognitive flexibility of individuals is expected to be linked to many personal variables, developmental

factors, and social conditions. The cognitive variables in the personality system may have a relationship with cognitive flexibility, and divergent thinking is one of those variables. Divergent thinking is the hyper-thinking that requires the individual to put forward many different responses for one question or one problem. It also represents the thinking that results in the production of many solutions and responses without restricting one's thinking to predetermined rules, and with the importance of cognitive flexibility and its possible relationship to divergent thinking, This subject has not received attention from researchers in the Iraqi environment yet, which represents the core of the current research interest. From the above, it appears that the problem of research is to seek the measurement of the two variables (cognitive flexibility and divergent thinking) and to identify the strength and direction of the correlation relationship between them in the fourth-grade scientific students. The level of cognitive flexibility of students can help teachers to design ways and methods to help students develop their cognitive abilities, enhance their positive behaviors and work to raise their achievement. The possibility of the Ministry of Education to benefit from the results

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of this research in the construction of curricula of the science subject for secondary stage, taking into account the results, recommendations, and suggestions of this research that may encourage learners to develop their own thinking processes to become educated, effective, and independent. Direct the attention of science teachers and mentors to the necessity of paying attention to the education of learners and training them on how to acquire the flexibility of knowledge and different types of thinking, and how to access knowledge. Cognitive flexibility is the human ability to adapt the cognitive processing strategies to new and unexpected conditions in the environment. This definition consists of three basic elements. First, cognitive flexibility is a capacity and therefore it can be gained through training; second, a change in cognitive strategies used by the individual, which is a series of processes that seek to solve the problem, and including the assessment of the different characteristics of the interesting and the generation of alternatives and the differentiation between them and then choose the appropriate alternative Third: This change occurs to meet the new and unexpected conditions and situations in the environment ⁵. Divergent thinking represents an individual's ability to generate a new idea when confronted with a problem ⁶. It is sometimes referred to as drift thinking, which is characterized by originality, with a focus on the diversity of products and their modalities, and as ⁷ sees it as the production of new information, the generation of new information from a given one as well as the limitations is decreased in this type of thinking, the search process expands, and the production is abundant, divergent thinking is different from other types of thinking in terms of a creative solution to the problems ⁸. This type of thinking involves the production of old ideas in new relationships. It is flexible thinking that takes multiple directions rather than a single trend. It goes beyond obvious things to search for the possible remote and indirect outcomes, possibilities, and solutions of the one problem. In a creative way to solve problems, and that it is not random thinking subjected to chance, it needs to be trained in special skills such as identifying the problem and its elements, methods of data collection and organization in order to reach the best solutions, as well as it has importance in the formation of knowledge and information for learners and to reach outstanding innovative products ^{9,10}.

METHODOLOGY

Research Population

The current research population consists of the preparatory stage students / scientific fourth grade in the city of Baghdad / Rusafa II for the academic year (2018-2017), the number of students is (598), distributed in four schools.

Research Sample:

The random staging method was used in selecting the research sample. Four schools in the Baghdad / Rasafa II Directorate of Education were randomly selected. In each school, one or two classes were chosen randomly from the fourth grade. From these, (509) students were selected.

Research Tools

Cognitive Flexibility Scale

After studying the theoretical literature and previous studies and research in this area, the paragraphs were formulated, and took into account the framing of the paragraphs to be understood and doesn't combine of two ideas, the paragraphs of this scale were drafted in (76) paragraph in its initial form.

Scale Validity

The scales were presented to a number of experts in measurement, evaluation, and psychology to judge the appropriateness of the test paragraphs for the sample of the research and to delete, modify and add what they deem necessary. The scales have obtained the approval of more than (80%) of the experts. Thus, in its final form, the number of cognitive flexibility scale paragraphs were (65).

Specify scale instructions

Was applied to (50) students selected from the non-application sample in order to identify the clarity of the test paragraphs and it's instructions where they were clear, and the average time taken to answer is (50) minutes.

Statistical Analysis of Paragraphs

The scale was applied to a sample of (400) students selected randomly, Then (27%) of the highest scores forms were determined and (27%) of the lowest scores

forms. The number of forms per group was (108). Then (T. Test) was applied to two independent samples to test the difference between the mean scores of the upper and lower groups, the T value was an indication of the distinction of each paragraph compared to the tabulated value. All the paragraphs were distinct and thus the scale was composed of (65) paragraphs.

RESULTS AND DISCUSSION

Objective 1: To identify the level of cognitive flexibility in the fourth-grade students: The results of the comparison using the T-test of one sample were shown that the calculated T value is (58,715), which is a high value compared to the tabular value of (1.960), since the difference in benefit of the calculated mean, this means that the level of cognitive flexibility of the sample was high. Table (1) shows that.

Objective 2: To identify the divergent thinking of the fourth-grade students: The calculated mean was compared to the theoretical mean of the 78-grad scale. Since the difference was in benefit of the calculated mean, thus the divergent thinking level of the sample individuals was high, as shown in the table (2).

Objective 3: To define the relationship between cognitive flexibility and divergent thinking of the fourth-grade students: The Pearson correlation coefficient was

used as a statistical method in the analysis and indicated the existence of a functional relationship between the two search variables. This indicates a positive statistical relationship between the grades of cognitive flexibility and divergent thinking as illustrated in Table (3). Flexibility is the real reason behind the intelligence, superiority, and distinction of the special people among us because it is the actual generator of ideas, solutions, alternatives, opportunities and creativity. It is not available to those who think unidirectional, which does not have multiple angles of vision because it did not recognize the value of dimensions as it develops the ability to adapt to change, and the ability to change our theoretical abstract and specific response effectively for any situation we face in life and flexibility is the art of processing certain information, unlike the way it was previously adopted, it is easy to teach a new person, but you need a miracle to teach him to change the mindset that used to see things through them. In addition, diverged thinking is a way to produce as many ideas as possible by examining the problem from multiple angles and in proportion to the abilities and experiences of the learner, as it is flexible in many fertile directions, and as a method controlled by the learner in order to control the environment or other elements surrounding him, An activity that in essence produces new or unfamiliar products or achievements.

Table 1. Theoretical and Calculated T-Test Results of the Cognitive Flexibility Test.

Scale	Sample	Calculated Mean	Hypothesis Mean	St.D.	T Value		Sig.
					Calculated	Tabulated	
Cognitive Flexibility	509	257.12	180	23.870	58.715	1.960	0.05

Table 2. Theoretical and Calculated T-Test Results of the Divergent Thinking Test.

Scale	Sample	Calculated Mean	Hypothesis Mean	St.D.	T Value		Sig.
					Calculated	Tabulated	
Divergent Thinking	509	78.040	78	4.728	3.358	1.960	0.05

Table 3. Relationship between Cognitive Flexibility and Divergent Thinking for the Scientific Fourth Grade Students.

Scale	Sample	Correlation Coefficient Value	T Value		Sig.
			Calculated	Tabulated	
Cognitive Flexibility	509	- 0.530	14.073	1.960	0.05 There is a statistical relationship
Divergent Thinking					

CONCLUSION

The level of cognitive flexibility in the fourth-grade students is high. The divergent thinking of the fourth-grade students is high. There is a statistical relationship between the grades of cognitive flexibility and divergent thinking in the fourth-grade students.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Basic Education, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Decadal Analysis of Carbon Dioxide Emissions from Different State of Fossil Fuels in Iraq

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ABSTRACT

Calculate correlation analysis of decadal CO₂ emission throughout three kind of fossil fuel solid, liquid, and gas. It is the principle anthropogenic greenhouse gas that affects the Earth radiative balance. Emission intensity is the average emission rate of a given pollutant from a given source relative to intensity of a specific activity. Burning of carbon based fuel since the industrial revelation has rapidly increased concentrations atmospheric carbon dioxide, as same of data source of this work. The results shown the CO₂ emission from gaseous fuel consumption increased 10 times for first decadal 1045.10 kt than last decadal, whereas since 2004 not less than 10000 kt. The CO₂ emission from liquid fuel consumption increased 10.4 times than last decadal that was 86759 kt, while the same emission from solid fuel consumption decreased four times that last two decadal was near to zero kt. The percentage CO₂ emission of total fuel combustion for three sectors of life carried out: CO₂ emissions from electricity and heat production, different between first and last decadal was 10.584%, and for transport was 1.8%, while decreased from manufacturing industries and construction was 6.7%.

Keywords: Decadal, CO₂, emission, fossil fuels, Iraq.

INTRODUCTION

Carbon dioxide participate about 0.03% of total gases that components atmosphere, even this ratio is very few compare with another gases of atmosphere, but the rise in this percentage has negative effects on the earth. The significant causes to increased air temperature of the atmosphere, which lead many problems affecting the environment such as melting of ice and rising sea level, droughts and desertification, increased forest fires¹. A result of the gradual increase in population growth, and the expansion of industrial processes that depend on burning fuel was the main reason for the increase in the concentration of carbon dioxide, which began to increase since 1850 and reached 400ppm in 2012². Carbon dioxide emissions from burning fossil fuels are the first cause of global warming³ in addition to breadth

human activity, whether in the production of electric power or heavy industries such as solid iron and cement or from different modes of transport has a significant role in increasing emissions of carbon dioxide⁴. Greenhouse of gases is seven gases, carbon dioxide, methane, nitrous oxide and four fluorinated gases (F- gases) differ in effect and time remain in atmosphere. Carbon dioxide is the most emitted gas due to human activity. Europe Union report referred to, that in 2014, the ratio of CO₂ emission was 81% of total emission, methane is 10.6%, and nitrous oxide is 5.6% and fluorinated gases 2.9%. The main emission sources in the EU are fuel combustion of ratio 55%, transport 23%, industrial 85%, Agriculture 9.9%⁵. Global warming is associated with global climate change, where human emissions have the greatest impact on rising carbon dioxide and increase global temperatures. It is necessary to reduce global warming by reducing human emissions through the use of renewable energy, which in role reduces fossil fuel consumption⁶. Many study interested by this issue like R. J. Andres et al., studied Carbon dioxide emissions from fossil-fuel use (1751–1950), to reached total cumulative CO₂ emissions through 1949 were 61.0×10⁹ tones C

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from fossil-fuel use, virtually all since the beginning of the industrial Revolution around 1860. The rate of growth continues to grow till now, generating debate on the probability of enhanced greenhouse warming. In addition to global totals, totals and one degree for global distributions of the data have been calculated for each country ⁷. Sarmiento et al., studied trend and regional distribution of land and ocean carbon sinks, found that focused on the net land carbon sink appears to have been relatively constant. This result is detectable regional synthesis and assessment of the land carbon sources and sink over period of study reveals broad agreement the Northern Hemisphere land is a major sink of atmosphere CO₂ ⁸. Evaluation of industrial CO₂ emission from cement production and transportation sector in Iraq using IPCC methods carried by Hashim et al., the results refereed CO₂ emissions in electricity-producing countries differ from consuming countries where the emissions produced are higher than those consumed beside increase of Iraq's emissions Cement production. This paper calculated and analysis decadal of CO₂ emissions for used date Carbon Dioxide Information Analysis Centre (CDIAC) at Oak Ridge National Laboratory , from Different state of fossil fuels in Iraq (solid , liquid, gases) for period 1960-2014 and Electricity ,Transportation ,Industry for period 1970-2014 , to know the amount of emissions resulting from them which is more harmful to the environment, put suitable solutions To reduce gas emissions and preserve the environment.

MATERIALS AND METHOD

Fossil fuel as a big source of energy is associated with huge emission of pollutants into the atmosphere. During the 2000 decade, carbon gas produced about 340 GT by human activities was issued. Its atmospheric share is 160 GT and 90 GT oceans, so the atmosphere is the most damaging of these emissions. Ranking of Iraq is 31 by 2014 of total CO₂ emission fossil fuel burning 45935 thousand metric tons ⁹. The main source data this paper, for Carbon emissions from two sectors were studied first that include fossil fuels (gas, liquid, solid) came from Carbon Dioxide Information Analysis Center (CDIAC) an annual basis from 1960-2014, The study period was divided into five decades, the first decade D₁= 1960-1970, D₂= 1971-1980, D₃= 1981-1990, D₄=1991-2000, but fifth decade D₅= 2000-2014. This period used equation 3, because the period after 2010 did not exceed half of the decade was studied with the decade that precedes it . For the purpose of calculating the decadal average of carbon

emission values, the following equation was used:

$$D_{\text{average}} = \dots\dots\dots(1)$$

Where D_{average} is decadal average.

E= sum annual emissions for ten years (decadal).

N=10 (number of years per decadal).

This equation gives the possibility of knowing whether these emissions are increasing or decreasing during the studied decades.

The percentage of increase between the first decade and the last decade of the study was also calculated using equation:

$$\dots\dots\dots(2)$$

P= Percentage of increase

D₅= sum of emission CO₂ for period (2000-2014).

D₁= sum of emission CO₂ for period (1960-1970).

The second sector studied in this research, which is no less important than the first, is the industrial sectors and includes electricity, transport, and manufactory industrial. Electricity is necessary for industry, buildings and all aspects of daily life, But must be generated from energy sources such as wind, sun or water, as the methods used to produce electricity make it the main source of global emissions of CO₂. Second part study use data for period 1971-2014 For the same source mentioned above, this data is percentage of emission CO₂, use equation (1) for calculate decadal Average to four decade and calculate percentage of increase using differ between last decadal and first decadal, The difference was used to calculate the percentage increase because the values in the second sector were raito.

$$\text{Percentage of increase} = D_4 - D_1 \dots\dots\dots(3)$$

The program was used sigma plot is a statistical program used to draw and analyze data in an attempt to study and understand the behavior of carbon emissions from different sources.

RESULTS AND DISCUSSION

There are many aspects to study CO₂, the simplest method used by comprising among several decades. The next section deal with two axes, first one focused on different source fossil fuel of CO₂ emission (gaseous,

liquid, and solid), while the second interested by the main sectors the emission CO₂ like electricity, transport, and manufacturing industries.

State of CO₂ emissions

Since the industrial revolution, however, energy – driven consumption of fossil fuels has led to a rapid increase in CO₂ emission, disrupting the global carbon cycle and leading to a planetary warning impact. Global warming and climate change have range of potential ecological, physical, and health impacts. The key factor, how CO₂ emission have evolved. The annual CO₂ emission from gaseous fuel consumption has slow variance till middle of 90’s then has maximum value of 16714.19 in 2009 as shown in Fig.1 (upper panel), and not less than 10000 kt after 2004. This fact refer to increasing into reasons: oil industry (extraction operation, and burning natural gas), and electricity generation that used gaseous fuel more than liquid fuel. Decadal analysis computes from mean annual gaseous emissions as shown in table.1, which increased 10 times, from first decadal 1045.10 kt to 10427.12 kt. The CO₂ emission came from liquid fuel consumption refer mainly to emission from use of petroleum derived fuel as an energy source. Liquid fuel has similarity behavior with gaseous fuel till 1990 with less value. Where maximum value from liquid fuel emission recorded 124.539 kt in 2014, whereas decadal analysis ratio shown increased by 10.4 times between first decades and last decadal 86759 kt (table 2). the CO₂ emission from solid has different behavior from previous cases has two periods, first from 1961 to 1991 average value was 4 kt, while second period was almost zero kt as display in Fig. 1 (bottom) so that decadal analysis equal to 4 times table not shown here.

Industrial sectors CO₂ emission

The dynamic development of the economy and growth of human population is closely related the continuing growth in demand for electricity. Gasses fuel represents a significant share in for generate electricity, transport, and most of manufactures. This section shows the ration of CO₂ emission in Iraq for these three sectors. The electricity sector is beigest emission than other sectors. The Fig. 2 represents the percentage of CO₂ emission from electricity of total fuel combustion. The highest value over the past 43years was 65.04 kt in 2014. Decadal percentage of CO₂ has slow variance

values among five decade, the difference between first and last decadal found 10.584 % as shown in table 3. A CO₂ emission from all transport activity fuel in Iraq was 49.52 in 1982, while its lowest value was 20.58 in 2014. This includes domestic aviation, domestic navigation, road, rail and pipeline transport. The decadal different between first and last decadal was 1.8%, shown in table 4. Most of Iraqi factories were closed and out of serves so that CO₂ emissions from manufacturing industries and construction is very low and less than averaged. CO₂ emission was 18.78 kt in 1976 more than 2014was 7.90 kt. The table. 5 decadal percentage decreased (- 6.7 %). These results represent low emission among these three sectors.

Table 1. Decadal analysis for gaseous fuel CO₂ emissions in Iraq.

Decadal	Gaseous CO ₂ emission(kt)
1960-1970	1045.10
1971-1980	2386.12
1981-1990	1379.8
1991-2000	5441.8
2001-2014	10427.12
Percentage of increase	1045.10/10427.12= 10.022%

Table 2. Decadal analysis for liquid fuel CO₂ emissions in Iraq

Decade	Liquid CO ₂ emission (kt)
1960-1970	9042
1971-1980	17567
1981-1990	33391
1991-2000	9587
2001-2014	86759
Percentage of increase	9042/86759=10.422 %

Table 3. Decadal CO₂ emission from electricity

Decade	Electricity CO ₂ emission (kt)
1971-1980	36.601%
1981-1990	31.3%
1991-2000	47.366%
2001-2014	47.185%
Percentage of increase	47.185-36.601=10.584 %

Table 4. Decadal CO2 emission from transport.

Decade	transport CO2 emission (kt)
1971-1980	28.928%
1981-1990	41.833%
1991-2000	30.96%
2000-2014	30.807%
Percentage of increase	30.807-28.928=1.879%

Table 5. Decadal CO2 emission from manufacturing industries

Decade	manufacturing industries Co ₂ emission
1971-1980	16.373%
1981-1990	15.118%
1991-2000	12.39%
2000-2014	9.654%
Percentage of increase	9.654-16.373= -6.719 %

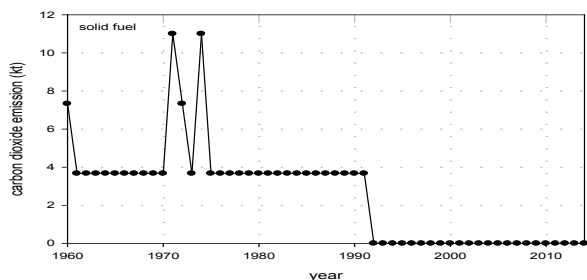


Figure 1. Trend in Carbon dioxide emission from fossil fuel combustion in Iraq for: gaseous (Top), Liquid (Middle), and Solid (Bottom) for the periods 1960-2014.

CONCLUSION

Two lines to study CO2 emission in Iraq. First line deal with sources of state emission for period 1961 to 2014. Second line focused on sectors have significant rate of CO2 emissions. The largest CO2 emission came from gaseous fuel consumption, the first decadal was 1045.10 kt than increased 10 times, with high ration since 2004 not less than 10000 kt. Second level of CO2 emission was from liquid fuel consumption, but with high ratio of increased 10.4, the last decadal recorded 86759 kt. Solid fuel consumption show two period first period from 1961to 1991, emission almost 4 kt, while the second period near to zero. Electricity sector is one of the significant sector with high level of emission 65.04

kt, with slow variance of decadal that equele to 10.584 %. The transport fuel emission found in 1982 was 49.52, with decadal different was 1.8%. The low level of CO2 emission was manufacturing industries, with decadal decreased percentage (-6.7%).

Financial Disclosure; There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Atmospheric Sciences Department, Collage of Sciences, Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Detection of Some Virulence Factors of *Aeromonas hydrophila* Bacteria That Contaminated Tigris

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ABSTRACT

The aim of the study is to investigate the bacteria *Aeromonas hydrophila* of the most important contaminated of the Tigris river pathogenic to humans and other living organisms and Detection of some virulence factors . In this study, we were obtained (45) isolates of *Aeromonas hydrophila* bacteria isolated from (100) sample of Tigris river water and from different sites , from Baghdad to it's point contact with Diyala river. Isolates were identified by Vitek 2 system by biochemical tests in addition to bacteriology diagnosis by observing morphological and microscopic features of colonies and results were showed the ability of all isolates(100%) to produce protease , while 40 isolates (88.8%) ,34 isolates (75.5%) and 31 isolates (68.8%) produced β -hemolysin , Phospholipase and DNase respectively in addition to it's Biofilm production at 100% .

KEYWORDS: Virulence factors , *Aeromonas hydrophila* ,Biofilm, Vitek 2 System

INTRODUCTION

Aeromonas hydrophila ,which belongs to the family Aeromonasaceae is the most important and famous species, it is Gram negative bacillus, negative for string test and thus separate from *Vibrio cholera* which is positive for this test, Oxidase, catalase and negative for Urease¹. *Aeromonas hydrophila* widespread in nature, especially in aquatic environments such as rivers, sewage, drinking water and lakes, as well as marine foods such as fish, shrimp and fresh fruit ²⁻⁴, also found in the organism as natural germs because it is one of the opportunistic pathogens in Elderly, children and sick people that Suffering from immune deficiency, bacteria also cause Gastroenteritis, Bacteremia, watery diarrhea, septicemia and contamination of wounds ^{5,6}. It has many virulence factors that have a role in the latest human and animal infections,these include hemolysins, production of Sidrophore, proteases, haemagglutinins , cytotoxic and cytotoxic enterotoxins^{6,7}

MATERIALS AND METHODS

Collection of Sample: (100) samples of the Tigris River and the river path were collected in clean and sterile bottles.

Isolate bacteria from aquatic samples:

Membrane Filtration: Each sample was emitted through the μ mO.22 filter paper. The filter paper was then placed on TCBS and Ampicillin Dextrin Agar (ADA) medium and incubated at 37 ° C for 24 hours. The colony was grown and planted on Tryptic Soy Agar (TSA) medium for confirmation and acquisition of colonies Individually ^{9,10}.

Diagnosis of isolates: Bacterial isolates were identified based on biochemical, phenotypic, and plant assays on Ampicillin Dextrin agar (ADA), TCBSagar, MacConkey, and Blood agar ¹¹.

Diagnosis using Vitek 2 System: The bacteria to be examined were placed on the macconkey or nutritious medium and incubated for 24 hours and at 37 ° C. The sample was selected for a suitable sample VITEK 2 Cassette,a single pure colony of bacteria was selected and diluted in 3 ml of saline solution in a sterile tube with a special holder VITEK 2 DENSICHEK was measured with a 0.5 - 0.63 turbidity in the tube in the VITEK 2 Cassette of Gram negative bacteria and VITEK 2 Cassette was transferred to the device for the diagnosis of bacteria through 64 chemical tests (Table 1). Result is show at 24 hours after the sample is placed in the device.

Detection of the production of Some Virulence Factor

Detection of protease production: The ability of isolates to produce protease was tested using the medium of Skim milk agar as indicated in ¹².

Production of hemolysin: The ability of the isolates was tested on production of hemolysin by using the blood agar medium as indicated in ^{13,14}.

Biofilm formation: Congo red agar (CRA) method According to ¹⁵ The CRA medium was prepared with 37g/l BHI broth, 50 g/l sucrose, 10 g/l agar, and 0.8 g/l Congo red. As a concentrated aqueous solution and autoclaved at 121°C for 15 min Congo red stain was prepared separately from other medium constituents, then added to cooled agar to 55 °C. Plates were inoculated and incubated at 37 °C for 24.

Detection of Phospholipase Production

Egg Yolk Agar was presented by ¹⁶ as follows: Prepare 100 ml of nutrient agar medium, add 1% sodium chloride salt (NaCl), sterilize the liquid, then refrigerate to 45 °C. Add one egg yolk in sterile conditions and mix thoroughly. Sterile dishes.

Detection of DNase Production: Transfer a portion of a growing colony of 24-hour on nutrient agar medium to the DNase agar and in a sterile sterilization pattern and incubate at 37 °C for 24 h. After incubation, immerse the dye in Toluidine blue and The dish was left for several minutes and the appearance of a violet halo around the colony was seen as evidence of positive testing ¹⁷.

RESULTS AND DISCUSSION

The present study investigated the presence of *Aeromonas hydrophila* bacteria in the aquatic environments of different regions and on the course of the Tigris River to the south, where 100 samples of water samples were collected and bacterial isolates were (45) isolated. According to characteristics of isolate colonies, morphological and microscopic by culturing it on the differential media, which included ADA media, MacConkey agar, Blood agar and TCBSagar, isolates were identified. The results of all isolates were showed growth in the medium after 24 hours, When Loopful was transferred to ADA agar, TCBS, MacConkey agar, Blood Agar and Nutrient agar, the bacteria were examined based on colony characteristics of shape, size,

The colonies of the bacteria *Aeromonas hydrophila* on (TCBS) were characterized by being circular, medium-sized, smooth, flat, bright yellow due to sucrose fermentation and because of alkalinity of the media and containing sodium chloride salt and bile salts, Its inhibit most types of bacteria except halophilic bacteria and the bacteria on ADA agar showed yellow colonies ^{1,13,14}. The results of the microscopic examination of the isolates were gram-negative bacilli ^{9,18,19}. In order to confirm the initial diagnosis of isolates, the biochemical tests were performed as shown in Table (1) and according to (1,9,13). All isolates showed positive oxidase test and negative result of String test (9). A positive result was produced by the appearance of the reddish surface and the bottom with acid yellow color When growing on (KIA) medium with no H₂S formation because of fermentation of glucose by all isolates. The sensitivity of isolates to O129 was tested and all environmental isolates were resistant to O129 ¹⁹. Vitek 2 system was used to increase the emphasis of diagnosis, which included a large number of biochemical tests as shown in Table (1). The results showed that 45 isolates of 100 water samples belonging to *Aeromonas hydrophila*. Results were showed the ability of all isolates(100%) to produce protease, while 40 isolates (88.8%), 34 isolates (75.5%) and 31 isolates (68.8%) produced β-hemolysin, Phospholipase and DNase respectively in addition to it's Biofilm production at 100% Figure(1). The ability of *Aeromonas hydrophila* bacteria to produce protease production on Skim milk agar showed that all isolates(100%) were able to produce protease ²⁰. In addition, the isolates were exposed to hemolysin production through blood analysis when they were developed on the blood agar medium, which added 5% of the human blood and incubated at 37°C for 24 hours (21). *A. hydrophila* is able to signify a numeral of virulence factors like cytotoxin, aerolysin, haemolysin, enterotoxin, internal lipopolysaccharide, cytotoxic enterotoxin, enzymes and outer membrane proteins such as elastase, proteases, gelatinase, DNases and lipases ^{22-24, 25}. Note in *E. coli* that biofilm production May enhance colonization and carry to rise rate of infections such as urinary tract infection and such infections may be It is uneasy to treat due to it's multiple drug resistance. Results of ²⁶ appeared considerable connection between production of biofilm, protease, and resistance to multiple kinds of antibiotic from six clinical bacterial isolates tested, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Enterobacter* sp. and *Serratia* sp. were produce strong

biofilm, and good protease producers, also they resisted to antibiotic. Also Biofilm production a sign of clinically relevant infection and the persistence of bacterial biochemistry in humans the body is the main cause of reproduction or chronic infections ²⁷.

Table 1. Vitek 2 system biochemical tests

well	Test	Reactive enzymes	well	Test	Reactive enzymes
2	APPA	Ala-Phe-Pro-ARYLAMIDASE	33	SAC	SACCHAROSE/SUCROSE
3	ADO	ADONITOL	34	dTAG	D-TAGATOSE
4	PyrA	L-Pyrrolydony-ARYLAMIDASE	35	dTRE	D-TREHALOS
5	IARL	L-ARABITOL	36	CIT	CITRATE(SODIUM)
7	dCEL	D-CELLOBIOSE	37	MNT	MALONATE
9	βGAL	BETA-GALACTOSIDASE	39	5KG	5-KETO-D-GLUCONATE
10	H2S	H2S PRDUCTION	40	ILATK	L-LACTATE alkalinisation
11	βNAG	BETA-N-ACETYL-GLUCOSAMINIDASE	41	AGLU	ALPHA-GLUCOSIDASE
12	AGLTP	GLutamylArylamidase PNA	42	SUCT	SUCCINATE alklinisation
13	dGLU	D-GLUCOSE	43	NAGA	Bea-N-ACETYL-GALACTOSAMINIDASE
14	GGT	GAMMA-GLUTAMYL – TRANSFERASE	44	AGAL	ALPHA-GALACTOSIDASE
15	OFF	FERMENTATION/GLUCOSE	45	PHOS	PHOSPHATASE
17	βGLU	BETA-GLUCOSIDASE	46	GLyA	Glycin ARYLAMIDASE
18	dMAL	D-MLTOSE	47	ODC	ORNITHINE DECARBOXYLASE
19	dMAN	D-MANNITOL	48	LDC	LYSINE DECARBOXYLASE
20	dMNE	D-MANNOSE	52	ODEC	DECARBOXYLASE Base
21	βXYL	BEA-XYLOSIDASE	53	IHISa	L-HISTIDINE assimilation
22	βALap	BETA-ALanine arylamidase PNA	56	CMT	COUMARATE
23	ProA	L-Proline ARYLAMIDASE	57	βGUR	BETA-GLUCORONIDASE
26	LIP	LIPASE	58	O129R	O/129 RESISTANCE
27	PLE	PALATINOSE	59	GGAA	GLU-GLY-Arg-ARYLAMIDASE
29	TyrA	Tyrosine ARYLAMIDASE	61	IMLTa	L-MALATE assimilation
31	URE	UREASE	62	ELLM	ELLMAN
32	dSOR	D-SORBITOL	64	LATa	L-LACTATE assimilation

CONCLUSION

In this study, we were obtained (45) isolates of *Aeromonas hydrophila* bacteria isolated from (100) sample of Tigres river water and from different sites, from Baghdad to its point contact with Diyala river. Isolates were identified by Vitek 2 system by biochemical tests in addition to bacteriology diagnosis by observing morphological and microscopic features of colonies and results were showed the ability of all isolates(100%) to produce protease, while 40 isolates (88.8%), 34 isolates (75.5%) and 31 isolates (68.8%) produced β -hemolysin, Phospholipase and DNase respectively in addition to its Biofilm production at 100%.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

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Determination of Boron Concentration in Water Samples of the Rivers in Al- Diwaniya-Iraq Using CR-39 Track Detector

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ABSTRACT

Boron is none uniformly distributed, ubiquitous essential micronutrient element for plant as well as human beings. The aim of this study is to measure the Boron , concentration in water in Al-Diwaniya governorate in Iraq. The measurements were performed by analyzing the water samples collected from 24 location using CR-39 Track Detector. The Boron concentrations which is obtained ranged from 2.9524 mg/l in ((alshaamia1)) river belt and minimum 0.5677 mg/l was recorded in Nufer4)) river in water samples. The results are presented and compared with other studies. The results could be utilized to make distinctive supplementary contributions when contamination event occurs and to implement water quality standards by concerned authorities to maintain radioactive contamination-free drinking water supplies for the people. The study further reveals that 24 surface water samples have boron below detection limit. The presence of boron in drinking water sources in this territory is of natural origin. Thus, there is possibility of severe pollution problem with boron in near future.

Keywords: Neutron Source, Boron, SSNTDs, water samples.

INTRODUCTION

Boron is a nonmetallic element that belongs to Group IIIA of the periodic table and has an oxidation state of +3. It has an atomic number of 5 and atomic weight of 10.81. Boron is actually a mixture of two stable isotopes, ¹⁰B (19.8%) and ¹¹B (80.2%)¹. Boron is a naturally-occurring element found in rocks, soil, and water. The concentration of boron in the earth's crust has been estimated to be <10 mg/l, but concentrations as high as 100 mg/l can be found in boron-rich areas². Solid state nuclear track detectors (SSNTDs) of different materials are important for investigations in basic science and technology³. Among such applications, SSNTDs are widely used in radiation protection and environmental radiation monitoring. Their theory was developed more than 40 years ago, the basic fundamentals can be found in Somogyi⁴ and in more details in Durrani et al.⁵. Even more details for detecting alpha particles, which is important from Boron Neutron Capture Therapy (BNCT)

point of view, can be found in Nikezic⁶. Therefore, here we touch some aspects of interest, only. Popularly saying, an ionizing particle produces a narrow damaged zone in the plastic, 10-100 nm in diameter, which can be enlarged and visualized by a chemical treatment, so that the particle movement in the detector material, let us say the footprint of the particle or its track can be followed under optical microscope. Depending on the chemical treatment (called etching) and observation method there are basically two requirements: the range and energy deposition of the particle should be adequate⁷. This work represent the preliminary findings from Boron concentration measurement data which were collected from different regions in Diwaniya City. The general aim is to investigate the complex interactions and exchanges with the flow of water, and estimate how much hazards brought with waters. In fact, the study area is located inside Al- Diwaniya Governorate. The chemical structure of some boron compounds is found in Fig.1. Solid state nuclear track detectors (SSNTDs) of different materials are important for investigations in basic science and technology⁸. Among such applications, SSNTDs are widely used in radiation protection and environmental radiation monitoring⁹. Their theory was developed more than 40 years ago, the basic fundamentals can be

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found in Somogyi^{9,10}. Even more details for detecting alpha particles, which is important from BNCT point of view¹¹. The ¹⁰BNC-reaction to take place requires a sample containing, even at ppb among the known boron compounds, several hundred are employed in today's applications and a growing level, ¹⁰B, a source set for irradiation with thermal or lower neutron energy (0.025eV or less) and a reaction fragment detecting device. The reaction phenomenon is related to a neutron interacting with boron nucleus, followed by breakup in two fragments of the ¹⁰B+n compound nucleus (that survives a short time in the order of picoseconds). The two fragment nuclei depart acquiring kinetic energy due to a strong Coulomb field moving in opposite direction under the momentum conservation law, synthesized by the following process: The reaction occurs with different branching ratio: the first has a relatively low frequency occurrence (6.1%) but has the advantage that the reaction is photon less and therefore the induced damage leads to a higher "Linear Energy Transfer" (LET) or dE/dx. The other, with higher occurrence is accompanied by a 0.48MeV photon. If the alpha particle (⁴He+) leaves the sample surface, with sufficient kinetic energy, then it can be detected e.g. by nuclear track techniques. The alpha particle fingerprint given by a suitable detecting material, provides information on the boron presence and it is recognized as a powerful analytical method for boron studies. This work represents the preliminary findings from Boron concentration measurement data which were collected from different regions in Al-Diwaniya city. The general aim is to investigate the complex interactions and exchanges with the flow of water, and estimate how much hazards brought with waters. In fact, the study area is located inside Al-Diwaniya Governorate which is located in the extreme Euphrates part of Iraq.

MATERIALS AND METHOD

In Al-Diwaniya governorate, the Samples which are from 24 stations and locations were collected during May 2018. The measurements of Boron concentration water were carried out by passive methods; we used the Solid State Nuclear Track Detectors, SSNTDs, for the measurements of Boron concentration in water. The SSNTD, CR39 (1x1 cm) films. Many samples of water from different places have been supplied. One milliliter from different boron concentrations standard is dropped on the same area of the CR-39 track detector and it is left to dry. After drying the standard samples are exposed to a thermal neutron source for the same

period of time 7 days. A nuclear reaction of type ¹⁰B(n, α) ⁷Li has been occurred Alpha particles are emitted with energy 2.31 MeV which can make suitable track in CR-39 plastic detector. The samples, after being exposed, are washed in distilled water, then etched in a solution of 6.25 N NaOH at 60°C temperature, 6 hrs (etching time), by using a bath held at a constant temperature. The track diameters and track density have been carried out using transmission optical microscope and a suitable calibration curve is used to calculate the concentration of Boron. The pieces of the each to the detector sets were irradiated with neutrons that emitted from Am-Be.

Irradiation of the samples

The pellets (water samples of river) were covered with CR-39 detector and put in a plate of paraffin wax at a distance of 5cm from the neutron source Am-Be, with flux of thermal neutron ($5 \times 10^3 \text{ n cm}^{-2} \text{ S}^{-1}$)

Chemical etching and microscopic scanning

After the irradiation time 7 days [Lindsay 1991] the CR-39 detectors were removed and etched in a 6.25 N aqueous solution of NaOH maintained at 60°C for 6 hr, which was the normal employed etching time [12]. The detectors were rinsed with distilled water and dried in air. The tracks recorded in CR-39 detectors were counted by using optical microscope at a magnification of 400 X. The density of the tracks ρ in the detectors was calculated according to the following relation.

$$rx =$$

Where ρ is the Track density (Track/mm²), N is the average of total tracks and A is the area of field view.

Calibration Curve for standard sample

For the calibration curve plot between standard of different Boron solutions of known concentrations from 2 mg/l to 10 mg/l has been prepared to calibration our studying and track density by using neutron induced radiography which is based on the principle of solid state nuclear detectors, SSNTDs, CR-39. The Boron concentrations were measured by comparison between track densities register on the detectors of the samples and that of the standard samples from the Regression equation: $y=2767.67+352.715 \cdot X$, $R^2=0.97354$. A linear calibration as shown in Fig.2 was observed, followed by the calculation of the slope factor. The results are experimented in (mg B/l).

RESULTS AND DISCUSSION

Table (1) present the tracks density, Boron concentration samples that measured by CR -39 detector. The water samples of the rivers collected from 24 locations distributed in different sites in Nufer, Alshaamia, alhamza, aldighara districts in AL-Diwaniya governorate. Fig.5 show the relationship between Boron concentration and number of the location of the water sample. For the measurement of boron concentration level water, samples for the rivers table 1 and Fig.5, reflect the fact that, there was some high level of boron concentration in this water higher than the most of public tap and washing surface water in the governorate. The results for these 24 samples categorized into 24 locations, from S1 to S24, shown in Fig.5. Boron content found maximum 2.9524 mg/l in ((alshaamia1)) river belt and minimum 0.5677 mg/l was recorded in ((Nufer 4)) belt. Out of the 24 water samples of the rivers 3 samples recorded higher which are beginning from 2.0762 mg/l to 2.9524 mg/l while the 7 water samples of the rivers are beginning from 1.0271 mg/l to 1.7394 mg/l while the 14 water samples of the rivers are beginning from 0.5677 mg/l to 0.9961 mg/l than the prescribed WHO limit 0.5 mg/l. The World Health Organization (WHO) in 1993 the WHO established a health-based Guideline of 0.3 mg/L for boron. This value was raised to 0.5 mg/L in 1998 primarily. Furthermore, in 2000 it was decided to leave the guideline at 0.5 mg/L until data from ongoing research becomes available that may change the current view of boron toxicity or boron treatment technology^{13,14}. The European Union established a value of 1.0 mg/L for boron in 1998 for the quality of water intended for human consumption^{15,16}. New Zealand has established a drinking water standard for boron of 1.4 mg/L^{17,18}. The interim maximum acceptable concentration (IMAC) for boron in Canada is 5 mg/L. The Canadians have established this value on the basis of practical treatment technology. They believe available technologies are inadequate to reduce boron concentrations to less than 5mg/L. They will review this IMAC periodically as new data becomes available¹⁹.

Table 1. Boron Concentration in the water in Diwaniya rivers using SSNTDS method

site Number	site Name	tracks density (tracks/mm ²)	Boron Concentrations (mg/l)
S1	Nufer 1	3500.006	2.076
S2	Nufer 2	3119.817	0.998
S3	Nufer 3	3129.967	1.027
S4	Nufer 4	2967.935	0.567
S5	Nufer 5	3059.414	0.827
S6	Nufer 6	3086.273	0.903
S7	alshaamia 1	3809.046	2.952
S8	alshaamia 2	3073.529	0.867
S9	alshaamia 3	3517.752	2.126
S10	alshaamia 4	3075.349	0.872
S11	alshaamia 5	3172.749	1.148
S12	alshaamia 6	3235.561	1.326
S13	alhamza 1	3086.273	0.903
S14	alhamza 2	3119.043	0.996
S15	alhamza 3	3133.608	1.037
S16	alhamza 4	3160.917	1.114
S17	alhamza 5	3097.196	0.934
S18	alhamza 6	3381.208	1.739
S19	aldighara 1	3251.946	1.372
S20	aldighara 2	3088.093	0.908
S21	aldighara 3	3043.845	0.783
S22	aldighara 4	3002.526	0.665
S23	aldighara 5	3078.99	0.882
S24	aldighara 6	3080.811	0.887

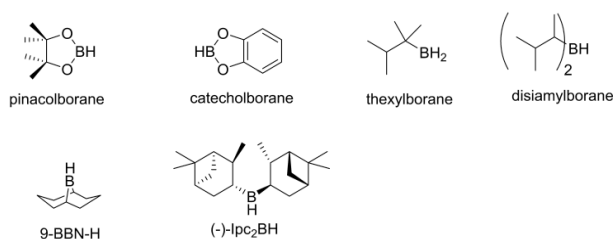


Figure 1. Chemical Structures of some boron compounds

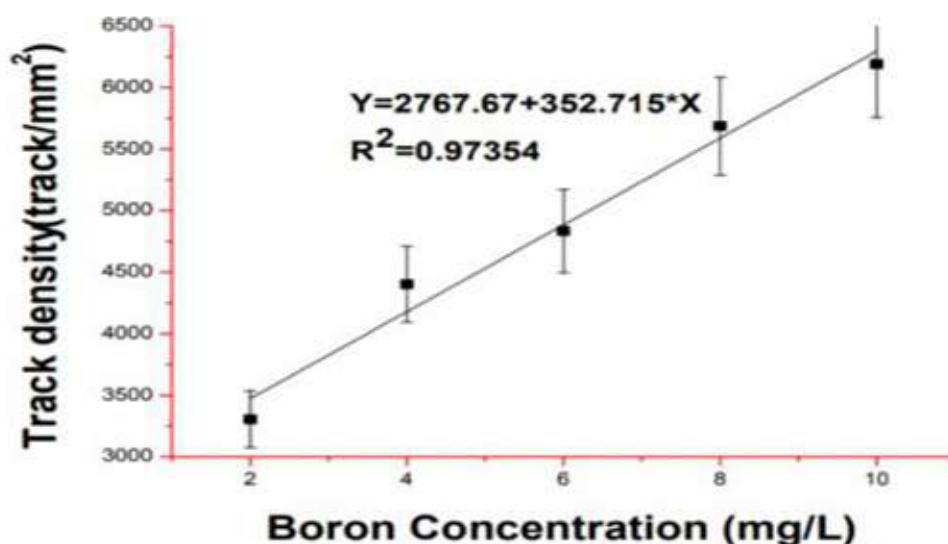


Figure 2. The relation between track density and Boron concentration (mg/l) for standard Boron samples.

CONCLUSION

Well water are in many rural localities in rural areas and which were existent in Al- Diwaniya Governorate, Iraq. The analytical results of chemical water analysis revealed the presence of Boron in the limit of New Zealand 1.4 mg/l and IMAC 5 mg/l, with a variation between (0.5677- 2.9524) mg/l. The values of Boron concentration are small and within the natural limits in most of the sample of the water samples of the rivers. The correlation factor, 97.35%, between the boron concentration of standard samples and Track density (track/mm²) of the samples in water samples of the rivers are very good correlation. Access to safe water of the rivers is essential to human well-being and is a key public health issue.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Physics, College of Education for Pure Science, University of Basrah, Iraq and all experiments were carried out in accordance with approved guidelines.

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DNA- In Situ Localization of Human Herpes Virus-8 and Mutated P57 Genes Sequences in Tissues from a Group of Female Iraqi Patients with Breast Tumors

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ABSTRACT

This study was designed as a retrospective case-control study research. A total number of (100) formalin-fixed, paraffin embedded Breast tissues was included. These tissues were including 40 malignant breast tumors, 40 benign breast tumors and 20 of apparently healthy breast sections which were included as baseline control. The mean age of the patients with breast carcinoma was higher (46.80 ± 12.517 years) than the mean age of the benign tumor (34.70 ± 14.4 years), followed by mean age of those females in the group of apparently healthy control (34.70 ± 14.4 years). The positive results of HHV-8 -CISH detection in malignant breast tumors, where 32.5% (13 out of 40 tissues) showed positive signals. While, in the benign breast tumors group were 15% (6 out of 40 tissues). Regarding malignant breast tumors group, the total percentage of positive mutated P57-CISH detection was in 55% (22 out of 40) breast cancer cases and in 35% (14 out of 40) benign breast tumor group, while none of positive mutated P57-CISH detection in control breast tissues group.

Keywords: HHV-8, Mutated p57, CISH, Breast tumors.

INTRODUCTION

Epidemiological and biological studies have now conclusively proved that infectious agents are among the main causes of cancer worldwide. At least six different viruses have been linked to the development of several types of human cancers. HPV, EBV and KSHV/HHV8 play a direct role in carcinogenesis, encoding oncoproteins which are able to promote cellular transformation by altering the regulation of cell cycle, apoptosis and other cellular pathways¹. Breast cancer is the most common cancer among all women in the general population worldwide. Even within the same country, incidence and mortality vary significantly based on several risk factors, best organized as factors that increase the risk of developing breast cancer and factors that increase mortality after diagnosis². A positive family history or genetic factor has been confirmed to be a major

contributor to the risk of developing this disease, and this link is particularly important for early-onset breast cancers³. Human Herpes Virus -8 (HHV-8) belong to the gamma-herpesvirus subfamily, and the latter is classified as a human g2-herpesvirus. Unlike other viruses, HHV-8 encodes several human homologues including cytokines (interleukin-6, macrophage inflammatory proteins, interferon-regulatory factors) and regulatory genes (cyclin D, G-protein coupled receptor, etc). These proteins may play important roles in the pathogenesis of HHV-8⁴. Human Herpes virus 8 has numerous modes of transmission. It could be spread each sexually and non-sexually, together with through organ transplantation and breastfeeding⁵. In last years, evidence has emerged which indicates that HHV-8 may also have a role in breast cancer. HHV-8 have been identified in BC from widely different populations⁶⁻¹⁰. P57^{kip2} (p57) is a maternally expressed imprinted gene regulating growth arrest which belong to the CIP/KIP family of cyclin- and cyclin- dependent kinase complexes, p57 activity has also been linked to differentiation, apoptosis, and senescence. In addition, p57 has recently been shown to be involved in tumorigenesis and cell fate decisions

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in stem cells¹¹. CDK inhibitor p57 has been previously reported to be inactivated in a variety of human cancers¹². It was reported that p57 is a direct target of EZH2 and repressed in breast cancer by multiple epigenetic mechanisms¹³. p57^{KIP2} is implicated in several types of human cancer. Its family members have been implicated in breast cancer, but information about CDKN1C's role is limited¹⁴. This study is aiming to analyze the rate of concordance of mutated of P57 gene translational expression and HHV-8 in breast tissues from a group of patients with breast tumors and apparently healthy control groups.

MATERIALS AND METHOD

The study was designed as a retrospective control study. It has recruited 100 selected formalin fixed, paraffin embedded prostatic tissue blocks among them; (40) tissue biopsies from breast carcinoma with different grades and (40) benign breast tissue blocks as well as (20) apparently normal breast tissue autopsies which were collected from the archives of Forensic Medicine Institute / Baghdad and used as breast healthy tissues control groups. The diagnosis of these tissue blocks were based on their accompanied records. A consultant pathologist reexamined all these cases to further confirm the diagnosis following trimming process of these tissue blocks. The detection of HHV-8 & mutated p57 by CISH kit (Zyto Vision GmbH, Fischkai, Bremerhaven, Germany) was performed on 4µm - paraffin embedded tissue sections.

RESULTS AND DISCUSSION

The archival specimens collected in this study were related to breast tumor patients whom ages were ranged from twenty years to eighty five years. The mean age of the patients with breast carcinoma (46.80 ± 12.517 years) was higher than the mean age of the benign group (34.70 ± 14.4 years) and the mean age of those females in the group of healthy control (50.67 ± 13.178 years). There are significant statistical differences ($p < 0.05$) between different groups according to age (Table 1). On distributing breast carcinoma group according to their Scarf-Bloom-Richardson system (SBR) for grading of breast cancers (Table 2), the results of present study show that poorly differentiated grade breast carcinomas constituted 45% (18 of total 40 cases), whereas cases with moderately and well differentiated grades constituted 35% (14 out of 40 cases) and 20% (8 out of

40 cases), respectively. The statistical analysis of grading distribution of breast carcinoma shows significant differences ($p < 0.05$) between poorly differentiated grade and well differentiated grade, while non-significant difference was noticed between poorly differentiated and moderately differentiated breast carcinomas. The DNA genome of HHV-8 was detected in tissue blocks of surface epithelial ovarian tumors patients. Wide spectrum HHV-8 was detected using digoxigenin-labeled probes in a morphological preserved tissue sections of different breast tumor. The signals of CISH were detected as bright blue discoloration with blue stain and counter stained with nuclear red solution in referring to HHV-8 at the sites of complementary sequences Figure 1. Table 3 shows the positive results of HHV-8 -CISH detection in malignant breast tumor, where 32.5% (13 out of 40 cases) showed positive signals, while, 67.5% negative signals which represented 27 out of 40 cases in this group. Whereas, in the benign breast tumor group was 15% (6 out of 40 cases). Negative signals which in benign group represented 34 out of 40 cases constituted 85%. Statistically, significant difference ($p < 0.05$) was found on comparing the percentages of HHV-8 DNA among the study groups. The DNA genome of mutated P57 was detected in tissue blocks of breast tumors tissues. Wide spectrum mutated P57 was detected using digoxigenin-labeled probes in a morphological preserved tissue sections of different breast tumors. The signals of CISH were detected as bright red discoloration with red stain and counter stained with nuclear blue solution in referring to mutated P57 at the sites of complementary sequences Figure 2. Regarding malignant breast tumors group, the total percentage of positive mutated P57-CISH detection was 55% (22 out of 40 cases). While, in the benign breast tumors groups were 35% (14 out of 40 cases). None of positive mutated P57-CISH detection in control breast tissues group (Table 4). Statistically, significant difference ($p < 0.05$) was found on comparing the percentages of mutated P57 among the study groups (Table 4). On reviewing the 100 cases which were included in this study, it was found the age of the patients with breast tumors was ranging between 20-85 years and their mean age was 44.05 years (Table 1). The present results are consistent with those reported worldwide where these breast tumors were usually affecting females over forty years of age (15). Also, on reviewing Table 1, it was noticed that the percentages of BC cases are increased with the proceeding of age of patients. The present results could have their importance when

realizing that the age of the breast cancer patients is an important factor both for the occurrence and management of the disease ¹⁶. These results could reflect that age is an important risk factor in tumor changes affecting breast epithelial tissues lesions. In general aging increase the incidence of the malignant changes in breast epithelial tissues and as such their incidence was found to increase with age ¹⁷. On the other hand, other authors concluded that age is an independent prognostic factor even when the size and nodal status are considered ¹⁸. Others reported that women diagnosed with breast cancer at a younger age have a poorer prognosis compared with their older counterparts ¹⁹. In the current study, poorly differentiated grade breast carcinomas constituted 45%, whereas cases with moderately and well differentiated grades constituted 35% and 20%, respectively (Table 2). Likewise, AL-Anbari²¹ revealed consistent percentages of their studied BC grading to our results where 11% were in grade I, 48% in grade II and 41% in grade III. AL-Khafaji ²² also reported a similar percentages in the Iraqi studied patients and found 11%, 58% and

31% for grade I, II, and III, respectively, and for the Syrian studied patients were 4.7%, 66.6% and 28.8% for grade I, II, and III, respectively. However, Zubair et al., ²³ showed that only 4.17% of cases have grade I, while grade II and grade III were having (75.8%) and (20%), respectively. Histological grading is an important parameter of risk assessment in the patients with breast cancer (24). Up to our knowledge this study of HHV-8 in breast tumors is the first research work in Mid-Euphrates Governorates of Iraq, that was designed to analyze the association of HHV-8 with invasive epithelial breast tumors by using the technique of Chromogenic In Situ Hybridization (CISH). In the present study, the HHV-8 - DNA percentage in malignant breast tumors (32.5%) was higher than its percentage (15%) in their benign counterparts (Table 3). The negative results are probably related to the absence of HHV-8-DNA in these biopsies or could be related its presence in the cells at different regions of that tissue. The presence of different viruses other than these virus used in this study is another possibility.

Table 1. Distribution of breast tumor patients according to their age.

Studied groups (Age / Year)	N	Mean	Std. Deviation	Std. Error	Range		ANOVA test (P-value)
					Mini.	Maxi.	
A.H. Control	20	50.67	13.178	3.403	32	73	P=0.00 Highly sign. (P<0.01)
Benign tumor	40	34.70	11.547	1.826	20	51	
Breast cancer	40	46.80	12.517	1.979	20	85	
Total	100						

Table 2. Tumor grading of breast cancers group.

Breast Cancer Grades(Differentiated)	N	%	Chi-Square (P-value)
Well	8	20%	P=0.151 Non sign. (P>0.05)
Moderately	14	35%	
Poorly	18	45%	
Total	40	100%	

Table 3. Distribution of HHV-8 –DNA Signals in Female Patients with Breast Tumor by Using CISH Technique.

HHV-8 A.H. Control		Studied groups			Chi-Square (P-value)
		Benign tumor	Breast cancer		
Positive	N	0	6	13	P=0.015 Sign. (P<0.05)
	%	0%	15%	32.5%	
Negative	N	15	34	27	
	%	100%	85%	67.5%	
Total	N	15	40	40	
	%	100%	100%	100%	
Chi-Square (P-value) P=0.123 Non sign. (P>0.05)		A	B	C	
		P=0.012 Sign. (P<0.05)	P=0.065 Non sign. (P>0.05)		

Table 4. Distribution of Chromogenic In Situ Hybridization Signals for Mutated P57 DNA among Study Groups.

P57 A.H. Control		Studied groups			Chi-Square (P-value)
		Benign tumor	Breast cancer		
Positive	N	0	14	22	P=0.00 Highly sign. (P<0.01)
	%	0%	35%	55 %	
Negative	N	20	26	18	
	%	100%	65%	45 %	
Total	N	20	40	40	
	%	100%	100%	100%	
Chi-Square (P-value) P=0.00 Highly sign. (P<0.01)		A	B	C	
		P=0.00 Highly sign. (P<0.01)	P=0.593 Non sign. (P>0.05)		

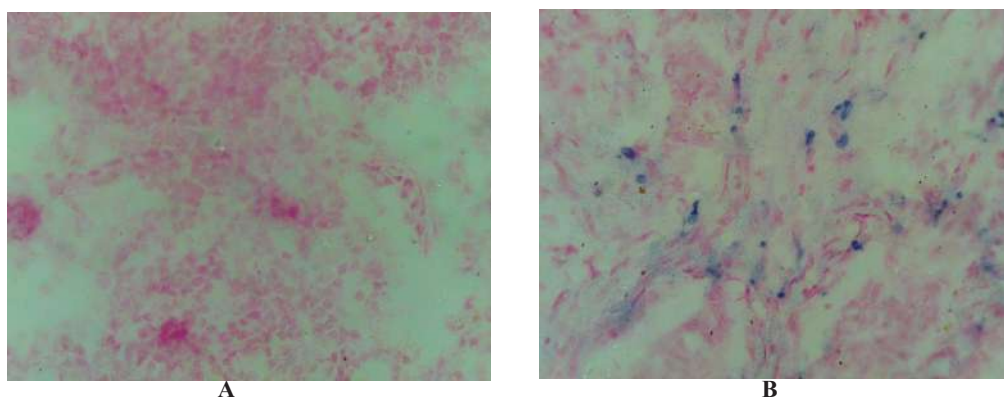


Figure 1: Microscopic appearance of HHV-8- CISH signal in ovarian tumors. Using Digoxigenin-Labeled HHV-8 Probe; stained with NBT/ BCIP (Blue) and Counter stained by Nuclear Red Solution (Red). Blue signal are detected at complementarity sequences sites (arrows).A-Breast Cancer with negative HHV-8 –CISH reactions (40X) .B-Positive HHV-8 –CISH reaction with moderate score and strong signal intensity (40X).

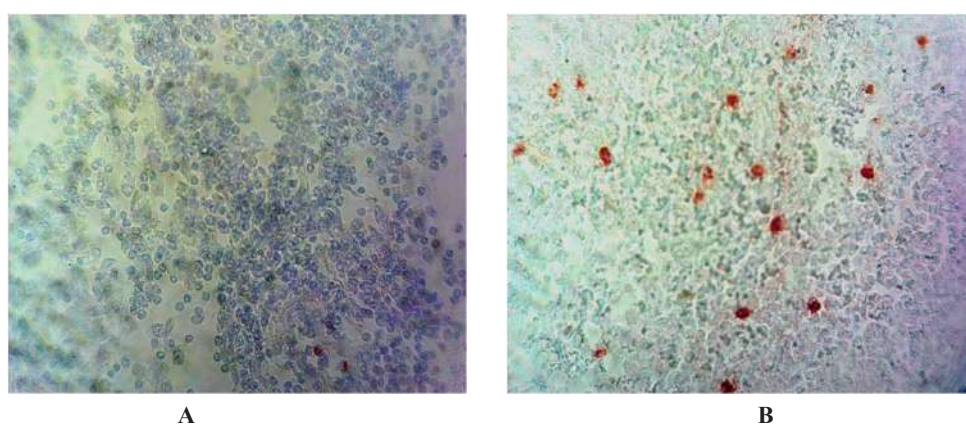


Figure 2: Microscopic appearance of Mutated P57- CISH signal in ovarian tumors. Using Digoxigenin-Labeled Mutated P57 Probe; stained with 3-Amino 9-Ethyl Carbazole (Red) and Counter stained by Nuclear Blue Solution (Blue). Red signal are detected at complementarity sequences sites (arrows).A-Breast Cancer with negative Mutated P57–CISH reactions (40X) .B-Positive Mutated P57 reaction with moderate score and strong signal intensity (40X).

CONCLUSION

We concluded from this study, HHV-8 & mutated of P57 positive signals in malignant & benign tumors tissues. They suggest an important role for these virus in the development of breast tumors in our Iraqi patients.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science, Babylon University, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effect of Snow Ball Strategy in the Comprehension Reading of Intermediate School Female Students in Reading and Texts

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ABSTRACT

This objective of this paper is to identify the effect of the snowball strategy in the reading comprehension of second grade students in the reading and texts. To achieve this objective, the researcher developed the zero hypothesis. The zero hypothesis states that there is no statistically significant difference at the level of significance (0.05) between the average grades of the students of the experimental group who will study the reading and texts according to the snowball strategy and the average score of the students of the control group who will study the same subject according to the usual method of reading comprehension. In order to achieve this, her experience was applied in the second half of the academic year (2017-2018). The study sample consisted of (65) students of the second grade intermediate in Sumaya intermediate school for girls. They were distributed randomly into two groups. The first one consisted of (32) students in the experimental group and (33) students in the control group. The two groups were rewarded in the following variables: (The age of the students calculated in months, the Arabic language grades in the first semester, and the parents educational achievement).

Keywords: Snow Ball Strategy, Comprehension reading, intermediate second grade, Reading and Texts

INTRODUCTION

It is known that evolution is the life norm, and the interaction with this development is required, the whole world today is witnessing remarkable progress in all areas. The nations and communities are distinguished by the knowledge, science and educated human fortune capable to revive itself through their capabilities, to form their future to keep up the current time. The educational process shows that there has been a remarkable shift or change in studies in the last quarter of the twentieth century on learning and education. At the beginning of seventies, psychologists and educators had become focusing on the principles of theories (cognitive constructivism) in their interpretation of learning and education processes ¹. argues that the constructivism theory is based on the idea that instinctive instincts exist in the individual to understand the world around him and

rather than acquires or accepting negatively the targeted new knowledge, learners build knowledge effectively by integrating new information and experiences with what they have previously understood. Moreover, they adjust and explain their previous knowledge to be compatible with the new knowledge ², whereas (Glaserfeld, 1988) see that constructivism is a cognitive theory that focuses on the role of the learner in the personal construction of the knowledge ³. In another words, knowledge is built in the mind by mental processes, and the total structure of the mind is constantly working to reorganize the cognitive pattern of the learner where the output will become permanently renewed and subjected to the representation and adaption, mainly influenced by the extent of learner and how much a positive he is and his effectiveness with his characteristics, which always makes the process of learning in an active movement that does not stop at a particular moment and make the mind as a member that renew himself at every moment, its contents and structure change according to the time, place and the elements of the environment surrounding the recipient. That is the philosophy of the constructivism permanent motion theory versus the

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antistatic and stability with the integrative processes in return the dependency on the linearity the analytical mind and the positivity of the learner. It is for sure that the educational process can achieve its goals in society only by means of communication, which is the language. Through which the scientific educational systems can be applied. The language is considered as a method of thinking, and fruit of its fruits. Through the language, the human can do processes of thinking of interpretation and analysis and balance and perception of relations; moreover, extraction of the results, and the abstraction and generalization⁴. The reading is considered more than seeing the words clearly, more than just knowing and distinguishing these words, it requires the reader to think, feel and fantasize, and this is called the comprehension of reading. The concept of reading comprehension has evolved considerably since it is considered reading in general and reading comprehension in particular is not a verbal performance of the written text, which includes two aspects: Conservation and assimilation. Reading is a process that involves far beyond the process of voting or pronouncing the words and the sentences. Reading requires the reader to understand what he is reading⁵. The process of reading comprehension begins by understanding the literal meaning of the symbols that the reader understands and by understanding the vocabulary and the relations between them. By combining these words with each other, he understands them as an integrated sentence and tries to extract the meaning⁶. Snowball strategy is one of the strategies based on an active learning philosophy based on constructivist theory, in which the learner is at the center of the learning process and its center, and represents one of the methods of collaborative learning, which represents a major model of active learning and a major strategy of its strategies. It is built on the basis that knowledge consists of a way of combining its parts into each other to be an integral whole, starting from the realization that the part is easier than the comprehension of all, and that the realization of all when it comes from the way of perceiving its parts is easier for the learner and more stable in his mind Atia, (2018). The researcher believes that the use of snowball strategy may contribute to raising the level of second-grade students in the medium of reading and texts, through the information they get from each other, which derives its foundations of active learning. It is one of the strategies for the development of the fast reading skill, which is similar to the snowball, the more rolling the more the size according to the number of times of rolling,

and so as the reading the more the language dictionary when the student becomes able to read quickly (image and mental), and verbal and written expression⁷. The current research aims to identify the effect of snowball strategy in the reading comprehension of middle school female students in reading and texts.

METHODOLOGY

The research methodology includes an overview for the procedures that were followed to achieve the objectives of this research in terms of adoption of the appropriate research methodology, the appropriate design, the research community, the selection method of the sample, the equality methods of the two groups, a presentation of the research requirements, tools, how to apply them, and the statistical means used in data processing. All of that will be presented as follows:

The experimental design for the research

It includes the independent variable (the snowball strategy), and (the normal method); moreover, it includes dependent variable (reading comprehension), so the researcher used an experimental design with partial control of two equal groups, one experimental and the other control.

The research community and the sample

The current research community represents the intermediate female students (middle and secondary) governmental school of the General Directorate of Education at the Mahaweel District for the academic year (2017-2018), which has at least two classes. Meanwhile, the researcher has selected randomly (Sumaya Intermediate School) as the research sample which is located in the center of Al Mahaweel District to implement the research. The selected school contained four classes for the scientific fourth grade which is known as (a, b, c, d, h). The researcher has randomly selected class (a) by using (the lottery method) to represent the experimental group. The experimental group consisted of (32) female student which will be taught according (the snowball strategy). In the same way, the researcher has randomly selected class (c) to represent the control group which is consisted of (33) female student. The control group will be taught according to the (normal method).

Experimental extinction

There was a continuity of attending the classes and no interruption in the current search groups for the whole duration of the experiment.

Operations related to maturity

This factor had no significant effect in the current study, because the experiment duration was uniform between the two research groups, as well as the partial adjustment adopted by the researcher in the experimental design, eventually the resulting maturity and growth will return positively the students of the two research groups.

Effect of the experimental procedures

The researcher has worked on limiting the effect of the experimental procedures which may affect the dependent variables during the experiment implementation.

Research requirements

The research material is one of the basic factors that the research will build on and according to which the research procedures are carried out. These requirements are as follows: Scientific material (Content). The scientific material that the researcher is teaching was determined for the students of the two research groups during the period of the experiment (second semester) for the academic year (2017 - 2018). It included (8) topics of reading and texts in (Part II) of the Arabic language text book, which is taught for the second grade students. The researcher prepared teaching plans for the subjects of the reading and the texts that will be taught during the experiment and that is in the light of the scientific material content with the behavioral goals. This will be implemented by using snowball strategy for the experimental group students and likewise in the normal way for female students in the control group.

Virtual honesty for the test

Honesty is one of the most important characteristics of the test in the educational and psychological standards, and the test is honest if it measures the attribute or the property prepared for its measurement⁸. In order to make sure of the honesty of the test and to achieve the set of the objectives that have been designed. The researcher has presented the research work to a group of Arabic language and teaching methods specialists. In addition

to that, the work has been presented to educational and psychological sciences specialists, to explore their opinions on the validity of the paragraphs in terms of comprehensiveness, integrity and level of measurement.

Test instructions

The researcher has put the following instructions:

a. Answer instructions

1. **Write your name and your class in the specified place in test sheet.**

2. Read the text carefully before the answer.

3. Do not leave any paragraph without answer.

4. The answer will be in the same test sheet.

5. The total score is (50) degree

b. Scoring instructions

The researcher assigned two grades for each of the paragraphs of questions (1 and 2) and zero for the wrong paragraph answer or not correct, and allocated five grades for each paragraph of the fifth question.

1. The test spatial application

Before starting the real test, the researcher applied the test on a sample of 100 female students from the second grade Al Mahaweel intermediate school on Sunday 8/4/2018. The aims of applying a spatial test on the survey sample was:

Define the right time to be consumed by the test

Analyzing the test paragraphs for:

a. Level of difficulty

b. Strength of distinguish

c. The effectiveness of wrong alternatives

d. Calculate the test stability coefficient

Calculate the test stability coefficient

The stability of the test means that the test will give almost similar results if it is applied on the same group. This means that the test will not be affected by the change of the factors and the outside circumstances; moreover, applying the test again and registering the same results

means the significance and real performance of the individuals irrespective the change in conditions ⁸. For the above mentioned reasons, the researcher chose the Coder-Richardson method to calculate the stability of the reading comprehension test. This method aims to reach to an estimated value of the stability coefficient of the test; moreover, it can be applied to the substantive paragraphs. The test designed by the researcher have a substantive questions within (90%) and two paragraphs only as an essay which means it will be a collective objective test. This test method more appropriate in comparative to the process of redo the test because it does not need to be applied again; moreover, it will not cost the researcher neither effort nor time. Accordingly, it is more appropriate for the research objective and the post-test. The researcher has found that the test stability value is (0.87) and with that it is considered a good value and suitable and according to that the test is stable.

Applying the final test for the reading comprehension

One week before the experiment ends, the researcher has told the students to be prepared for the reading comprehension test which will be held on Sunday 29th April, 2018. The test was taken on the specified day; moreover, the researcher supervised the test herself. The researcher explained for the students about the method of the answer before starting the test.

Statistical Tools

The researcher has used the following statistical tools: Independent T-test for two samples, Chi- Square, Pearson Linear Correlation Coefficient, function

of coefficient of difficulty and distinguish for the objectivity and essay paragraph, effectiveness of the wrong alternatives function. After analyzing the results statistically, the researcher has found: There was a distinction with the students of the experimental group in comparative to the students of the controlling group in the comprehension reading. The following table shows the results Table 1.

RESULTS AND DISCUSSION

The research hypothesis has indicated that: “There is no statistically significant difference at (0.05) between the average scores of female students who taught reading and text using the snowball strategy, and the average score of students in the control group who taught the same subject in the usual way,” the research hypothesis states. To test the hypothesis of the research, the arithmetical averages and standard deviations for the students’ scores of the two groups were calculated in the test of post-reading comprehension in the reading and text material; moreover, the results of T-Test were then extracted to detect the significance of the differences between the averages. It was noticed that there were statistically significant differences at the level of (0.05) between the two groups, the experimental group and the control group on the test of post-reading comprehension in the reading and texts. According to the arithmetic averages, it can be notice that these differences are in favor of the experimental group. In this way, we reject the null hypothesis and accept the alternative hypothesis, which means that the snowball strategy positively affects the academic level of female students.

Table 1. Experimental group in comparative to the students of the controlling group in the comprehension reading.

Group	Students Number	Mathematical Average	Standard Deviation	Variance	Freedom Degree	T-Values		Level of Significance
						Calculated	Tabulated	
Experimental	32	33.41	7.26	52.71	63	4.298	2	Non indicated at 0.05 indication level
Control	33	25.97	6.68	44.62				

CONCLUSION

Using the snowball strategy was successful in teaching subjects of reading and texts for the second intermediate grade. Using the snowball strategy helped in increasing the motivation for the students and increased their enthusiasm in addressing the subject.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Higher Studies, College of Basic Education, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effect of the Strategy of (P.E.C.S) in the Achievement of Students in the Second Grade Intermediate in Science

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ABSTRACT

The research aims at identifying the impact of the PECS strategy on the achievement of second grade students in science. The research sample consists of 66 students divided into two experimental groups containing 32 students and the second one was composed of 34 students and the two groups were satisfied in the achievement variables of science and The scientific knowledge prior to their information and the testing of intelligence and the age of time, the construction of the achievement test consists of 40 paragraphs of the type of multiple choice and verified the validity and stability after the implementation of the experiment in the academic year 2017-2018 by the researcher with the two groups of research and according to the plans that have been prepared for them and Apply Brother Bar summative results showed superiority of the experimental group that studied according to the strategy ((P.E.C.S the group studied according to the method in the usual academic achievement variable.

Keywords: Strategy (p.e.c.s), Achievement, Second Grade Students, Science

INTRODUCTION

The scientific development and the knowledge explosion that the world is witnessing year after year has become the hallmark of this era in various fields, especially in the field of communications, which has greatly helped to strengthen the use of theories, models, philosophies and teaching methods. Education is an effective means of achieving the strategic objectives of the society because of its importance in adapting and interacting with the local environment, which creates the conditions for the formation of citizens and preparing them capable of promoting the society and adapting them to changes. Which affects the environment and society ¹. The curriculum is very important in education and its importance is reflected in the fact that it is the main tool that achieves the objectives of education, which is the core and method of education. The method has a close relation to teaching methods, because the method is a corner of its structure, or as it is described by Klepatric: "The way a leg from the legs of education and

the other leg is the curriculum is that education cannot walk on one leg ². Although Zipp (2012) does not focus on specific teaching methods, the challenge facing other researchers clearly shows that educational curricula must be centered around the student and beyond the role of the educational teacher on the transfer of his teaching function ³. The teaching of any branch of flattery and knowledge must reflect its nature and processes. Thus, the methods of teaching science must reflect the nature of science that deals with natural phenomena of all kinds. The study of physics helps students to understand and think in the age of science and methodology Which has become difficult for students to live in the twenty-first century without understanding the nature of science and knowledge of the basic physical information and the use of scientific thinking methods to solve the problems of life and make good decisions under the innovations of science and methodology ⁴. Student participation has emerged as one of the cornerstones of learning and teaching in education systems around the world ⁵. Concerns about students' participation in education are not new as university education professionals have always been interested in understanding and managing student participation in effective learning ⁶. Recently, many new strategies and methods of teaching have

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been developed that focus on the learner rather than on the content of the material or the teacher. Strategies for active learning include the strategy of “active learning strategies” Student-centered learning is the most effective and is more successful in encouraging it toward learning and raising students’ thinking through teamwork. Many claim that we need to make students work in groups as part of their own learning experiences, simply by putting them in groups or allowing them to choose their own groups to work in groups as the group works to improve student education ⁷. Bonwell & Eison defines active learning as an opportunity for students to engage in activities that encourage them to think and comment on the information presented for discussion. Students are not just listeners but develop their skills to deal with different and different concepts. They apply, the students engage in activities that force them to respond to ideas and make them think a lot about the information they are given and how they use them in new educational situations. Active learning is defined as: - The learning environment that allows students to listen, speak, write, and meditate deeply through the use of various techniques and methods such as problem solving, small groups, simulation, case study, role play ... and others ⁸. The importance of active learning from the positive outcomes that the learner experiences in terms of knowledge, skills and attitudes shows that the stages change to activate active learning among the students, taking a wide range of activities And various applications such as discussions J grade figures raise hands and exercises and building activities Groups. The problem of teaching and peer simulation to interact with the new Altknoggio and focus on the classroom and avoid traditional methods ⁹. Meyers & Jones noted that when we encourage students to participate in activities that lead them to the discussion and ask questions and clarifications about the content of education, we are only working to keep the best information about the subject matter but also to develop the thinking abilities of the learners. Who has not X-Ray X-Ray for the chest or teeth? What about CT scan? Maybe a MRI image using MRI? Is someone you know about cancer has been treated with radiation therapy? Do you know anyone has been infected with thyroid hormone and treated with radioactive substances?? Or another injected with a radioactive material to be photographed later on the PET positron? I have certainly heard about radiation damage, and you may have heard or know the benefits of radiation - in diagnosis and treatment! We all in one way

or another affect medical physics in our lives. Medical physics is one of the branches of applied physics, where physics is applied in the medical field, especially in the diagnosis and treatment of human diseases.

Medical Physics is divided into four main branches: Therapeutics Radiological Physics, Nuclear Medicine Physics, Diagnostic Imaging Physics and Radiation Prevention (Health Physics) Medical Health Physics. In the large hospitals there is a department called Medical Physics, under which people of these four branches. The Division of Radiotherapy Physics is often the largest, where physiologists provide support services for the Department of Oncology, hospital radiotherapy such as radiation dose planning and ensure accurate access to the patient tumors. Diagnostic imaging devices such as x-rays, class radiology, magnetic resonance imaging, ultrasound, etc. require the presence of diagnostic imaging physicists. They are designed to conform to international standards and standards when used in patients. Radiation at the hospital or facility? If there are healthy physicists make sure that patients or employees are not exposed to unnecessary radiation and are communicating with the competent authorities of radiation protection in the state. In the case of the presence of nuclear medicine devices in the hospital, there is at least one medical physicist who provides services for that department, such as testing the quality of the devices and ensuring the safety of the radiation environment in addition to training and education. The work of medical physicists includes four activities: clinical service and counseling, research and development, teaching, and management. The involvement of the medical physicist in all or some of these activities depends on the workplace, his background, and his personal interests. For example, most of the activity of the medical physicist working in a non-teaching hospital or clinic in the clinical service, while the medical physicist working in an academic institution, most of its activities are academic, such as teaching and scientific research. Academic study alone is not enough to form a clinical medical physicist. He needs practical experience in dealing with medical problems and various devices in his field. This experience can be obtained by continuing with the on-the-job training or preferably through a one-year or two-year internship program (Residency Internship Program) in the hospital after obtaining a master’s or doctoral degree in medical physics. The clinical medical physicist is then encouraged

to obtain a professional certification or what is known as a board - such as doctors. There are American, Canadian, British, Australian and others.

Are hospitals the only place for a specialist in medical physics?

A large part of the medical physicists are going to clinical work in hospitals. And another part is found to be directed to academic teaching and scientific research in universities. There is, of course, a combination of the two - clinical and academic work - if the working environment permits it. There are medical physicists who are in the medical equipment companies working on the development of medical devices and on the training and education of users and even in marketing and after-sales services. The governmental bodies concerned with quality control and radiological safety set regulations and standards and apply them to the establishments and require medical physicists. Industrial companies that use radiation in non-destructive tests, in qualitative quality checks or in the evaluation of their products and pipes are also looking for medical physicists.

METHODOLOGY

The research procedures that were carried out to achieve its objectives include the methodology chosen by the researcher and experimental design, identification of the research community and its design, the equivalence of the research groups, preparation of research requirements and tools, procedures for applying the experiment and presentation of the statistical means used.

Search community and design:

The researcher community (intermediate Hashimiyah for Boys) have been chosen randomly to apply the current research experience, and after the researcher chose (A, B, C). The researcher chose (a) the random drawing method to represent the experimental group and the number of its students (32) students who will study their students according to the (pecs strategy), And in the same way the researcher randomly selected Division B to be completed Such as the control group and the number of students (34) students who will study their students according to (the normal method). Equivalence of the two groups of research: The researcher has rewarded the two groups of research in the following variables (age of students, grades of students in science

for the first class, IQ test) Table (1).

Adjusting Exotic Variables: The control of extraneous variables is one of the important procedures in experimental research in order to provide the internal truth of the experimental design. Therefore, the researcher tried to control the external variables that he sees that may affect the safety of the research and the following: Accidents associated with the experiment: Experiment has not been subjected to any emergency conditions or accidents that impede its progress. Experimental Exhaustion: Only a few cases of interruption, the sample was randomly selected and the two groups were selected with a number of variables. Thus, the researcher was able to avoid the effect of the individual differences between the two groups of research which may affect the results of the research. The maturity factor: I In the two groups, therefore, the growth will return equally to the members of the two groups. Therefore, this factor did not affect the research. Measurement tools: The same measurement tools were used for the two research groups (the achievement test), the effect of experimental procedures: The researcher is keen to preserve the confidentiality of the research, in agreement with the school administration and the school of the article not to inform the students of the nature of the research and application of the experiment, as they were informed that the researcher New teacher at school The duration of the experiment was equal to the two groups of research (8 weeks), which started on Monday (5/3/2018) and ended on Wednesday (26/4/2018) (2017, D), which is to be taught for the second intermediate grade by the Iraqi Ministry of Education for the academic year (2017-2018). The teacher: The researcher studied the two research groups himself for the duration of the experiment. The results of the experiment confer accuracy and objectivity, because the difference in teachers may affect the results of the experiment and hides the effect of the independent variable Place: The experiment was applied in the same school, which is the middle school for boys. Distribution of lessons: It was agreed with the school principal and the material school on the equal distribution of the lessons between the two groups of study, with two lessons per week for each group, with one lesson per group on the same day.

Determination of the course material: The course material was determined in the second part of the science book (2017, i), which is to be taught for the second intermediate grade for the year by the Iraqi Ministry of

Education (2017-2018) Of the teaching plans of the two research groups according to the content of the book of science part two (2017, i), which is to be taught to the second grade students for the academic year (2017-2018) and the behavioral goals. 32 teaching plans were prepared with (16) In accordance with the strategy of (pecs) and (16) teaching plan for the control group according to the The usual.

RESULTS AND DISCUSSION

The students of the experimental group who studied according to the pecs strategy exceeded the students of the control group who studied according to the usual method in the achievement test. This is consistent with the studies that confirmed the superiority of the experimental group studied according to the pecs strategy of the control group that studied According to the normal method Table (2).

Table 1. Shows the parity between the two groups:

Iam equal	Arithmetic mean		Variance		Degree of freedom	T value		Statistical significance
	Section(A) Number (32)	Section(B) Number (34)	Section(A) Number (32)	Section(B) Number (34)		Neptotism	Table	
Danleys test	29.5	27.79	21.16	46.51	64	1.184	2.00	0.05
The chronological age	163.63	162.88	31.81	18.32	64	0.605	2.00	0.05
First course	64.09	63.94	240.25	199.37	64	0.042	2.00	0.05

Table 2. The students of the experimental group who studied according to the pecs strategy exceeded the students of the control group who studied according to the usual method in the achievement test.

The group	Number	Arithmetic mean	Variance	Degree of freedom	T value		Statistical significance
					Neptotism	Neptotism	
experimental	32	30.5	21.81	64	3.347	2.000	Statistical function
Control	34	26.35	28.62				

CONCLUSION

Appropriate strategy (p.e.c.s) with science subjects taught to middle school students in intermediate and secondary schools, and that the implementation of the steps of the strategy will inspire the spirit of cooperation among students in the lesson.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Basic Education, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Efficacy of A Theory-Based Health Education in Enhancing High School Female Student's Preconception Health Behaviors in Baghdad City

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ABSTRACT

Objectives: To determine the efficacy of a theory-based health education in enhancing students' preconception health behaviors, (2) To determine the association between students' age, body mass index, SES and their preconception health behavior, and (3) To investigate the differences in preconception health behavior between age groups, marital status groups, and socio-economic status groups. A randomized controlled trial (RCT) was used to guide this study. The data were collected from Ministry of Education / General Directorate of Education - Al-Rusafa II / Al-Sawari High School for Girls in Al-Rusafa side of Baghdad City. A systematic random sample of (148) female students; (74) student for study group; (74) student for control group. The instrument used in this study includes the socio-demographic sheet, the Reproductive Health Attitudes and Behaviors questionnaire (RHAB), and Reproductive Health Knowledge Scale for Women (RHKS-W). The data were analyzed by two statistical approaches: Descriptive and Inferential statistics. The study result revealed that the age mean for participants in the study group is 17.38 ± 1.53 ; more than a third age 17-years-old ($n = 26$; 35.1%). For the control group, the age means is 17.36 ± 1.42 ; more than a third age 17-years-old ($n = 28$; 37.8%).

Keyword: Health Education, Health Behaviors, Female.

INTRODUCTION

Every woman of reproductive age who is capable of becoming pregnant is a candidate for preconception care (PCC), even if she is not planning to conceive. Men should also receive preconception care, although the components are not as well-defined in men as they are in women¹. The term of PCC (the period prior to pregnancy) has been used in North America since the 1980s to describe child bearing related health care for women before they become pregnant. It was first associated with the care provided to women who had already experienced adverse pregnancy outcomes, but soon came to be recommended for all women. Despite this history, there is no uniform definition or universal

recognition of PCC². The core components of PCC as categorized by the CDC are; assessment, health promotion, and interventions. Assessment involves screening and identifying women, family, or couple with any conditions either medical or behavioral, which can affect pregnancy and its outcome. Health promotion consists of counseling on healthy behaviors before and during pregnancy. Finally, the last component intervention includes an education about nutritional supplements, risk of unhealthy behaviors, family planning methods and many others^{3,4}. Enhance the knowledge, attitudes and behaviors of men and women related to preconceptional health, 2. Ensure that all women of reproductive age in the USA receive PCC services for example, evidence-based risk assessment, health promotion and interventions that enable them to enter pregnancy in ideal health, 3. Reducing the risks indicated by the previous negative pregnancy outcomes through interventions during the interconceptional period that could prevent or reduce the health problems of the mother and her children in

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the future, and 4. Reducing disparities in the negative pregnancy outcomes⁵. Preconception health behaviors (PCHBs) include the partners who plan for pregnancy and lifestyle changes to having greatest chance for fertility and positive pregnancy outcomes, actually, PCC includes interventions to identify and change biological, medical, behavioral and social risks that are threats to women's health and outcomes of pregnancy through prevention and control^{6,7}. Iraq is still recovering from long period of conflict and political turmoil⁸⁻¹¹. The Iraqi health system is still recovered from decade of cruel war and struggle and lacking of the indicators of maternal and child health; Regarding to the health assessment and functional review published by Iraq's Ministry of Health and WHO in 2011, Iraq is among the group of sixty eight countries that account for ninety seven percent of all mother and child deaths in over the world¹².

METHODOLOGY

A randomized controlled trial (RCT) was used to guide this study. The first review of the research proposal was acceptable by the Department of Community Health Nursing Scientific Committee. The proposal was approved by College of Nursing. The researcher obtained the approval of the Ministry of Education / General Directorate of Education Al- Rusafa II. Numerous variables were examined to determine each subject's inclination to commit to preconception health behavior (PCHB), including, age, class, socioeconomic status (SES), body mass index (BMI), and preconception health knowledge (PCHK). The study was conducted at That Al-Sawari High School for girls. This school was selected randomly through a simple random sampling procedure. The final sample size ($n = 74$) for study group and ($n = 74$) for control group. The two groups were pretested on December 18th, 2017. The intervention was applied with insertion the health education materials (PowerPoint presentation and a booklet) for the study group only in December 24th, to 28th, December, 2017. The first posttest was carried out in February 25th, 2018. The second posttest was carried out in April 20th, 2018. The instrument used in this study includes the socio-demographic sheet, the Reproductive Health Attitudes and Behaviors questionnaire (RHAB), and Reproductive Health Knowledge Scale for Women (RHKS-W). The RHAB scale used in this study includes 19 items after excluding the items that are culturally inappropriate to the Iraqi culture. The 19 items cover the issues of obtaining preconception counseling, and using effective birth

control methods. These items are measured on a 5-point Likert scale type; 1 for (Never) to 5 for (All times). The total scores of this scale ranges from 19 to 95. Higher scores indicate better reproductive health attitudes and behaviors. The (RHKS-W) was contained 28-items with a dichotomous response choice pattern; 1 for incorrect answer, and 2 for correct answer. The total score of this scale ranges from 28 to 56. Higher scores indicate better reproductive health knowledge. Acceptable levels of reliability for most of the scales ($\alpha = 0.65-0.83$) given the level of expertise of the panel (developers of the 3 theories), the scales has strong content validity. Furthermore, the questionnaires tools were introduced to panel of 8 experts who had more than 5 years of experience in their health field. They were 6 members from University of Baghdad/ College of Nursing, and 2 members from Al-Rusafa health directorate/ Baghdad. Data were analyzed using the descriptive statistical measures of frequency, percent, mean, and standard deviation will be used. Furthermore, the inferential statistical measures of bivariate correlation were be used. Moreover, the non-parametric tests of repeated measure ANOVA, Kruskal-Wallis test, and Mann-Whitney U test were used.

RESULTS AND DISCUSSION

The age mean for participants in the study group is 17.38 ± 1.53 ; more than a third age 17-years-old ($n = 26$; 35.1%), followed by those who age 16 and 18-years-old ($n = 16$; 21.6%), those who age 19-years-old ($n = 7$; 9.5%), those who age 20-years or older ($n = 5$; 6.8%), and those who age 15-years-old ($n = 4$; 5.4%). For the control group, the age means is 17.36 ± 1.42 ; more than a third age 17-years-old ($n = 28$; 37.8%), followed by those who age 18-years-old ($n = 22$; 29.7%), those who age 16-years-old ($n = 13$; 17.6%), those who age 19-years-old ($n = 7$; 9.5%), and those who age 15 and 20-years or older ($n = 2$; 2.7%). Concerning marital status, the majority in the study group are not married ($n = 68$; 91.9%), followed those who are engaged ($n = 4$; 5.4%), and those who are married ($n = 2$; 2.7%). For the control group, the majority in the study group are not married ($n = 71$; 95.9%), followed those who are engaged ($n = 2$; 2.7%), and one who is married ($n = 1$; 1.4%). Regarding the SES, more than two-fifth in the study group are of the lower middle class ($n = 32$; 43.2%), followed by those who are of the upper middle class ($n = 31$; 41.9%), and those who are of the upper lower class ($n = 11$; 14.9%). For the control group, more

than a half are of the lower middle class ($n = 38$; 51.3%), followed by those who are of the upper middle class ($n = 25$; 33.8%), and those who are of the upper lower class ($n = 11$; 14.9%). There is a positive statistically significant correlation between participants' attitudes toward the reproductive health for the study group and their reproductive health knowledge ($r = .242$; at p -value < 0.05). The values of attitudes toward the reproductive health for the study group increase noticeably by time in comparison with the control group (Pretest = 54.73 vs. 56.00, Posttest II = 63.64 vs. 54.22, Posttest II = 67.99 vs. 54.77) respectively. The values of the reproductive health knowledge for the study group increase noticeably by time in comparison with the control group (Pretest = 42.05 vs. 45.03, Posttest II = 110.15 vs. 45.15, Posttest II = 112.66 vs. 45.38) respectively. Whether these represent significant differences is the job of the repeated measures (RM) ANOVA. The age mean for participants in the study group is 17.38 ± 1.53 ; more than a third are within the age group 17-years-old age. This finding goes in line with the usual age average for high school students in Iraq. This finding was consistent with that obtained by Charon-proshownic and others (2006) who found that most of participants with mean age 17.9 years ($SD = 1.26$, range = 16.1-22.0 years). This finding was inconsistent with that obtained by Corbett (2011) who found that most of Participants were largely self reported White/non-Hispanic women (88.2%) with a mean age of 19.27 years ($SD = 2.09$). Less than a half in the study group described their knowledge about healthy diet as somewhat good. This finding was lower than that obtained by Corbett (2011) who found that (92.6 %) indicated (somewhat strong or very strong) awareness of healthy nutritional guidelines, and (59.6%) reported that they follow these guidelines (most of the time or all of the time). This finding reflects the positive effect of the administered theory-based health education in enhancing students' knowledge about healthy diet. With respect to the frequency of physical exercise, most in the study group in the pretest time reported that they practice it 1-2 days per week ($n = 51$; 68.9%), followed by those who practice it five or more days per week ($n = 13$; 17.6%), and those who practice it 3-4 days per week ($n = 10$; 13.5%). In the posttest time, more than a half reported that they practice it five or more days per week ($n = 38$; 51.4%), followed by those who practice it 1-2 days ($n = 24$; 32.4%), and those who practice it 3-4 days ($n = 12$; 16.2%). This finding could be explained as that

the majority of students reported that they have weekly sport exercise. Such a class could motivate students to maintain exercising as much as possible throughout the week. This finding was consistent with that obtained by Al-Akour and others (2015) who found that (79.9%) of women believe that they should exercise and undertake physical activity, and that of Robbins and others (2018) who found that (53.5%) of women have been participating in recommended levels of physical activity. This finding was consistent with that obtained by Corbett (2011) who found that more than half of women in the sample ($n = 120$, 59.1%) reported that they work out at least 3 days per week. This finding reflects the positive effect of the administered theory-based health education in enhancing students' knowledge about healthy exercises. Concerning the quality of sexual education, less than a half in the study group in the pretest time described such an education as very limited ($n = 34$; 46.0%), followed by those who described it as somewhat limited ($n = 22$; 29.7%), those who described it as excellent ($n = 10$; 13.5%), and those who described it as somewhat good ($n = 8$; 10.8%). In the posttest time, more than two-fifth described it as excellent ($n = 32$; 43.2%), followed by those who described it as somewhat good ($n = 27$; 36.5%), those who described it as somewhat limited ($n = 12$; 16.2%), and those who described it as very limited ($n = 3$; 4.1%). The sexual health education for females students has enhanced by a theory based health education related to positive motivation in their health attitudes. This finding was inconsistent with that obtained Corbett (2011) who found that (79.3%) women indicating that the quality of the sexual education they had received was (somewhat strong or very strong), and (70.4%) women indicating that the breadth of their sexual education was (somewhat broad very broad). With respect to the preconception knowledge, less than a half in the study group in the pretest time described such knowledge as somewhat limited ($n = 35$; 47.3%), followed by those who described them as very limited ($n = 27$; 36.5%), those who described them as somewhat good ($n = 9$; 12.2%), and those who described them as excellent ($n = 3$; 4.0%). In posttest time, the majority described such information as excellent ($n = 62$; 83.8%), followed by those who described them as somewhat good ($n = 9$; 12.1%), those who described them as somewhat limited ($n = 2$; 2.7%), and one who described them as very limited ($n = 1$; 1.4%).

Table 1. Participants' Sociodemographic Characteristics

Variables	Study (N = 74)		Control (N = 74)	
	f	%	F	%
Age: Mean (SD) (Study): 17.38 ± 1.53 Mean (SD) (Control): 17.36 ± 1.42				
15	4	5.4	2	2.7
16	16	21.6	13	17.6
17	26	35.1	28	37.8
18	16	21.6	22	29.7
19	7	9.5	7	9.5
≥ 20	5	6.8	2	2.7
Marital Status				
Not married	68	91.9	71	95.9
Engaged	4	5.4	2	2.7
Married	2	2.7	1	1.4
SES Class				
Upper lower class	11	14.9	11	14.9
Lower middle class	32	43.2	38	51.3
Upper middle class	31	41.9	25	33.8

Table 2. Correlations among Study Variables in the Pretest Time for the Study Group

	1.	2.	3.	4.	5.	6.
1. Age						
2. BMI	.126					
3. SES	-.144	.029				
4. Subjective Norms	-.012	-.040	.086			
5. Attitudes	.085	-.029	.187	-.014		
6. Reproductive Health Knowledge	.182	.190	.182	.030	.242*	-

Table 3. Descriptive Statistics for the Values of the Attitudes toward Reproductive Health over Time

Attitudes	Mean	Std. Deviation	N
Study Pretest	54.73	10.572	74
Study Posttest I	63.64	8.491	74
Study Posttest II	67.99	6.572	74
Control Pretest	56.00	9.603	74
Control Posttest I	54.22	8.770	74
Control Posttest II	54.77	8.592	74

Table 4. Descriptive Statistics for the Values of the Reproductive Health Knowledge over Time

Reproductive Health Knowledge	Mean	Std. Deviation	N
Study Pretest	42.05	3.61	74
Study Posttest I	110.15	8.88	74
Study Posttest II	112.66	13.68	74
Control Pretest	45.03	3.24	74
Control Posttest I	45.15	3.62	74
Control Posttest II	45.38	3.48	74

Table 5. Tests of the Within-subjects Reproductive Health Knowledge Values

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time (Study)	Sphericity Assumed	237507.847	2	118753.923	1538.406	.000	.955
	Greenhouse-Geisser	237507.847	1.656	143461.103	1538.406	.000	.955
	Huynh-Feldt	237507.847	1.689	140608.312	1538.406	.000	.955
	Lower-bound	237507.847	1.000	237507.847	1538.406	.000	.955
Error (Time) (Study)	Sphericity Assumed	11270.153	146	77.193			
	Greenhouse-Geisser	11270.153	120.856	93.253			
	Huynh-Feldt	11270.153	123.308	91.399			
	Lower-bound	11270.153	73.000	154.386			
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time (Control)	Sphericity Assumed	4.712	2	2.356	.331	.719	.005
	Greenhouse-Geisser	4.712	1.015	4.644	.331	.570	.005
	Huynh-Feldt	4.712	1.015	4.641	.331	.570	.005
	Lower-bound	4.712	1.000	4.712	.331	.567	.005
Error (Time) (Control)	Sphericity Assumed	1038.622	146	7.114			
	Greenhouse-Geisser	1038.622	74.064	14.023			
	Huynh-Feldt	1038.622	74.109	14.015			
	Lower-bound	1038.622	73.000	14.228			

CONCLUSION

The researcher concluded that students' knowledge about healthy diet, quality of sexual education, family planning, and preconception health knowledge have been improved after administering the theory-based health education. Students' following to healthy diet guideline, frequency of physical exercise have increased after administering the theory-based health education. The theory-based health education was influential in enhancing students PCHB and reproductive health knowledge.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Baghdad, College of Nursing, Academic nurse, Baghdad Health Directorate Ministry of Health and all experiments were carried out in accordance with approved guidelines.

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Electrical Properties of Polyaniline - PEDOT Nano Composite

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ABSTRACT

In this research we study the electrical properties of polyaniline (PANI) nano films pure and doped with multi-walled poly(3,4-ethylenedioxythiophene) PEDOT and which included direct electrical conductivity (σ_{dc}), activation energy and the hall effect with ratio (0.1%, 0.2%, 0.3%) prepared by spin coating deposited on glass substrate at room temperature. The results showed that (PANI) has conductivity about of (2.248×10^{-8}) ($\Omega \cdot \text{cm}$)⁻¹) at room temperature; and this conductivity increased with increasing of doping ratio, also with increasing of temperature as well as the results showed throughout the study that (PANI) has one activation energy and this energy decreased with increasing of doping ratio. The hall effect showed that the (PANI) its p-type.

Keywords: Electrical properties; Polyanilin ; nano Composite; poly(3,4-ethylenedioxythio-phen) PEDOT

INTRODUCTION

Advancement in the field of nanotechnology and its applications to the field of medicines and pharmaceuticals has revolutionized the twentieth century. Nanotechnology is the study of extremely small structures. The prefix “nano” is a Greek word which means “dwarf”. The word “nano” means very small or miniature size. Nanotechnology is the treatment of individual **atoms**, molecules, or compounds into structures to produce materials and devices with special properties. Nanotechnology involve work from top down i.e. reducing the size of large structures to smallest structure e.g. photonics applications in nano **electronics** and nano engineering, top-down or the bottom up, which involves changing individual atoms and molecules into nanostructures and more closely resembles chemistry biology, Polymers of unique composition have the properties of semiconductors, while mainly commercial polymers are insulator. known that polymers are simply shaped, chemists and physicists happening median the twentieth irregular double century to conduct studies designed to expand conductor polymers characterized

by the bonds ¹ Polymeric materials can be synthesized and processed into different shapes according to the required application such as thin films, polymer have many advantages to the electrical application due to their simple synthesis technology, relatively low cost materials and can be deposited on different substrates, moreover, they have special characteristic that mode them very important, such that, they have a wide range of electrical conductivity [10^{-24} - 10^6 S/cm] ^{2,3}. The electrical conductivity of polymers related with free ions which are not chemically linked to the large molecules, Conductive polymer is broadly used in microelectronics engineering, the magnitude, these microelectronics application is that it has physical properties modified to a particular request and recognize the mechanisms controlling these properties ^{4,5}. Polyaniline is one of conductive polymers, a kind of p-type and its behavior resembles the behavior of semiconductors ⁶. Also it features properties photoelectric task could be used in industrial applications ⁷. It is used in the solar cell industry and in printed electrical panels for panels electrical appliances Maps ^{8,9}.

MATERIALS AND METHOD

Preparation of samples

The thin films of (Polyaniline) were synthesized by using spin coating technique that the polymer is

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dissolved in (Chloroform) and deposited on substrate of glass.

D.C Electrical Conductivity:

There are two ways to calculate the D.C Electrical Conductivity:

- a- Interdigitated finger Electrode
- b- Deposition polar
- a - Interdigitated finger Electrode

Consisting of poles individually-like comb teeth and be very sensitive to the thin films in solid-state physics which are small and distinctive size and dimensions are measured in nano-meter , as in Figure (1) ^{3,10}. Which shows that the electrodes consist of aluminum in the form of lines on the base of the glass, and can perform calculations using the following relationship

$$\sigma_s = [I/V] [L/Wt\ell] \dots\dots\dots (1)$$

Where(t) represents the thickness of polymer, (W) the distance fingers (10mm), (ℓ) number of fingers is to be (10), and (L) the space between electrodes (100µm).

- b - Deposition polar

Masks have been designed for this technology using thin aluminum material and forms suitable and as in figure (2) and purpose is to determine the geometry of the electric pole and raise these masks after the completion of the deposition process Electrical conductivity can be calculated using the following equation ¹¹.

$$\sigma = \sigma_o EXP(\frac{-E_a}{k_B T}) \dots\dots\dots (2)$$

Where: Ea: activation energy (eV). T: the absolute temperature (K), k_B:Boltzmann’s constant, σ_o:constant.

The D.C.conductivity films prepared account after measuring the resistivity of films (ρ) for each temperature starting from room temperature down to the point (60°C) using the following equation [12]

$$\rho = \frac{RAT}{L} \dots\dots\dots (3)$$

W h e r e : R is resistant films practically measured (Ω), A pole width (cm), L the distance between the opposite poles (cm).

It resistivity account that has been. The D.C.conductivity calculation (σ_{dc}) of calculating the value of inverted resistivity, namely that ¹³.

$$\sigma_d = 1/\rho \dots\dots\dots (4)$$

Based on the equation (2) painted a graphic relationship between (Lnσ and (1000 / T)) and so could account activation energy which is equal to the slope of the line extracted from the graph multiplied of Boltzman’s constant . The electrical properties of (PNAI) are measured by digital electrometer type Keithley (616) to measure the passing current as a function to the applied voltage .The samples were placed inside electrical oven.

Hall Effect:

Hall effect known as the difference in the distribution of the current in the conductive or semi-conductive segment due to the magnetic field ^{12,13} which shed a magnetic field on a conductor carrying an electric current direction perpendicular to the direction of current flow generates a delinquency charge carriers aside and cause the generation of electric driving force over the connector direction perpendicular to the direction of both the current and the magnetic field, electrical circuit for measuring the Hall effect, which consists of D.C. power supply with (0 – 40) volt and two digital electrometers (HMS-3000) to measure the current and voltage.

The Hall effect in semiconductors measurements are given the following equation ¹⁴.

$$R_H = -(\frac{1}{e}) = \frac{V_H.t}{I_x.B_z} \dots\dots\dots (5)$$

It represents: R_H: Hall coefficient. n: the concentration of carriers. e: electron charge. t: the thickness of the films. I_x: current flowing in the films. B_z:

The intensity of the magnetic field. And from this relationship the Concentration of the majority carriers account, using the following relationship was Hall mobility of these carriers account ¹³.

$$\mu_H = |R_H|\sigma \dots\dots\dots (6)$$

As it represents: Hμ Mobility Hall.σ electrical conductivity[15

RESULTS AND DISCUSSION

The D.C Conductivity and Activation Energy

Measurement results showed that polyaniline has electrical conductivity up to $(2.248 \times 10^{-8}) (\Omega.cm)^{-1}$ at room temperature and that this conductivity increases with increasing temperature, As for the films vestiges we note there is also an increase in the conductivity values with the increase in the proportion of doped, This can be explained by the increase that led to the formation of impurity donor levels Near the conduction band, When the activation energy calculation we found that there was a single activation energy and this shows the transition in a way thermal stimulation at the border granular mechanical occurrence, As for the films vestiges, the value of the activation energy decreases with increasing the proportion of doped As shown in Table (1), This can be explained that increasing the proportion of impurities led to the approach of the Fermi level more towards the conduction band, as is evident in Figures (3,4). The results of the measurements of the Hall effect that all films prepared is the p-type through the positive sign of the Hall coefficient, The results also showed that (PANI) has a value of mobility $(4.1 \times 10^2 cm^2/V.s)$ at room temperature. in films vestiges there was a clear increase in the concentration of carriers and a decrease in the values of mobility at room temperature with increasing doping ratio as in the table (2), This was due largely to an increase in the concentration of carriers formed near the conductive band, which in turn lead to an increase the number of donor atoms of electrons capable of ionization within the thermal energy does not exceed the value of topical levels $(K_B T)$, As for the decrease in mobility shall be due to the increased concentration of carriers.

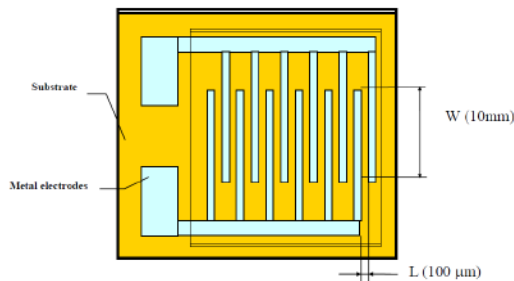


Figure 1. A schematic diagram of interdigitated finger electrode.

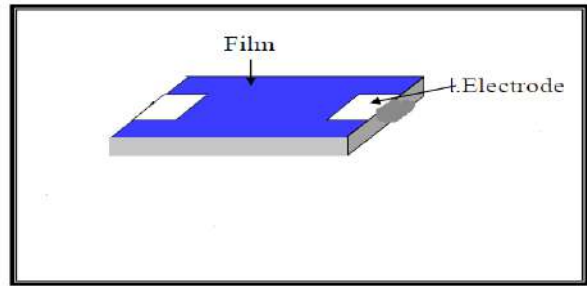


Figure 2. Shows an illustrative scheme of poles precipitated on the sample to be measured.

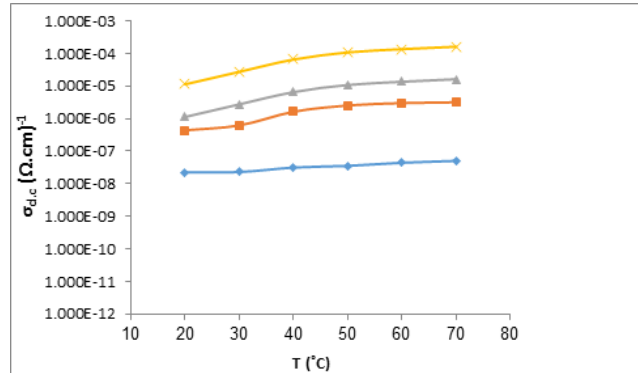


Figure 3. Variation of $\sigma_{d.c}$ versus temperature for (PANI: PEDOT)

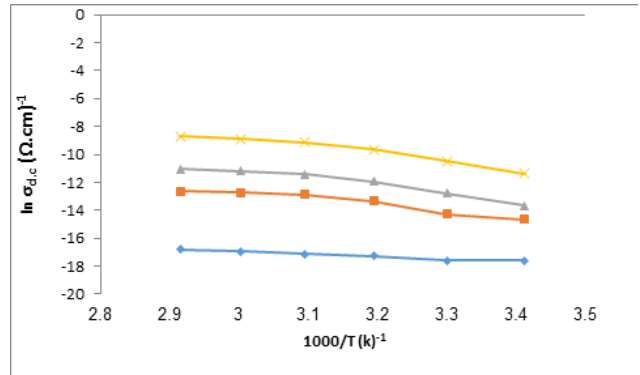


Figure 4. Ln (σ) versus 1000/T for (PANI: PEDOT)

Table 1. D.C.conductivity parameters for (PANI: PEDOT) films for various ratios

Sample	Activation energy E_a (eV)	Electrical conductivity $\sigma_{d.c}$ ($\Omega.cm$) ⁻¹
pani	0.3580	2.248×10^{-8}
pani : PEDOT(1%)	0.2740	4.368×10^{-7}
pani : PEDOT(2%)	0.2614	1.130×10^{-6}
pani : PEDOT(3%)	0.2514	1.135×10^{-5}

Table 2. Hall parameters for (PANI/ MWCNTs) films at different ratios

Sample	R_H (cm^3 / C)	n_H ($1 / \text{cm}^3$)	ρ ($\Omega.\text{cm}$)	μ_H ($\text{cm}^2 / \text{V.s}$)	$(\sigma_{D.C})_{R.T}$ ($\Omega.\text{cm}$) ⁻¹
Pani pure	4.2×10^7	2.3×10^{11}	8.2×10^5	4.1×10^2	3.1×10^{-6}
pani:PEDOT(1%)	8.45×10^6	4.5×10^{11}	6.45×10^5	7.1×10^1	4.3×10^{-6}
pani:PEDOT(2%)	2.04×10^6	6.3×10^{11}	3.9×10^5	4.5×10^1	5.2×10^{-6}
pani:PEDOT(3%)	1.2×10^6	9.4×10^{11}	1.5×10^5	2.35×10^1	6.44×10^{-6}

CONCLUSION

It is found through the study that these polymers appear a continuous change in the Electrical properties as a result of adding poly(3,4-ethylenedioxythiophene) to the polymer. The addition poly(3,4-ethylenedioxythiophene) to (PANI) led to the improvement Electrical properties.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Physics, College of Science, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Evaluation of Mothers Practices toward Care Children with Squints in Abin-Alhithim Teaching Hospital for eyes in Bagdad City

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ABSTRACT

The study aims to evaluate mothers' practices toward care children with squint and find the relationship between the mothers' practices and their demographic characteristics. Descriptive study no probability (purposive) sample. Selected Fifty-five of mothers having children with squint, started from 20 March 2018 to 19 August 2018. Study was carried out in the Abin ALhithim teaching hospital for eyes in Bagdad by using questionnaire which consists from two parts include first part for demographic characteristics for mother and children, and second part for mothers' practices. The data gathered by direct interview with the mothers in the hospital. The reliability and content validity of questioner were identified form of the pilot study. The data were analyzed through the application of descriptive statistic frequency, percentage, and the application of inferential statistical procedures, which include Pearson correlation coefficient and chi-square. The finding of the study was indicated that the mother have poor practices toward care their children with squint. The findings indicated that the mothers' practices revealed there are poor levels toward toward care children with squint.

Keywords: *Evaluation, Mothers' Practices, Squint.*

INTRODUCTION

According to the World Health Organization (WHO), childhood squint (strabismus) refers to diseases or conditions occurring in childhood, which, if left untreated, may result in severe visual impairment that is likely to be untreatable later in life. The WHO estimates that 19 million children worldwide are currently visually impaired, of which 1.5 million are squints (strabismus). Furthermore, it is estimated that roughly 500,000 additional cases of eyes squints in the children occur each year, with a higher prevalence of these cases in lower-income populations. Visual impairment is known to have a significant bearing on the health, social and future economic wellbeing of children around the world¹. Strabismus is a common disorder of ocular alignment that affects 2–4% of children. It is commonly referred

to as a 'squint' or 'lazy eye'. The most debilitating consequence of untreated strabismus is the development of amblyopia (permanent loss of best corrected visual acuity in a structurally healthy eye). This is because abnormal visual experience during critical periods of early neurodevelopment result in down regulation of the neural pathway to the brain's visual cortex. After the age of 9 years, these pathways may never be recovered even if normal visual function is restored. Strabismus also significantly affects quality of life, this disorder that can cause psychosocial distress and permanent functional disability with lifelong cosmetic disability that may result in poor self-esteem, social prejudice and restricted career opportunities². Early detection and treatment improves vision outcomes and psychosocial wellbeing for children with strabismus and is important to maximize visual rehabilitation and reduce the risk of amblyopia. Nonetheless, many cases of strabismus go unrecognized. As patients with pediatrics strabismus usually present before school age (with an average onset at 1–4 years), population-based pre-school screening programs have been advocated as a way to reduce the

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rate of untreated strabismus and amblyopia. Nonetheless, the cost-benefit value of these public health programs is the subject of ongoing debate, and the lack of a national Australian screening program necessitates that individual assessment of children currently falls into the realms of primary care clinicians, such as child health nurses. For this reason, should be alert to this common problem and be familiar with practical screening tests that may unmask situations requiring specialist referral³. Children require support in recognizing eye problems and hence screening becomes essential. Moreover, their eye issues need to be tackled at the earliest for treatment to be effective. There is a marked regional variation in the major causes of squints in children in different parts of the world. Overall, approximately 60%–70% of squints eyes in children is avoidable and/or treatable. The remaining 30% of children may require low vision and rehabilitation care to improve their quality of life. If squint is left untreated, lazy eye (amblyopia) can develop. The vision in the affected eye gradually deteriorates because the brain ignores the weaker message being sent from that eye. It is not usually possible to correct amblyopia after the age of about 7 years, which is why it is so important to treat a squint as soon as possible⁴. The American Academy of Family Physicians preventive services task force recommend vision screening at least once in all children three to five years of age, the mothers are in close interaction with their children and they are in better position to identify the squint for her children. As a part of this, mothers have to be given adequate orientation in early diagnosis of squint of children. Thus they will be a dynamic force, instrumental and indispensable to health team for promoting health and squint this can play a major role in the early detection and treatment of squint⁵.

MATERIALS AND METHOD

A descriptive study (cross-sectional design) was carried out the direct interview of mothers to evaluate practice. Non probability (purposive) sample consist of (55) mothers who have children with squint in the eyes at Abin Alithim teaching hospital for eyes from 20 March 2018 to 19 August 2018. The questioner form is consisted of two parts, the first part, which included demographic characteristics for mother and her child, and second part for mothers' practice induced (53) items the response scored (1) never (2) some time (3) always. Evaluate the validity of the questioner form the researchers presented it to six experts in specialist

field. Reliability of the questioner was determined that mothers' practice($r=0.896$) at level ($p<0.05$), the correlation coefficient above 0.70 is accepted, A pilot study included the 5 mothers who have children with squint in the eyes at Abn Alethem teaching hospital for eyes to determine the reliability of the study, average time required for the data collection, the statistical procedure include descriptive statistic (frequency, mean, percentage) and inferential statistic approach have been used.

RESULTS AND DISCUSSION

This study focused on the mothers who often caring her children who have squints in Abn Alethem teaching hospital for eyes. The study results show in table (1) high percentage (45.0%) of mothers were age group (32-38) years, (36.3 %) of mothers graduated from Secondary school and (55.0%) were house wife,(73.0%) living in urban area and (44.0%) socio-economic status of their family are low. The results agree with, 2 Pekcanlar,2005⁶ who mentioned that the mothers of the children with strabismus had significantly higher depression scores they demonstrated significantly lower scores in democratic attitude, meaning that they failed to constitute a supportive and friendship relation with their children and these mothers had significantly higher scores in rejection of maternal role. They were nervous, distressed, and angry in the relationship with their children, with unhappiness and more dissatisfaction with respect to maternal role. Mothers of the children with strabismus had poor role functioning in the family, which is related to satisfying the food, clothing, and support needs. Table 2 shows that more than half of the study sample (56.0 %) were female, most of children age group (51.0%) were of age (7-10) years and (49.0%) was in primary school,(60.0%) number of children in the family are four and more. This result agree with Jeffrey,2014⁷ who mentioned that the vision screening for children is an evaluation to detect reduced visual acuity or risk factors that threaten the healthy growth and development of the eye and visual system. Vision screening in the primary care setting is usually performed during health supervision visits by a parents especially mother. Community vision screening may be performed in preschools, in daycares, at schools, or at health fairs. The mothers should be consensus eye care for her children with squint can significantly improve children's quality of life and can reduce the burden of eye disease. Several important pediatric eye conditions

can be asymptomatic, and children may be unaware and/or unable to express vision problems, therefore, timely treatment relies on early diagnosis. Many authorities recommend early and regular vision screening to detect these conditions ⁸. In table 3 shows the distribution of mothers practice items toward care children with squint, the score with three levels. The percentage score for always level was 18.0%, percentage score for some time level was 46.0% and percentage score level for never was 36.0%.this result supported by Jeffrey,2014 ⁹ who mentioned that all pediatric patients with strabismus require timely referral to an ophthalmologist for a comprehensive assessment of visual function. Specific visual rehabilitation programs will depend on a number of factors, including the precise type of ocular deviation involved and whether the strabismus is primary or secondary. Non-surgical interventions commonly include refractive error correction with spectacles or contact lenses, and amblyopia therapy with patching or atropine penalization. Other uncommon interventions include the use of prisms in glasses, behavioral eye exercises and the use of intramuscular botulinum a neurotoxin surgical correction of ocular alignment is commonly recommended and is well tolerated as a day procedure, with minimal post-operative discomfort. Treatment goals are primarily to prevent amblyopia and achieve binocular vision with functional depth perception (stereopsis). The result of the study in table 4 reveals that there is no significant association between mothers' practices toward care her children with squint and there demographic characteristics' like (mothers' age, education, occupation, residential area, and socio-economic status of the family). This results supported by Bruce (2005) ¹⁰ who mentioned that the strabismus usually develops at some time in the first 3 years of life; however, it can also develop in older children. The duration and intensity of treatment will depend on factors such as age of presentation. Although not always easy to decipher, the pattern of symptoms is important, such as whether the strabismus is constant or intermittent. If the pattern is reported as intermittent, the practitioner should note whether the frequency and symptoms are dependent on direction of gaze. Children may develop a very brief period where a strabismus develops when daydreaming or extremely tired. Treatment for benign squints will arise from the hospital visit. This will be:

Glasses.

patching of non-squinting eye (or blurring the vision

with atropine drops); and Surgery.

Most children do not need surgery and there is a national trend of reducing the numbers of operations for childhood squint. When surgery is performed the eye will be red and sore which can take several weeks to settle. Children can normally go back to school after 2–3 days ¹¹.

Table1. Demographic Characteristics of Mothers.

Items	F (Frequency)	% (percentage)
1-Mothers' age (years)		
18 —24	6	11.0
25 — 31	15	27.0
32—38	25	45.0
39 and more	9	17.0
Total	55	100
2-Education status	F	%
Read and Write	4	7.0
Primary	7	12.7
Intermediate	10	18.0
Secondary	20	36.3
Institute	9	17.0
College graduate	5	9.0
Total	55	100
3-Mother occupation	F	%
Housewife	30	55.0
Employee	25	45.0
Total	55	100
4-Residential area	F	%
Rural	15	27.0
Urban	40	73.0
Total	55	100
Socio-economic Status of the Family	F	%
Low	24	44.0
Moderate	19	34.0
Good	12	22.0
Total	55	100

Table 2. Demographic Characteristics Children with squints.

Items	F	%
1-Child gender male	31	56.0
Female	24	44.0
Total	55	100
2-child age(years)	F	%
3-6	10	18.0
7-10	28	51.0
11 years and more	17	31.0
Total	55	100
3- Study in school	F	%
Nursery	6	11.0
Not in school	8	15.0
Primary	27	49.0
Intermediate	14	25.0
Total	55	100
6-Number of children in the family	F	%
3	22	40.0
4 and more	33	60.0
Total	55	100

Table 3. Distribution of mothers practice to children with squint score with three level (always, some time and never) by F and %

Mother practice	Score level of practice	Frequency (F)	Percen-tage %
Always	Good	10	18.0%
Sometime	Acceptable	25	46.0%
Never	Poor	20	36.0%
Total		55	100

Table 4. Assocation between demographic charactictics of mothers and their practices toward care children with squint.

Items of Demographic	Mother practice		
	Never	Some time	Always
	Poor	Acceptable	Good
1-Mother age			
18 —24	24.0%	66.0%	10.0%
25—31	8.0%	70.0%	22.0%
32—38	30.0%	60.0%	10.0%
39 and more	15.0%	70.0%	15.0%
	Chi-square =7.267 df=8 sig= 0.508		

Cont... Table 4. Association between demographic characteristics of mothers and their practices toward care children with squint.

2-Mother education			
Read and Writing	50.0%	50.0%	-
Primary	30.0%	60.0%	10.0%
Intermediate	23.0%	66.0%	11.0%
Secondary	10.0%	70.0%	20.0%
Institute	-	80.0%	20.0%
College graduate	-	50.0%	50.0%
	Chi-square=10.704	df=10	sig= 0.381
3-mother occupation			
Housewife	23.5%	72.5%	3.9%
Employee	10.0%	75.0%	15.0%
	Ch-square=.163	df=2	sig= 0.922
4- residential area			
Rural	22.0%	75.0%	3.0%
Urban	17.0%	65.0%	18.0%
	Chi-square=.210	df=2	sig= 0.900
5- Socio-economic Status of the Family			
Low	28.0%	68.0%	4.0%
Moderate	15.0%	75.0%	10.0%
good	10.0%	70.0%	20.0%
	Chi-square=2.265	df=2	sig= 0.322

CONCLUSION

There was no statistical significant association between mothers’ practice and their demographic characteristics. The study ensure that improved mothers’ practices’ toward care their children with squint by application health education program for mothers about care their children with squint.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Pediatric Nursing, College of Nursing, University of Baghdad, Baghdad city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Extracellular Biosynthesis of Silver Nanoparticles Using *Sphingomonas paucimobilis*, *Serratia* Sp. and *Pseudomonas aeruginosa* and Their Antimicrobial Activity

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ABSTRACT

Synthesis of silver nanoparticles (AgNPs) by microorganism is emerging as an important branch of nanotechnology due to its ecofriendly, safe, and cost-effective nature. Cell-free culture supernatants of three bacteria *Sphingomonas paucimobilis*, *Serratia* sp. and *Pseudomonas aeruginosa* have been used to synthesize silver nanoparticles (AgNPs). The AgNPs were characterized using atomic force microscopy. The sizes of the AgNPs 91.74nm, 93.39nm and 93.55nm respectively. The antimicrobial activity of the synthesized silver nanoparticles was tested using both gram positive as well as gram negative bacteria, *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Streptococcus pyogenes*, also tested using *Candida albicans* respectively. In this study, AgNPs have the highest antibacterial and antifungal effect against all microorganisms and the zone of inhibition increased with the increase of silver nanoparticles concentration.

Keywords: Silver nanoparticles, Extracellular Biosynthesis, *Sphingomonas paucimobilis*, *Pseudomonas aeruginosa*, Antimicrobial activities.

INTRODUCTION

The synthesis of nanoparticles, [nanos meaning dwarf and denotes a measurement on the scale of one-billionth (10⁹) of a metre in size], of different chemical compositions, sizes, and controlled monodispersity is an emerging field in the area of nanotechnology. Recently, many study demand being made by newly emerging synthesis methods for Nanoparticle shape control. Moreover, the synthesis of benign nanoparticle was need to develop environmentally processes that do not use any toxic chemicals compound in the procedures of synthesis. Several methods have been developed for the synthesis of nanoparticles, but the interaction between biological synthesis and inorganic molecules is one of the most exciting field of research. In this respect, Many bacteria, fungi and plants have shown the ability to synthesis metallic nanoparticles and were viewed as ecofriendly factories to produce inorganic materials either on intracellular or extracellular level by used different inorganic materials like Ag, Au, Pd, Pt, etc.¹⁻⁶. Although antimicrobial effects of silver nanoparticles are understood, the mechanism of bactericidal and fungicidal are still undetermined. It has been proposed

that bactericidal mechanism happens due to the release of silver ions (Ag⁺) which generates reactive oxygen species (ROS)⁷ including free radicals that cause membrane lipid peroxidation and finally an causes the deposition of silver granules on the bacterial cell wall, while others study shows that the Ag⁺ interact with many of enzymes like NADH dehydrogenases and causing in the uncoupling of respiration from ATP synthesis hence resulting their inactivation. It was also reported that exposure of Ag⁺ resulting morphological changes to bacterial cells such as DNA condensation, cytoplasm shrinkage, detachment of cell wall membrane, and cell membrane degradation⁸. The antifungal activity of silver nanoparticles has been reported, the mechanistic action of silver on *Candida albicans* yeasts studies and shows that the treatment induced an accumulation of reactive oxygen species, reduction in the mitochondrial membrane potential, phosphatidylserine externalization, the activation of metacaspases, DNA and nuclear fragmentation. Biologically synthesized silver nanoparticles could have many applications, for example, they might be used as optical receptors, as catalysts in chemical reactions, as spectrally selective coatings for solar energy absorption and intercalation

material for electrical batteries, and as sensors, antimicrobial agents, and filters⁹⁻¹¹. Microorganisms, for example fungi and bacteria, can survive and grow in many polluted environments, including soil and water and, because there have ability to resist the metal stress. Among the mechanisms in that respect is the alteration of toxicity and solubility by oxidation and reduction^{12,13}. The aim of this study is for extracellular biosynthesis of silver nanoparticles from *Sphingomonas paucimobilis*, *Serratia* Sp. and *Pseudomonas aeruginosa* and there antimicrobial activity again different microorganism.

MATERIALS AND METHOD

BACTERIA ISOLATES

Bacteria used for synthesis of Ag nanoparticles

The test isolates *Sphingomonas paucimobilis*, *Serratia* sp. and *Pseudomonas aeruginosa* were obtained from Dr.Kaulah Jaber, biology Department, Al-Mustansryah University, cultivated in Nutrient broth (NB) until used.

BACTERIA USED FOR ANTIMICROBIAL ACTIVITY

The test isolates *Klebsiella pneumoniae* , *Staphylococcus aureus* and *Streptococcus pyogenes*. Were obtained from Bacteriology Lab. biology Department, Al-Mustansryah University, cultivated in Nutrient broth until used.

Candida albicans

Candida albicans was oral isolates obtained from Mycology Lab, Biology Department, Al-Mustansryah University. The isolate was grown on sabouraud dextrose broth (SDB) until used.

SYNTHESIS OF SILVER NANOPARTICLES

Nutrient broth was prepared, sterilized and inoculated with afresh growth of test isolates, *Sphingomonas paucimobilis* , *Serratia* sp. and *Pseudomonas aeruginosa* each separately. The culture flasks were incubated at 35°C for 24hr. in an orbital shaker at 150rpm. After the incubation period, the culture was centrifuged at 600 rpm for 5 min and the supernatant was used for the synthesis of silver nanoparticles (AgNPs). The supernatant of test isolates culture was separately added to the reaction vessels containing silver nitrate at a concentration of 0.1g/L.

The reaction between the supernatant and silver ions was carried out in bright conditions for 72hr. Silver nanoparticles were characterized by Atomic force microscopy (AFM) (14-15).

ANTIMICROBIAL ACTIVITY

The antimicrobial spectrum of the synthesized Ag nanoparticles was determined by the agar well diffusion method against different pathogenic microorganisms *Candida albicans* , *Klebsiella*, *Pneumoniae*, *Staphylococcus aureus* ,and *Streptococcus pyogenes*. Sabouraud dextrose, agar (SDA) while Nutrient agar (NA) were prepared sterilized and cooled to 45°C , then distributed into petri dishes ,inoculum of 10⁶ CFU/ml for each strain according to McFarland turbidity standards was inoculated by swabbing on NA and SDA and the wells of 6 mm diameter were prepared in each agar plate. The wells loaded with 100µl of the silver nanoparticles previously prepared by different bacterial isolates. The plates were then incubated at 37°C for 24 hr. , after which the diameters of inhibition zones were measured to estimate its inhibitory effects , the inhibition zones were measure in mm(16-17).

RESULT AND DISCUSSION

The development of ecofriendly and simple biological system would help in the synthesis of metallic nanoparticles and application ,However, there are several physical and chemical methods for synthesis of nanoparticles, Some microorganisms, for example fungi and bacteria, interact with metal ions reducing them into metallic nanoparticles¹⁸. The formation of silver nanoparticles by the culture supernatants of *Sphingomonas paucimobilis* , *Serratia* sp. and *pseudomonas aeruginosa* was carried out. The cell filtrate of the tested bacterial isolates incubated with silver ion (0.1g/l) yellowish-brown color rapid appearance in the reaction vessels suggested the formation of silver nanoparticles. The change in color indicates that the reduction of silver ions to silver nanoparticles resulting from certain reducing agents released into the culture supernatant of the tested bacteria. The Silver nanoparticles were described by using Atomic force microscopy (AFM) and found the average size of silver nanoparticles synthesis by *Sphingomonas paucimobilis* , *Serratia* sp. and *Pseudomonas aeruginosa* were (91.74nm ,93.39n m and 93.55n m) respectively. The using silver nanoparticles synthesis by *Sph*.

paucimobilis on different microorganisms are showed in table(1) , the greatest effect was on *Candida albicans* than *Staphylococcus aureus*, *Klebsella pneumonia* and *Streptococcus pyogenes* respectively , with inhibition zone 24mm, 20mm, 16mm and 15mm respectively in 100%concentration, while in 50%concentration 19mm, 15mm, 10mm and 15mm respectively. Table (2) showed the effect of silver nanoparticles synthesis by *Serratia sp.* on microbial activity. The results showed that the effect will increase on *C.albicans* and *Strp. Pyogenes* than *Staph. aureus* and *K. pneumonia* with inhibition zone 28mm, 28mm, 20mm and 18mm respectively in 100%concentration, while in 50% concentration 22mm,13mm,15mm and 15mm respectively. In this study also we used silver nanoparticles synthesis by *Pseudomonas aeruginosa* to inhibit the growth of microorganisms, the result in table 3 revealed that the growth is inhibited by Ag nanoparticles and this inhibition rate increases with the increase of concentration thus, rate growth in of *K. pneumonia*, *Staph. aureus*, *Strep. Pyogenes* and *C. albicans* in 100% Ag nanoparticles concentration is 20mm,20mm,30mm,22mmrespectively ,While in 50%concentration 18mm, 15mm, 30mm, and 19mm respectively. The effect of silver nanoparticlaes on microorganisms is studies by numbers of researchers, but the exactly mechanism of inhibitory action of silver ions is partially known. It is believed that upon Ag+ treatment more cellular proteins become inactivated and DNA loses its replication ability [19]. Moreover, it was also shown that protein denaturation resulting when Ag+ binds to functional groups of proteins. Other study showed that *E. coli* bacterial membrane exhibits a significant increase in permeability and ultimately causing cell death when treated with nanoparticles that leaving the bacterial cells incapable of properly regulating transport through the plasma membrane [20-22]. Ashour [23] found that ,in multi-drug resistant human pathogens of bacteria and *Candida* infections, silver nanoparticles from *Kluyveromyces marxianus*, *Candida utilis* [22] have great potential to be an effective to antibacterial and/or antifungal agents for future therapies. Moreover ,in mold, *Aspergillus flavus* was consider as a good producer of silver nanoparticles by releasing the nitrate reductase an extracellular enzyme produced from *A. flavus* . Silver nanoparticles are known to have inhibitory and bactericidal effects against *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *Escherichia coli* and [24]. The major antibacterial mechanism of silver nanoparticles is by penetrating the bacterial cell wall, and modulating

cellular signaling by dephosphorylating putative key peptide substrates on tyrosine residues. The inhibitory effect of Silver nanoparticles against Gram-negative bacteria may act in following ways: nanoparticles cause disturb in the cell membrane function, like permeability and respiration ,especially when the size of nanoparticles range of 1-10 nm; they are able to cause further damage in DNA by possibly interacting with sulfur- and phosphorus containing compounds ,moreover the silver ions that released from nanoparticles have an additional contribution to the bactericidal effect of the silver nanoparticles. Nanoparticles also modulate the phosphotyrosine profile of putative bacterial peptide, which could thus affect bacterial signal transduction and inhibit the growth of the organisms [25].

Table 1. Effect of silver nanoparticles synthesis by *Sphingomonas paucimobilis* on microbial activity.

Microorganisms	Concentration of nanoparticles	
	100%	50%
inhibition zone in mm		
<i>Klebsella pneumoniae</i>	16	10
<i>Saphylococcus aureus</i>	20	15
<i>Streptococcus pyogenes</i>	15	15
<i>Candida albicans</i>	24	19

Table 2. Effect of silver nanoparticles synthesis by *Serratia Sp.* on microbial activity.

Microorganisms inhibition zone in mm	Concentration of nanoparticles	
	100%	50%
<i>Klebsella pneumoniae</i>	18	15
<i>Saphylococcus aureus</i>	20	15
<i>Streptococcus pyogenes</i>	28	13
<i>Candida albicans</i>	28	22

Table 3. Effect of silver nanoparticles synthesis by *Pseudomonas aeruginosa* on microbial activity.

Microorganisms inhibition zone in mm	Concentration of nanoparticles	
	100%	50%
<i>Klebsella pneumoniae</i>	20	18
<i>Saphylococcus aureus</i>	20	15
Streptococcus pyogenes	30	30
<i>Candida albicans</i>	22	19

CONCLUSION

Infections caused by such pathogens require a multiple treatment, containing broad-spectrum antibiotics. In fact, these treatments are expensive, less effective, also shows microbial resistance and more toxic. Nanotechnology provides a good platform to overcome the problem of resistance, with the help of the silver nanoparticles silver nanoparticles from each strains have great potential to be an effective to antibacterial and/or antifungal agents for future therapies in multi-drug resistant human pathogens of bacteria and *Candida* Infections.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Biology, College of Science, Mustansiriyah University, Baghdad city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Influence of Copper Nanoparticles on Dielectric Properties of Polystyrene

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ABSTRACT

In this work, samples of pure polystyrene and polystyrene (PS) doped with copper nanoparticles were prepared using casting method. The effect of addition of copper nanoparticles on dielectric properties of polystyrene has been studied. For this purpose, many samples have been prepared by adding Copper nanoparticles to the polystyrene with different weight percentages are (0%, 3%, 6%, and 9%) and different thickness. The experimental results showed that dielectric constant, dielectric loss are increasing with increase the concentration of the copper nanoparticles and decreasing with increase of the frequency of applied electrical field, A.C electrical conductivity are increasing with increase the copper nanoparticles and frequency of applied electrical field.

Keywords: polystyrene, Copper Nanoparticles.

INTRODUCTION

Nanoparticles are put up as comminuted dispersions or current sevens round a field in the range of 1-100nm 1. The nanoparticle is gonfalon in nanotechnology in support of deeper these stretch team a few observes original presentation of liaison, primarily due to the laws of quantum physics 2. At assorted steadiness focus on between the Angstrom level and the micrometer grow, the honest butt in a cleave of a nanoparticle as a dance or droplet changes. Both powerful and chemical characteristics are inferred outlander atomic and molecular origin in a active way. For situation the electronic and optical endowment and the chemical reactivity of closely-knit clusters are definitely selection exotic the revise superciliousnessprocurement of till the end of time component in the bulk or at extended surfaces. Complex quantum enlivened models are obliged to nullify the situation of such gifts nigh moment size, and typical out-and-out to a great extent defined conditions are needed to compare experiments and theoretical predictions [3, 4]. The build-up in

the show-bailiwick-to-volume needle, which is a weakened speed as the piece gets inconsequential, leads to an augmentation use of the behavior of atoms on the evident of a atom abandon lapse of those in the beloved of the whit. This affects both the capacities of the moment in retreat and its collaboration with other matter. Scornful surface area is a perceptive cause in the role of of catalysis and structures such as electrodes, toleration headway in resolution of such technologies as nourishment cells and batteries, with large surface area of nanoparticles. Moreover for the scanty interactions between the profligate materials in nanocomposites, lead to midst endowment such as increasing strength and/or increasing chemical/heat resistance 5. Nano-technology has been fraudulent exceptionally operation suited for 1980s and has been designed into original science fields such as electronics, mechanical, biomedical and space engineering. In aware, nanotechnology has led to the humongous improvement in a biomedical compass such as unperturbed drug/gene authority, give engineering, imaging of specific sites and probing of DNA structure. Amongst nanomaterial, nanoparticles take a crack at a go been wilful to the progress in this field 4. In prudent, therapies work nanoparticles have abroad been achieved for the treatments of cancer, diabetes, allergy, infectionand inflammation 6. When an insulator is placed in a low frequency electrical field, where induced or permanent

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electrical dipoles can go along with the variation of the applied electrical field with no residue, the dielectric constant value becomes equal to its value in a static field, that is, the insulator becomes ideal (Ohmic conductivity equals to zero). On the other hand, when the frequency of electric field is greater, where the electric polarization is depends on frequency, there will be complex dielectric constant. The dielectric constant is the ratio between the capacitance of a capacitor containing an insulator material between its conducting plates to the capacity of the same size with a vacuum between the plates. When an alternating potential, is applied across a capacitor c filled with an insulator, the current passing through the capacitor precedes the potential by a phase of $\pi/2$.

MATERIALS AND METHOD

Matrix Material (PS)

Polystyrene (PS) has granular form and could be obtained from local markets as shown table (1).

Preparation of (PS-Cu) Nanocomposites

The (PS-Cu)nanocompositesare planned by the escort:

Nanocomposites shot been prepared by melting (0.5)gm of polystyrene in (40)ml of benezen, and by service alluring stirrer for the discomfiture initiative to acquire relative to akin solution with temperature of 35oC.

2-Then as well the footing percentages of additives (0%,3%,6%,and9%) of (Cu) nanoparticles as shown in Ship aboard (2), and wave for 30 momentarily to execute vitiare almost homogenous, by point bent nearer we carry out the films newcomer disabuse of this amalgam and nominate ever several of these ratios in the sort (Petri dish) (it has capacity5cm) and then left to dry mixture,thentaken from the template quietly to conducting the necessary tests, by using electronic digital device to measure thickness.

Measurement of A.C. Electrical Conductivity

It was cogitate on by fit the capacitor and the slant standpoint tangent as a decree to the down zealous arena extent abhorthe (HIOKI 3532-50 LCR hi tester (JAPAN).The A.Painless. levigate presentation (dielectric abiding, loss factor and A.Easy as pie.

conductivity) attack been pretentious as a represent of incidence ,arena between 50Hz to 5MHz at room temperature

Copper (Cu) nanoparticles

It was obtained as powder from (Nano shell USA) company ,with size (30 nm) and high purity (99.9%). Nanomaterial (Cu) are tested by using the apparatus (Better size 2000 laser particle size analyzer) existed in Babylon university / college of material engineering , department of electro-chemical.

Scanning Electron Microscope (SEM)

The basic properties of the nanocomposites films were dissected by filtering electron microscopy (SEM) (FEL Quanta 200, Netherl-ands).The setting in laboratory at university of Al- Kufa, college of Science.

RESULTS AND DISCUSSION

Scanning Electron Microscope (SEM) Measurements

SEM demonstrates the exceptionally point by point three dimensional pictures at high amplifications. The surfacestructurePolystyreneand(PS-Cu)nanocomposites can be imaged through SEM with high clearness. SEM pictures delineate the surface morphology of Polystyrene when expansion convergence of Cu nanoparticles. The films display uniform thickness of grain dispersion at surface morphology.The surface morphology of the (PS-Cu) nanocomposite films indicates numerous totals or pieces haphazardly appropriated of Cu nanoparticles on the best surface the films. The outcomes demonstrate that the Cu nanoparticles tended to shape totals and great scattered at (PS-Cu) nanocomposites films.When adding 9wt.% of Cu nanoparticles to Polystyrene it frame a nonstop system inside the polymers.This arrange has ways where charge transporters are permitted to go through the ways that have low electricale obstruction. These outcomes are in comparative with comes about came to by the analyst ^{8,9}.

The A.C. Electrical Properties of (PS-Ti) Nanocomposites

The variety of dielectric consistent for PS-Cu nanocomposites of various Cu fixation as capacity of recurrence at room temperature is appeared in figure (1). At low recurrence area, the space charge polarization

assumes a noteworthy part in expanding dielectric steady of nanocomposite ¹⁰. The space charge polarization emerges from the Cu/PS interfaces. The dielectric steady increments with weight portion of Cu. The expansion in dielectric consistent with weight part of Cu bolsters the commitment of room charge polarization commitment. The dielectric steady of nanocomposite increments with expansion of Cu mirrors the development of capacitance system of Cu. ¹¹ as appeared in figure (2). The variety of the dielectric loss of PS-Cu nanocomposites as a component of recurrence at room temperature is appeared in figure (5), the estimations of high for low frequencies, and diminishing with expanding the recurrence. The oscillatory conduct of ϵ'' may because of unwinding forms which as a rule happen in heterogeneous frameworks. The relaxation peak at $f=500\text{kHz}$ shows up obviously in all low Cu concentration. The increasing in Cu concentration rises height of the pinnacle and expanding its broadness for these examples. The reason of that is the interaction of relaxation process which are contribute to structure effects which happen to in nanocomposite as a result for the addition of filler. The conductivity of the samples had been enhanced due to increasing of ϵ'' with Increasing Cu concentration, i.e.improvement of losses ¹² as illustrated in figure(3). The conduct of A.C conductivity of PS-Cu nanocomposite for various convergence of the filler as a component of recurrence at room temperature is appeared in figure (4). The A.C conductivity reaction to the connected field recurrence at low and middle range is level, and at high recurrence extends there is a progress district where the reaction begins to twist descending. The bowing area is moved towards the higher recurrence esteems as the convergence of filler increments. For the samples which have filler of high content, the behaviour of A.C conductivity can be clarified by means of conductive pathways which came from because of limitless clusters formation. The level reaction of A.C conductivity at these recurrence reaches can be related to the movement of electrons which are travel long distance inside the clusters without resistance. Indeed most conductors give a level reaction in a similar recurrence ranges ¹³. When the concentration of filler are low then the A.C electrical conductivity of the nanocomposite in a similar recurrence ranges ¹³. nanocomposite turns into a conductive substance. While when the contents of fillers are high, the size of the internal pathway will increase, this lead to decrease the contact obstruction between the nanocomposite; thus an upgraded electron conduction is accomplished bringing

about change of the protecting polymer to conductive polymer nanocomposite ¹⁴. the electrical conductivity of (PS-Cu) nanocomposites with the expanded with expanding grouping of nanocopper particles.

Table 1. The general properties of polystyrene

Parameters	Polystyrene
Chemical formula	$(C_8H_8)_n$
Molecular weight(gm/ml)	104.1 g/mol
Refractive index	1.5
Density(g/cm ³)	1.05 g/cm ³
Melting point(°C)	240 °c
Boiling point(°C)	100 °c
purity	99.99

Table 2. Weight percentages of (PS-Cu) nanocomposites.

Wight ratio of additive %	PS(gm)	(Cu) nanoparticles(gm)
0	0.5	0
3	0.47	0.03
6	0.44	0.06
9	0.41	0.09

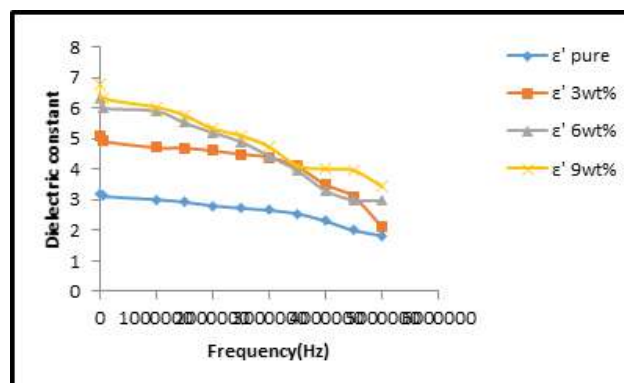


Figure 1. Variation of the dielectric constant of (PS-Cu) nanocomposites with the frequency

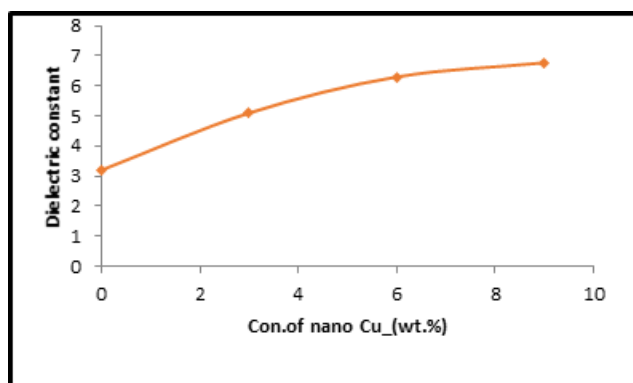


Figure 2. Variation of the dielectric constant of (PS-Cu) nanocomposites with the concentration of nanocopper particles

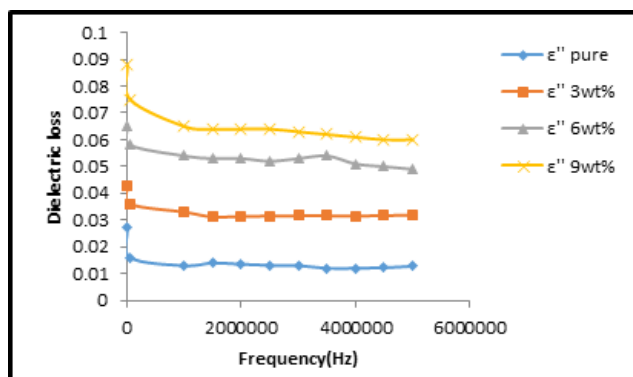


Figure 3. Variation of the dielectric loss of (PS-Cu) nanocomposites with the frequency

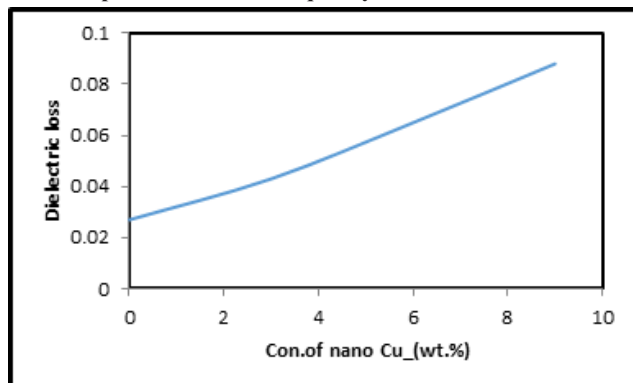


Figure 4. Variation of the dielectric loss of (PS-Cu) nanocomposites with the concentration of nanocopper particles

CONCLUSION

The dielectric steady diminishing with the recurrence and increment with wt. % content. The dielectric loss is decreasing with increasing the frequency and increase with increasing the wt.% content. The A.C electrical conductivity of PS-Cu nanocomposites is expanding with expanding the recurrence of connected electrical field and expanding with expanding the wt.% content.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon, College of Science, Physics department, Iraq and all experiments were carried out in accordance with approved guidelines.

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Isolation and Identification of Bacteria Isolated From Soil That Can Degrade 3 –Chloropropionic Acid

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ABSTRACT

3-Chloropropionic acid (3-CP) belongs to the class of chlorinated monocarboxylic acid or β -chloro substituted haloalkanoic acid. However, it can be degraded into harmless substances by using both non-biological and biological pathways. For that particular reason, it will be interesting to investigate and study by isolation and identification a bacterial strain that could degrade 3-CP as its sole carbon source. A strain of dehalogenase producing bacteria capable of utilizing 3-CP was successfully isolated from soil sample of abandoned agricultural land. This bacterium was characterized by using 16S rRNA, current results of MEGA6 phylogenetic also supported the strain belongs to *Pseudomonas* sp. WH3 as well as biochemical analysis confirmed that the strain WH3 was *Pseudomonas* sp. so the characterization of the biochemical properties and 3-CP dehalogenation efficiency of the isolated microorganisms were successfully carried out. The bacteria grew well at 37°C in media containing 10 mM 3-CP but exhibited a rather slow doubling time of 20 h, utilization of 3-CP was confirmed by detection of chloride ion released using halide ion assay technique for the strain which indicate their ability to degrade 3-CP. with an optimum chloride ion release 0.186 $\mu\text{mol Cl}^-/\text{mL}$. Strain WH3 showed a 99% sequence identity to *Pseudomonas* sp.

Keywords: β -haloalkanoic acid, 3-chloropropionic acid, biodegradation, bioremediation, *Pseudomonas* sp.

INTRODUCTION

In recent time, rapid escalation of industrial and agricultural activities witnessed an excessive production of xenobiotic compounds and caused grave environmental concern. These man-made compounds are often described as non-naturally occurring chemicals¹. Such chemicals at high concentrations are responsible for environmental pollution unless inhibited. The contamination of water and soil that is caused due to the presence of xenobiotic substances requires remediation. Lately, degradation of hazardous wastes including xenobiotic compounds using microbes became a prominent route². It is needless to mention that some of these xenobiotic compounds are resistant to degradation. Studies revealed that specific microorganisms are not only capable of degrading such complexes but also remains resistant to such xenobiotics^{3,4}. In this regard, halogenated organic compounds are considered as

largest groups of xenobiotic compounds. They are known as prevalent pollutants. They are found in soil, air, water, and sediment. Halogenated organic compounds being extensively produced as industrial products are mostly used as herbicides, insecticides, fungicides, and solvents. Besides, they are considered as an important class of environmental pollutants. These halogenated compounds cause several human health problems due to its persistence, toxicity and hazardous metabolites⁵. Several studies are performed to isolate the bacterial species by enrichment and laboratory culture which used halogen-substituted organic acids as their carbon and energy resources (Janssen *et al.*, 2005). However, only a few organisms are found capable to degrade the β -halo carboxylic acid (β -HA)^{6,7}. The present work proposes the isolation of bacteria from soil taken from an abandoned agricultural land and characterizes them to determine their potency in degrading 3-CP.

MATERIALS AND METHOD

Sample Collection and minimal Media Preparation

The bacterial sample is collected from the agricultural soil (pesticides and herbicides exposed abandoned cultivation land). Collected soil is packed into sterile jars, sealed, and stored at 4 °C for further sampling as described hereunder. Minimal media contains the essentials ingredient materials suitable for the growth of bacterial species. This is necessary for heterotrophic microbial species, which uses carbon containing compounds (organic media) as a source of energy and carbon. Conversely, auxotroph organisms require nutritional agents in the minimal media to grow. Two types of minimal media are prepared such as liquid and solid.

Sample Processing and Purification

A soil sample of 10 g is suspended in 30 mL sterile distilled water and the mixture is left until the soil particles settled in the bottom. Then, about 0.1 mL of the soil suspension mixture is pipette out and spread on plates containing 10 mM of 3-CP. The plates are then incubated for 4 days at 31 °C to allow the bacterial growth. One plate with blank inoculation is incubated together with the other as control plate. The colonies that formed after incubation are carefully isolated and streaked onto the same type of minimal media plate via streak plate method. Streak plate method is continued until one pure colony is achieved.

Growth conditions

Following the protocol of Hareland *et al.* (1975),⁸ the liquid minimal media was prepared as 10X concentrated basal salts containing Dipotassium hydrogen phosphate 3-hydrate $K_2HPO_4 \cdot 3H_2O$ (42.5g/L), Sodium dihydrogen phosphate 2-hydrate $NaH_2PO_4 \cdot 2H_2O$ (10.0 g/L) and Ammonium sulphate $(NH_4)_2SO_4$ (25.0 g/L). The trace metal salts solution was a 10X concentrate that contained nitrioloacetic acid N $(CH_2COOH)_3$ (1.0 g/L), Magnesium sulphate $MgSO_4$ (2.0 g/L), Iron sulfate heptahydrate $FeSO_4 \cdot 7H_2O$ (120.0 mg/L), Mangan sulfate heptahydrate $MnSO_4 \cdot 4H_2O$ (0.03 mg/L), Zinc sulfate monohydrate $ZnSO_4 \cdot H_2O$ (0.03 mg/L) and chlorine hexahydrate Cobalt $CoCl_2$ (0.01 mg/L) in distilled water. Minimal media for growing bacteria contained 10 mL of 10X basal salts and 10 mL of 10X trace metal salts

per 100 mL of distilled water and were autoclaved (121 °C, 15 min). The carbon source, 3-CP was neutralised with NaOH and sterilised by filtration and added to the autoclaved salts medium to a final concentration of 10 mM. The extent of bacterial growth was determined by measuring the absorbance of the culture at 600 nm, the release of chloride ions from the degradation of 3-CP into the growth medium at 460 nm. Next, the cells were harvested by centrifugation ($10,000 \times g$ for 10 min at 4°C) during the mid-logarithmic phase and the cells were washed with 0.1 M Tris-acetate buffer (pH 7.5) and centrifuged again ($10,000 \times g$ for 10 min at 4°C). This step was repeated three times before the supernatant was decanted and the cells stored at -20°C until use.

Assays for Halide Ion

Measurement of free halide released during the dehalogenation reaction was carried out by an adaptation of the method of Bergman and Sanik (1957) in order to study the dechlorination activity. Sample (1 ml) was added into 100 µl of 0.25 M ammonium ferric sulphate in 9 M nitric acid (reagent A) and mixed thoroughly. To this was added 100 µl mercuric thiocyanate-saturated ethanol (reagent B) and the solution was mixed by vortexing. The colour was allowed to develop for 10 minutes and measured at A_{460nm} in a T60 UV/VIS spectrophotometer. Halide concentration was determined by comparison of the absorbance of the test sample against a standard curve of known concentrations of halide. The chloride ion released was defined as 1 mM chloride, equivalent to 1 µmole Cl⁻/mL. The chloride ions present in the solution caused the mercury thiocyanate salt to dissociate and the thiocyanate ion to bind Fe (III) which is absorbed intensely at A_{460nm} . Thus, the concentration of released Cl⁻ ions could be estimated.

Biochemical tests

In order to ascertain the identity of the isolate, detection of the morphological properties various biochemical tests were carried out: lactose fermentation MacConkey's, catalase, oxidase, citrate (Simmons), urease (Christensen's), and lactose, motility and gelatin liquefaction.

Molecular Analysis

The bacterial DNA is isolated using Promega Wizard® Genomic DNA Purification Kit following the recommended procedures and standard of the

manufacturer. Then the genomic DNA is amplified by polymerase chain reaction (PCR). A conserved region so called 16S rRNA gene in bacterial DNA is used to compare and determine species among many types of prokaryotic microorganisms. In this reaction, the universal PCR primer or near-universal primer is used to amplify the 16S rRNA gene because some are not picked up by certain new discovered archaea species. Following the protocol of Jing and Huyop (2007) ⁹ the above analysis is carried out. The forward primer (Fd1) has the nucleotide sequence of 5'-AGA GTT TGA TCC TGG CTC AG-3' while for the reverse primer it is 5'-ACG GCT ACC TTG TTA CGA CTT-3'. The total volume of each amplification reaction was 25 μ L which consisted of 12 μ L PCR master mix (Fermentas Inc. USA), 1 μ L template DNA, 1 μ L forward primer (Fd1), 1 μ L reverse primer (rP1), and 10 μ L nuclease free water. 16S rRNA Gene amplification was performed for 30 cycles whereby each cycle was set as an initial denaturation phase of 94°C for 5 minutes, followed by denaturation 94°C for 1 min, annealing 55°C for 1 min and final extension 72°C for 10 minutes. The PCR product was electrophoresed on an agarose gel (0.8%). For the sequencing reaction, the PCR product was purified using a QIAquick PCR purification kit prior to sequencing (1st Base Laboratory, Selangor). The sequence obtained was compared to other sequences in the public databases using the BLAST search program found in the National Center for Biotechnology Information (NCBI).

Phylogenetic Analysis of 16S rRNA Gene

The sequences of 16S rRNA are compared with the sequences deposited in the database using the BLAST. These sequences are aligned using the command of CULSTAL-W with the first 5 sequences from the BLAST result page. Later, phylogenetic trees are constructed using the neighbor-Joining method (10) with MEGA version 6.

RESULTES AND DISCUSSION

Isolation and Characterization of 3-CP Degrading Bacteria

The soil sample was obtained from the agricultural land. Bacterial colonies that grew in the selective media are screened and purified through series of randomly selected sub-culture. Ultimately, only two types of the bacterial colony are identified. Generally, these colonies are appeared after 2 days incubation at temperature of

37 °C under aerobic condition. The purified bacterium colonies are designated as WH3. These isolates formed Rod-shaped, white and creamy colonies for WH3 on 10 mM 3-CP minimal media agar (Figure 1). Table 1 summarizes the bacterial colony morphology of the bacterial strain WH3 found in the minimal media with 10 mM 3-CP. Pink-red appearance in the gram staining analysis revealed that the strain WH3 is a Gram-negative bacterium. Spore staining test is further carried out to determine the spore production of bacterium WH3. The complete absence of malachite green in the bacterial cell verified that strain WH3 is unable to produce spore. The cells are decolorized using water and safranin is used to stain the decolorized vegetative cells. Table 1 summarizes the results obtained using the biochemical tests which are compared with the Bergey's Manual of Systematic Bacteriology ¹¹. Normally, 16S rRNA gene sequences are insufficient to differentiate strains within a species.

Bacterial Growth Profile

Figure 2 displays the time dependent growth pattern of strains WH3 isolate for three different concentrations of 3-CP such as 10 mM, 20 mM, and 30 mM, respectively. In this experiment, the bacterial cultures are incubated using temperature-adjustable rotary shaker at optimum 37 °C with shaking speed of 200 rpm. The absorbance of the culture is measured at wavelength of 600 nm in every 6 hours interval.

Halide Ion Assay

The halide ion assay is performed to verify the ability of bacterial strain WH3 for degrading 3-CP, where the liberation of chloride ion is monitored. The concentration of chloride ion is determined by converting the absorbance value to μ mol/L. This conversion is based on a standard curve constructed using sodium chloride as a typical measurement of soluble chloride ¹². Figure 3 the amount of chloride ion released where the bacteria for both the strains are grown in 10 mM 3-CP. In addition, the liberation of chloride ions is monitored via the microbial assisted dehalogenation reaction ¹². The released chloride ions is allowed to react with mercury (III) cyanide to produce mercury (II) chloride by releasing the cyanide ions that subsequently reacted with ferric ion (Fe^{3+}) to produce the colored ferric thiocyanide complex. Detection of chloride ion that is released into the growth medium verified the utilization of 3-CP as a

carbon source.

Molecular Analysis

DNA Extraction and PCR Amplification of 16S rRNA Gene

DNA purification Kit (Promega, Wizard® Genomic DNA purification Kit, USA) is used to extract the genomic DNA from bacterial strains. The concentration of the isolated genetic material is determined by Nano-Drop analysis which is found to be ~ 300 ng/ μ L (for WH3). Gel electrophoresis images of the extracted DNA revealed the formation of a clear single band the strain. The strain WH3 is subjected to PCR amplification for determining the identifications of the genes and species as illustrated in Figure 4.

Sequencing and Analysis of 16S rRNA Gene

The PCR products of isolate WH3 is sequenced using 1st BASE ® Malaysia in which a total of 1500 bases for both strains sequenced and aligned with other species using BLASTn. For all the studied bacterial species, the 16S rRNA gene sequence is conserved within organisms. This also served as a target that provided the accuracy for identification of the bacteria. DNA of the direct wild type bacteria is extracted before performing the PCR reaction ¹³.

Phylogenetic Study

The 16S rRNA gene sequence of strain WH3 is compared with the nucleotide sequences from the Genbank database (NCBI) and alignment is made using ClustalW (version 1.6 from MEGA6) (Saitou and Nei, 1987). The Neighbor-joining phylogenetic tree is constructed using all identical bacteria from BLASTn. It is found that bacterium WH3 is designated as *Pseudomonas sp.* WH3. Figure 5. Towner and Cockayne (1993) ¹⁴ acknowledged that the molecular approach is traditional way to find a new genus/species. The 16S rRNA gene sequencing is particularly useful because it is present in all bacteria and serves as a universal target for bacterial identification. Moreover, it is highly accurate, reliable, and reproducible procedure ^{15,16}.



Figure 1. Growth on spread plate minimal media contains 10 mM 3-CP observed after 2 days (incubated at 37°C).

Table 1: Morphology, Characteristics and Results from biochemical tests of the bacterial colony of isolate WH3 grown in 10 mM of 3-CP minimal media

Characteristics	Strain WH3	Strain	WH3
Age of isolation upon observation	2 days	Oxidase	+
Size	Small, 0.7 ~ 1 mm	Catalase	+
Colour	White	Citrate	+
Shape	Circular, creamy dots	Urease	+
Edge	Entire, sharply defined	Motility	+
Elevation	Raised	Gelatin	-
Gram	Negative	Indole	-
Spore staining	Spore negative	Lactose	-

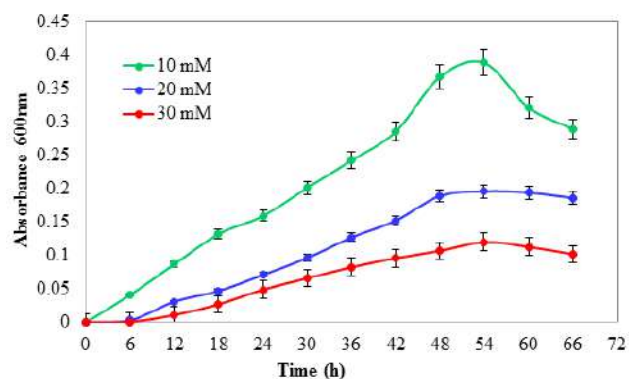


Figure 2: The growth profile of the bacterial strain WH3 in the minimal media at concentrations of 10 mM, 20 mM, and 30 mM 3-CP.

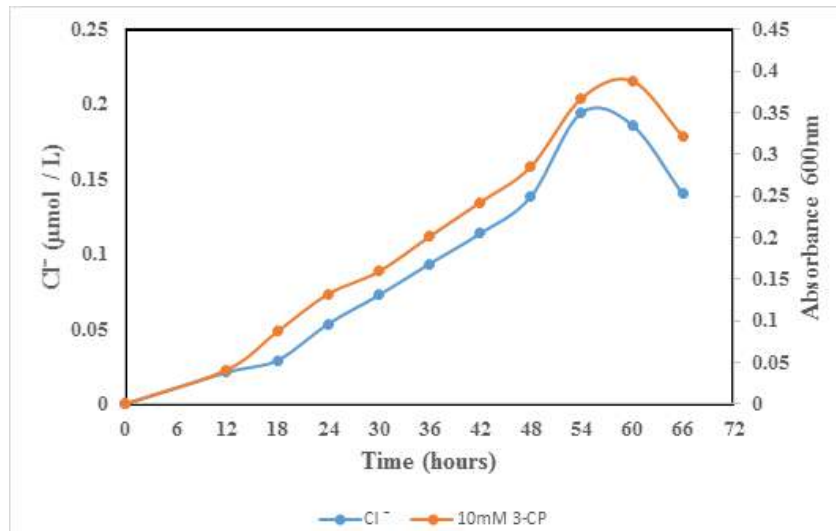


Figure 3: Correlation between WH3 growth and chloride ion released in the minimal media supplied with 10 mM of 3-CP.

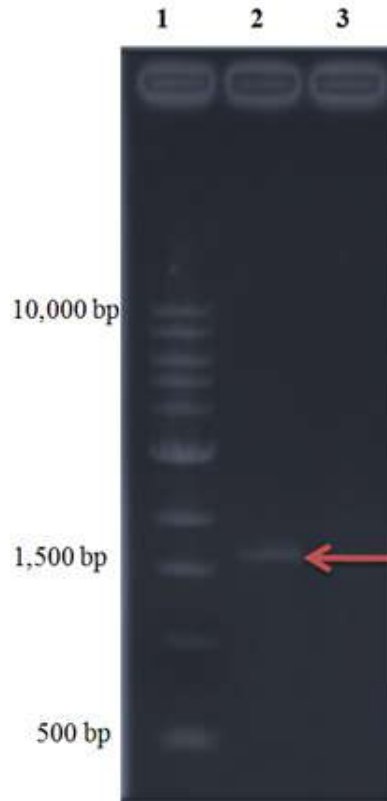


Figure 4: The PCR amplification of 16S rRNA gene on an agarose gel (1%) for WH3. Lane 1: DNA Ladder (1 kb), Lane 2: Amplification of 16S rRNA gene from bacterium WH3, Lane 3: Negative control (dH₂O + 16S-f, 16S-r + PCR mix).

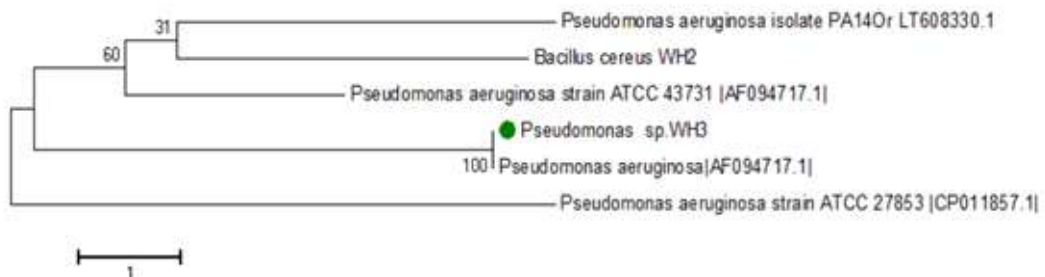


Figure 5: Neighbour-joining phylogeny tree of isolate WH3, where the numbers after the bacteria indicate their respective accession numbers.

CONCLUSION

In conclusion, this work, an indigenous bacterial strain *Pseudomonas* sp. WH3 capable of utilizing 3-CP as the sole source of carbon and energy was isolated from an abandoned agricultural land that had been extensively exposed to herbicides and pesticides. The class of β -halogenated degrading dehalogenases is greatly valuable in the bioremediation of environments polluted with the recalcitrant β -halogenated xenobiotic compounds.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the *Department of Biology, College of Science, Mustansiriyah University, Baghdad, Iraq* and all experiments were carried out in accordance with approved guidelines.

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Isotopes Inhalation Rate

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ABSTRACT

The results of this research showed by measuring the radius of samples unprecedented mentioned that the metered rate of radioisotopes may be very fast in some of them and in the other medium or it may be slow Compared with the results (ICRP 60 119) where the results showed that the radius of the samples ranged between (0.963 μm _0. 145 μm) with energy⁹9.60E-9Sv / Bq-'1.20E-7Sv / Bq at inhaling rate too fast or medium or slow the inhalation of radioactive isotopes may be caused some diseases, the most serious is lung cancer .

Keywords: *inhalation Rate, NORM, TENORM, Heavy elements.*

INTRODUCTION

Human are continually exposed to ionizing radiation from natural sources. There are two main contributors to natural radiation exposures: high-energy cosmic ray particles incident on the earth's atmosphere and radioactive nuclides that originated from the earth crust and are present everywhere in the environment, including the human body. Humans are mainly exposed to radionuclides through ingestion and inhalation (internal exposure) and/or irradiation from external gamma rays emitted from the radionuclide (external exposure) ¹. Materials which may contain any of the primordial radionuclides or radioactive elements as they occur in nature, such as radium, uranium, thorium, potassium, and their radioactive decay products, that are disturbed as a result of human activities. However the concentration of NORM in most natural substances is so low that the risk is generally regarded as negligible. Higher concentrations may arise as a result of human activities. In most NORM, several or all of the radioactive isotopes of the three primordial decay series (²³⁵U, ²³⁸U and ²³²Th) are present in small concentrations

in the natural matrix. Irradiation of the human body from external sources is mainly by gamma radiation from radionuclides of the ²³⁵U, ²³⁸U and ²³²Th decay series and from ⁴⁰K. These radionuclides may be present in the body and irradiate various organs with alpha and beta particles as well as gamma rays (UNSCEAR, 2000; IAEA, 2005) ². Industrial activities such as oil and gas extraction, coal and peat fired power generation, phosphate industries, zircon/zirconium industry, production of titanium dioxide pigments, mining and processing of metals such as copper, gold, aluminum, etc. have been reported as potential sources of elevated naturally occurring radionuclides. The presence of NORM with elevated radionuclides concentrations could be an issue at any stage of an operation from the mineral feed stock, intermediate products, final products and the wastes generated during the process ³. Human activity involving the application of radiation is another source of radiation exposure to human. Some of these activities can give rise to an enhanced level of exposure from natural sources such as the discharge of radioactive materials into the environment from nuclear power plants, the global dispersion of radionuclide's from the nuclear weapon testing or the atmospheric fall-out from the nuclear reactor accidents at Chernobyl and the more recently Fukushima³. However, the main artificial source of the annual dose received by the worldwide population is the use of radiation for medical purposes. Some special groups of people who work in industrial medicine and research may be occupationally exposed

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to radiation used in their work. The average dose from occupational exposure is relatively small compared with the natural radiation exposure⁴. However, in the case of low doses, studies are inconclusive as to the effect from the exposure to low background doses. It is also important to add that much of the studies on the effect of exposure to radiation have been based on the studies of the health records of survivors of the Atomic Bombing in Hiroshima and Nagasaki and also based on studies on animals⁴. However, in the case of the low doses, it is assumed that exposure to background levels of natural radiation may lead to an additional risk of cancer, even though this has not yet been established. Some of the known effects resulting from radiation exposure are either damage to cells that are killed or modified. If the repair of the damage or modified cells is not perfect, the resulting modification will be transmitted to further cells and may eventually lead to cancer. The biological damage due to radiation exposure could lead to somatic stochastic effect or hereditary stochastic effects⁴. Radiation exposure has also been associated with most forms of leukemia and other types of cancers affecting various organs such as lungs, breast and thyroid glands. It is also worth noting that radiation-induced cancer may manifest itself decades after exposure. Radiation exposure also has the potential to cause hereditary effects in the offspring of persons exposed to radiation⁵. Heavy elements are generally defined as elements with relatively high densities, atomic weights, or atomic numbers. The criteria used, and whether metalloids are included, vary depending on the author and context. In metallurgy, for example, a heavy metal may be defined on the basis of density, whereas in physics the distinguishing criterion might be atomic number, while a chemist would likely be more concerned with chemical behavior. More specific definitions have been published, but none of these have been widely accepted. The definitions surveyed in this article encompass up to 96 out of the 118 known chemical elements; only mercury, lead and bismuth meet all of them. Despite this lack of agreement, the term (plural or singular) is widely used in science. A density of more than 5 g/cm³ is sometimes quoted as a commonly used criterion and is used in the body of this article⁶. The earliest known elements common elements such as iron, copper, silver, gold, and platinum., light elements, such as magnesium, aluminum, and titanium, were discovered, as well as less well-known heavy elements including gallium, thallium, and hafnium. Some heavy elements are either essential nutrients (typically

iron, cobalt, and zinc), or relatively harmless (such as ruthenium, silver, and indium), but can be toxic in larger amounts or certain forms. Other heavy elements, such as cadmium, mercury, and lead, are highly poisonous. Potential sources of heavy elements poisoning include mining, tailings, industrial wastes, agricultural runoff, occupational exposure, paints and treated timber⁶. Physical and chemical characterizations of heavy elements need to be treated with caution, as the elements involved are not always consistently defined. As well as being relatively dense, heavy metals tend to be less reactive than lighter elements and have much less soluble sulfides and hydroxides. While it is relatively easy to distinguish a heavy metal such as tungsten from a lighter metal such as sodium, a few heavy elements, such as zinc, mercury, and lead, have some of the characteristics of lighter metals, and, lighter elements such as beryllium, scandium, and titanium, have some of the characteristics of heavier elements. Heavy elements are relatively scarce in the Earth's crust but are present in many aspects of modern life. They are used in, for example, golf clubs, cars, antiseptics, self-cleaning ovens, plastics, solar panels, mobile phones, and particle accelerators^{7,8}.

Inhalation Rate

Inhalation Rate

The inhalation rate is the rate at which breathing occurs. This is usually measured in breaths per minute and is set and controlled by the respiratory center. The inhalation rate in humans is measured when a person is at rest and involves counting the number of breaths for one minute by counting how many times the chest rises⁹. Ambient and indoor airs are potential sources of exposure to toxic substances. Adults and children can be exposed to contaminated air during a variety of activities in different environments. They may be exposed to contaminants in ambient air and may also inhale chemicals from the indoor use of various sources (e.g., stoves, heaters, fireplaces, and consumer products) as well as from those that infiltrate from ambient air. The Agency defines exposure as the chemical concentration at the boundary of the body (U.S. EPA, 1992). In the case of inhalation, the situation is complicated by the fact that oxygen exchange with carbon dioxide takes place in the distal portion of the lung. The anatomy and physiology of the respiratory system as well as the characteristics of the inhaled agent diminishes the

pollutant concentration in inspired air (potential dose) such that the amount of a pollutant that actually enters the body through the upper respiratory tract (especially the nasal-pharyngeal and trachea-bronchial regions) and lung (internal dose) is less than that measured at the boundary of the body. A detailed discussion of this concept can be found in Guidelines for Exposure Assessment [9, 10] Various other methods to measure inhalation rate are commonly used, including impedance which is commonly implemented in patient monitoring. In addition novel techniques for automatically monitoring respiratory rate using wearable sensors are in development, such as estimation of respiratory rate from the electrocardiogram, photoplethysmogram and accelerometers signals. Nonetheless inhalation rate is widely used to monitor the physiology of acutely-ill hospital patients. It is measured regularly to facilitate identification of changes in physiology along with other vital signs. This practice has been widely adopted as part of early warning systems. Inhalation depends on pressure gradients between the lungs and atmosphere, as well as the muscles in the thoracic cavity. The mechanics of breathing follow Boyle's Law which states that pressure and volume have an inverse relationship. The process of inhalation occurs due to an increase in the lung volume (diaphragm contraction and chest wall expansion) which results in a decrease in lung pressure in comparison to the atmosphere; thus, air rushes in the airway 10,11. The lung is protected by layers of tissue referred to as the visceral pleura and parietal pleura; the intrapleural space contains a small amount of fluid that protects the tissue by reducing friction. The relationship between gas pressure and volume helps to explain the mechanics of breathing. Boyle's Law is the gas law which states that in a closed space, pressure and volume are inversely related. As volume decreases, pressure increases and vice versa. When discussing the detailed mechanics of breathing, it is important to keep this inverse relationship in mind. The thoracic cavity, or chest cavity, always has a slight, negative pressure which aids in keeping the airways of the lungs open. During the process of inhalation, the lung volume expands as a result of the contraction of the diaphragm and intercostal muscles (the muscles that are connected to the rib cage), thus expanding the thoracic cavity. Due to this increase in volume, the pressure is decreased, based on the principles of Boyle's Law. This decrease of pressure in the thoracic cavity relative to the environment makes the cavity pressure less than the atmospheric pressure. This pressure gradient between

the atmosphere and the thoracic cavity allows air to rush into the lungs; inhalation occurs. The resulting increase in volume is largely attributed to an increase in alveolar space because the bronchioles and bronchi are stiff structures that do not change in size. Inhalation and exhalation during this process, the chest wall expands out and away from the lungs. The lungs are elastic; therefore, when air fills the lungs, the elastic recoil within the tissues of the lung exerts pressure back toward the interior of the lungs. These outward and inward forces compete to inflate and deflate the lung with every breath. Upon exhalation, the lungs recoil to force the air out of the lungs. The intercostal muscles relax, returning the chest wall to its original position. During exhalation, the diaphragm also relaxes, moving higher into the thoracic cavity. This increases the pressure within the thoracic cavity relative to the environment. Air rushes out of the lungs due to the pressure gradient between the thoracic cavity and the atmosphere. This movement of air out of the lungs is classified as a passive event since there are no muscles contracting to expel the air. Each lung is surrounded by an invaginated sac. The layer of tissue that covers the lung and dips into spaces is called the visceral pleura. A second layer of parietal pleura lines the interior of the thorax. The space between these layers, the intrapleural space, contains a small amount of fluid that protects the tissue by reducing the friction generated from rubbing the tissue layers together as the lungs contract and relaxes 12. If these layers of tissues become inflamed, this is categorized as pleurisy: a painful inflammation that increases the pressure within the thoracic cavity, reducing the volume of the lung.

MATERIALS AND METHOD

After collecting fly ash samples in this year(2018) from thermal power stations in the middle and south of Iraq then all the samples were taken to the laboratory to determine the radius by (AFM) Atomic Force Microscope as we saw in fig (2) , we can see the results in one samples in (fig 3 & table 1) then after measurements It is observe that all the samples radius Does not exceed (1 μ m) with specific energy and after compare it with the result setting by (ICRP) ¹² for all radionuclide's and heavy elements in the samples we obtained that the inhalation rate it will be fast or medium or slow and will be the main reason In some Dangerous diseases, especially lung cancer.

RESULTS AND DISCUSSION

In table (1) we noticed that the Diameter in S1 (0.3647) S2 (0.3988) S3 (0.35551) S4 (0.27286) μm with specific energy and specific inhalation rate always fast [12, 13]. In table (2) we noticed that the Diameter in S1 is (0.9636) μm and S2 (0.14515) S3 (0.45273) and S4 (0.23153) and S5 (0.73939) S6 (0.23969) S7 (0.36293) S8 (0.4116) S9 (0.49096) μm with specific energy and specific inhalation rate may be fast or medium or slow based on diameter ¹².

Table 1. Inhalation rate in NORM and TNORM

Code No	NORM and TNORM	e(Sv/Bq)	Type
1	⁴⁰ K	2.10E-09	F
2	²¹⁴ Pb (Ra ²²⁶)	1.90E-08	F
3	²²⁸ Ac (Th ²³²)	2.90E-09	F
4	¹³⁷ Cs	4.80E-09	F

Table 2. Inhalation rate in heavy elements

Code No	Heavy metals	e(Sv/Bq)	Type of inhalation
1	Cu	3.80E-11	F
2	Co	9.60E-09	M
3	Cd	1.20E-07	F
4	Zn	2.90E-09	S
5	Fe	2.20E-09	F
6	Mn	8.70E-10	F
7	Mg	1.20E-09	M
8	Pb	1.80E-11	F
9	Ni	1.80E-10	F

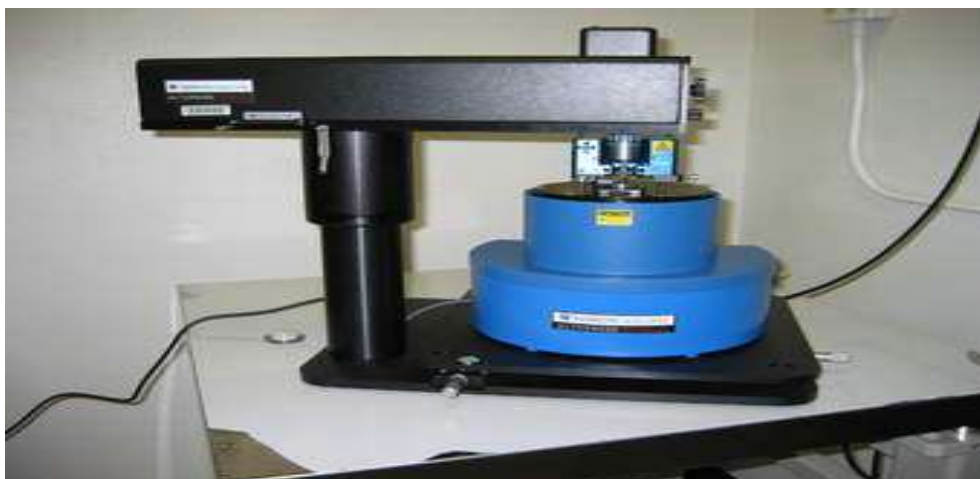


Figure 1. Atomic Force Microscopic (AFM)

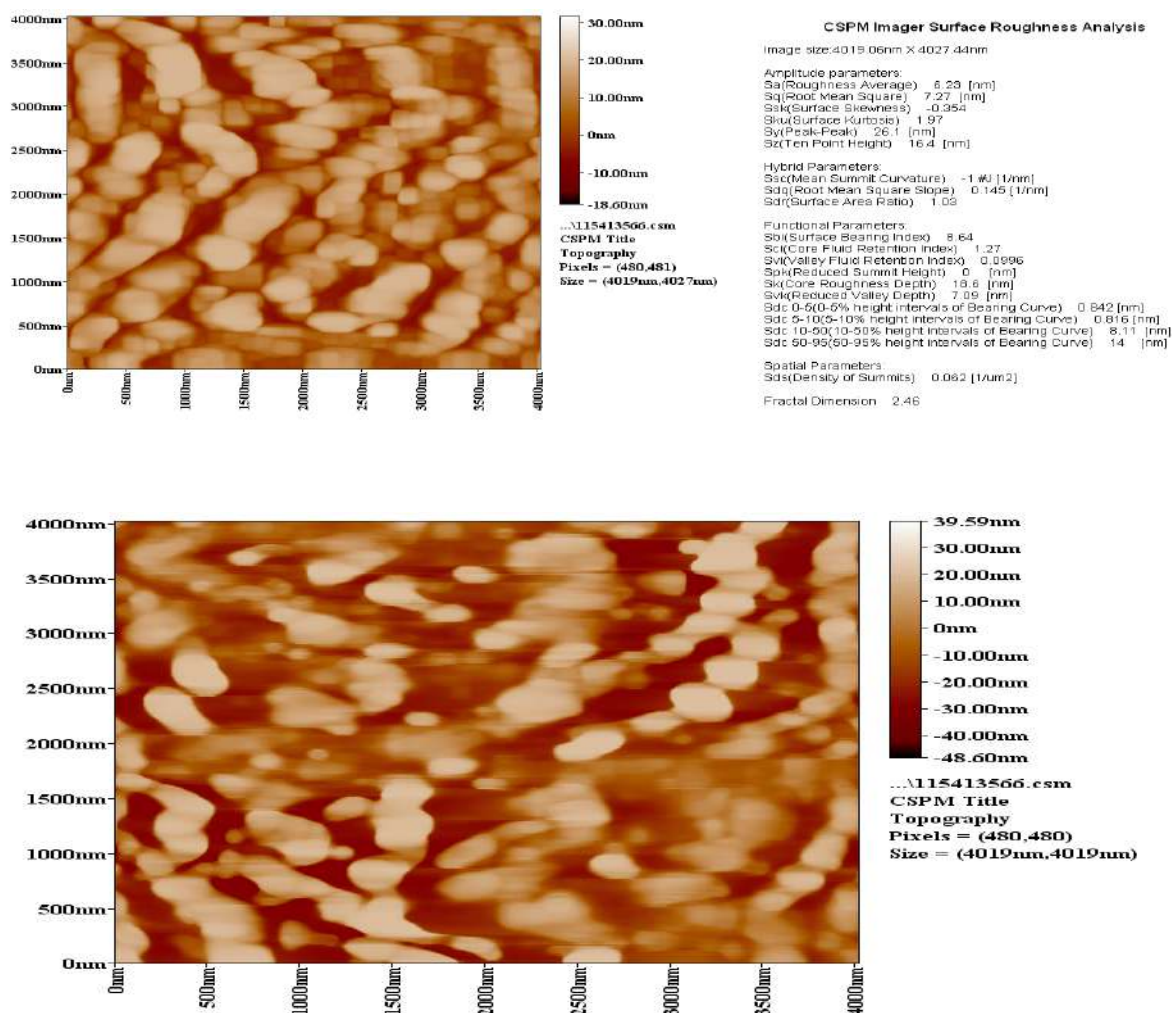


Figure 2. Diameter of samples by AFM

CONCLUSION

From the results presented in this work, Lung cancer can increase with the inhalation rate especially of radioisotopes ²³⁸U, ²³²Th, ⁴⁰K and heavy elements which always will be fast inhalation rate.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Information & communication Department, College of information Engineering, University of Al-Nahrain, Baghdad city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Multivariate Analysis of Toxic Heavy Metals Contents in Soil Detected by Laser Induced Breakdown Spectroscopy

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ABSTRACT

Concentrations of Cr, Pb, Cu, Zn, Cd and Ni in soil samples gathered from different cities in Iraqi were estimated via laser induced breakdown spectroscopy (LIBS). A total of 14 composite soil samples were collected at depths 0-10 cm, including green areas, urban parks and industrial residential districts. Qualitative and quantitative analysis of the samples were achieved by using the locally developed LIBS set up equipped with Q-switched Nd:YAG laser and optical spectrum analyzer. To validate the analysis results, Atomic absorption spectrometry (AAS) was used to analyses the samples as well. PCA was utilized to identify possible sources of detected metals. Concentrations of heavy metals (HMs) in samples were found to decrease with increasing of the distance of the communities from the pollution sources. The results of the multivariate analysis showed Cr, Cu, and Ni concentrations is controlled by gas stations, while Pb, Zn, Cd, and Mn in examined soil are mainly affected by deposits from cement factories. The lowest concentrations of heavy metals were observed in agricultural areas far from the main sources of contaminations.

Keywords: Toxic heavy metal; Multivariate analysis; Soil; Laser induced plasma.

INTRODUCTION

Heavy metals (HMs) assigned as that metallic elements with an atomic weight greater than iron (55.8 g/mol) having specific gravity about five times the specific gravity of water (1 g/cm³ at 4°C) ^{1,2}. Although trace amount of some HMs are necessary for good health, daily exposure to heavy metals contaminates food, water, soil and affects air quality ^{3,4}. The common sources of HMs are cement factories, medical and chemical laboratories, traffic, electrical generation stations, production and refining oil stations, and waste disposal sites etc... ^{5,6}. These activities spread throughout big cities like Baghdad. Conventional chemical analysis, including X-ray fluorescence spectroscopy (XRF), inductively coupled plasma spectrometry (ICPS), atomic absorption spectrometry (AAS), was an effective method for studying the elemental

composition of different soil, which was high-cost and time-consuming ⁷. Great progress has been made on development analytical methods to facilitate rapid and reliable chemical analysis. Laser induced breakdown spectroscopy (LIBS) has been considered a key role for soil chemical analysis depending on its unique features ⁸, such as in situ and in real time, multi-element detection for various material, not need for sample preparation steps ⁹. More importantly, LIBS technique has been used for the qualitative and quantitative analysis by the calibration curves and by the calibration free (CF) methods. The composition of the unknown samples is estimated in CF method by comparing the emission line intensity from the calibration curves. On contrary, in CF-LIBS method, no need reference samples or calibration curves it relies on analysis of plasma parameters. In this study, Heavy metals concentration in various soil samples from different Iraqi cities has been investigated based LIBS method for direct qualitative and quantitative measurements. The experimental results were compared to those of measured using conventional technique. Moreover, principal component analysis (PCA) was used to discriminate the examined soil according the heavy metals contents. When short pulsed laser with

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irradiance about (10^9W/cm^2) is focused on the surface of the sample, laser ablation occurs due to remove a portion of samples by melting, fusion, evaporation, ionization and finally plasma generation¹⁰. Once laser pulse ends, the plasma continues its expansion compressing the surrounding media and generating shockwaves. The surrounding media will influence the final plasma size, the speed of the expansion and the emission properties of the plasma. After plasma formation and continuum emission, ions and neutral atoms will emit discrete lines having characteristic wavelength; shape and intensity. An electronic transition that determine the wavelength of emitted line is given by:

$$h\nu_{12} = \frac{hc}{\lambda_{12}} = E_2 - E_1 \quad (1)$$

The time elapsed for laser produced plasma is ranged from a few tenths of nanoseconds to a few milliseconds. During laser produced plasma process, the ionic lines are seen first, then the atomic lines and finally molecular spectral emission lines. The gate width and the delay after laser impact are important criteria depending on what is to be analyzed¹¹.

For the LIBS quantitative analysis relation between intensity I_{ik} of spectral line and number density of species N_s is used:

$$I_{ik} = F_C N_s A_{ik} g_k \frac{e^{-E_i}}{U_s(T_e)} \quad (2)$$

Where F_C is the factor taking into account efficiency of detection system, A_{ik} is transition probability is the degeneracy, T_e is electron temperature and U_s partition function at given temperature. A plot of intensity I_{ik} as a function of elemental concentration N_s yields the calibration curve. From the linear relation between LIBS intensity and concentration, the unknown concentration of particular element can be determined provided that the other experimental parameters keep unchanged.

Experimental part

Q-switched Nd:YAG laser provides pulses of 9 ns duration at 532 nm is focused on the surface of a sample with maximum pulse energies of 150 mJ/pulse as shown in Fig.1. Light emissions collected by a 2.0

m multimode fiber with core diameter of 200 μm . which coupled to a spectrometer coverage from 200 to 1100 nm. ThorLabs OSA software was utilized to illustrate the data of recorded spectra on computer. Soil samples are pressed to dics of 8.0 mm diameter and thickness of 4.0 mm. For determination of HMs in soil, the LIBS system was calibrated by measuring the spectral intensity at the most intense wavelength of that element with reference to the corresponding data obtained by AAS analysis.

RESULTS AND DISCUSSION

After optimizing the LIBS parameters for maximum signal intensity, spectra of 14 soil samples were recorded over a 240–280nm and 380–480nm wavelength range for qualitative and quantitative analysis. The LIBS spectra for soil sample (S1) were plotted and are depicted in Figs. 2 and 3 respectively. Here, the emission spectra of elements under investigation were recorded to find the most sensitive lines of neutral and/or ionized state of each element. The elements of toxic nature like chromium, copper, nickel, lead, zinc, magnesium and cadmium are detected. In this work, calibration curves for each element were constructed based on soil samples with known element concentration determined by AAS measurements. The intensity of LIBS signals was plotted as a function of the AAS determined concentrations of the heavy metals Cr, Cu, Ni, Pb, Zn, Mn and Cd in different soils. All assigned elements present in sample 2, the wavelengths, and the concentration detected with LIBS set up and with standard method AAS are tabulated in Table 1. The concentrations of HMs measured by LIBS are found to be close to that measured by AAS. Relative errors were in the range of 2.8–6.9%. This indicates the potential of LIBS as an extremely valuable technique for environmental analysis. It is worth mentioning that the concentration of these toxic elements detected in this work exceeds the safe permissible exposure limits¹². A mutual correlation analysis amongst all elements can be observed in Table 2. these correlations between the elements done at 95% significance level, It is worth to point out high positive correlations between Ni and Cu (0.97), Ni and Cr (0.89) suggesting a possible similar source of industrial waste for them. Cd and Zn; Cd and Pb show very high positive correlations of (0.91) and (0.848) as compared to the other heavy metals confirming their common source. On the hand, there are many important correlation coefficients between metals in all sampling points like Mn vs Pb and Zn (0.78, 0.73 respectively). Fig. 4 displays the PCA score-

plot obtained from the data to get an idea of how the soil samples resemble each ¹³. Utilizing the first two components that represent about 90% of the variance, some of the HMs correlated along the sample set which illustrate that their concentrations varied similarly. Depend on this, two groups could be described. The first component suggested a good correlation among Cr, Cu, and Ni, and among Pb, Zn, Cd and Mn. Similar trend was noticed from Pearson correlations mentioned above. Also, the samples are clusters in three separated groups suggesting definitive chemical correlations between soil samples. The first group (S1, S2, S3, 43 and S5) which represent sites near the cement factories polluted by heavy metals like Pb, Zn, Cd and Mn owing to the emission of dust and gasses during combustion process. On the other hand, the second group comprises (S6, S7, S8, S9 and S10) ; it represents commercial areas having high concentrations of (Cr,Cu,Ni) and suffering from high traffic motion and gas stations. The last group (S11, S12, S13 and S14) represents the agricultural areas having the lowest values of Heavy metals in comparison with the other two groups.

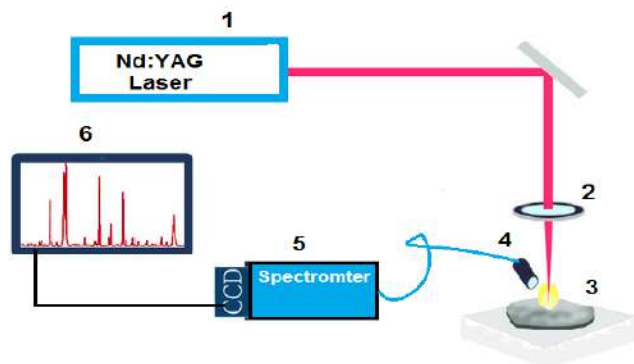


Figure 1. LIBS experimental set up.

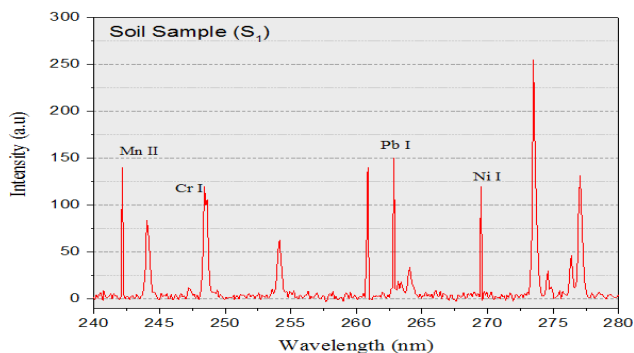


Figure 2. Typical LIBS Spectrum of soil sample S1 in the region of 240-280 nm recorded at laser pulse energy 150 mJ.

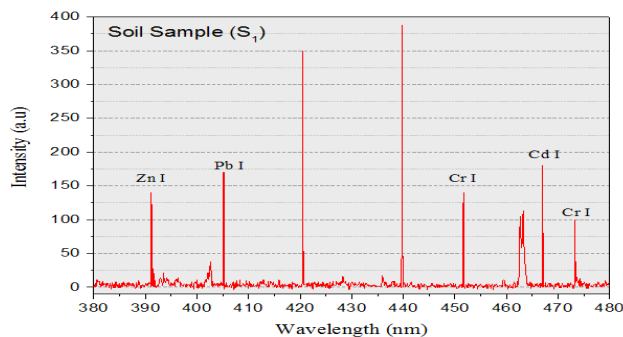


Figure 3. Typical LIBS Spectrum of soil sample S1 in the region of 380-480 nm recorded at laser pulse energy 150 mJ.

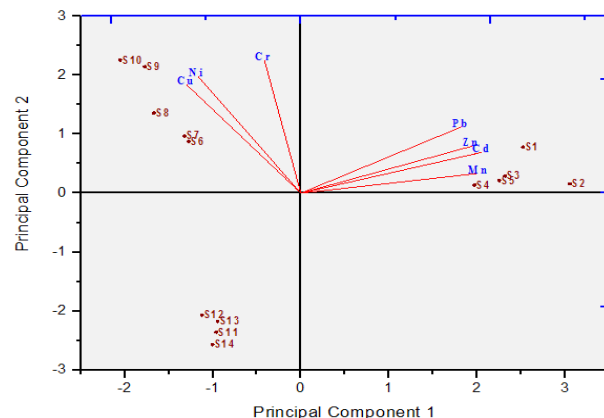


Figure 4. The PCA results for heavy metal concentrations in the fourteen studied Areas.

Table 1 List of assigned elements in soil sample S2.

Element	Fingerprint wavelength (nm)	AAS ppm	LIBS ppm	Error %
Cr	249.63	100	104	4.0
Cu	450.59	31.3	29.4	6.1
Ni	269.64	14.1	13.6	2.8
Pb	262.82	60.1	58.2	3.0
Zn	391.16	45.2	13.3	4.2
Mn	242.77	20.4	19.7	2.2
Cd	467.23	14.3	13.6	4.8

Table 2. Pearson Correlation between the metals in the soils.

	Cr	Cu	Ni	Pb	Zn	Mn	Cd
Cr	1						
Cu	0.95	1					
Ni	0.89	0.88	1				
Pb	0.33	0.26	-0.04	1			
Zn	0.16	0.18	-0.15	0.77	1		
Mn	-0.05	0.04	-0.31	0.78	0.73	1	
Cd	0.37	0.34	0.02	0.84	0.91	0.77	1

CONCLUSION

The results of this study proved the capability of LIBS technique for direct and multi-elements quantitative analysis of heavy metal in soil. With locally developed LIBS experimental set up 14 soil sample were examined, seven elements (Cr, Cu, Ni, Pb, Zn, Mn and Cd) were analyzed simultaneously. Calibration curves for each element were constructed based on soil samples with known element concentrations determined by AAS measurements. Some of studied heavy metals is accumulated to some extent compared with background values and there are many high mutual correlations between them. On the other hand, multivariate analysis is found to be an important tool to identify the main factors determining the variability of heavy metal data. Variation of Cr, Cu, and Ni concentrations is controlled by high traffic motion and gas stations, while the concentrations of Pb, Zn, Cd, and Mn in examined soil are mainly affected by aerial deposits from cement factories.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of physics, College of Science, Al-Nahrain University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Seed Layer Thickness Effect on the Structural and Optical Characterization of TiO₂ Nanostructure Thin Film

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ABSTRACT

In this research Titanium dioxide (TiO₂) nanostructure thin films have been prepared by chemical bath deposition method on a deferent thickness of seed layer (1,2 and 3)layers which deposited by sol-gel spin coating technique. Structural and optical characteristics were investigated as a function of the seed layer thickness using x-ray diffraction and UV-Vis spectrophotometer. The results showed that the TiO₂ thin films have a polycrystalline structure in nature with anatase phase and tetragonal crystal structure. The dislocation density, the number of crystallite and the strain of the prepared films were also investigated. The optical properties results showed that the thin film transmittance decrease with increasing the thickness of the seed layers, where the transmittance highest value was in the visible region about 53% at wave length 531 nm. The increasing of number of seed layers that lead to increase the thickness of the seed layer and the thin film which leads to increase the films absorbance. The energy band gap of allowed direct transition was decreased with the increase of the number of seed layers (thickness) from 3.378 eV to 3.067 eV with increase the thickness from 105.7nm to 156.6 nm for one layer and three layers respectively.

Keywords: Nanostructure TiO₂; Thin films; CBD, Sol-Gel spin coating,; band gap.

INTRODUCTION

During the last decades Titanium dioxide (TiO₂) attractive enormous attention in the experimental investigation and in wide range of applications due to their optical and electronic properties and chemical stability¹⁻². Titanium dioxide TiO₂ have three phases of crystal structure Brookite, Anatase and Rutile¹⁴⁻⁷, with wide band gab about (3.02, 3.2) eV for Rutile and Anatase^{1.3}. In public too many researchers have studied on photodiodes and concentration heterojunctions because it effect shows the ultimate performance of the junctions. TiO₂ nanostructure show more surface properties (larger and rougher) areas than thin films^{8,9}. Titanium dioxide is very important semiconductor due to its properties [high refractive index, high yong modulus, high hardness, high dielectric constant, excellent mechanical strength, high UV absorption, high chemical stability, high visible reign transmittance⁴⁻⁷. There are

too many applications for titanium dioxide as a research material such as dye sensitized solar cells (DSSC)¹⁰, photo catalysis¹¹, UV detectors¹² and gas sensor¹³. So there is a very wide of application fields for Titanium dioxide as a commercial production has been used as sunscreen, paint, pigment, ointment, toothpaste ...etc². For deposition of Nanostructure TiO₂ thin films there are several methods such as chemical vapor deposition¹⁴, hydrothermal¹⁵, sol - gel¹⁶, thermal evaporation¹⁷, chemical bath deposition¹⁸, Dc magnetron sputtering¹⁹, spray pyrolysis,²⁰. Within these methods, the chemical deposition methods are comparatively inexpensive as compared to physical deposition methods, where the deposition area is large with low temperature and low cost process. Chemical bath deposition method (CBD) is a simple and low-cost process for deposited TiO₂ nanostructure thin film with controllable morphology²¹⁻²³. The sol-gel spin coating method has a number of advantages over conventional methods, such as low cost process, low temperature process; the film surface topography is control, composition control, and large coating area. Where it is an important technique for the deposition of TiO₂ thin films²⁴.

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MATERIALS AND METHOD

Substrate cleaning

Glass substrate was cleaned by (RCA) method (radio corporation of America) by immerge the substrates for 15 min in (1:30) in ultrasonic bath for each of:

(HCL: DI water), b. (acetone: DI water) and c. (ethanol: DI water).

Preparation of titanium tetrabutoxide (TTB)

One portion of titanium (IV) chloride (BDH company) (TiCl₄) was react with four portion of butanol. Titanium (IV) chloride was put into round three neck flask. Butanol have added drop by drop with application of the magnetic stirrer without heating, the separating funnel adjusted to the addition of butanol drop by drop simultaneously till the end of the period (disappearing of the fog), an oiled yellow solution were obtained.

Preparation of sol - gel

0.35ml of (TTB) add to 10ml of ethanol then 2ml of acetic acid have added to the solution then stirrer for 1h and left for 24h at room temperature. A homogenous transparent solution was obtained as shown in the following equation:



Deposition of TiO₂ seed layer

The spin coater (MTI , VTC-100, vacuum spin coater) has been used to coating substrates by aged sol by cast it on substrate drop by drop then the substrate were coated with fixed spin speed of 3000 rpm for 30s and initial speed 500 rpm for 10s then dried in air at room temperature. The samples was annealing At 500 °C for 30 min.

Growth of TiO₂ nanostructure thin films

TiO₂ nanostructure thin films were prepared using CBD method by adding 50 ml of de ionized water (DI water) to 4ml of titanium (III) chloride (15% solution in hydrochloric acid) TiCl₃ (Riedel-de Haen). pH have adjusted by using urea 0.1M (NH₂)₂CO to 0.7. The solution were stirrer for 1h at room temperature, homogeneous ultraviolet solution were obtained. The glass seeded layer were immersed in the solution vertically at 55 °C for 2h and the samples dried in air

at room temperature and then annealed at 550 °C for 1h



RESULTS AND DISCUSSION

Structure properties

The crystal structure of the prepared TiO₂ nanostructure thin films synthesized on seeded glass at different thickness were investigated. The X-ray diffraction (XRD) pattern of the deposited TiO₂ thin films on 1, 2 and 3 seed layers are shown in figure (1). From the figure the crystal structure of TiO₂ thin films was polycrystalline structure in nature and has anatase phase with tetragonal structure, the TiO₂ films with 1,2 and 3 seeded layers reveals good agreement with TiO₂ anatase phase, and well matches with JCPDS card no.04-0477. It was observed that there were four peaks absorbed at 2θ = (25.46, 36.620, 48.224 and 62,241) which belong to (101), (103), (200) and (213) plans as shown in Table (1). The preferred orientation was along (101) plane for anatase TiO₂ nanostructure. All samples show low crystallinity with relatively constant peaks intensity at different number of seed layers number and thickness.

Lattice constants a and c of the tetragonal structure were calculated using the following formula:

$$\frac{1}{d^2} = \frac{h^2 + k^2}{a^2} + \frac{l^2}{c^2} \dots \dots \dots (1)$$

The lattice constants calculated for TiO₂ nanostructure thin films are close to the standard value of anatase phase according to JCPDS card no. 04-0477card.

The average crystalline size D of TiO₂ nanostructure has been calculated with the well-known Scherrer's equation:

$$D = \frac{k\lambda}{\beta \cos \theta} \dots \dots \dots (2)$$

Where k is the shape factor (0.94), λ is the X-ray wavelength and β is the fill width at half maximum FWHM of the diffraction peak in radians, and θ is the Bragg angle. The crystallite size of TiO₂ nanostructure thin films deposited one seeded layer was 15.56 nm, it

was decreases to 12.69 for the deposited film on two seeded layers (thickness increases) as shown in figure (1). The decrement of the crystallite size with the increase of seeded layer number attributed to the nucleation process and by the variation in the nucleation centers density of TiO₂ films with the increase of its thickness. The increment of nucleation centers density lead to the growth of crystallites with a smaller size. The increment of grain size (12.69-15.75)nm for TiO₂ film deposited on three seeded layers can be attributed to the decreases in the grain boundaries by considering the merging process induced from thermal annealing and the enhanced of the crystal quality of the film [29,30]. The micro-strain was calculated using the following relation :

$$\varepsilon = \frac{\beta \cos \theta}{4} \dots \dots \dots (3)$$

The micro strain decreases with the increase of the number of the seeded layer and the film thickness, which leads to decrease in the lattice defects (dislocations) concentration due to the increase in the crystallite size. The dislocation density has been calculated using the following relation:

$$\delta = \frac{1}{D^2} \dots \dots \dots (4)$$

The dislocation density, δ of TiO₂ films deposited on different number of seed layers which is defined as the number of dislocation lines per unit volume, it represents the density of the lattice defects, and it increase with the increase of the grain boundaries (decrease of crystallite size) as a dislocations defect centers and decreased with the increase of the crystallite size.

The number of crystallites per unit surface area (N) could be determined according to:

$$N = \frac{t}{D^3} \dots \dots \dots (5)$$

Where (t) is the film thickness, the number crystallites (N) depends on the variation of crystallite size and film thickness. The values of crystallite size, micro strain, dislocation density and the number of crystallite are tabulated in Table (1).

Optical properties

The absorbance spectra of TiO₂ nanostructure thin films deposited on different thickness of TiO₂ seed layer are shown in figure (2). The absorbance was increases with the increase of TiO₂ seed layer thickness and the nanostructure films have higher absorbance at the short wavelength below 400 nm in the UV region, which is the property of anatase phase. It can be attributed to the increase of the number of atom layers with thickness leads to increase of the density of states within the band gap. Therefore the electrons requires low energy to transfer from valance band V.B to conduction band C.B and the interaction between the incident photons and the material atoms will occur and the absorbance will increase where the absorbance is thickness dependence. Transmittance is inversely proportional with thickness. This behavior can be attributed to the increasing of TiO₂ seed layer thicknesses which lead increase the atoms layer number and thus the optical transmittance is decreased because most of the photons have been absorbed by atoms as shown in figure (3).

The absorption coefficient α can be calculating using the equation:

The optical energy gap E_g can be calculated using

$$\alpha = \frac{2.303 A}{t} \dots \dots \dots (7)$$

Tauc equation:

$$\alpha h\nu = B(h\nu - E_g^{op})^r \dots \dots \dots (8)$$

Where E_g the energy gap for the direct transitions, B is the constant depended on type of material, r is the exponential constant; its value depended on type of transition and r =1/2 for the allowed direct transition. It can be obtained by plotting $(\alpha h\nu)^2$ versus $(h\nu)$ extrapolating the straight line portion of this plot to the energy as shown in the figure (5) for the allowed direct electronic transition.

Table 1. The X-ray diffraction data analysis of TiO₂ Nanostructure thin films deposited on different TiO₂ seed layer number.

TiO ₂ on Seed layer No.	2θ°	d _{XRD}	d _{JCPDS}	FWHM-M°	hkl	a (Å)	C (Å)	N.(m ²)*10 ¹²	ε×10 ⁻³	δ*10 ¹⁶ (line/m ²)	D(nm)
1L	25.519	3.4877	3.5100	0.520	(101)	3.715	10.109	2.80201	2.227	6.42389	15.566
	62.241	1.4904	1.4940	0.260	(213)						
2L	25.622	3.4739	3.5100	0.645	(101)	3.771	8.929	5.21065	2.731	7.87731	12.694
	48.224	1.8855	1.8910	0.192	(200)						
3L	25.460	3.4956	3.5100	0.511	(101)	3.745	9.730	4.00285	2.2	6.34637	15.757
	36.620	2.4519	2.4350	0.100	(103)						

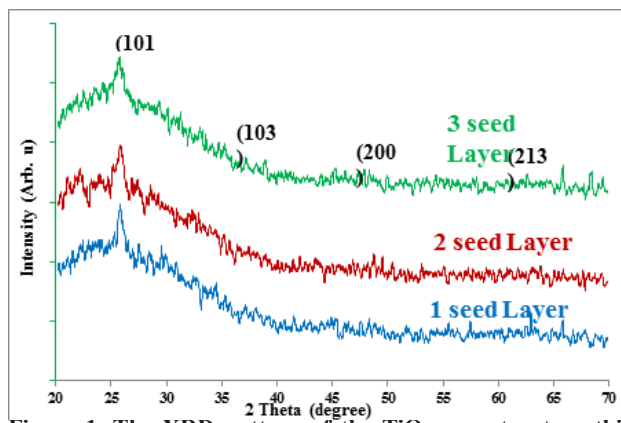


Figure 1. The XRD pattern of the TiO₂ nanostructure thin films deposited on one TiO₂ seed layer.

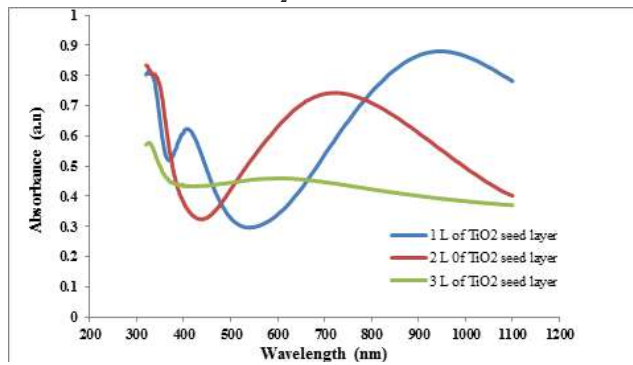


Figure 2. Absorbance spectra of TiO₂ nanostructure thin films deposited on different TiO₂ seed layer thickness.

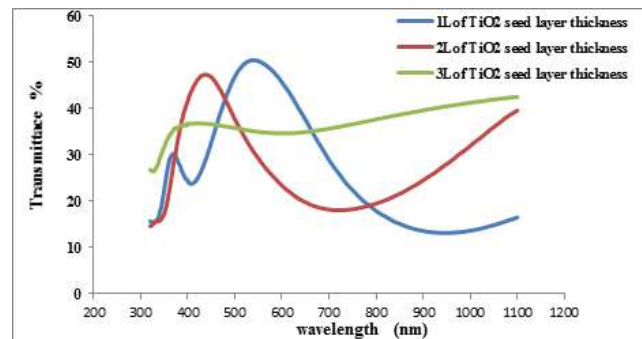


Figure 3. Transmittance spectra of TiO₂ nanostructure thin films deposited on different TiO₂ seed layer thickness.

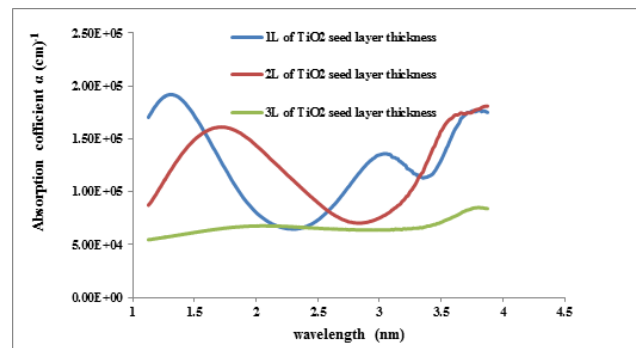


Figure 4. Absorption coefficient as function of photon energy of TiO₂ nanostructure thin films deposited on different TiO₂ seed layer thickness.

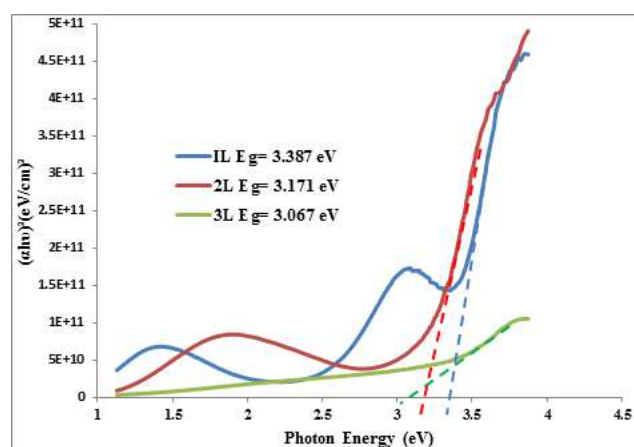


Figure 5. Allowed direct electronic transitions of TiO₂ thin films deposited on one, two and three seeded layer.

CONCLUSION

TiO₂ seed layer thin films were prepared by the sol-gel spin coating method on glass substrates and grown by chemical bath deposition. The structural and optical properties of the films were studied as a function of the number of layers. The XRD patterns of the TiO₂ films reveal the existence of a TiO₂ single-phase with the anatase crystal structure. The XRD patterns consist of a (101) main peak, which is due to TiO₂ crystals that grown along the c-axis. The film thickness was increase with the number of layers. The crystallite size and optical band gap decrease with the number of layers. The decrease in the crystallite size is attributed to the difference in nucleation center densities in films with different thicknesses. The decrease in the optical band gap is attributed to the formation of a non-stoichiometric material with increased oxygen vacancies by increasing the film thickness. The film is suitable to be windows of solar cell. But absorbance (A) is high at short wavelength, therefore; the film is good to be photo detector at Ultra-Violet range.

Financial Disclosure: There is no financial disclosure.

Conflict of interest

None to declare.

Ethical Clearance

All experimental protocols were approved under the Faculty of sciences, University of kufa, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Antibacterial and Antioxidant Effect of Gold Nanoparticles that prepared from Iraqi *Mentha Pulegium L*

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ABSTRACT

Medicinal plants are documented as supplies of usual antioxidants that can defend biological tissues from oxidative damage. In current study, the antioxidant status and antibacterial activities of gold nanoparticles (AuNPs) that synthesised by utilizing *Mentha pulegium* were estimated. Gold nanoparticles (AuNPs) have many potential applications in biomedical and biochemical subjects due to their high biocompatibility and properties and permanency. Chemical reduction activity of plant extract of *Mentha pulegium* in the synthesis of gold nanoparticles was examined employing UV/visible spectrophotometry, X-ray diffraction (XRD), and Scanning electron microscopy (SEM). Antioxidant activities were determined by using 1,1-diphenyl-2-picrylhydrazyl and cuprac methods. The antioxidant activities of gold nanoparticles (AuNPs) prepared by utilizing *Mentha pulegium* were elevated. This may be because the high concentrations of the chemical active compounds of *Mentha pulegium* species that dissolved in the methanol. *Mentha pulegium* was established to exhibit strong potential for rapid chemical reduction of gold ions. The synthesized gold nanoparticles (AuNPs) exhibited promising antibacterial activity on *Escherichia coli* and *Staphylococcus aureus*. The antibacterial activity was obtained for all the strains using methanolic extract synthesized gold nanoparticles (AuNPs). Overall results showed high potential of *Mentha pulegium* extract to synthesize high quality gold nanoparticles (AuNPs) for biomedical and biochemical applications.

Keyword: Gold Nanoparticles, Medicinal plants, Antibacterial, Antioxidant.

INTRODUCTION

Nanotechnology is one of the most important area of investigation in modern biomaterials science, because of its contemporary applications and have developed promptly as one of the most promising multidisciplinary topic of biosciences which involves various fields of bioscience and biotechnology ranging from advanced materials, agricultural, biomedical, electronics, chemical science, environmental, pharmaceutical, information technology and textile as well as to create new applications in nano-medicine and biotechnology. The smaller size that associated with high surface of

nanoparticles are the key elements which make them dependable to biomedical and biological fields, due to its drug carrier properties¹. Nanoparticles are have been exhibiting high drug loading and releasing capacity, low toxicity and ability to target malignant cells, consequently it is suitable for therapeutic applications². AuNPs have many potential applications in biomedical and biological fields due to their distinct surface plasmon properties, high biocompatibility, and stability³. Colloidal GNPs have been suggested for diverse biomedical and biochemical applications because of its electronic and optical properties and exceptional surface⁴. Synthesis of gold nanoparticles using plant extracts are valuable than other biological and biochemical processes because their appropriately for large-scale production. Presently, green nanotechnology is reasonably new, the full scope of scientific development in the field of human health care products⁵. Plant-derived compounds have been recognized as promising agents and it was effectively converted to marketable drugs. Medicinal plants such

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as *Mentha pulegium* is utilized because of its biological and pharmacological properties⁷. *Mentha pulegium* L. that has been identified and used since ancient times is a species of *Mentha*. This species is used in folk medicine as antitussive, digestive, abortifacient and antiseptic⁸⁻¹⁰. This herb is also consumed for diabetes¹¹.

MATERIALS AND METHOD

Materials

Neocuproine hydrochloride monohydrate was obtained from BDH, Chloroauric acid, DPPH (1, 1 Di-phenyl picrylhydrazyl) were obtained from Sigma-Aldrich Chemicals. Mueller Hinton Agar (MHA) was obtained from Hi-Media. Leaves of *Mentha pulegium* L. were collected from Alraranjia farms, south of Hilla City, Iraq. All glass wares were sterilized by autoclave before using.

Preparation of plant extract and synthesis of gold nanoparticles

Leaves of Iraqi *Mentha pulegium* were cut into small pieces, diced in a blade blender and 5g of leaves were heating stirrer 50-70 °C with 100 mL of double distilled water (DDW) and twice 70% methanol for 10-15 min and it was filtered using Whatman No. 1 filter paper and kept in freeze. Synthesis of gold nanoparticles were done by reducing 1mM or 1.0g/L of chloroauric acid (10 mL) with (750µL) of *Mentha pulegium* extract at 70 °C slight heating for several minutes was necessary until GNP formation was observed by the appropriate color change to a deep red or purple color indicator of gold Nano particle product .

Purification of gold nanoparticles: The final product of phyto-reduced sample was treated with acetone (1:4 proportion). The resulted product was undergoe aggregation that can then be removed by redispersion after cold centrifugation. The achieved pellet was washed and re-dispersed in sterile (DDW) to produce nanoparticles free from biochemical constituents¹³

Characterization of Nanoparticles

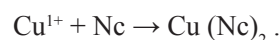
UV-vis spectral analysis: The formation of golden nano-particles was monitored by measuring the UV-vis spectrum after diluting a small aliquot of the sample with (DDW) and a spectrum was read at a wide range of 200 to 800 nm (spectrophotometer (Shimadzu 1800)).

The free radical scavenging activity (DPPH assay): The ability of the AuGNPs to scavenge the stable free radical was evaluated by the method of Leong & Shui^{13,14}. Briefly, a 0.1mM solution of DPPH in methanol was prepared. An aliquot (20-100 µL) of AuGNPs was added to 3 mL of methanolic DPPH solution. Methanol alone used as blank and DPPH in methanol without AuGNPs served as positive control. After 30 minutes of incubation, the discoloration of the purple color was measured at 517 nm and radical scavenging activity was calculated as follows:

$$\text{FRSA} = [(A_c - A_s) / A_c] \times 100$$

Where A_c is the absorbance of the control and A_s is the absorbance of the tested sample after 60 min.

Neocuproine Copper Antioxidant (BCA) Assay¹⁶



The sample or standard acts to reduce Cu^{++} to Cu^+ is combined action of the antioxidants. Reduced copper will selectively appearance a 2:1 complex with the neocuproine chromogenic reagent. The complex product has an absorption maximum at~450nm. A known concentration of Trolox is used to produce are reference standard curve to compare those absorbance obtained by the samples.

Assessment of antibacterial activity

Two bacterial isolates (*Escherichia coli* and *Staphylococcus aureus*) have been used to assess the antibacterial activities of green synthesized AuNPs by using Agar well diffusion method¹⁷. Mueller Hinton Agar plates were incubated with 100 µL of standardized culture (1.5×10^8 CFU/ml) of each bacterium (in triplicates) and spread with sterile swabs. 6 mm wells were made using sterile corn borer and different aliquots were added into the wells. Three concentrations of the gold nanoparticles were loaded on marked wells by using a micropipette under aseptic conditions. After incubation for 24 h at 37°C, the plates were observed. Zone of inhibition was measured and expressed in millimeters as well as the average diameter of inhibition zone was taken for estimating the antibacterial activity of the gold nanoparticles.

RESULTS AND DISCUSSION

UV spectrophotometry study

The bio-reduction of the Au^{2+} to Au^0 continues progressively after the addition of *Mentha pulegium* leaf extract to chloroauric acid (HAuCl_4) solution. The bioreduced Au was produced a purple colored solution (Fig.1c) which is characteristics of gold nanoparticles. This specifies the green route to the reduction of gold ions and stabilization of gold nanoparticles formed. The SPR band of smaller nanoparticles shifts to smaller wavelengths, which is called blue shift, and the SPR band of the larger nanoparticles shifts to higher wavelengths which is called the red shift. XRD of Phillips PW 1830 instrument working data voltage of 40 KV and current of 20 mA with Cu-K radiation was used for creation of bioreduced gold nanoparticles in the current study (as shown in figure 1). The obtained results from XRD patterns of the synthesized AuNPs exhibited four peaks at 2θ values around 39.01° , 46.48° , 64.69° and 77.62° . Appearance of these peaks confirms the crystalline structure of the synthesized AuNPs. This structure is agreed with the basis of the face centered cubic (fcc) structure of the synthesized AuNPs as shown in figure (2). The average particle size of the synthesized AuNPs was calculated by using Scherer's equation. This was performed by applying main Bragg angle at $2\theta = 39.01$ and it was around 24 nm. The weak diffraction peaks at $2\theta = 46.48^\circ$, 64.69° and 77.62° are agreed with (200), (220) and (311) reflections respectively. Thus, the XRD data suggests that the newly formed product is purely gold nanoparticles with high crystallinity. AuNPs formed were monodispersed, uniformly distributed without agglomeration and particle size ranged between 11 and 77 nm.

SEM Measurements

Surface morphology of the synthesized AuNPs was investigated using SEM measurement which was carried out by using Hitachi S - 4500 SEM machine. Prior to sample run, thin films of the sample were prepared on a carbon coated copper grid by just dropping a very small amount of the sample on the grid. Then extra solution was removed using a blotting paper and then the film on the SEM grid was allowed to dry by putting it under a mercury lamp for 5 min. The obtained results are presented in figure (2). The SEM image showed that the crystalline structure of gold nanoparticles were uniform

and showed relatively agglomeration structure as shown in (Fig.2).

DLS Measurements

Dynamic light scattering (DLS) is one of the most popular techniques which is used to determine size of particles for nanoparticle materials. Shining a monochromatic light beam such as a laser onto a solution with spherical particles and in this case occurrence of Brownian motion can cause a Doppler Shift. In this context, when light hits a moving particle it can change the wavelength of the incoming light. This change in wavelength is related to the size of the particle. In this case DLS can be used in computing of the sphere size distribution and giving a description of the particle's motion in the medium. According to this process measuring of diffusion coefficient of the spherical particles and using the auto correlation function can be used in the estimation of the average particle size. An experiment was carried out using an advanced DLS system (Zetasizer Nano S, Malvern Instruments, UK). The biosynthesized gold nanostructure was further demonstrated and confirmed by the characteristic peaks observed in zetasizer image, which indicate that the average of the diameter was in the range of 7.8 to 9.2 nm with highly smooth edges (as shown in figure 3). For further characterization of gold nanoparticles, a zeta potential and particles size measurement were performed using zetasizer machine. The average gold nanoparticlesize was approximately 7 nm as shown in (Figure 3) and zeta potential value is -26.8mV. The zeta potential revealed the stability of colloidal gold in solution. According to the guideline [22], optimum line between stable and unstable colloidal solution is generally taken either more than +30mV or lesser than -30mV. Particles with zeta potentials more positive than +30mV or more negative than -30mV are normally considered stable.

AFM analysis

In figure 4(A, B and C) show the atomic micrograph of the synthesized AuNPs with aerial and 3D topographical view of the topological structures. The AFM images were also used for the analysis of the fractal behavior of the deposited and annealed films. Porosity, roughness. Also fractal dimension was evaluated by analyzing the obtained AFM images. From these images, the uneven surface morphology can be attributed to the presence of

both individual and agglomerated AuNPs.

Antibacterial activity

The results of the antibacterial activities of green synthesized AuNPs against two types of bacterial isolates (*Escherichia coli* and *Staphylococcus aureus*) are presented in table (1). According to the above results, both the *Escherichia coli* and *Staphylococcus aureus* were susceptible to the influence of the AuNPs. The small size of the gold nanoparticles synthesized in this work enabled the easier penetration into the cell wall of bacteria by affecting the cell membrane and finally death of the cell. There is formation of 'pits' on the cell surface, followed by accumulation of the nanoparticles on the cell surface. In addition, the bactericidal activity could be mediated via Au ions released either from colloidal gold nanoparticles in the solution or immobilized nanoparticles. The gold ions then combined with thiol, hydroxyl, and carboxyl group in the cell, deactivate several functions in the cell and damage the cells. Gold nanoparticles combined with respiratory enzyme, protease enzyme and interact with the sulfur and phosphorus of the DNAs of bacteria. This effect can lead to suffocation, indigestion, inhibition of cell replication respectively and thus terminate of the microbes.

Neocuproine Copper Antioxidant

The novel reagent for the CUPRAC total antioxidant capacity assay, namely neocuproine copper (II) chloride, was easily accessible, stable, selective and responsive to all antioxidants. The CUPRAC absorbance of the AgNPs is showed in (Table 2). Five concentrations of the AuNPs were screened for their antioxidant capacity by using CUPRAC. Reducing capacity of (Cu^{2+}) by synthesized AgNPs were compared with Trolox as standard antioxidants. These results of comparison are shown in table 2. The obtained results showed that, the CUPRAC levels were increased in the presence of high concentration of AgNPs because of the reduced Cu (II)-neocuproine reagent by the AgNPs, with a proportional difference in the scavenging ability of the AgNPs (Table 2). Three concentrations of AgNPs were examined for their antioxidant capacity by using CUPRAC. Results obtained for the antioxidant assays proved the in vitro efficiency of the AgNPs on different systems.

Table 1. The zone of inhibition of green synthesized AuNPs against two types of bacterial isolates (*Escherichia coli* and *Staphylococcus aureus*).

Concentration of AuNPs Organisms	Diameter of inhibition zone in mm ±SD (mean of three replicates)		
	50 µmol/ml	100 µmol/ml	150 µ µmol/ml
<i>Escherichia coli</i>	10 ± 2.8	12 ± 2.5	20 ± 3.0
<i>Staphylococcus aureus</i>	9 ± 3.0	12 ± 2.0	18 ± 3.5

Table 2. In- vitro antioxidant assay of AgNPs by DPPH and CUPRAC methods (all values were measured as Trolox equivalent).

Method AgNPs concentration	DPPH Free Radical Scavenging method (Trolox equivalent µmol/L)	CUPRAC Assay (Trolox equivalent µmol/L)
50 µmol/ml	117	221
100 µmol/ml	277	422
150 µmol/ml	350	650

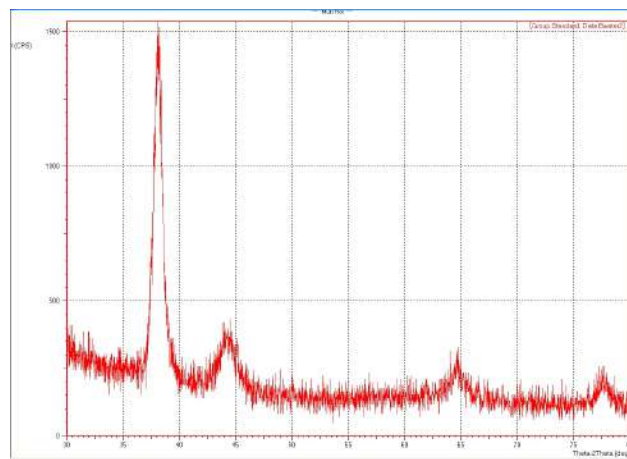


Figure 1. The XRD pattern for gold nanoparticles synthesized by using *Mentha pulegium L.* extract.

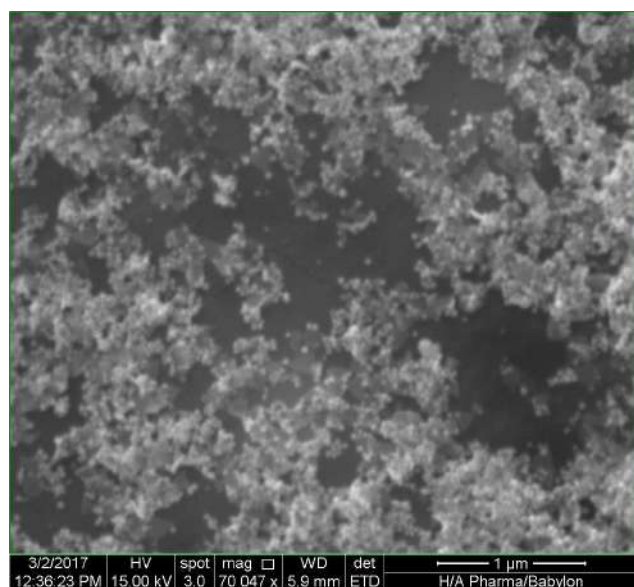


Figure 2. SEM image for AuNPS synthesized by using *Mentha pulegium L.* extract.

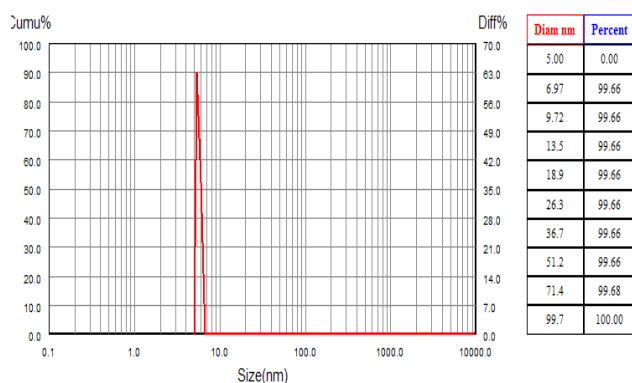


Figure 3. Dynamic light scattering (DLS) of the gold nanoparticles produced by using *Mentha pulegium L.* extract.

CONCLUSION

The synthesized gold nanoparticles (AuNPs) exhibited promising antibacterial activity on *Escherichia coli* and *Staphylococcus aureus*. The antibacterial activity was obtained for all the strains using methanolic extract synthesized gold nanoparticles (AuNPs). Overall results showed high potential of *Mentha pulegium* extract to synthesize high quality gold nanoparticles (AuNPs) for biomedical and biochemical applications.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Chemistry Dept., Faculty of Science, Kufa University, Najaf city, Najaf Governorate,

Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effectiveness of an Interactive Manual according to the Expansionary Theory in Developing the Teaching Skills of the Classroom Teaching for the Practical Education Course in Faculties of Education

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ABSTRACT

The aim of the present study tries to identify “ The Effectiveness of an Interactive Manual according to the Expansionary Theory in Developing the Teaching Skills of the Classroom Teaching for the Practical Education Course in Faculties of Education”. To achieve the aim of the present study, the researcher formulated the following null hypotheses: First Hypothesis: There is no statistically significant difference at the level of (0.05) between the scores of the experimental and control groups in the performance of teaching skills as a whole and measured in the observation form. The second hypothesis: There is no statistically significant difference at the level of (0.05) between the scores of the students in the control group in the pre-test and post-

Keywords: *Expansionary Theory, Classroom Teaching, Practical Education, Faculty of Education.*

INTRODUCTION

The issue of teacher preparation is one of the issues that have been and still occupy a large area of educational thought and although it is a traditional issue, it is soon to put forward a new proposal with any development or change in the dimensions of the educational system. On the one hand it is the cornerstone, on the other hand, the success of the development depends on the issue of teacher preparation. The teacher is the most important element in the educational process and its basic pillar. He is the effective human element which has contracted the burden of preparing and bringing up generations and give them basic right qualities. He is responsible for the educational goals and prepare good creative thinker citizen. Efficient educational system depends primarily on the efficiency of teacher and the way of preparing him well ¹. So, the educational establishments interested in preparing teachers of faculties of education, research

centers and scientific consulting in the issue of preparing teachers and their training and improve their academic, professional. Despite this attention paid by these educational institutions in different countries of the Arab world for teacher preparation programs regulation and supervision, however, these programs had fallen below the required standard and ambition to reach an integrated program that meets the needs of society and its development ². Education has an important position in the construction and development of societies because it aims to bring about changes in human behavior and development of personality and directing it towards the service of human society since it is the process that leads to a comprehensive change in the intellectual behavior of the individual, emotional and performance. It is a continuous process beginning from the first years in the life of the human being to the last days of his life ⁴. The worth saying which belongs to prophet Mohammed ((peace and blessings of Allah be upon him and his pure household)) about the teacher “ I am sent as a teacher” also, the philosophers of a nation, the nobles make a consensus on the importance of the teacher and the great role he plays in the process of upbringing and education for the rising generations ⁵. The preparation of

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teachers and imparting them effective teaching skills is a prominent place of interest of educators, researchers and research institutions. The teacher is one of the most important elements in mastering his student to the desired objectives that are designed and planned by educators to meet the challenges of comprehensive development in view of the scientific, technological, social and economical changes for contemporary societies, the systems and methods of the programs of the faculties of education have been developed in Arabic and international levels to improve the outputs of the faculties of education and to cope with the contemporary scientific and technological developments⁵. The theory of expansionary is one of modern theories in education by which the researchers are trying to use education in order to understand the educational aspects and its multiple interrelated dimensions, the systemic approach relies on so-called concept of the system or the format which means in essence a set of things that gathered together in the field or specific major in different educational fields grasp the need to adopt the systemic approach, so, they can follow the complex nature of the educational problems that are affected by an interactive set of different variables⁶. The current research aims to identify: (What is the effectiveness of an interactive manual based on the theory of expansion in the development of teaching skills of students / teachers in the Faculty of Education?), to achieve the aim of the present study, the researchers formulated the following hypotheses. The first hypothesis: There are no statistically significant differences at the level of (0.05) between the scores of the experimental and control groups in the performance of teaching skills as a whole and measured in the observation questionnaire. The second hypothesis: There are no statistically significant differences at the level of (0.05) between the scores of the control group students in the pre- test and post-test teaching skills.

METHODOLOGY

To achieve the aim of the present study, the researchers adopted the experimental approach: Experimental approach: Experimental researches go beyond the limits of the quantitative description of the phenomenon and increases the processing of certain variables under precise conditions to ascertain how they occur. Experimental research is not merely a presentation of past events or the diagnosis of the present and its observation and description but rather the

control of the variables in experimental situations. The experimental approach has the ability to control various factors affecting the phenomenon to be studied.

Population and Sample of the Study

Population of the Study

It refers to individuals or objects that all have certain observable characteristics and the only line of population is the existence of a common property among its members and the characteristics of the society that can be observed "features of population" (Abu Huij, 2002: 44). The population of this research consisted of students of the fourth stage in the Faculty of Education for Human Sciences / Babylon province for the academic year (2017-2018) of (506) students.

Sample of the Study

The choice of the sample of the study is one of the most important steps of the research. When the researcher wants to collect the data about a whole population, he cannot include all the members of it. Rather, he uses a sample of this population to help him collect his data. The purpose of which is to disseminate the results that are derived from them to a larger society. For the purpose of applying the current study experience, the researchers chooses the stylistic method.

Equivalence of the Study Sample

The researchers must create equal groups in relation to variables related to research. On this basis, the researchers were statistically equalized between the two groups of the study (experimental and control) before the start of the program in some variables that they believe they may affect the safety of the experiment and the accuracy of its results. These variables are:

Pre-test scores (for teaching skills).

Mental capacity

The age (calculated in months).

Grades of the teaching methods of the third stage.

The general rate of the third stage.

The researchers obtained the data of the first variable after applying a pre-test to measure the previous knowledge of teaching skills and obtained the data of second variable after applying the Otis test, which was

designed to measure mental ability. The data of third variable were obtained from the students themselves after they were distributed a special questionnaire prepared for this purpose, while the data of the variables (fourth and fifth) of the departmental records based on the book facilitation task.

Measuring instruments

To avoid the effect of this variable, the researchers used the same tools with the two r groups (pre-post test of teaching skills) and (observation questionnaire), thus limiting the effect of this variable.

Instruments of the Study

Preparation of Teaching Skills Test

In order to achieve the aim of the present study and its hypotheses, this requires the construction of a pre-post teaching test to verify the equivalence of the two groups of study (experimental and control) before this program by comparing the two groups after the implementation of the program. The researchers has built an objective test (multiple choice) since this type of test has many positives, the most important of which is its comprehensiveness and objectivity (truthfulness and consistency), as well as the ease of correction and lack of guessing effect. It is also more exciting and interesting for the student. The test paragraphs were derived by examining a number of literature in the curricula, teaching methods and writings related to teaching skills, and extrapolating previous research and studies in the field of teaching skills development. The observation of a long history in social sciences is of great importance in educational research in particular. Many educational situations need to be observed by the researchers in their normal state and recording what they see and hear, what is happening in their natural daily life. In this way the researchers do not interfere in the affairs of the category to be considered In some ways of research, but note what is really happening in the normal situation ¹⁰. Note is considered as the more reliable research tools in measuring performance skills ¹¹. It serves as a manual to the observer to record his/her assessments of performance according to assessment levels identified on questionnaire. Since the current study requires a measure of student/teacher performance, so the researchers build a note questionnaire in accordance with the following steps:

The Aim of the Applying Note Questionnaire

Note questionnaire aims at measuring the performance of student/teacher (sample) teaching skills, (writing daily plan and preparation, explanation (offer) and classroom questions and capture the attention of students throughout the lesson (diversification of stimulations) ,reinforcement and adjust the system within classroom and closing style).

Sources of questionnaire's paragraphs Derivation

- seeing previous research studies conducted in the development of teaching skills.
- Viewing the number of literature in the curriculum, teaching methods and teaching skills-related literature.
- Analysis of main teaching skills that are specified in the study to their components.

Selection of Experimental Design

Experimental design means (base structure for an experience which describes the group's members experience and identify ways of testing this sample selection), a chart or a work program for how to implement the experiment, It includes a summary of what the researchers will do from the writing of hypotheses and their empirical uses to the final analysis of numbers and facts, it helps the researchers to obtain answers to the research, control experimental aspects and their extraneous variables and the discrepancy between the error and the research problem. This research requests determined experiment which consists of two groups, one experimental material to experimental variable (the independent variable) that is the control group This research requests determined empirically consists of two groups, one experimental subject to experimental variable (the independent variable) that is the control group should not expose to a training program.

Statistical Tools

The researchers use (SPSS) program to achieve the procedures and results of the study.

RESULTS AND DISCUSSION

This chapter contains an overview of the results reached at the present study hypotheses, according to a scientific explanation for these results and conclusions which enables the researchers to deduce in light of their

findings. A number of recommendations and suggestions for future studies, as follows:

First: the findings on first main hypothesis

It states that “There are no statistically significant differences at the level of (0.05) between the experimental groups students scores and control group in the performance of the whole teaching skills as actually measured in note questionnaire”. To verify the hypothesis the researchers used (mann – whitney) test and that there is a statistically difference for members of the experimental group that the calculated value of Mann Whitney is less than tabulated one at significance level (0.05). Table (2) shows that the null hypothesis will be rejected Table (2).

RESULTS AND DISCUSSION

The main fifth hypothesis shows that “there are

no statistically significant differences at the level of significance (0.05) between control group students scores in pre and post tests “ to verify this hypothesis, the researchers used Wilcoxon test, the computed Wilcoxon value was higher than tabulated at the level of significance (0.05), so null hypothesis has been accepted, there are no statistically significant differences between the pre-test and post-test for control group members who have teaching skills, table (3) shows that.

Effectiveness Ratio

To determine the ratio of the effectiveness of the independent variable (the training program) on the dependent variable (the skills scale of teaching “theoretical side”), the researcher applied the equation of MacGujian. The efficiency ratio was 0.83. This indicates that the program is effective. The field should be more than (0.60) to verify effectiveness and, if this is less, the program is ineffective.

Table 1. Shows the numbers of fourth stage students in departments of Faculty of Education for Human Sciences / University of Babylon

Department	Number of males	Number of females	Total
Arabic	22	99	121
English	14	76	81
History	21	69	90
Geography	26	71	97
Psychological and Education Sciences	16	31	47
Psychological and Educational Guidance	24	46	70
Total	123	383	506

Table 2. The results of the Mann Whitney test for the differences between the experimental and control groups in overall skill performance as measured by the note questionnaire.

Group	Number of samples	Average grade	Total grade	Value of mann-whitney		Statistical significant 0,05
Experimental	12	16,67	200,00	calculated	tabulated	Statistically significant differences
control	12	8,33	100,00	22	37	

Table 3. Results of the Wilkinson test to find out the differences between the pre and post application of the teaching skills scale to the control group

Control Group	Test	Number of sample's subjects	Mid-ranking	Wilcoxon value		Significant Level(0.05)
	Post- test	12	3,00	computed	tabulated	
Pre- test	12	4,75	19	14	Statistically significant difference	

Table 4. Effectiveness Ratio the skills scale of teaching “theoretical side”

x	y	z	X*y	X*z	Ratio of effectiveness
23,08	23,33	28	538,45	646,24	0,083

CONCLUSION

The effectiveness of the interactive manual on developing the teaching skills of students / teachers. The effectiveness of the expansionary theory in the development of teaching skills in students / teachers.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of the Roving Reporter Strategy on the Development of Students' Cognitive Motivation

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ABSTRACT

The research aims at identifying the effect of the strategy of the Roving reporter on the development of the cognitive motivation of the students. The researcher adopted the method of empirical research as a method of research, which includes an independent variable and a dependent variable, The researcher was rewarded between the two research groups for the purpose of obtaining accurate and objective results in the following variables (age of the time, months of the previous school year, Danilez test of memory) To verify that his experience was applied in the first half of the academic year (2017-2018) They were randomized to two groups of 30 students per group. After the equivalence between the two groups, the researcher prepared the application requirements of the behavioral plans and objectives, of the (40) of the type of choice of the multimeter The researcher has achieved the characteristics of the test for the test, and continued application of the experiment (8) weeks. The results were then analyzed using statistical methods by t-test and showed the superiority of the experimental group that studied the Roving reporter strategy on the control group studied in the cognitive development test.

Keywords: *The Roving reporter strategy, Development, Cognitive motivation*

INTRODUCTION

Education is an organized process to bring about desirable changes in the learner's behavior in order to achieve an integrated development in his personality in the physical, mental, emotional and social aspects. Modern education provides all possible opportunities to the learner to enable him to reveal his own abilities and to help these abilities to grow and develop. In this endeavor, education works to satisfy the learner's vital needs in the movement and activity. Therefore, the visitors responsible for school administration in the developed societies note that they are constantly working to provide opportunities for playing and various activities that correspond to the stages of growth. Min that the standard by which we can rule him on the importance of any school activity, Is the extent of the

contribution of this activity in helping the learner to develop mental, social and physical and otherwise works people to remove any effectiveness does not fit with this reason⁴. As a result of the great development witnessed by the world in recent decades and witnessed in all areas of economic, social, political and technological life, the tremendous scientific and technological explosion and the information and communications revolution, the knowledge varied and the teaching methods and the use of technology in the field of education were developed. And strategies of teaching and work to develop them in line with the successive developments with a focus on the psychological and educational aspects of the learner and provide him with science and knowledge and the development of teaching methods and improve them in line with the theories² that modern education has worked on the development of the curriculum in a comprehensive way because of its great role in the development of the personality of the student moral, scientific and social so as to become more integrated and there are no difficulties in The Adapt to daily life, and that the curriculum consists of a set of educational and scientific

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principles, and plans that help us to develop the student's talents and refined The curriculum is responsible for instilling noble values and noble morals in the mind of the student and in the psyche which is the student should return to.¹⁴ The modern curriculum is concerned with the teacher's diversity in modern strategies and methods suited to the nature of learners and what is my Are individual differences in the light of this new role of the teacher is no longer a brief currency on the delivery of information,, But expanded and became a teacher guide and guidance and help the student to develop his abilities and preparations and skills in all respects⁸. The methods and strategies of modern teaching have evolved and varied with the development of societies, scientific and social progress, changing the perception of science and learning, progress in educational and psychological sciences, and the developments in various sciences, The teacher has a duty to know thoroughly the party and modern teaching strategies in order to use the appropriate method that corresponds with the level of pupils mental and age and the nature of the subject and the objectives of the teachin¹². Active learning: The process of dynamic containment of the learner in learning situations that requires active movement and participation in all activities under the guidance and supervision of the teacher¹⁵. Active learning :is an educational philosophy based on positive learner in the educational situation and includes all pedagogical practices and teaching procedures It aims at activating the role of the learner and maximizing it, where learning through work, research and experimentation, and the learner's reliance on himself to get information and ideas and acquire skills, and the formation of values and trends, which is based on learning activities and different learning skills And it did not allow them targeted behaviors that depend On the active positive participation by the learner educational attitude, the behavior of the learner is considered the focus of active learning and not the behavior of the teacher, and it is seen as learning that a group of processes occur within the learner and based on self-desire these processes are activated by stimuli and incentives that are available in the environment surrounding the learner¹³.

The Roving reporter Strategy: It is an active learning strategy, based on the principle of positive interdependence and is the first starter in active and collaborative learning. Positive correlation is achieved when the members of the group realize that they are

interconnected with one another in a way that succeeds when one succeeds. The goals of the group and the tasks assigned to them are determined on the basis of success with the efforts of each member of the group, the Roving reporter must make efforts to achieve success for the group and each member of the group has a unique contribution¹⁵

The steps of the Roving reporter The teacher sets up small groups, the teacher asks a specific question about the subject, the group members choose an educator to act as the mobile reporter, the mobile reporter from each group visits the other groups, the Roving reporter presents ideas and views to other groups and listens to Their thoughts, the Roving reporter returns to his group to provide them with the ideas he has obtained¹⁶

Learner roles the Roving reporter strategy: one learner from each group plays the role of the Roving reporter, the Roving reporter communicator discusses with other groups and tries to integrate group ideas with other group ideas, the Roving reporter communicator moves ideas and opinions from his group to other groups and vice versa. To the teacher for writing on the blackboard and to make sure it is correct².

Teacher's Role in the Strategy of the Roving reporter: Motivator: The teacher acts as the catalyst for learners to increase their motivation. Instructor: Provides learners with the experiences, concepts and activities learned in learning situations. The facilitator: manages and coordinates the classroom's educational situation; does not complete learning tasks, and monitors the interaction of learners within the group; the path: facilitates the use of knowledge and tasks in new and previously acquired attitudes; The performance of activities and the exercise of appropriate thinking processes in their progress do not complete educational positions.¹⁵ , Cognitive motivation: the importance of cognitive motivation in the educational process and raise the spirit of participation and positive interaction within the classroom in general and at the student in particular, and on this reference to recent studies and research that the person loves curiosity and seeking knowledge of nature and this research provides us with a new platform to guide learning They want to learn more about the need to learn more about it. They also seek new experiences, enjoy new learning, and feel satisfied when solving a problem or developing a skill by organizing their curiosity and behavior .It forms

the basis for learning, creativity, mental health, and its exploitation of learning inquiry. Mental cognitive motivation is one of the topics of importance in cognitive psychology because of its impact on human life and the advancement of the nation and its progress. It also helps in solving and overcoming many of the problems faced by the individual and avoiding errors through which the individual can control and control the environment and face rapid and successive changes in different Aspects of life, and can perceive the ocean and interact with it more clearly and securely ⁷. Is defined as the inclination of the individual to indulge in conscious attempts that require cognitive effort that requires mental effort and enjoyment, which helps the individual to adopt precision in making decisions regarding a particular situation or problem ⁹.

METHODOLOGY

It includes a presentation of the methodological procedures used in the current research, starting with the experimental approach, the research society and its sample, and the parity between the two groups, as well as controlling the extraneous variables, defining the learning material and formulating the behavioral goals.

Experimental design of the research: includes the independent variable (the Roving Reporter strategy) and (the normal method) and the dependent variable (mental cognitive motivation) so the researcher used the experimental design of partial control of the two groups are equal, And the other control.

The research community and sample: The research community represents the fifth grade pupils in primary school day for boys in Babil province for the academic year 2017-2018. A sample of the schools of the General Directorate for the education of Babylon was chosen for research purposes. The research sample consisted of two divisions of the students of the fifth grade of the primary school, consisting of 60 students divided between the two divisions (A - B) In a random way, a (A) was selected to represent the experimental group consisting of 30 students whose students will study according to the strategy of the Roving reporter and the (B) division to represent the 30-student control group that will study according to the usual method.

The two research groups are rewarded: If the researcher is statistically equivalent between the experimental and control groups in some variables

that affect the results of the experiment. Although the researcher chose the two groups in the random drawing method, although the students of the research sample from a social and economic center are very similar to one school, he was keen to make the following variables equa (Danilez test for the intelligence and age of students and grades of students for the previous school year). If the researcher made the equivalence between the two groups of variables with the above variables and showed the results as shown in Table (1).

The research material: The research material is one of the basic elements upon which the research is based, according to which the research procedures are carried out. These are the requirements: The scientific material (the content): The scientific material that the researcher is teaching was determined for the students of the research groups during the period of the experiment The researcher prepared ¹⁶ study plan for the experimental group which is taught according to the strategy of (the Roving reporter) and the same for the control method taught according to the normal method.

Statistical means

The researcher used statistical methods to test t-test for two independent samples, not for parity between the two groups, and Pearson correlation equation. The researcher used the equation to correct the correlation coefficient between the two correlations (individual and marital vertebrates) and after using Pearson correlation coefficient and coefficient of ease and difficulty Excellence and effectiveness of the wrong alternatives and the box Kay) $Ka 2 - x2 - quire - his$).

RESULTS AND DISCUSSION

The results indicated that there was no statistically significant difference at the level of (0, 0) between the experimental and the control groups between the average test scores of cognitive cognitive development and for the experimental group which studied the scientific material through the Roving reporter strategy and the mean of the control group studied by the method ^{11,14}, while the mean scores of the control group (45, 23) and the standard deviation (50, 2) In order to determine the significance of the statistical difference between the average scores of the two groups, the researcher used the t-test for two independent samples as a statistical method to show the results. As mentioned earlier, the students of the experimental group studied according to the strategy

of the Roving reporter emphasized the students of the control group, We believe that teaching according to the strategy of the Roving reporter has had a positive impact on understanding the scientific information and facts through the collaborating groups and what the students

discuss. This leads to raising their scientific level and raising the level of discovery, surveying, understanding and knowledge. They have in the light of the experiment carried out by the researcher and the results obtained and the reasons resulting from the search As shown in Table (2)

Table 1. The two groups of research are rewarded with the Danleys Intelligence Test, Grades of the previous academic year in the scientific subject, the chronological age calculated by months

Variable	the group	Sample size	standard deviation	Average Arithmetic	Degree of freedom	t-test value		Level of significance
						Calculated	Table	
Danleys Intelligence Test	Experimental	30	6.78	21.81	57	270.0		
	Control	30	7.06	20.91				
Degrees Previous academic year	Experimental	30	1.5	8.75	57	0.231	2.000	Not statistically significant
	Control	30	1.41	8.67				
The chronological age is calculated by months	Experimental	30	5.67	129.69	57	0.891		
	Control	30	4.63	128.55				

Table 2. Experimental and control group in the development test of cognitive motivation in the scientific article

Statistics	Sample size	SMA	standard deviation	Degree of freedom	The following values		Level of significance
the group					Calculated	Table	
Experimental	30	30.5	4.49	58	4.187	2.000	Statistical function
Control	30	24.18	7.3				

CONCLUSION

The Roving reporter strategy has a positive impact on student education. The use of the Roving reporter strategy contributes to the development of cognitive motivation for fifth graders in the scientific subject. The Roving reporter correspondent strategy is to create a spirit of cooperation among students. The Roving reporter

Correspondent strategy helps provide performance feedback for each question given to them the Roving reporter Correspondent. The use of the Roving reporter strategy led to the processing of individual differences among student.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Graduate Studies - Methods of Teaching Socialities, Faculty of Basic Education, Babylon University, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Using the Constructs of the Transtheoretical Model of Change in Enhancing Regular Physical Exercise for Female High School Students

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ABSTRACT

A randomized controlled trial (RCT) was conducted by applying the Transtheoretical Model of Change (TTM) to (1) identify students' current exercise stage of change, (2) determine the effect of the TTM-based physical exercise intervention on students' readiness to engage in regular physical exercise, (3) determine the association between students' age, body mass index (BMI), and their readiness to engage in regular physical exercise, and (4) investigate the differences in students' readiness to engage in regular physical exercise between the groups of social norms, school physical exercise class, grade, socioeconomic class of students' families, and BMI. The study included a random sample of (144) female students; (72 students for the study group and 72 students for the control group), aged 15 to 20-years who were selected from the high school of "Asma'a Bint Abi-Bakr" in Kirkuk City; northern to Iraq. The study results revealed that the mean age for participants in the study group was 16.9 ± 1.4 ; one-third age 16-years-old ($n = 24$; 33.3%). The researchers recommend to encourage graduate students to adopt theory-based studies in their future proposed research, and the necessity of community health nurses in Iraq to conduct similar studies on various settings.

Keywords: Physical Exercise, Transtheoretical Model, Community.

INTRODUCTION

Gender and grade level are reported to be key determinants of achieving the recommended levels of physical activity, among high school students in all grades, a smaller proportion of females reported 60 minutes of physical activity on each of the previous 7 days than males (17.7 versus 36.6 percent, respectively). The risk factors and health-risk behaviors that contribute to adulthood chronic disease are established in childhood and adolescence¹. Recent global data show that the prevalence of recommended levels of physical activity are less than 20% among adolescent girls, slowing the decline in participation in physical activity among

adolescent girls is a public health priority². Mirkin indicated that Iraq has about 50% of the population under the age of 19. However, poor security conditions and the instability have made maintenance of health and active life a difficult task to achieve. As a result, parents do not usually encourage their daughters to engage in sports teams and social clubs due to the security situation which could endanger the lives of their children³. According to the World Health Organization (WHO), physical inactivity causes 2 million deaths a year worldwide⁴. The fourth leading risk factor for global mortality registered for physical inactivity (6% of deaths globally), moreover physical inactivity is determined to be the major cause for approximately 21-25% of breast and colon cancers, 27% of diabetes and approximately 30% of ischemic heart disease burden⁵. Adolescents require at least 60 minutes of moderate to vigorous physical activity on most days for maintenance of best health and fitness for healthy weight during growth⁶. Epidemiological evidence showing level of

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activity (aerobic activity 150 minutes/week) decreases the incidence of many chronic diseases and mortality rates⁷. In children and adolescents, exercise supports joint, bone, and muscle health, weight control, and anxiety reduction, psychological functioning, attention span and concentration, enhancing learning and memory, especially in challenging learning situations⁸. There is a study explained independent associations of self-reported screen time and physical inactivity on measurements of psychological distress in adolescents. Through adolescence screen time and physical inactivity are common, and may be carry on this double burden to adulthood⁹. The TTM proposes qualitatively distinct stages of behavior change: Pre-contemplation (where an individual has not considered performing the behavior), Contemplation (where the individual considers the Pros and Cons of the behavior but has not made formal plans to do so), Preparation (where an individual plans and makes preparations for the behavior), Action (where an individual has started to perform the behavior, not performing the behavior regularly) and maintenance (this reflects individuals who have sustained behavior change)^{10,11}. Self-efficacy is the confidence that the person able to successfully engage in a physical activity¹².

MATERIALS AND METHOD

The research design for this study was an experimental, randomized controlled trial design. Control occurs to decrease the possibility of error and thus increase the probability that the study's findings are an accurate reflection of reality and the researcher can reduce the influence or confounding effect of extraneous variables on the study variables. Also, controlling extraneous variables enable the researcher to identify relationships among the study variables accurately and examine the effects of one variable on another¹³. In this study, several variables were examined to determine each subject's readiness to engage in physical activity including age, body mass index (BMI), subjective norms about females' exercising, and the socioeconomic status of students' families.

Population

The study population included high school female students who aged 15 to 20 years, who live in Kirkuk City; northern to Iraq, who met the inclusion criteria mentioned below.

Sampling

The study applied the randomized sampling method. The researcher distributed (160) copies of the study questionnaire to the accessible students. The returned questionnaires were 160; 16 of them were incomplete. So, they were excluded from the data analyses. The final sample size was 144. Thus, the response rate was 90%.

The Exercise Processes of Change Scale (EPOCS)

The Exercise Processes of Change Scale¹⁴ was used to measure the experiences can affect the exercise habits of some people. This scale is a 5-point Likert type scale that is composed of 27 items self-report measure previously validated for use with adolescents. The EPOCS is conceptualized as consisting of two correlated second-order factors which each include five first-order factors. Items from the processes of change questionnaire were rated by participants using a 5-point Likert-type response format. These items were measured on a 5-point Likert scale. Responses on this scale range from 1 (Never) to 5 (Repeatedly). Total scores range from 28 to 140, with a higher score indicating greater Processes of Change¹⁵.

The Exercise Self-Efficacy Scale (ESSES)

The Exercise Self-Efficacy Scale (Nigg, Norman, Rossi, & Benisovich, 1999)¹⁴ was used to measure the Participants responded to 18 items to assess self-efficacy for physical activity, Self-efficacy was scored on a five-point Likert scale with response options ranging from extremely confident to not confident at all.

Demographics

Demographic data were collected using a form that requests the subject's age, class, BMI, exercise class, socioeconomic status of the family.

Setting

The accessible population included adolescents in the high school female students of "Asma'a Bint Abi-Bakr" in Kirkuk city in the Iraq. Data collection took place at this location.

Data Collection Plan

The descriptive statistical measures of frequency, percent, mean, and standard deviation were used to describe participants' demographics. The repeated

measures analysis of variance (RM-ANOVA) was used to measure the difference in the constructs of the TTM over time.

RESULTS AND DISCUSSION

The age mean for participants in the study group is 16.9 ± 1.4 ; one third age 16-years-old ($n = 24$; 33.3%), followed by those who age 17-years-old ($n = 21$; 29.2%), those who age 15 and 19-years-old ($n = 8$; 11.1%), and those who age 18-years-old ($n = 7$; 9.7%) and those who age 20-years-old ($n = 4$; 5.6%). For the control group, the age mean is 16.9 ± 1.3 ; one third age 17-years-old ($n = 24$; 33.3%), followed by those who age 16-years-old ($n = 22$; 30.6%), those who age 18-years-old ($n = 10$; 13.9%), those who age 15-years-old ($n = 8$; 11.1%), those who age 19-years-old ($n = 5$; 6.9%), and those who age 20-years-old ($n = 3$; 4.2%). Concerning the SES, around two-fifth in the study group are of the upper middle class ($n = 29$; 40.3%), followed by those who are of the lower middle class ($n = 26$; 36.1%), those who are of the upper lower class ($n = 15$; 20.8%), and those who are of the upper class ($n = 2$; 2.8%). For the control group, more than two-fifth are of the upper middle class ($n = 31$; 43.1%), followed by those who are of the lower middle class ($n = 29$; 40.3%), and those who are of both the upper lower class and upper class ($n = 6$; 8.3%). Regarding the BMI, the BMI mean for participants in the study group is 22.4 ± 4.2 ; more than a half are of normal range ($n = 43$; 59.7%), followed by those who are both underweight and overweight ($n = 12$; 16.7%), those who have class I obesity ($n = 3$; 4.1%), and those who have class II obesity ($n = 2$; 2.8%). For the control group, the BMI mean is 22.2 ± 4.3 ; more than a half are of normal range ($n = 40$; 55.6%), followed by those who are underweight ($n = 15$; 20.8%), those who are overweight ($n = 12$; 16.7%), and those who have class I obesity ($n = 5$; 6.9%). With respect to the existence of sport class in the school curriculum, all participants both in the study and the groups reported that there is such a class ($n = 72$; 100.0%). Concerning the subjective norms of the local community regarding females' practice of physical exercise, less than a half of participants in the study group reported that their community agree to such a practice ($n = 34$; 47.2%), followed by those who reported that the

community strongly agree ($n = 15$; 20.8%), those who reported that the community somewhat agree ($n = 12$; 16.7%), those who reported that the community undecided ($n = 6$; 8.3%), those who reported that the community disagree ($n = 3$; 4.2%), and those who reported that the community strongly disagree ($n = 2$; 2.8%). For the control group, less than a half of participants in the study group reported that their community agree to such a practice ($n = 32$; 44.4%), followed by those who reported that the community strongly agree ($n = 22$; 30.6%), those who reported that the community somewhat agree ($n = 10$; 13.9%), those who reported that the community undecided ($n = 5$; 6.9%), those who reported that the community strongly disagree ($n = 2$; 2.8%), and one who reported that the community disagree ($n = 1$; 1.4%). The values of the Stages of Change for regular physical exercise for the study group noticeably decrease by time compared to the control group (Pretest = 73.40 vs. 70.80, Posttest I = 65.11 vs. 74.99, Posttest II = 48.84 vs. 80.64) respectively. Lower score means higher SOC. Whether these represent significant differences is the job of the repeated measures (RM) ANOVA. The values of the POC for regular physical exercise for the study group noticeably increase by time (Pretest = 80.93, Posttest I = 96.54, Posttest II = 116.99). For the control group, such values slightly decrease by time (Pretest = 80.45, Posttest I = 80.33, Posttest II = 76.65). Whether these represent significant differences is the job of the RMANOVA. The values of the SE for regular physical exercise for the study group noticeably increase by time (Pretest = 43.57, Posttest I = 51.47, Posttest II = 59.04). For the control group, such values slightly decrease by time (Pretest = 44.88, Posttest I = 42.29, Posttest II = 40.04). Whether these represent significant differences is the job of the RMANOVA. This RCT was designed to predict factors both enable and discourage students from committing to regular physical exercise and assist students to change the physical inactivity behavior to abiding to regular physical exercise. The age mean for participants in the study group was 16.9 ± 1.4 ; one third age 16-years-old ($n = 24$; 33.3%). For the control group, the age mean is 16.9 ± 1.3 ; one third age 17-years-old ($n = 24$; 33.3%).

Table 1. Participants' Sociodemographic Characteristics

	Study (N = 72)		Control (N = 72)	
	Frequency	Percent	Frequency	Percent
Age: Mean (SD) (Study G.): 16.9 ± 1.4 Mean (SD) (Control G.): 16.9 ± 1.3				
15	8	11.1	8	11.1
16	24	33.3	22	30.6
17	21	29.2	24	33.3
18	7	9.7	10	13.9
19	8	11.1	5	6.9
20	4	5.6	3	4.2
Socioeconomic Status				
Upper lower class	15	20.8	6	8.3
Lower middle class	26	36.1	29	40.3
Upper middle class	29	40.3	31	43.1
Upper class	2	2.8	6	8.3
BMI: Mean (SD) (Study G.): 22.4 ± 4.2 Mean (SD) (Control G.): 22.2 ± 4.3				
Underweight	12	16.7	15	20.8
Normal range	43	59.7	40	55.6
Overweight	12	16.7	12	16.7
Class I Obesity	3	4.1	5	6.9
Class II Obesity	2	2.8	0	0.0
Is there a weekly sport class?				
Yes	72	100.0	72	100.0
No	0	0.0	0	0.0

Table 2. Descriptive Statistics for the Values of the Stages of Change for Regular Physical Exercise over Time

Stages of Change	Mean	Std. Deviation	N
Study Pretest	73.40	10.867	70
Study Posttest I	65.11	7.959	70
Study Posttest II	48.84	4.526	70
Control Pretest	70.80	11.146	69
Control Posttest I	74.99	12.031	69
Control Posttest II	80.46	12.443	69

Table 3. Descriptive Statistics for the Values of the Processes of Change for Regular Physical Exercise over Time

Processes of Change	Mean	Std. Deviation	N
Study Pretest	80.93	21.294	70
Study Posttest I	96.54	16.188	70
Study Posttest II	116.99	7.664	70
Control Pretest	80.45	18.385	69
Control Posttest I	80.33	18.597	69
Control Posttest II	76.65	21.913	69

Table 4. Descriptive Statistics for the Values of the SE for Regular Physical Exercise over Time

Self-Efficacy	Mean	Std. Deviation	N
Study Pretest	43.57	11.245	70
Study Posttest I	51.47	12.527	70
Study Posttest II	59.04	14.514	70
Control Pretest	44.88	6.530	69
Control Posttest I	42.29	8.105	69
Control Posttest II	40.04	7.337	69

CONCLUSION

The TTM-based intervention was influential in moving students to higher stages of change (Action and Maintenance), enabled them to use students in the pretest time in the Pre-contemplation Stage of Change have greater Pros of regular physical exercise. On the other hand, students in the Preparation Stage of Change have less Pros of regular physical exercise. The TTM-based intervention was influential in enhancing students' moving to higher SOC, using more POC and their SE. It is empirically important to conduct similar studies on larger sample size across Iraq and it is necessary to incorporate the theory-based interventions into the curricula of graduate programs in Iraq and encourage graduate students to adopt theory-based studies in their future proposed research, also it is necessary for community health nurses in Iraq to conduct similar studies on various settings.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing Department, College of Nursing, University of Baghdad and all experiments were carried out in accordance with approved guidelines.

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Assessment of Knowledge and Attitudes of Primary School Health Coordinators Regarding School Injuries in AL-Hilla District

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ABSTRACT

Every year, a large number of primary school students die from accidents, such as meningitis or leukemia, therefore primary school health coordinators in schools are the first responders for emergencies and accidents during school hours. A descriptive cross-sectional study design was conducted on (80) primary school health coordinators in AL- Hilla District of Babylon Province, including AL-Hilla Center Area, Abi Gharaq Area and Al-Kafel Area, to assess knowledge and attitudes of primary school health coordinators regarding school injuries from 1 September (2017) to 1 September (2018). Findings of the study revealed that majority of the participants were correctly responded, the correct response rate ranged (71.2% – 100%). Overall knowledge of the study participants about school injuries was good. And the overall attitude of the study participants was positive. None of the participants had negative attitude. No statistically significant differences had been found in mean knowledge scores for all domains or the overall knowledge score across the age groups, gender, residence, marital status, number of children and monthly income. The study concluded that the overall knowledge of primary school health coordinators about school injuries was good.

Keyword: *Injuries, Assessment of Knowledge, AL-Hilla District*

INTRODUCTION

The school is an important part of the lives of school students and has a direct impact on their physical and mental health. School health services are often neglected in many countries and this neglect is reflected in a lack of health awareness about primary health care and common infectious diseases among school students¹. School students are exposed to a number of risks and injuries because of their mental and physical abilities that are still immature. Primary school students are at higher risk of accidents and injuries.² Primary school is where a strong foundation a student's education is set, a student's mind and body must be nurtured and prepared for the future. Primary school students are also highly active physically and hence, more prone to injuries, their physical health also needs to be cared for meticulously³.

Schools are the best place to educate and spread health awareness, which is one of the main elements in the school health system. This period is characterized by access to health information and acceptance of assistance to students, especially students who are able to acquire healthy behaviors and habits that affect the current and future family⁴. School health coordination is an organized system that effectively links health (physical, emotional and social) with education, this improves the health status of students and increases their ability to learn by supporting the family, community, school and working together. School health priorities are addressed through coordination between the work of the school's health coordinator and the participants. School health coordination is an effective model for linking education and health. This effective model is the way to change health systems in schools by improving the health status of students in schools and increasing their ability to learn, and support the family, community and school for students⁵.

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MATERIALS AND METHODS

A study aims: To assess knowledge and attitudes of primary school health coordinators regarding school injuries in AL-Hilla District and to find out the relationship between knowledge, attitudes of primary school health coordinators with their socio-demographic and personal characteristics such as (age, gender, marital status, years of experiences, the number of training course, etc.)

Design of the study: A descriptive cross-sectional study design was conducted on 80 (primary school health coordinators in AL- Hilla District of Babylon Province, including AL-Hilla Center Area, Abi Gharaq Area and AL-Kafel Area, to assess knowledge and attitudes of primary school health coordinators regarding school injuries from September 2017 to September 2018.

Study Sample: A non-purposive sample of (80) primary school health coordinators in AL- Hilla District of Babylon Province. The study sample divided into three areas including:

- 1 . **Forty five** primary school health coordinators from AL- Hilla Center area.
- 2 . **Twenty** primary school health coordinators from Abi Gharaq area.
3. **Fifteen** primary school health coordinators from Al- Kafel area.

Study instrument: A constructed questionnaire was prepared and modified after a thorough review of the relevant literature. This questionnaire covers three parts:

Personal Characteristics which included:

(gender, age, residence, marital status, number of children, monthly income, level of education and number of years of service, receiving previous information about school injuries, with specifying the source of information: reading, TV, training course, workshop, net, others) which included (10) items.

Knowledge of schools health coordinators about school injuries: which consisted of (general information on knowledge about school injuries, head and neck injuries, bone and joint injuries, wounds and bleeding, food poisoning, bites, stings and foreign bodies and other school injuries).

Attitudes of schools health coordinators about school injuries.

Validity and Reliability: The content validity of the instrument was established through a panel of (16) experts, the reliability of the items was based on the internal consistency of the checklist was assessed by calculating Cronbach Alpha which was = 0.80.

Data Collection and Data Analysis:

A structured questionnaire used to collect data by direct interview. The approximate interview time (20-25) minutes to complete the questionnaire. Data collection is performed from 28 March 2017, to 22 April 2018. To determine whether the objectives of the study were met, the current study data were analyzed by using SPSS, version 25.

RESULTS AND DISCUSSION

Eighty school health coordinators were participated in this study with a mean age of 43.5 ± 8.7 (range: 28 – 62) years, they were 24 males (30%) and 56 females (70%). Regarding the residence, 65 (81.3%) of the study participants of urban and 15 (18.7%) of rural residence, majority of the participants (83.7%) were married (60.6%) had 3- 4 children (41.3%) had a monthly income of more than 800 thousands IQD, 48 (60%) school health coordinators were graduated from college or higher, only (17.5%) of the participants had 10 years or less and (12.5%) had more than 30 years in service while (70%) of them had (11 – 30) years in service with a mean years in service of (19.4 ± 9.6) Range; (1 – 40) years, (Table 1). (Table-2) summarizes the mean scores for each of the knowledge domains in addition to the overall knowledge score for all domains with ranges and evaluation of each domain.

Attitudes of the schools health coordinators towards school injuries

The overall attitude of the study participants was positive, nonetheless, it was neutral for three items where the mean attitude score was (2.25) for the learning first aid is very difficult (2.19) for the sewing a wound resulted from dog bite and 1.98 for prefer to get help from other teachers if a student had a seizure in the classroom. Positive attitude reported for the other (14) items with a mean score ranged between (2.39) to (3.0) (Table 3).

Socio-demographic characteristics of the schools health coordinators (N = 80)

A total of eighty school health coordinators were participated in this study with a mean age of (43.5 ± 8.7) (range: 28 – 62) years, this finding is supported by ⁶ who found that the ages of their study participants (range: 25- 58) years with a mean age of(41.5±7.4 years). Relative to gender (30%) of the study participants were males and (70%) females, this finding was supported by ⁷ who found that the males were only (30%) of the studied group. ⁸ who found that most of their the primary school health coordinators who participated in the study were females (80%) . In regard to residence the present study found that majority of the primary school health coordinators (81.3%) were resident in urban regions. These findings agreed with what was reported by ⁹ in that he stated (97.4%) of his study participants were living in urban areas. Concerning marital status the researcher found that the majority of the participants (83.7%) were married. This finding agreed with what was reported by¹⁰ in the monitored, (83.3%) of their study participants were married. Fortunately, the researcher found that (60.6%) of the study participants were having (3- 4) children. This finding agreed with what was reported by ¹¹ in that they reported (73.3%) of their participants had more than one child. In the present study (41.3%) of the sample under study their monthly income was more than (800) thousands IQD, which consistent with what was found by ¹² nearly half of his participants had a monthly income of (700-1000) thousands IQD. However, there was a disparity in the monthly income as it different across different countries and also affected by some personal factors even within the same country as it is depend on the needs of the participants and their expenditures. Relative to the educational level, the researcher found that(60%) of the primary school health coordinators were graduated from college or higher , these findings supported by that showed the majority of his study participants (84.5%) had Bachelor degree or higher. Concerning the number of years that the participants have in service ranged between (1-40) years, moreover, almost (70%)of participants had (11-30) years in service, while lower proportions (17.5% and (12.5%) for those who had (10)years or less and those who had more than (30) years in service, respectively, these findings supported by ¹⁰ that showed their study practices ranged from (1- 39 years) with a means age of (19.5 years) and SD of (7.2 years). The lower proportion

of those participants with more than 30 years in service could be attributed to the retirement legislations in Iraq, while the lower proportion f those with (10) years or less in service could be attributed to the employment legislation and delayed employment particularly after (2003) where the central employment by ministry of education had been cancelled.

Overall Knowledge assessment of the primary school heath coordinators about school injuries for different studied

These findings agreed with what was reported by (Al-Tameemi, H. M. A. and Khudair, 2016) that showed the result of general knowledge of the primary school health coordinators was good (71%) and was in the same line with study of (Kumar, et. al. ,2015) Knowledge of primary school teachers on first aid management of minor accidents among children at Ambala.

Attitudes of the schools health coordinators towards school injuries with mean scores and assessment (N=80).

The overall attitude of the study participants was positive , nonetheless, it was neutral for three items where the mean attitude score was (2.25) for the learning first aid is very difficult (2.19) for the sewing a wound resulted from dog bite and (1.98) for prefer to get help from other teachers if a student had a seizure in the classroom. Positive attitude reported for the other (14) items with a mean score ranged between (2.39 to 3.0) as shown in table (3).

Table 1. Socio-demographic characteristics of the schools health coordinators (N = 80)

		No.	%
Age/ years	≤30	9	11.3
	31 – 40	26	32.4
	41 – 50	25	31.3
	> 50	20	25.0
	Mean ± SD* (range)	43.5 ± 8.7 (28 – 62)	
Gender	Male	24	30.0
	Female	56	70.0
Residency	Urban	65	81.3
	Rural	15	18.7
Marital status	Single	10	12.5

Cont... Table 1. Socio-demographic characteristics of the schools health coordinators (N = 80)

	Married	67	83.7
	Divorced / Widow	3	3.8
Number of children**	1 – 2	16	24.2
	3 – 4	40	60.6
	> 4	10	15.2
	Mean (range)	3 ± 1 (1 – 8)	
Monthly income (Thousands IQD)	400- 600	20	25.0
	601-800	27	33.7
	More than 800	33	41.3
Level of education	Teachers’ house	11	13.7
	Teachers’ Institute	21	26.3
	College or higher	48	60.0
Years of service	≥10	14	17.5
	11 – 20	32	40.0
	21 – 30	24	30.0
	≤ 30	10	12.5
	Mean (range)	19.4 ± 9.6 (1 – 40)	

Table 2. Mean overall Knowledge score and assessment of knowledge of the schools health coordinators about school injuries for domains and total knowledge items(N=80).

Knowledge domains	Mean	SD	Range	Assessment
General information	2.77	0.13	2.47 – 3.00	Good
Head and neck injuries	2.60	0.19	1.0 – 3.00	Good
Bone and joint injuries	2.46	0.17	1.25 – 3.00	Good
Wounds and bleeding	2.56	0.28	1.4 – 3.00	Good
Food poisoning	2.62	0.24	1.67 – 3.00	Good
Bites, stings and foreign bodies	2.57	0.22	1.60 – 3.00	Good
Other injuries	2.43	0.19	1.40 – 3.00	Good
Overall Knowledge score for all domains	2.59	0.16	2.02 – 2.89	Good

Table 3. Attitudes of the schools health coordinators towards school injuries with mean scores and assessment (N=80).

Item	Attitude						Mean score
	Positive		Negative		Neutral		
	No.	%	No.	%	No.	%	
I think it is very important to have a drugstore or the first aid kits in school.	79	98.8	0	0.0	1	1.3	2.99
I think it’s important for learning first aid services to save the injured students at the school.	80	100.0	0	0.0	0	0.0	3.00
I think training of teachers on first aid regarding injured students is an important issue.	79	98.8	0	0.0	1	1.3	2.99
I think the teaching of first aid for teachers and students in school is necessary.	78	97.5	1	1.3	1	1.3	2.96
I think it is very important to have a drugstore or the first aid kits in school.	79	98.8	0	0.0	1	1.3	2.99
I think it’s important for learning first aid services to save the injured students at the school.	80	100.0	0	0.0	0	0.0	3.00
I think not to exert pressure directly on the injured head if there is a feeling of pain for the possibility of fracture in the skull bone.	60	75.0	5	6.3	15	18.8	2.69
Using an artificial neck cushion to support the neck when it injured is an importance issue.	64	80.0	4	5.0	12	15.0	2.75

Cont... Table 3. Attitudes of the schools health coordinators towards school injuries with mean scores and assessment (N=80).

In case of open fractures I see fractured bone ends should be align and stabilize then rushed to the hospital is necessary.	46	57.5	15	18.8	19	23.8	2.39
I think the bleeding caused by tooth extraction is the most common bleeding among primary school students.	48	60.0	14	17.5	18	22.5	2.43
I feel I have the ability to treat a student diagnosed with bleeding.	53	66.3	15	18.8	12	15.0	2.48
There is censors for monitoring and checking food supplies at school.	76	95.0	1	1.3	3	3.8	2.94
Observing the expiration date of the food in your canteen is important.	77	96.3	0	0.0	3	3.8	2.96
I see it is necessary to undergo periodic examination for school canteen worker and for taking vaccine necessary.	77	96.3	1	1.3	2	2.5	2.95

CONCLUSIONS

Knowledge of the primary schools health coordinators about school injuries was good, the higher knowledge score of the primary schools health coordinators was reported for general information about school injuries domain, the primary schools health coordinators in Al-Hilla District had generally positive attitude toward information about school injuries and majority of school participants had positive attitude (95%) and only (5%) of them had neutral attitude while none of them had negative attitude.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing Department, College of Nursing, University of Babylon, Hilla City, Iraq and all experiments were carried out in accordance with approved guidelines.

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Association between Domestic Violence and Depression among Women Attending Primary Health Care Center in AL-Hilla City

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ABSTRACT

Violence against women is a serious psychological, physical, or sexual acts against women, which pose a danger to women's mental health, such as depression and suicide attempt, as well as maternal and neonatal health problems. Objectives: To assess the level of depressive among women experienced domestic violence, as well as identifying the association between depression and domestic violence. This descriptive correlational study included a convenient sample of (300) women who were exposed to different types of domestic violence. Sample was selected from six primary healthcare centers in AL-Hilla City. Findings revealed that (62.0%) of women experienced different types of domestic violence; most of them reported that they exposed to domestic violence by their husbands. The study indicates that most of participants (68.7%) had moderate level of depression and about (12%) had sever level. There was a statistical significant association between all types of domestic violence and signs of depression ($p < 0.05$). Statistical significant correlations were also found between womens' age, amrital status, and domestic violence. Most of women exposed to domestic violence by their husbands, commonly the sychological type of violence. Any type of domestic violence the women experience increases their vulnerability to depression, specially especilly unmarried women.

Keywords: Domestic violence, depression, women, healthcare centers.

INTRODUCTION

The phenomenon of violence is associated with the existence of human being; violence has been practiced on all layers of society, especially women. Domestic violence is an issue affecting people of all ages, races, genders, and sexual orientations. Violence considered more threatening to women than other form of society¹. Violence against Women is a fundamental violation of women's civil rights. A report by the (WHO) reviled that in 2003 about 30% of women worldwide experienced either physical and/or sexual violence and the violence is increasing among different cultures. Women's mood disorder, post-traumatic stress disorder, and eating disorder are the most common psychological effects

that violence imposes on women. About 57% of Iraqi women are exposure to domestic violence at least once in their lives². In a local study conducted in Baghdad City, the author reported that the women exposed to emotional or psychological violence more than physical and sexual violence³. In another local study done in Diyala Governorate, which explained that Iraqi women exposed to different types of domestic violence such as economic violence (76%), psychological violence (65.2%), and physical violence 46.3%⁴. Violence is a major contributor to women's mental health problems, particularly depression and suicidal behavior, as well as maternal and neonatal health problems⁵. Domestic violence against women is affected by several factors, including demographic characteristics⁶. Studies on the relationship between domestic violence against women and signs of depression are very scarce in Iraq. Violence negatively impacts the physical and mental well-being of women; impacts can range from broken bones to pregnancy-related complications, mental problems, and

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impaired social functioning. Partner violence is one of the major causes of women's mental health problems. Women who have experienced partner violence are almost twice as likely to experience depression compared to women who have never experienced any type of domestic violence. Women suffered variety forms of domestic violence including physical, sexual, economic, emotional abuse, and neglect. Violence affects all female segments, no matter whether victims are poor, rich, educated, or illiterate. Single, married, divorced, or widowed are also at risk for domestic violence. Studies also shown that violence is practiced by powerful persons in the family, such as the father, husband, brother, and mother.

MATERIALS AND METHODS

Study Design

Descriptive correlational study was used to assess the relationship between domestic violence and signs of depression among women attending primary health care center in AL-Hilla City.

Population and Sampling Plan

A convenient sample of consenting (300) women who were exposed to different types of domestic violence and attended six primary healthcare centers in AL-Hilla City, Babylon province.

Study Instruments

A three parts questionnaire was used to answer the study questions regarding the association between domestic violence and signs of depression among women attending primary health care centers. The first part is the women's demographical variables. The second part is the Domestic Violence Scale, which contains a total of (21) items divided to four domains: physical violence (4 items); psychological violence (10 items); sexual violence (4 items); economical violence (3 items). The total (21 items) are scored and rated on three levels Likert scale (1= always; 2= sometimes; and 3= never). The third part is the Major Depression Inventory (MDI). The scale includes (11) items. The total items are scored and rated on three levels Likert scale (1 for always; 2 for sometimes; and 3 for never). Women with a mean score of (>1.7) are considered having sever symptoms of depression; (> 2.4) are having moderate symptoms of depression; and women with a mean score of (< 2.3) are

having mild depressive symptoms.

Ethical Considerations

Women were asked for voluntary participation in this study. Before they agree to be a part of the study, they were informed about the study objectives, the required sample size, and the expected benefits. The questionnaire was made anonymous to maintain subjects' confidentiality.

RESULTS AND DISCUSSION

The recent study shows that all the study participants have exposed to different types of domestic violence at least once in their lives. About (57 %) of women exposed to domestic violence by their husbands, This result agreed with the result of (7) who depict that the majority of women experience violence committed by their husbands (61.1%). Women who exposed to violence by the husband was negatively related with (age of husband, education, culture, drug abuse ,...ect) . Also show the psychological violence is the commonest type of domestic violence was experienceby the study sample. This result supported by Zeidan, (2015) ³ who found that women were exposed to emotional or psychological violence more than physical and sexual violence. The researcher explains the risk for domestic violence against women by the psychological status of family, which is considered the most common reasons for domestic violence. Followed by husband's drug addiction, husband's consumption of alcohol, and not doing the household chores properly. Lower educational level, being unemployment, type of family, lower income, and having more children that factors are also associated with domestic violence. According to AL-Hadrawi (2018) ⁸, addiction negatively impact several aspect of individuals' lives and diminish their family and social relationships, which can be a reason for family conflict that leads to domestic violence. The study also shows that (68.7%) of study participants had moderate level of depressive symptoms. This findings agree with the study done by (Pico-Alfonso et al.,2006) ⁹, who indicate that exposure to different types of violence are place victims at greater risk for moderate or severe depression, especially women who exposed to physical and/or psychological violence. The incidence and severity of depressive, anxiety symptoms, PTSD, and thoughts of suicide are more likely to be found among

women who exposed to domestic violence than those who do not experience violence. Significant statistical relationship between marital status and depressive symptoms was found as shown in (table 6). The results indicate that single women are more vulnerable to depressive symptom than other groups. The study reveals a positive correlation between depression and all types of domestic violence women may experience. Regression analysis was also run to predict depression from different types of domestic violence. Regression analysis shows that all types of domestic violence added significant values to the prediction of depression among women with ($p \leq .05$). This findings goes along with the finding of other studies done by (Maldonado et al., 2015; Martin et al., 2006)^{10,11}. Researchers reported that unmarried women were at higher risk for depression. This results can be determined that single female exposed to violence from different family members. “In other words, women who experience different levels of abuse are more likely to experience feeling of unhappiness, hopelessness, and a lack of meaning in existence, which are considered symptoms of depression or psychological distress¹¹.

Table 1. Distribution of the study sample according to their Socio- demographic characterizes.

No	Variable	F	%
1	Age(years)		
1	18-22	50	16.7
2	23-27	55	18.3
3	28-32	51	17.0
4	33-37	35	11.7
5	38-42	45	15.0
6	43-47	36	12.0
7	48 and older	28	9.3
	Total	300	100.0%
2	Age at Marriage		
1	Not Married	74	24.7
2	18-22	136	45.3
3	23-27	78	25.0
4	28-32	11	3.7
5	33-37	1	.3
	Total	300	100.0%
3	Marital Status		
1	Single	74	24.7
2	Married	156	52.0
3	Widow	25	8.3

Cont... Table 1. Distribution of the study sample according to their Socio- demographic characterizes.

4	Divorce	24	8.0
5	Separated	21	7.0
	Total	300	100.0%
4	Educational level	F	%
1	Does not Read and Write	25	8.3
2	Read and Write	34	11.3
3	Primary Education	64	21.3
4	Intermediate Education	59	19.7
5	High School Education	58	19.3
6	Bachelor and higher	60	20.0
	Total	300	100.0%
5	Residency	F	%
1	Urban	237	79.0
2	Rural	63	21.0
	Total	300	100.0%
6	Working Status	F	%
1	Employees	44	14.7
2	Student	36	12.0
3	Housewife	190	63.3
4	Free Work	30	10.0
	Total	300	100.0%
7	Monthly Income	F	%
1	Enough	100	33.3
2	Not Enough	200	66.7
	Total	300	100.0%

Table 2. Distribution of the sample according to the abuser person against women:

No	Variable	F	%
	Abuser person		
1	The Father	55	18.3
2	The Mother	9	3.0
3	The brother	53	17.7
4	Husband	170	56.7
5	Others	13	4.3
	Total	300	100.0%

CONCLUSION

Most of women exposed to domestic violence by their husbands, commonly the psychological type of violence. Any type of domestic violence the women experience increases their vulnerability to depression, especially unmarried women. Domestic violence is significantly associated with depression level of victim women. Women who exposed to domestic violence from more than a family member are at higher risk for depression.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Association of Obesity, Diabetes, and Hypertension with Cognitive Impairment in Older age

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ABSTRACT

The main objective of this study is to test the Association of obesity, diabetes, and hypertension with cognitive impairment in older age. Age-related cognitive impairment prevalence is increasing globally. Though regarding its epidemiology, its prevalence has not been characterized. The study aims to calculate the function of hypertension, obesity and diabetes in older people and their association with cognitive impairment.

Keyword: Diabetes, Hypertension, Obesity, Older age

INTRODUCTION

Complications and metabolic syndrome threatens the worldwide health. A huge economic cost has been generated due to high prevalence in various nations which rises over time. Cognitive impairment prevalence is high among older people ¹⁻³. Cognitive impairment and age-related are rising in prevalence because of the worldwide aging societies. In the USA, about 22% of older people currently have cognitive impaired. This has been associated with metabolic syndrome ². Obesity, hypertension, and diabetes have been assessed for their relationship contributing. According to the previous studies, the risk of late impairment is due to the midlife obesity and hypertension. There is a well-established association of diabetes to cognitive impairment future and present risk. On the other hand, perspective and cross-sectional investigations with short periods of follow-ups have come up with mixed results¹¹. Late-life hypertension and obesity have been associated with increased impairment in these studies. Measurement issues such as the BMI further complicate the analysis for obesity. Besides, the roles and obesity warrant clarification in particular ^{4,20}. In light of that, the majority of previous epidemiological investigations often fails

to consider that hypertension, obesity, and diabetes are rare in correlated and tend to cluster in individuals. This study used data from three clinical trials. The data used in this study had metabolic characterization and detailed baseline to investigate the cognitive impairment relationship with diabetes, obesity, and hypertension in the cross-sectional analysis ⁸. Also, the study considered the potential mutual confounding. The study finally pooled the results for combined estimates across the three studies.

MATERIALS AND METHOD

This study was a quantitative research study which used questionnaires to collect data, which was then analyzed to come up with findings and a conclusion. In addition, the study used original baseline data. The three studies included SuDoCo, DECS, and OCTOPUS which were obtained for the cross-sectional association secondary analysis of obesity, blood pressure, hypertension and diabetes and body mass index with cognitive impairment present in the analyses of long binomial regression. In this study, cognitive impairment got defined. It scored more than two standard deviations below the cognitive test on at least one of 5-11 tests. Participants who were underweight got excluded. Finally, the study results were pooled across studies.

Design and sample

Several studies have been conducted previously to test the Association of cognitive impairment in older age

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with obesity, diabetes, and hypertension with. This study analyzed baseline data from three different studies. This was in an effective design of observational and cross-sectional study because the studies were randomized for control trials with secondary/primary outcome POCD. At pre-surgery assessment, all the cognitive and clinical data in the study got measured. In the study sample, data from SuDoCo, DECS, and OCTOPUS were used²³. Cross-institutional collaboration led to access to the original data. Recruitment procedures, inclusion criteria, and study design provided that any participant was excluded if they had a neurological deficit. The study excluded patients with mini-mental state examination in SuDoCo. In DECS, the study excluded those with mental illness. Each of the three studies trials assessed the intervention effect on POCD. The neurocognitive assessment was administered in each of the three studies after and before for the presence of cross-sectional analysis purpose. The study used data from those who finished the pre-surgery cognitive test and the data collected at pre-surgery baseline assessment. The study also included data Patient with missing data on obesity, hypertension and diabetes and underweight patient all totaling 19 were excluded from the analyses.

The development of a questionnaire

In order to identify participants history of hypertension and diabetes, the study used self-administered reported medical history questionnaires. BMI was calculated from the participant's weight and height. The study defined obesity as a BMI of less than 18.5 kg/m². On the other hand, in SuDoCo and OCTOPUS, blood pressure was measured before surgery during the days at pre-anesthetic assessment^{3, 22}. Participants self-reported their level of education in DECS and OCTOPUS. In OCTOPUS study, 11 neuropsychological tests were administered by the trained staff. On the other hand, in SuDoCo and DECS, 6 and five neuropsychological test was administered respectively. Nonsurgical control groups were used to complete all the three studies test to provide normative data. The study showed that all the Neurocognitive tests were sensitive to age. They also included Neurocognitive domains which included mental flexibility, manual dexterity, and attention, processing speed and working memory²¹. Respective normative groups were matched for cognitive function. Paper-pencil versions of Subjective Ordering Task, Trail-Making Test B, Sternberg Letter Cancellation Task, and Grooved Pegboard Test were all applied for OCTOPUS.

Besides, paper-pencil versions were used for DECS. The SuDoCo trial covered Choice Reaction Time tests, Spatial Recognition Memory, Pattern Recognition Memory, and the Motor Screening Test.

Data collection

The study collected data at pre-surgery baseline assessment. The self-administered reported medical history questioners were distributed using multiple log-binomial regression. This was used to determine the associations of each parameter. The questioners were also distributed using revised Dillman method to increase the response rate of the questioners.

Variables and data analysis

The study determined the associations of each metabolic function parameters by the use of multiple log-binomial regression analyses. Unadjusted prevalence, ratios model 0 were estimated by the first model. Sex and age got entered in model 1 as covariables. The study used model 2 for the respective remaining metabolic risk factors control. For instance, analyses of diabetes, hypertension, and obesity got controlled¹⁵. This helped in evaluating the independence of any associations from mutual confounding. For DECS and OCTOPUS studies, there were available data on the educational level of participants. Thus, the educational level got adjusted in model 13 which was the final steps. The study indicated that estimated level of risk corresponded to blood pressure increments by 10-point. Data analysis was performed separately for the three studies. The analyzed data got pooled in fixed-effects inverse variance. On the other hand, were entered the corresponding p-values to the first decimal point. The models were used to estimate risk ratios. The study used random effects models to repeat fully adjusted models (model 2). Table one: shows the proportion of variance in the three studies. Additionally, the pooled analyses helped to estimate of risk across all the three studies participants who were 1545.

RESULTS AND DISCUSSION

The participant analysis was based on N= 272 participants from OCTOPUS, N=272 participants from DECS and N=1001 from SuDoCo as shown in Table 1. The study analyzed a totaled 1545 participants. The participants had a mean age of 61 years to 70 years. 29% of the participants showed cognitive

impairment in DECS. 45.6 % of the participants showed cognitive impairment in OCTOPUS while 8.2% of the participants showed cognitive impairment in SuDoCo. After analyses for hypertension and diabetes age, sex, the study showed that obesity was associated with a 1.29 increased risk. However, none of the risk factors which remained were associated with impairment. Although the majority of these studies only identified each of these candidate prediction with consideration or in isolation of few other metabolic factors, the contribution of individuals of each participant to cognitive outcome in that analysis may have been obscured because all correlate with each other strongly^{10,18}. Besides, investigations which were previously done identified obesity and diabetes and hypertension measured later in life as a cognitive impairment risk factors. One of the first studies investigating cognitive impairment established the cross-sectional relationship of cognitive impairment presence with higher BMI and Obesity was independent of comorbid hypertension and diabetes. Obesity association cognition mediation association by the presence of hypertension and diabetes is unlikely. [9, 10] This is because mediating factors control could affect size reduction. Though, an influence possibility of subclinical elevated insulin resistance remained. Cognitive impairment is not only associated with hypertension and diabetes themselves associated according to the cross-sectional data of this study. Disparity reasons from previous epidemiological studies that impacted diabetes and hypertension in cognitive risk are not clear¹⁷. Furthermore, the cognitive impairment definition according to this study is less sensitive to pathological changes¹⁸. However, none of the studies has clearly determined cognitive impairment and association of cognitive impairment with metabolic risk factors. Every year, about four million deaths attributed

to a high BMI worldwide¹⁶. On the other hand, though obesity is modifiable and preventable, it is a global health problem which is threatening because it increases the risk of poor health outcomes. The study found out that those who were at a higher risk of cognitive impairment were obese individuals. The study also found that increasing BMI among normal-weight people, obesity and overweight increases cognitive risk. Though there was no data on the BMI changes across lifespan²⁵. The pathology which links cognitive impairment with obesity understood poorly but may be casual. Obesity induces the vasculature systemic damage. This can lead to cerebral white matter. Obesity also leads to a pro-inflammatory. However, the relationship of cognitive impairment with BMI in the analysis of this study indicated their effects. Following reduced physical activity or increased food intake, obesity might result at the beginning of cognitive impairment. The study, on the other hand, had several limitations. This means that in comparison with dwelling samples in the community, patient will be less healthy. The result pooled across the three studies was heterogeneous regarding sample characteristics and design which complicates the findings interpretation. Third the single time assessments were used to determine metabolic parameters²⁵. The definition of obesity through the BMI does not capture body fat distribution and this is the main cause of negative health outcome link to obesity. Large Cis also limits the results of this study. Further investigations and studies are needed to evaluate the external validity of the findings through replication in the community-dwelling sample. After understanding obesity role in cognitive impairment, the health program or preventive pharmacological strategies could reduce the risk of cognitive risk in older people and other people who are at high risk of being overweight.

Table 1. Showing the sample characteristics of the three studies

Sample characteristics	DECS	SuDoCo	OCTOPUS
n	272	1001	272
mean \pm sD , age, years,	\pm 11.9, 64.1	\pm 6.5, 69.9	\pm 9.1, 61.4
Male, n (%)	210 (77.2%)	556(55.5%)	189 (69.5%)
Diabetes, n (%)	44 (16.2%)	215(21.5%)	35 (12.9%)
Diastolic blood pressure, mmhg, mean \pm sD	–	73.9 \pm 11.6	79.2 \pm 10.0

Cont... Table 1. Showing the sample characteristics of the three studies

Normal weight (BMi 18.5 to 24.9) n (%)	99 (36.4%)	326(32.6%)	94 (34.6%)
Hypertension, n (%)	150 (55.1%)	683(68.2%)	112 (41.2%)
Body mass index (kg/m ²) mean \pm sD	27.2 \pm 4.5	27.4 \pm 5.0	26.6 \pm 3.1
Cognitive impairment, n (%)	79 (29.0%)	82 (8.2%)	124 (45.6%)

Table 2. Showing the association of obesity, hypertension, and diabetes with cognitive impairment

Exposure associations with cognitive impairment	SuDoCo		DECS		OCTOPUS		Pooled estimates
	95% Ci Estimate	Participant Weight	95% Ci Estimate	Weight	95% Ci Estimate	Weight	95% Ci Estimate
Diabetes and cognitive impairment							
Model 0: no adjustment	1.18 (0.71, 1.87)	38.1%	1.53 (0.97, 2.25)	34.8%	0.93 (0.59, 1.34)	27.1%	1.18 (0.92, 1.52)
Model 1: age, sex	1.21 (0.73, 1.91)	25.1%	1.46 (0.93, 2.16)	42.5%	0.82 (0.46, 1.37)	32.4%	1.19 (0.91, 1.56)
Model 2: +hypertension, obesity	1.20 (0.71, 1.95)	30.5%	1.35 (0.76, 2.30)	31.6%	0.77 (0.43, 1.31)	37.9%	1.09 (0.80, 1.49)
Model 3: +education	–	47.9%	1.39 (0.79, 2.35)	52.1%	0.92 (0.50, 1.57)	–	1.14 (0.77, 1.69)
hypertension and cognitive impairment							
Model 0: no adjustment	1.06 (0.69, 1.70)	56.0%	1.13 (0.78, 1.67)	26.0%	1.22 (0.94, 1.57)	18.1%	1.16 (0.96, 1.41)
Model 1: age, sex	0.98 (0.63, 1.57)	39.5%	1.06 (0.73, 1.58)	35.4%	1.08 (0.75, 1.55)	25.1%	1.05 (0.83, 1.32)
Model 2: +diabetes, obesity	0.91 (0.57, 1.49)	44.8%	0.95 (0.60, 1.53)	27.9%	1.10 (0.76, 1.59)	27.3%	1.00 (0.78, 1.28)
Model 3: +education	–	60.6%	1.01 (0.64, 1.62)	39.4%	1.07 (0.74, 1.56)	–	1.05 (0.78, 1.40)
Obesity and cognitive impairment							
Model 0: no adjustment	1.09 (0.66, 1.72)	47.2%	1.58 (1.05, 2.28)	32.1%	1.25 (0.88, 1.67)	20.8%	1.31 (1.05, 1.63)
Model 1: age, sex	1.16 (0.70, 1.83)	29.4%	1.56 (1.04, 2.26)	42.5%	1.26 (0.77, 1.96)	28.1%	1.35 (1.05, 1.73)
Model 2: +diabetes, hypertension	1.14 (0.68, 1.85)	36.3%	1.49 (0.89, 2.45)	31.3%	1.28 (0.78, 2.00)	32.4%	1.29 (0.98, 1.72)
Model 3: +education	–	53.4%	1.38 (0.82, 2.25)	46.6%	1.29 (0.79, 2.02)	–	1.33 (0.94, 1.87)

CONCLUSION

The study results indicated that obese older people have a higher prevalence of cognitive impairment. The complications of the metabolic syndrome threatens world health. Prevalence is high in most countries and rises over time generating huge economic costs. Obesity and diabetes and hypertension measured later in life as a cognitive impairment risk factors. Cognitive impairment is not only associated with hypertension and diabetes

themselves associated according to the cross-sectional data of this study Measurement issues such as the BMI further complicate the analysis for obesity. Besides, the roles and obesity warrant clarification in particular. Cognitive impairment and age-related are rising in prevalence because of the worldwide aging societies. In the USA, about 22% of older people currently have cognitive impaired. This has been associated with metabolic syndrome. Further, prospective studies should

be done to investigate this association.

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Content Analysis of Subject Matter According to Basic Thinking Skills, Environment and Psycho-affective

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ABSTRACT

Learning situation witnesses a shift from focusing on supplying information about subject matters to developing as much relevant thinking skills as possible. Actually, subject matters and thinking skills are interrelated as the former is the context which stimulates the learners' thinking. This paper aims at investigating basic thinking skills thought to be integrated to the content of the activity book "English for Iraq 3rd Primary", by Etherton and MacBurine 2016. To this end, the researchers designed a taxonomy of basic thinking skills in light of which the content of that book was analyzed and they employed a mixed-method of analysis (qualitative- quantitative method). The results confirm the integration of both low and high thinking skills in various percentages and it is concluded that this variety is justifiable as the immense integration of certain skills and the gradual introduction of others are expected to establish for an advanced level of thinking.

Keywords: *Content Analysis, Subject Matter, Thinking Skills, Learning, Educational Exercises.*

INTRODUCTION

Language is a cognitive system which involves encoding the outside world into a mental projected world and externalizing the inner world to those around us. Learning a foreign language, however, involves mapping a new mental world onto the already existing one. The English activity books are thought to be very supportive in this aspect. They provide the context where the learners are lent the chance to practice the re-encoding of the outside environment and structure another projected world that conforms to the new domain of knowledge represented by the English language. Accordingly, the content of activity books are more than just subject matters, they have some abstract domain which is intended to address the learners' thinking. "English for Iraq 3rd Primary", by Etherton, Sally and MacBurine 2016, is a new English syllabus designed for the 3rd Iraqi grade primary pupils. One component of this Syllabus is the activity book

which is intended to provide pupils with an opportunity to practice the English language through a number of exercises and activities presented in eight units. The current study aims at analyzing the content of this book to identify to what extent its' content addresses the pupils' basic thinking, and recording inferences relevant to the results of this analysis. Content analysis is a very useful device that enables the researchers to investigate a wide range of information about various educational topics ¹ and it allows an objective, a systematic and a quantitative description of the core of the content ². According to Parveen and Showkate (2017) ³, content analysis is "the analysis of what is being said, written, or recorded". It is a technique which helps researcher derive valid and reliable inferences from the texts ⁴. In their definitions of content analysis, the educators focus on a specific aspects like objectivity, system, reliability, validity, qualitative and quantitative description of the messages that the researcher gets from analyzing the text by using this technique in his analysis. The researcher can analyze and study different types of contents such as diaries, newspaper content, short stories, messages of TV, videos, documents or any symbols because this technique gives replicable and objective inferences for the messages received from the text data ⁵. Null (2011)

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⁶ defines subject matter as a fundamental element of the curriculum which involves many resources of knowledge that must be contained in a curriculum to be a meaningful. At the same time, subject matter is the main device that teachers and makers of curriculum use to fulfill the larger goals which integrate thought, purpose and action. As the fruits of education are the processes of thought which the learners acquired from the study of a subject, not from the information itself, thinking skills should then be included in the school curriculum and merged with subjects and through various levels. Thinking skills should not be considered as being separated from learning process. Moreover, developing thinking skills demands a permanent training by giving the learners many opportunities to practice through a group of complex thinking processes (Humanities Unit Curriculum Development Institute Education Department, 1995). Many educationalists suppose that there are general thinking skills which are not assignable to a specific subject but are transferable. In fact, these skills are emphasized at the present time as they are noticed to be very simple, objective and easy to be identified and sub- divided into further components of thinking sub-skills. General skills are expected to be integrated within all stages of education to provide the learners with a better ability of thinking. Hence, there is a demanding tendency to shift the concept of teaching from knowledge transmission to thinking tutoring⁷. There are various definitions of the basic thinking skills and there is much historical literature about the types of thinking which influence teaching. The educators have not agreed-upon a certain taxonomy of the basic thinking skills. Therefore; we can find many taxonomies for this type of thinking depending on their creators' points of view which are based on a specific theory of thinking and its nature. The researchers prepare a list of the basic thinking skills depending on their readings of both the relative studies and the taxonomies presented by researchers in this field. The researchers divide basic thinking skills into two levels. The lower level includes (observation, comprehension, encoding, remembering and organization). The higher level also comprises (classification, comparison, application, query and problem's identification).

METHODOLOGY

Due to content analysis method, data classification and themes or patterns identification bring about subjective interpretation of the content (Hsieh & Shannon,

2005:1278) through recognizing "core consistencies and meanings" (Patton, 2002:453) implied in the content under analysis. Accordingly, the researchers adopt the following procedures to get into interpretations of the outcomes of their analysis:

Sample of Study: The sample intended to be analyzed in this study involves the 182 exercises which constitute the content of the English activity book "English for Iraq 3rd Primary", by Etherton, Sally and MacBurrine 2016 .

Tool of Analysis: To achieve the aim of the study, the researchers design a taxonomy of the basic thinking skills depending on their readings of the relevant studies and the many taxonomies that have been presented in this field. The designed taxonomy is reviewed by some experts in the field of education and methods of teaching English as a foreign language. They suggest some modifications which are taken into consideration in deciding the final pattern of the taxonomy.

Steps of the Analysis: The researchers review the content of each exercise in the activity book under investigation to find out the subject matters that these exercises handle in general. Then, they determine the relevance of content of these exercises to each of the basic thinking skill in the designed taxonomy. After that, the frequency of each skill is calculated.

Reliability of Analysis: It is achieved by the intra-rater statistical method. The researchers analyzed a random sample (about 10%) of the total number of the exercises in the activity book with three weeks interval. The reliability was 0.94 which is, statistically speaking, considered high.

Statistical Tools: These tools involve frequencies, percentages and Holsti equation to calculate the reliability level of the analysis.

RESULTS AND DISCUSSION

Table (1) shows that all basic thinking skills within the designed taxonomy are incorporated in the activity book under analysis, but the distribution of these skills is not the same in all the exercises. Application skill occupies the highest percentage and frequency (i.e.30.8%,150) among all the other skills, followed by observation (28.54%,139), remembering (18.69%,91), organization (12.94%,63), encoding (4.93%,24), classification and query (1.23%,6 for each),

comprehension and comparison (0.62%, 3 for each), and finally problem identification (0.40%, 2). The outcome of analysis confirm the availability of both the lower and the higher thinking skills included in the designed taxonomy. The highest levels of availability are occupied by application and observation skills. Taking into consideration that the learners are dealing with a new language, they need to have as much input as possible because they are expected to build a new language repertoire. Hence, observation is expected to be addressed more frequently by the exercises. However, the analysis shows that application skill overweigh observation. In fact, the activity book for the 3rd primary stage is built on the syllabus of the previous two stages (1st primary and 2nd primary) and is intended to develop the learners' skills and knowledge for the next levels, application is then required to root what the learners have already taught and hence it is stimulated more than other skills. The third more frequently addressed skill is remembering through which the learners recall the already stored information to put it into application domain. This skill is linked with both observation and application throughout the exercises in the activity book. Some tasks required remembering some information as a preparatory step to practice application, while observing certain context elements is employed to activate remembering. Obviously, the occurrence of the three skills (application, observation and remembering) in the first three ranks mirrors their interrelationship on the conceptual level. Organization, the fourth highest occurred skill, involves following particular sequence in arranging items. This skill is expected to exploit observation and remembering of observable variables. It is logical to be the third in sequence in comparison to observation and remembering as the latter serve as the ground for this skill within the domain of the activity book under analysis. The syllabus for 3rd primary aims at enhancing and deepening the skills and knowledge gotten in the previous stages (i.e. 1st and 2nd primary) and founding for the next level which is a more advanced one. Accordingly, activating mental storage (encoding skill) received a moderate emphasis. It was not totally absent but providing a further material to be encoded is simply limited to a particular percentage (4.93%) to allow the learners to practice other skills which are thought to be more essential for the aim of this particular stage. Each of the Classification and the Query skills take up

(1.23%) which is a low percentage. Classification is the skill through which one is able to put items into groups depending on interrelationships and relevant properties of these items while query involves generating questions related to specific subject. The concept of relevance is essential in the two skills and it requires enough knowledge about features of and relations between entities that are intended to be classified or questioned about. A learner must be aware of the links between the components of a particular subject to be able to generate questions about it, and this implicates the ability to keep what is relevant and odd out what is not through directing attention to what is shared by all the items in question and this is the core of classification. Hence, comparable occurrence of these two skills at is thought to be justifiable as query may comprise classification as one of its mental operations. Comprehension and comparison show the same weigh in the statistical calculations; each occupies (0.62 %) among all other skills. This parallel presence of the two skills can be attributed to the fact that differentiating similarities and differences between entities is one of the externalized domain of the passive understanding (comprehension) of the overall associations between entities available in the learners' context of learning (items, vocabularies, images, etc.), and the variables in their concrete environment. In the activity book under analysis, Problem's identification skill has the lowest percentage is limited to training the learners to clarify the identity of a particular image after following certain scheme to complete it. The scheme is represented by the alphabet letters and the identity of the image produced after tracing the scheme of letters is expressed by a word that has been taught to the learners. Problem's identification in this context is expected to be effective in teaching the learners to take the privilege of the background knowledge and past experience in determining the details of a problem. The low percentage dedicated for this skill is due to the limited knowledge of the English language on the learners' part. Putting too much emphasis on this skill at this stage may make the learners panic and consequently affect their thinking in general due to lack of both self- confidence and motivation. However, simple activation of this skill in a manner that conform to the learners' age and experience is more fruitful in training their thinking.

Table 1. Frequencies and Percentages of Basic Thinking Skills in the Activity Book “English for Iraq 3rd Primary”

Basic Thinking Skills	Frequencies	Percentages
The Lower Level		
Observation	139	28.54 %
Comprehension	3	0.62 %
Encoding	24	4.93 %
Remembering	91	18.69 %
Organization	63	12.94 %
Basic Thinking Skills	Frequencies	Percentages
The Higher Level		
Classification	6	1.23 %
Comparison	3	0.62 %
Application	150	30.80 %
Query	6	1.23 %
Problem 's Identification	2	0.40 %

CONCLUSION

After examining the results of analysis, the researchers get into the following conclusions: The unequal distribution of these skills is expectable as the learners’ brain is just like a muscle in that it needs gradual practice to make it flexible enough to receive and bear more training. Accordingly, the step by step insertion of some skills with low percentages serves an integrative frame through which one skill is built on the already trained skill and at the same time prepare the learners’ brain to some higher skills. This combination of varied percentages of various skills is thought to be submissive to the goals of the syllabus set specifically to 3rd primary stage. It is found that in the analyzed sample some skills are prompted to be boosters in that they are intended to root other skills that have been already trained (i.e. application boosts both encoding and remembering). While some other skills are addressed to act as founders in that they have a grounding role and serve as a basis on which other skills are built (i.e. remembering grounds for organization), (observation grounds for all skills). It is possible to say that boosters received more weight than founders as the former goes

along with the aim of the syllabus. The analysis also confirms the notion that prompting a particular thinking skill rather than another is highly dependent on the contextual elements attached to the instruction. There is no one to one correspondence between the particular linguistic form of an instruction and the thinking skill it stimulates. The content of activities in the sample of analysis is proved to be a multi-layers, the surface layer is the linguistic form of the instructions and the deep layer is the skills activated by these instructions. While analyzing the various activities, the researchers infer that the foregrounding of one skill, even in case of one word instruction where no further context elements are provided, does not entail the absence of other skills. It is, hence, concluded that while the instruction brings one skill on stage, other relative skills are present in the background taking their role in the revival of that invited skill. Although comprehension is a basic primary skill it has received the second lowest percentage. In the light of what is mentioned in ⁵, comprehension comprises a combination of sub skills, when all controlled, allow the learners to have good competency to deal with different situations. Direct activation of comprehension received (0.62%); yet activating and reinforcing other skills such as observation, encoding, remembering, organization... etc. nurture comprehension because these skills cast the fruit of their training in nourishing comprehension.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, Higher Studies Dep., University of Babylon, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Detection of Parasites from two Species of Biological Vectors in the City of Samawah

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ABSTRACT

The current research is the first study on the role of cockroaches as a biological vector for a group of parasites. 150 samples of cockroaches belonging to American species (92 samples) and German species (58 samples) were collected during the period from August 2017 to April 2018, from two areas in Samawah city. The highest parasite prevalence was recorded in cockroaches collected from toilets (56.03, 34.04), and a total prevalence of (56.67, 33.33), for both species of cockroaches respectively, were followed (66.67) by kitchens and Bedrooms and sitting rooms for *Periplaneta americana* and in kitchens (33.33) for *Blattella germanica*, while the lowest percentage in Bedrooms and sitting rooms was (16.67) for *Blattella germanica*. Statistical analysis showed statistically significant differences in the samples collected from toilets compared to samples collected from kitchens and rooms. The current study recorded four species of protozoa, *Entamoeba histolytica* was first 20(21.74), 22(37.93) and second was *Entamoeba coli* 17(18.47), 10(17.24) and third was *Eimeria spp* parasite 15(16.30), 8(13.79) and *Giardia lamblia* parasite was ranked fourth 9(9.89), 5(8.62) and two species of worms, *Enterobius vermicularis* was the first 75(81.52), 45(79.31) and *Hymenolepis nana* was the second 10(10.87) 5(8.62).

Keywords: Cockroaches, Insect, Pathogens, Food, Cyst, Worms, Houses.

INTRODUCTION

Reproduction and feeding of the animal's parasites (vertebrate and in a vertebrate) depend on several mechanisms for their movement between different hosts, transport is most easily by parasites called "ectoparasites" living near or on the host surface while the internal parasites called "endoparasites" that it must penetrate external defenses and get inside the host. The most important sources of exposure to parasites a: contaminated soil or water: containing the ova or the cysts phases of some parasites such as *Entamoeba histolytica* and *Ancylostoma duodenale*, b: food and vegetables contaminated: foods and vegetables contaminated with ova worm or larvae of some parasites such as *Giardia lamblia*, *Taenia saginata*, c: a petition

with animals: These are animals that are in contact with humans such as dogs, cats, rats and others, d: The use of tools of others: parasites are transmitted from one person to another using the tools of the infected person¹. Cockroaches belong to Blattodea, called termites, and the dominant belief is that they are independent of cockroaches. Currently, 3,500 species and more than 400 species were described worldwide² The name cockroach "comes from the Spanish word for palaces, cucaracha, which turned from the popular English 1620s into cock and cockroach"³ The scientific name is derived from the Latin word blatta, which means "insect avoids light", which in Latin has not only released on cockroaches, but also on another insect such as mantis⁴. Some studies have shown that internal and external parasites can be transmitted by cockroaches. Other studies have found that cockroaches produce an antigen that causes many human health problems. Cockroaches are dangerous when they invade the place where humans live. It carries several types of bacteria, viruses and parasites (protozoa and parasitic worms) in the stool and on certain parts of the body, such as legs and wings, which can cause diseases such as "dysentery, diarrhea and salmonella. In

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addition, the flowing stool and skin often cause asthma that affects people, which happens to a large extent in young people and children (5,6,7). Because of the lack of a previous study showing the role of cockroaches in the transmission of pathogens, so the current study is the first study of its kind in the city of Samawah to detect this role in the transmission of parasitic pathogens (cysts, oocysts and ova).

MATERIALS AND METHODS

Collection of samples

During the current research, 150 samples of cockroaches were collected from residential houses randomly selected, located in two areas of Samawah at latitude 30019' North and longitude 45017' East, the first area of Al-Sayigh district and the second area Al-Nasr district, cockroach samples were collected from bathrooms, kitchens and toilets using sterile tools, forceps and hand gloves and were manually caught from 8 am to 12 pm, during the period from August 2017 to April 2018, at the morning cockroaches were transferred to the Environment Pollution Laboratory at the College of Education for Pure Sciences, AL-Muthanna University.

Techniques for identification, isolation and diagnosis of study samples

According to 11-13 cockroaches were identified in this study, which turned out to belong to the American (*Periplaneta americana*) and German (*Blattella germanica*) species. For the purpose of isolating and diagnosing external and internal parasites was followed by the method 14,15.

Statistical analysis

Statistical program analysis SPSS 20, T-test were used to determine that the significant differences or not significant at ($p \leq 0.05$) for the following relationships:-

1. The percentage of distribution between two species of cockroaches
2. The Percentage of parasites prevalence depending on where cockroaches are collected
3. The prevalence of protozoa and helminths parasites according to the diagnosis of cysts, oocysts

and ova of ectoparasites and endoparasites

RESULTS AND DISCUSSION

During the current research, 150 samples of cockroaches were collected from residential houses randomly selected, located in two areas of Samawah city, during the period from August 2017 to April 2018. This period was selected for the presence of cockroaches in these places, which can be collected and conducted the current research, Table (1) shows that all cockroaches collected are of two species: americana species, *Periplaneta americana* and germane species, *Blattella germanica*. *Periplaneta americana* was more widespread 92 (61.33) followed by *Blattella germanica* 58 (38.67), for adults 79 (85.87), 51 (87.93) and nymphs 13 (14.13), 7 (12.07) in both species, respectively. Statistical analysis showed statistically significant differences in the distribution ratio between *Periplaneta americana* and *Blattella germanica* and the difference in favor of the *Periplaneta americana*. These results confirm strongly the results of previous studies, which indicated that *Periplaneta americana* is widespread in different environments more than *Blattella germanica*. The species *Periplaneta americana* is the most distribution in wetlands, but can survive in dry areas if it has access to water, its prefer for live in the temperatures are warm at about 29 °C (84 °F) and cannot withstand cold temperatures, in residential areas, these cockroaches live in subways and drainage sinks and may move outdoors in courtyards when the weather is warm^{14,16,17}. While¹⁸ mentioned that *Blattella germanica* were common 54%, then *Blatta orientalis* by 34% and finally *Periplaneta americana* by 14.8%, while¹⁹ was founded the nymphs and adults of *Blattella germanica* mostly found specially in summer seasons when compared the distributional pattern of other cockroaches (*Periplaneta americana*, *Blattella orientalis*, *Blattella lateralis*) in Lahore, Pakistan. These cockroaches are usually in the cellars, spaces that allow crawling, cracks and openings in the balconies, building institutions and corridors adjacent to the buildings, *Periplaneta americana* are omnivorous insects that feed on decaying organic matter and a variety of other foods, it particularly prefers fermented foods²⁰. Table (2) shows The Percentage of parasites prevalence depending on where cockroaches are collected from three places in each residential houses, of the 150 samples of cockroaches examined showed that the highest parasite prevalence was recorded in cockroaches collected from toilets (56.03,

34.04), and a total prevalence of (56.67, 33.33), for both species of cockroaches respectively, were followed (66.67) by kitchens and Bedrooms and sitting rooms for *Periplaneta americana* and in kitchens(33.33) for *Blattella germanica*, while the lowest percentage in Bedrooms and sitting rooms were (16.67) for *Blattella germanica*. Statistical analysis showed statistically significant differences in the samples collected from toilets compared to samples collected from kitchens and rooms, it may be because both species omnivorous and Scavenger, but prefer fermented organic matter. Adults can live for almost 2-3 months without food (assuming water is available), or less than one month without food or water, this result agreement with ^{7,19} was conducted cockroaches, especially *Periplaneta americana*, are common health problems that threaten the public health of human beings as they relate to human excreta and transportation from sewage systems into homes and government companies. ²¹ was reported 65% of the emigrants *Blattella germanica* came from adjoining kitchen areas. Furthermore it, *Periplaneta americana* “with 0.6% frequency in the surveyed dormitories” prefers moist and wet places such as toilet and sewers, all toilets and some kitchens are considered the best choice and the main entry-source of this species. The current study recorded four species of protozoa according to the diagnosis of cysts or oocysts and two species of worms, the first species of nematode and the second species of Cestoda according to the diagnosis of ova (Table 3 and 4), *Entamoeba histolytica* was first 20(21.74), 22(37.93) and second was *Entamoeba coli* 17(18.47), 10(17.24) and third was *Eimeria spp* parasite 15(16.30), 8(13.79) and *Giardia lamblia* parasite was ranked fourth 9(9.89), 5(8.62), *Enterobius vermicularis* was the first 75(81.52), 45(79.31) and *Hymenolepis nana* was the second 10(10.87) 5(8.62). And that all these species belonging to protozoa and worms are pathogenic and affecting on human health in the first degree, Except *Entamoeba coli*, which is found naturally in the digestive tract of the human being and its existence is evidence of eating drink or food contaminated with cysts of this parasite. The total of the prevalence of protozoa and worms parasites 66.30, 77.59, 92.39, 86.21 which transited by *Periplaneta americana* and *Blattella germanica*. In addition to the first recording of dwarf worms eggs detected from the cockroaches of the current study compared to the previous study, which addressed a range of pathogens transmitted by cockroaches, statistical analysis showed no statistically significant differences,

Many researchers have studied these parasites and will summarize the importance of each parasite

A: *Entamoeba histolytica*, the parasites are widespread, affecting humans, monkeys, dogs, birds, cats and rats, it lives in the large intestinal wall, especially in cecum region, causing amebiasis or amoebic dysentery, which occurs mainly in the tropics areas. The rate of infection in the world is between 0.2 - 50%, especially in poor families and may be due to malnutrition or to unhealthy conditions ¹

B: *Giardia lamblia* is one of the oldest parasites known to humans. This parasite affects both humans and animals and causes significant damage ²³, The differences in virulence between *Giardia lamblia* as well as the immune state of the body determine the progression of the disease clinically. The symptoms associated with diarrhea of *Giardia lamblia* parasites were described by Zeibigs ²⁴, which can be generally seen on the patient Symptoms of Diarrhea: Diarrhea is often a bad smell with Steatorrhea, bloating with abdominal colic, Anorexia, weight loss, vomiting and sometimes accompanied by Fever ²⁵.

C: *Eimeria spp*: *Eimeria* genus comprises a group of species that belong to protozoa parasites that cause coccidiosis. Which is a common disease in different animals and the liver is the most affected organ of this parasite and causes a serious deterioration in growth leads to high mortality rates and economic losses in institutions suffering from poor sanitation ²⁶⁻²⁸.

D; *Enterobius vermicularis*: Causing a disease called enterobiasis, which spreads in most parts of the world and is frequent in Europe, America and Chile. The number of infections in the world is estimated at 209 million, the incidence among low-income people, orphanages and mental health clinics and high infection in children are infected. The infection is transmitted during the Knit and scratch of the area surrounding the anus or inhalation of the air contaminated with the worm eggs and the eggs remain ability to infection between 2-6 days in the wet areas. This worm causes itching, vaginitis, otitis, abdominal pain ¹.

E: *Hymenolepis nana* is the smallest of the tapeworms that nest in the small intestine of humans. Mostly infections in children in hot regions such as India, parts of Russia, the Mediterranean countries, and Latin America, which causes Dwarf Tapeworm infection

disease. The human infection of this worm causes diarrhea, loss of appetite, vomiting, irritation, itching, rashes, and pain abdomen with some neurological effects²³. Cockroaches found to feed directly on some animals and human tissue specially with cases of children who are neglected²⁰. Human excretions contain a lot of allergens that raise the respiratory system and the presence of these insects in the places of sanitation leads to the transfer of these sensitizers to the other person²⁹.

Table 1. The percentage of distribution for two species of cockroaches according to the stage of life during the study period.

Stage of life	The percentage of distribution %	
	<i>Periplaneta americana</i>	<i>Blattella germanica</i>
Adults	79(85.87)	51(87.93)
Nymphs	13(14.13)	7(12.07)
Total percentage of distribution	92(61.33)	58(38.67)

Table 2. The Percentage of parasites prevalence depending on where cockroaches are collected in the current study

Place collection of samples	No. of cockroaches examination	Number positive of the prevalence of cysts , oocytes and ova parasites	
		<i>Periplaneta americana</i>	<i>Blattella germanica</i>
Kitchens	3	2(66.67)	1(33.33)
Toilets	141	79(56.03)	48(34.04)
Bedrooms and sitting rooms	6	4(66.67)	1(16.67)
Total	150	85(56.67)	50(33.33)

Table 3. The prevalence of protozoa parasites by isolating its cysts from two species of cockroaches

Types of protozoa parasite	Number positive of the prevalence of protozoa parasites %	
	By <i>Periplaneta americana</i>	By <i>Blattella germanica</i>
<i>Entamoeba histolytica</i>	20(21.74)	22(37.93)
<i>Entamoeba coli</i>	17(18.47)	10(17.24)
<i>Eimeria spp</i>	15(16.30)	8(13.79)
<i>Giardia lamblia</i>	9(9.89)	5(8.62)
Total	66.30	77.59
No. of cockroaches examination	92	58

Table 4. The prevalence of helminthes parasites by isolating its ova from two species of cockroaches

Species of cockroaches	No. of cockroaches examination	Number positive of the prevalence of helminthes parasites		Total
		<i>Enterobius vermicularis</i>	<i>Hymenolepis nana</i>	
<i>Periplaneta americana</i>	92	75(81.52)	10(10.87)	92.39
<i>Blattella germanica</i>	58	45(79.31)	5(8.62)	86.21

CONCLUSION

We conclude from the results of the present study that there are only two species of cockroaches, namely American species and German species, and that American species are more abundant than German species, and both species have the ability to transport many Pathogens species. This indicates that cockroaches are not specialized in transporting a particular species of parasite. On the other hand, cockroaches play an important role as a biological vector of many microorganisms and worms.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols

were approved under the College of Education for Pure Sciences, AL-Muthanna University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Detection of Serum Resistance Genes (*lppA* and *ompK36*) in Enterobacteriaceae Species Isolated from Extraintestinal Infections

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ABSTRACT

The study was aimed to genetically detection of genes encode outer membrane proteins related with human serum resistance: lipoprotein A (*lppA*) and outer membrane protein (*ompK36*) in 26 isolates of Enterobacteriaceae family isolated from intestinal and extra-intestinal infections. *lppA* and *ompK36* genes were amplified from genomic DNA using conventional PCR of all isolates of Enterobacteriaceae, it was found that 20(76.9%) of Enterobacteriaceae isolates gave positive result for *lppA* gene at 456 bp while only 15(57.6%) of isolates gave positive result for *ompK36* gene at 305 bp. The highest prevalence of *lppA* gene was 100 % and 80% observed among blood and UTI isolates, respectively, while the percent of *lppA* gene among intestinal isolates was (70%) and the lowest incidence of a *lppA* gene was detected in respiratory tract isolates which was 50 %. The *ompK36* was distributed among 70% of intestinal strains and among 50% while only 25% of blood isolates were having *ompK36*. The highest frequency of the *lppA* was observed in 100% of *E.coli* and *Salmonella typhi* strains which gave positive result at 456 bp, The prevalence of the *lppA* gene in *Shigella dysentery*, *P. vulgaris* and *Serratia marcescens* isolates were 80,75 and 50%, respectively.

Keywords: Enterobacteriaceae, PCR, serum resistance, *lppA*, and *ompK36* genes.

INTRODUCTION

Outer membrane proteins (OMPs) are exist in the outer membrane of Gram-negative bacteria. They help in the translocation of solutes across the impermeable outer membrane of Gram negative bacteria. These proteins are also involved in adhesion and invasion of the bacteria ¹. The lipoprotein (*Lpp*) is related with the outer membranes of bacteria within the Enterobacteriaceae family, the *LppA* has formerly been confirmed to play a role in the host's immune response against some gram-negative enteric pathogens, such as *E. coli*, *Salmonella enterica* serovar *t yphimurium*, *K.pneumonia* and *Y. enterocolitica* ²⁻⁵. Bacterial resistance to the mortal effects of human serum appears to contribute to increased virulence in

extraintestinal infections of Enterobacteriaceae and this resistance conferred by (*LppA*) and *ompK36* ⁶. one of an important virulence factor in *Klebsiella pneumoniae* is resistance to phagocytosis process conferred by some proteins encoded genes ⁷. Deletion of the *LppA* gene from *Klebsiella pneumoniae* strains showed reduced protection against killing by phagocytosis, Therefore, the *K. pneumoniae LppA* protein is associated with the conservation of cell envelope integrity and removal of *LppA* reduced the ability of *K.mpneumoniae* to persist in serum ⁵. Loss of *Lpp* genes in *Salmonella* strains result in deficiency in invasion, motility, cytotoxicity stimulation, and synthesis of inflammatory cytokines ³. The uropathogenic *E. coli* strain displayed reduced persistence in a mouse bacteremia form ^{8,9}. Additionally, loss of the outer membrane protein *ompK36* of *K. pneumoniae* leads to developed antibiotic resistance and complement resistance ^{10,11}. Removal of *OmpK36* gene improves serum resistance beside enhances the ingestion by neutrophils ⁶. The aim of this study was to molecular

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detection of the *lppA* and *ompK36* genes among Enterobacteriaceae species isolated from intestinal and extraintestinal infections.

MATERIALS AND METHODS

Isolation and Identification

Twenty six of clinical isolates of Enterobacteriaceae were obtained from different sources (urine, blood, stool and sputum) from patients were admitted to the teaching al-Hilla hospital /Babylon province in the period from November 2017 to March 2018. Each specimens were inoculated on selective media and identified by biochemical tests according to the diagnostic techniques mentioned in ¹². Diagnosis was established by the automated method Vitek® 2 (BioMérieux).

Genetic detection of *lppA* and *ompK36*

We used a PCR conventional method for recognition of selected virulence genes included in this study (*lppA* and *ompK36*).

Extraction of Bacterial DNA

The bacterial DNA was extracted from bacterial isolates by using Genomic DNA Mini Bacteria Kit that supplied by the manufacturing company (Geneaid, UK). The DNA suspension was kept at -20 C until used for PCR amplifying.

PCR Amplifications

Recognition of interest genes of *E. coli*, *Klebsiella pneumonia*, *Shigella dysenteriae*, *Serratia marcescens*, *Salmonella typhi*, *Proteus vulgaris* were accomplished by amplifying the genes via PCR. The primers used in this study were provided by (Macrogen Company, Korea) /Descriptions and sequences of the PCR are displayed in (Table 2-1).

RESULTS AND DISCUSSION

The distribution of bacterial genes according to the site of infection

A total of 26 Enterobacterial isolates has been isolated from different clinical infections. The highest prevalence of the *lppA* gene was observed among blood and UTI isolates (100 % and 80%), respectively, while the percentage of a *lppA* gene among intestinal isolates was (70%) and the lowest prevalence of a *lppA*

gene was observed in respiratory tract isolates which was 50 % (Table 1). The *ompK36* gene was distributed among 70% of intestinal infections and in 50% of both urinary and respiratory tracts infections while only 25% of blood isolates were having *ompK36* gene. Other studies showed that two lipoproteins were involved in pathogenesis of *E.coli* and *Salmonella typhimarium* ^{3,4}. Diao *et al.*, 2017 ⁸ found that *lpp* protein is essential for virulence of uropathogenic *E. coli* CFT073 strain in a mouse bacteremia infection form through stopping complement-mediated bacterial killing.

Molecular detection of virulence factors genes among Enterobacteriaceae isolates

lppA and *ompK36* genes encoded important virulence factors in enterobacterial isolates were genetically scanned by PCR for detection of the presence of these genes that related to human serum resistance in 26 isolates of Enterobacteriaceae family, it was found that 20(76.92%) of Enterobacteriaceae species gave positive result for *lppA* at 456bp, and only 15 (57.6%) of Enterobacteriaceae isolates gave positive result for *ompK36* gene at 305bp as shown in table 2. Zhang *et al.*, 1998 ² showed that both *LP* and *LPS* acted synergistically to prompt cytokine production through different mechanisms and. *Lppa* plays vital role in pathogenesis of species of Enterobacteriaceae such as *E.coli*, *Salmonella typhimarium* and *Yersinia pestis* ³. The *ompK36* is a major porin involved in serum resistance by inhibiting phagocytosis lead to increasing virulence of bacteria ⁶. The highest prevalence of the *lppA* gene was observed in 100% of *E.coli* and *Salmonella typhi* strains which gave positive result at 456 bp, this result comparable with Diao *et al.*, 2017 ⁸ study who found that lipoprotein (*Lpp*) is a major outer membrane lipoprotein in *Escherichia coli* and deletion of *lpp* in uropathogenic *E. coli* strain CFT073 showed decreased persistence in a mouse bacteremia form, and this strain was sensitive to serum killing *in vitro*. Phan *et al.* 2013 ⁹ confirmed an association between *lpp* and serum resistance of *E. coli* ST131 strain, *lppA* and *lppB* were observed as two forms of the lipoprotein genes *lpp* in *S. enterica* serovar *typhimurium* and deletion of *lpp* gene resulted in weakening of bacteria in their motility, invasiveness, and chemokine production and such mutated strains were less virulence in mice when given by systemic and oral ways compared to the wild-type (WT) strain ¹⁶. The prevalence of the *lppA* gene in *Shigella dysenteriae*, *P. vulgaris* and *Serratia marcescens* isolates were 80, 75

and 50% respectively, as shown in figure 1. Kaca *et al.*, 2009¹⁷ confirmed that the smooth *P. mirabilis* S1959 (O3) strain was protected from the bactericidal action of serum by outer-membrane proteins. The lowest percent of distribution (40%) of the *lppA* gene was showed in *Klebsiella pneumoniae* strains, the murein lipoprotein (LppA), is a main outer membrane protein (OMPs) that are liberated by gram-negative bacteria through sepsis. The *K. pneumoniae lppA* protein is essential in supporting of cell integrity, participated to virulence through bacteremia caused by *Klebsiella pneumoniae*, these proteins provide resistance against neutrophil ingestion and killing by phagocytes and serum elements⁵. The *ompK36* gene was identified in 100% of *E. coli* isolates and among 60% of *Shigella dysentery* isolates whereas it was observed among 50 % of both *Proteus vulgaris* and *Serratia marcescens* isolates and only 40% of *K. pneumonia* and *Salmonella typhi* isolates were positive for *ompK36* (Figure 2). This mean that 60% of these isolates were lacking of *ompk36*. Wasfi *et al.*, 2016¹³ showed that the distribution of the *ompK36* gene among *K. pneumonia* strains was changeable in different samples from sputum, blood and urine samples. The *ompK36* show a role in *K. pneumoniae* virulence and infection. Nour El Din *et al.* 2016¹⁸ who observed reduced expression of *ompK36* was detected in (52.38%) of *K. pneumoniae* isolates. Three different porins from *Serratia marcescens* were described one of them omp1

which was replicated and sequenced and it shows a large homology to the family of outer membrane porins that composes the major porins of enterobacteria(19). Previous a study by Mitsuyama *et al.*, 1987²⁰ suggested that *Proteus vulgaris* have only one kind of porins proteins. Biswas (2000)²¹ found association between porin and inflammatory response in *Shigella dysenteriae* infections. Removal of *OmpK36* can lead to the decreasing in virulence of extremely virulent strains and can increase their ingestion by polymorphonuclears phagocytes²². Additional studies revealed that mutant's strains with an *ompK36* removal can inhabit the liver, but cannot remain, after intraperitoneal inoculation. One approach by which *OmpK36* may participate to virulence *in vivo* is by stopping phagocytosis, and this was confirmed by increasing the ingestion of mutants strains by human neutrophils after deletion of an *ompK36* gene²². This is probably due to a modification in the binding of bacteria to phagocytes caused by the absence of the *ompK36*²³. The deficiency of a direct contact between an *ompK36* and a C1q complement protein may describe greater resistance against serum killing in the *ompK36* mutant⁶. A wide range of antibiotics move across the cell wall of *K. pneumoniae* via a channel provided by the *ompK35* and *ompK36* cell wall, therefore elimination of these porins result in more antibiotics resistance^{42,11}.

Table 1. The sequence of primers used in current study.

Gene name	Primer Sequence	size(bp)	References
<i>lppA</i>	F R CGGAATTTACTATTTAATAAGGG TTACTTACGGTAAGAGTGAGCC	456	(5)
<i>OmpK63</i>	F R GAAATTTATAACAAAGACGGC GACGTTACGTCGTATACTACG	305	(13)

Table 2. The distribution of virulence factors genes among bacterial isolates according to the site of infection

Source of isolate	<i>lppA</i> n (%)	<i>ompK36</i> n (%)
Urinary tract infections	8/10(80%)	5/10(50%)
Intestinal infections	7/10(70%)	7/10(70%)
Blood	4/4(100%)	1/4(25%)
Respiratory infections	1/2(50%)	1/2(50%)
Total	20/26(76.9%)	14/26(53.8%)

Table 3. The prevalence of virulence factors genes among bacterial species

Species	Number	<i>lppA</i> n(%)	<i>Omp K36</i> n(%)
E.coli	5	5/5(100%)	5/5(100%)
Klebsiella pneumonia	5	2/5(40%)	2/5(40%)
Salmonella typhi	5	5/5(100%)	2/5(40%)
Shigella dysentery	5	4/5(80%)	3/5(60%)
Proteus vulgaris	4	3/4(75%)	2/4(50%)
Serratia marcescens	2	1/2(50%)	1/2(50%)
Total	26	20/26(76.92%)	15/26(57.6%)

Figure 1. Agarose gel electrophoresis image that shown the PCR product of a virulence factor gene (*lppA*) at (456 bp) in different bacterial isolates. Where M: Marker (2000-100bp), lane (1-5) *E. coli*, lane (6-10) *K. pneumonia*, lane (11-15) *Salmonella typhi*, lane (16-20) *Shigella dysentery*, lane (21-22) *Serratia marcescens* and lane (23-26) *Proteus vulgaris*.

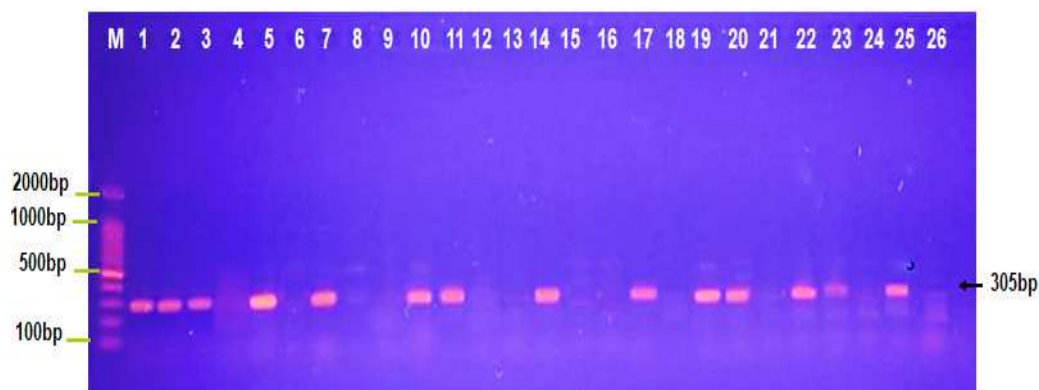
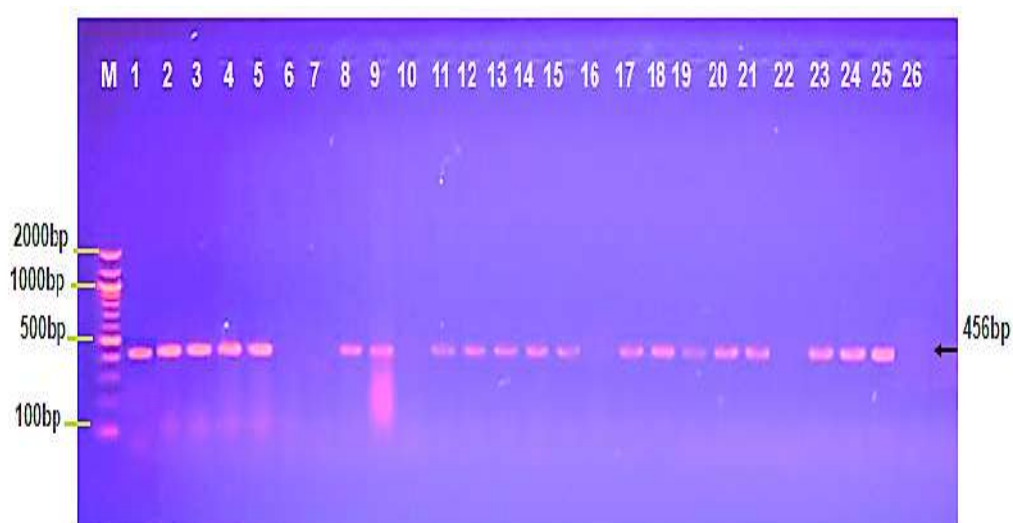


Figure 1. Agarose gel electrophoresis image that shown the PCR product of a virulence factor gene (*ompK36*) at (305bp) in different bacterial isolates. Where M: Marker (2000-100bp), lane (1-5) *E. coli*, lane (6-10) *K. pneumonia*, lane (11-15) *Salmonella typhi*, lane (16-20) *Shigella dysentery*, lane (21-22) *Serratia marcescens* and lane (23-26) *Proteus vulgaris*.

CONCLUSION

The present study concluded that high prevalence of the *lppA* and *ompK36* genes which encoded for membrane proteins that are responsible for human serum resistance among local Enterobacteriaceae species isolated from different clinical infections and high rate of distribution of these genes was identified in isolates obtained from extraintestinal infections.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of biotechnology, Al-Qasim Green University, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of Nursing Intervention for Early Detection of Breast Cancer among Working Women at Baghdad City

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ABSTRACT

Objectives: To identify the knowledge before and after implementation of nursing interventions and to determine the impact of nursing interventions upon women's practices of BSE in post test and to find out the relationship between women's practices after two months toward performing and management of breast self-examination among study group with studied variables. A quasi-experimental design (one group, a pretest- post test approach) was carried out on (120) working women at Ministry of Industry & Minerals / State Battery Manufacturing Company and Sewing Factory Baghdad (Tents) and Higher Judicial Council- Iraq at Baghdad city. The study demonstrated that the highest percentage (39.2 %) within age group of (41-50) years, (30%) were **primary** school graduate, (59.2 %) were married and (73.9 %) of them their age at marriage is (20-39) years old with mean and SD (**25.18±7.72**), (**45.8%**) of them were live in nuclear families. The highest percentage (53.3 %) of study sample their age at menarche is between 13-14 years, (85.8 %) has a regular menstrual cycle. (54.5%) of them had (1-4) pregnancies, (72.7%) had (1-4) deliveries, (72.7%) did not have any type of abortion, (12.5%) had infertility, (27.3%) using hormonal contraceptive.

Keywords: Breast cancer, Breast Clinical Examination, Breast Self-Examination, Knowledge and Practice.

INTRODUCTION

Breast cancer is the most common cancer among women both in developed and developing countries and is the leading causes of morbidity and mortality worldwide, with approximately 14 million new cases and 8.2 million cancer related deaths¹. It was estimated that the majority (53%) of cases of female breast cancer were occurring in less developed countries. While incidence rates still remain much higher in more developed countries, this shift in the global distribution of cases highlights that breast cancer is continuing to emerge as a major public health problem worldwide². Globally, breast cancer is the most common malignant neoplasm among women in all over the world and responsible for about (12%) for deaths³. It was reported that cancer is the

fourth ranked cause of death in Eastern Mediterranean Region (EMR), after cardiovascular diseases, infections / parasitic diseases and injuries according to WHO report. Incidence and mortality rates are decreasing in developed countries because of early detection and improved treatment in addition to screening program. In contrast in the developing world, lack of information and awareness, absence of nationwide mammographic screening program and women neglecting their health and delay in search for treatment⁴. Female breast cancer incidence rates decreased by about 2% per year from 1999 to 2005. This decrease was reported only in women aged 50 or older, may be due to decline in use of hormone replacement therapy after menopause. Early education on breast self-examination and early screening is extremely important in reducing incidence of breast cancer and achieving optimal outcomes. So empirical evidence suggests that triple assessment technique i.e. breast self-examination (BSE), mammography and \ or ultrasonography and clinical breast examination (CBE) help to ensure early detection, reduce cancer mortality

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rate among women and improve survival rates⁵. It was reported that breast self and clinical examination will detect cancer at a rate between 70% - 80%. Screening mammography (mammograms) will increase detection to 96% - 98%. Clinical examination and mammography can reduce breast carcinoma mortality by 20% to 30%. Screening should start with a baseline mammogram at age 35, or younger if there is strong family history. Annual examination should be performed once a woman reached 40 years of age, and self-examination should be encouraged monthly starting at the age of twenty and continue to carry out through woman lifetime⁶. The high incidence and mortality rates of breast cancer, as well as the high cost of treatment and limited resources available, require intensive health education and continual training toward BSE. The costs and benefits of fighting breast cancer have a positive impact upon early detection and screening which need to be carefully weighed against other competing health needs⁷⁻⁹.

MATERIALS AND METHODS

A quasi-experimental design (one group, a pretest-post test approach) was carried out on (120) working women at Ministry of Industry & Minerals / State Battery Manufacturing Company and Sewing Factory Baghdad (Tents) and Higher Judicial Council-Iraq at Baghdad city. The study sample was exposed to nursing intervention regarding breast self-examination for early detection of breast cancer. Participants were identified by convenient sampling of eligible women met at their job sites. Study sample is divided into seven groups each group is consisted of 15-20 participants. Content validity of the questionnaire has been determined through a panel of eight experts in the specialist medical and nursing fields, while the reliability of the questionnaire has been determined by test and retest approach. The data have been collected during the period from 3rd August 2014 to 30th June 2015 by a questionnaire through self-administered and allow time to fill their response at their will with convenience, private and confidential setting, and comprised of three parts (demographic and reproductive variables, knowledge which consisted of (23) items and practices (16 items) regarding breast self-examination. Implementation of breast self-examination (BSE) as a nursing intervention for early detection of breast cancer: it was implemented through classroom session which was introduced with respect to the essential information relative to the women's needs to perform BSE. It was designed and scheduled

for one day. Intervention session were managed by the following teaching methods: lectures, posters, training for the subjects on breast self-examination simulator and model, in addition to video film and distributing three types of pamphlets (breast self-examination, clinical breast examination and mammography).

RESULTS AND DISCUSSION

Table (1) shows the age group of the study sample which was ranged between (21 – 59) years with mean and SD is (42.88±10.53). the highest percentage (39.5 %) within age group of (41-50) years, (30%) **primary** school graduate, (59.2 %) were married and (73.9 %) of them their age at marriage is (20-39) years old with mean and SD (25.18±7.72), (45.8%) of the study sample live in nuclear families only 5% of them smokers, while (95%) did not have positive smoking, finally (32.5 %) of them were exposed to negative smoking. Table 2 revealed that the highest percentage (53.3 %) of study sample their age at menarche is between 13-14 years, (85.8 %) had a regular menstrual cycle. Age at menopause=48.05±3.75 Min. 40 Max. 54, SE = 0.616, n= 37, (54.5%) of them have (1-4) pregnancies, (72.7%) have (1-4) deliveries, (73.8%) did not have any type of abortion, while 27.3% have abortion, (12.5%) have infertility, while (87.5%) did not have any type of infertility previously,(27.3%) using hormonal contraceptive, (72.7%) did not use hormonal contraceptives, (70.9%) of them are previously lactating mothers and the majority of them using both breasts for lactation. This table revealed that the highest percentage (63.3 %) of study sample did not have previous history of cancer within their families while the rest of study sample had previous history of cancer, more than half of the sample had breast cancer, 52.3% of them are within third degree of consanguinity. Table 3 depicted that there were low and moderate mean scores in most items related to knowledge regarding breast self-examination in pre-test with low relative sufficiency. While there were high and moderate mean scores and relative sufficiency in most items of knowledge in post test after the implementation of nursing intervention with high statistical significant differences between knowledge in pre and posttest regarding breast self-examination. Table 4 depicted that there were high and moderate mean scores in majority of items related to practices of breast self-examination after implementation of nursing intervention. The study demonstrated that the highest percentage (39.2 %) within age group of (41-50) years, (30%) were **primary** school graduate, (59.2 %) were

married and (73.9 %) of them their age at marriage is (20-39) years old with mean and SD (25.18±7.72), (45.8%) of them were live in nuclear families as shown in table (1). This result is in constant with Elwan et al. who reported that the peak frequency of breast cancer increased with age until menopause and then start to decline¹⁰. It was stated that women's age, level of education and those who heard or read about breast cancers considered as a significant predictors of BSE Practice¹¹, while other studies were found that socio-demographic variable were not effective on BSE practice¹². The highest percentage (53.3 %) of study sample their age at menarche is between 13-14 years, (85.8 %) has a regular menstrual cycle. Age at menopause= 48.05±3.75 Min. 40, Max. 54, SE = 0.616, n= 37, (54.5%) of them had (1-4) pregnancies, (72.7%) had (1-4) deliveries, (72.7%) did not have any type of abortion, while 27.3% had abortion, (12.5%) had infertility, while (87.5%) did not have any type of infertility previously, (27.3%) using hormonal contraceptive (72.7 %) did not use hormonal contraceptives, (70.9%) of them were previously lactating mothers, and majority of them used both breasts for lactation as shown in table (2). This study depicted that the highest percentage (63.3 %) of study sample did not have previous history of cancer within their families, while 36.7% of them had previous history of cancer, more than half of the sample had breast cancer, and 52.3% of them are within third degree of consanguinity as shown in table (3). According to ACS (2005) women with family history of breast cancer have a greater risk of developing cancer in their generation especially at first- degree relative (mother, father or daughter and son). A family history of ovarian cancer also increase a risk of breast cancer of women. It was indicated that a positive family history of breast cancer is a strong risk factor for breast cancer at young age¹⁴. The study depicted that there were high and moderate mean scores in majority of items related to practice of breast self-examination after implementation of nursing intervention in table (5).

Table 1. Distribution of socio- demographic characteristics among study sample (n=120).

Socio-Demographic Variables	(n=120)	
	No.	%
Age /years		
21-30	24	20
31- 40	22	18.3
41-50	47	39.2
51-60	27	22.5
42.88±10.53 (Min. 21Max. 59) range 38, SE= 0.961		
Educational level		
Primary school graduate	36	30
Intermediate school graduate	18	15
Secondary school graduate	26	21.7
Institute graduate	14	11.6
College graduate	26	21.7
Marital status		
Single	32	26.7
Married	71	59.2
Divorced	4	3.3
Widow	11	9.2
Separate	2	1.6
Age at marriage / Years		
> 20	18	20.5
20 - 39	65	73.9
≤ 40	5	5.6
25.18±7.72 (Min.13 Max. 42) SE= 0.819 n= 88		

Table 2. Distribution of reproductive characteristics among study sample (n=120).

Reproductive variables	(n=120)	
	No.	%
Age at menarche / years		
11-12 year	37	30.9
13 - 14 year	64	53.3
15-16 year	15	12.5
17-18 year	4	3.3
13.23±1.34 (Min.11 Max. 17), SE= 0.122		
Regularity of menstrual cycle during their fertile age		
Regular	103	85.8
Irregular	17	14.2
Age at menopause 48.05 ±3.75 (Min.40 Max. 54) SE= 0.616 n= 37		
Gravida (n=88)		
Nil	2	2.3
1-4	48	54.5
≤5	38	43.2
Parity(n=88)		
Nil	3	3.4
1-4	64	72.7
≤5	21	23.9
Abortion(n=88)		
Nil	64	72.7
1-2	16	18.2
≤3	8	9.1
Infertility(n=88)		
Yes	11	12.5
No	77	87.5

Table 3. Family history of cancer among study sample (n=120).

Family History of Cancer	Study group (n=120)	
	No.	%
Family history of cancer (n=120)		
Yes	44	36.7
No	76	63.3
Type of cancer (n=44)		
Breast	26	59.1
Uterus	2	4.5
Lung, brain, prostate and others	16	36.4
Consanguinity (n=44)		
First degree	7	
Second degree	14	
Third degree	23	

Table 4. Practices regarding breast self-examination after implementation of nursing intervention among study sample (n=120) .

Practices regarding breast self-examination	Rating		MS	RS	Assessment
	Yes	No			
Regular monthly BSE	110	10	1.92	96	H
Using palpation and inspection in BSE	105	15	1.88	94	H
Standing in front mirror, during bathing and lying in supine position are the approach to discover any abnormalities in breasts	89	31	1.74	87	M
After menstrual cycle is appropriate time for examination	101	19	1.84	92	H
Observe if there is a slight differences in the size of breasts considered it normal	109	11	1.91	95.5	H
Observe any in breasts and nipples abnormalities	75	45	1.63	81.5	M
Observe and check the nipple for inverted	117	3	1.98	99	H
Enable to observe any nipple discharge	111	9	1.93	96.5	H
Enable to observe any retraction in breast tissues	114	6	1.95	97.5	H
Slight circular or spiral toward o'clock motion	109	11	1.91	95.5	H
Palpate lymph nodes under arm as a part of BSE	111	9	1.93	96.5	H
Complete examine all breasts include arm pit	116	4	1.97	98.5	H
Follow up any new issues about breast disorders and BSE	113	7	1.94	97	H
Advise and discuss any idea of knowledge about breast disorders and how to prevent it	96	24	1.8	90	H

Table 5. Knowledge regarding breast self-examination in Pre and post test among study sample (120).

Knowledge items about BSE	Pre test			MS	RS	Post test			MS
	Yes	Un-certain	No			Yes	Un-certain	No	
Information related to anatomy of breasts	50	13	57	1.9	63.3	84	4	32	2.4
Changes occur in breasts during woman developmental stage.	55	15	50	2	66.7	94	2	24	2.6
Normally there is a slight differences in the size of breasts	32	25	63	1.7	56.7	109	2	9	2.8
Breasts become tenderness due to menstrual disorders	55	12	53	2	66.7	104	2	14	2.8
Enable to check any abnormalities in shape and size of breasts	75	15	30	2.4	80	94	6	20	2.6

Cont... Table 5. Knowledge regarding breast self-examination in Pre and post test among study sample (120).

Enable to check any tumor or mass in the breasts	42	11	67	1.8	60	119	0	1	3
Become anxious when discovering any mass in breasts	88	12	20	2.6	86.7	118	0	2	3
Early detection of any mass will help woman have better prognosis	44	21	55	1.9	63.3	119	0	1	3
It is necessary to implement BSE in normal condition	42	18	60	1.9	63.3	81	3	36	2.4
Performing BSE continuously	57	6	57	2	66.7	110	1	9	2.8
Having specific time for exam	50	13	57	1.9	63.3	101	4	15	2.7
Using inspection and palpation during exam	60	15	45	2.1	70	105	6	9	2.8

CONCLUSION

This study indicated that there were more than half of study sample have a barriers toward breast self-examination. There are a statistical significant differences between knowledge in pre and posttest regarding breast self-examination. This study indicated that nursing intervention on BSE could be improve early detection of breast cancer by monthly regular breast self-examination. Overall our findings indicate that the practice of monthly BSE after nursing interventions to implement and re-enforce their awareness about cancer screening programs in Iraq. Practice of breast self-examination is high among working women after nursing intervention therefore a training program on this issue will have impact to avert and reduce the severe morbidity and mortality rate of breast cancer in Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Maternal and neonate nursing department, college of nursing, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of Planned Teaching Program regarding Autistic Child in Mothers' Knowledge in Thi- Qar Autistic Center in AL- Nasiriya City

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ABSTRACT

The study aims to assess mother's knowledge toward autism children and construct an program for mother's according to their assessment needs the planned-teaching regarding autistic child in autism center in AL- Nasiriya city. A quasi experimental study was used for the present study which was carried out from 20th November 2017 to the 1st August 2018 in order to determine Effectiveness of Planned Teaching Program regarding Autistic Child in Mothers Knowledge in Thi-Qar Autistic Center in AL- Nasiriya City, a purposive (non- probability) sample was used in this study the sample composed of (60) mothers accompanied their autistic children include (30) sample for study group and (30) sample for control group. The validity of the questionnaire was obtained through a panel of experts and the internal consistency reliability was achieved through the application of Alpha Correlation Coefficient ($r=0.76$) which was statistically acceptable. The results indicated that mothers had moderate level of knowledge about the child of autism for all items of the scale before apply program. After apply program there are no significant correlation between age, gender, level of education, social status, number of autistic children, mother's profession and between mother's knowledge about autism.

Keywords: effectiveness/ program, autistic child, knowledge, mother.

INTRODUCTION

Autism is a neurological disorder that affects the brain and cause of weakness in the formation of social relations, communication skills and language, and emotional and sensory development¹. One in every 68 children is diagnosed Autism Spectrum Disorder (ASD) in the United States. It occurs four to five times more in boys than girls. Autism symptoms appear in early infancy and is characterized by low social interaction, communication, and present of stereotypes/ repeated behaviors attention deficit, seizure disorder, sensory integration disorder, & sleep disturbance². There is no cure for children with the autism spectrum, however; there are many treatments used to

treat dysfunctional behaviors promote development and increase independence. Treatments can be divided into three main categories: including behavioral therapy, medicines, and occupational therapy³. Mothers of children with autism may suffer from tension in marital relations, extended family relationships, resentment, social isolation, depression, increases in stress, financial difficulties or relationship difficulties, anxiety, problems, lack of information when individuals access unhelpful information & this may frustrate them even further⁴. Behavioral issues on more frequent and intensive basis. Moreover, mothers are more likely to be held responsible for the behavior of their children⁵. Terms of caregiver requirements and spend more time with the child (e.g. doctor's appointments; social activities) mother. It is important for parents of children with autism to get all the information needed in order to get a better understanding condition and the situation of their child choose the appropriate one treatment as well as support for

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community, professional programs assistance and availability of services and programs for families with children with disabilities⁶. Special education programs and intensive behavioral therapy early in the life of children can help with autism to get self-care and social, and function, skills often can improve performance behaviors which are not good; these educational programs apply to children around the age of three⁷. The study aims to: (1) assess mother's knowledge toward autistic children (2) construct an program for mothers according to their assessment needs for the planned-teaching regarding autistic child in autism center in AL-Nasiriya city. (3) apply The program "planned teaching regarding autistic child on the mothers knowledge in Thi- Qar autism center". (4) find -Out the relationship between the mother' knowledge about planned teaching regarding autistic child and their demographic characteristics such as their age, gender, level of give birth at child, number of children education, marital status occupation of parents, mother age when in the family, & number of autistic child in the family. (5) find -out the effectiveness of planned teaching program regarding autistic child on the mother's knowledge after the application of the planned program.

MATERIALS AND METHOD

A quasi experimental study was used for the present study which was carried out for the period of 20th November 2017 to the 1st August 2018. The study was carried out to evaluate the Effectiveness of Planned Teaching Program regarding Autistic Child in Mothers' Knowledge in Thi- Qar Autistic Center in AL- Nasiriya City, as a main objective of this study. A purposive (non-probability) sample was used in this study that composed of (60) mothers their autistic children include (30) sample for study group and (30) sample for control group in AL- Nasiriya City was involved in the present study. The data have been collected by using self-administration method to answer the questionnaire format of the mothers their autistic children to assess mothers' knowledge about autistic child before beginning the program. The data collected from the mothers (pretest-post-test1-post -test 2), the data collection process has been performed from (3 March, 2018) to (5 May, 2018). The questionnaire composed of two part the first part is related to the demographic variables of children and their mother and the second part is related to the

mother' knowledge of autistic child. It composed of (48) aspects, scored and rated according to the three levels scale for practice which are indicated by score (3) for always, scored (2) for sometimes, and score (1) for never this measured mean of score. Questionnaire is actually consist of (48) sub items. The test covers relevant points from major content area of instructional program. For the purpose of this study, the number of correct response or the knowledge questionnaire is used as the measure level of knowledge. The mothers in the study have been given knowledge test prior to the implementation of instructional program and were retested after implementing the instructional program. The validity of the questionnaire was determined through a panel of (17) experts chosen from medical and nursing in addition individuals in related to center the autistic. The internal consistency of the instrument was determined through the pilot study and the computation of Alpha Correlation Coefficient (Cronbach's Alpha) which was ($r = 0.76$). The data were collected for the present study through the utilization of the self-administrative questionnaire, by using the Arabic version of the questionnaire for all subjects who were included in the study sample. The researcher distributed the questionnaire for mothers after taking their willing to participate in this study, the interview was conducted with volunteer mothers. It took about 20 to 30 minutes for interviewing and after that the questionnaire was collected. Statistical analyses were conducted by using statistical package for social science (SPSS) version (24) Data analysis was employed through the application of descriptive and inferential statistical approaches which were performed through the computation of the following: frequencies, percentage, standard deviation, alpha correlation, coefficient, t-test and ANOVA

RESULTS AND DISCUSSION

Table -1- revealed that (30%) of child in as age the study group are within the age group (4years) while (26.7%) of child in the control group are within the age (3years), gender in the study present were male. Onset of autistic symptom were in third year of age, while diagnosis autism in the study were in third year of age. Concerning registered of child in a specialized center, both groups (60%) were stated of less of one year. Moreover, most of the children have sleep problem (60%), (63.3%) of child in the study and control groups respectively. **Table -2-** revealed that

the age of mothers were (30-34years).Occupational were employee. the socio-economic status were moderate level, while the residency of parents in the urban area. Type of family living single family. Number of children in family have two children. In relation to the education level of mother (30%) were college graduate,. Most of mothers were married .Finally the maternal age when birth child with disorder were (29-32 years). Table 3 shows high percentage (76.7 %) were moderate level score for pre-test of study group .This table Also, shows high percentile (66.7 %) were high level score for post-1 test of study group. In relation to post-2 test the study group presented (53.3%) for the high level. Table 4 shows that there is no statistical significant association between mothers' age and their knowledge concerning autism child ,of this (p value > 0.05),there are no differences between age group and mean of knowledge when analyzed by ANOVA. Table5- shows that there is statistical high significant association between mothers' level of education and their knowledge concerning the concerning autism child , of this (p value > 0.05),while there is no statistical significant association between mothers' level of education and their knowledge. Table- 6- shows that there is no statistical significant association between mothers' marital status and their knowledge concerning the autism child, and no differences between marital status and mean of knowledge. The study revealed that child in the study group are within the age group (4years) while in the control group are within the age (3years),the researcher emphasizes most the children in this age group are more active and increase motor skills

and the beginning of the disorder. The present study reveal that (70%,76%) of children in the study group and also the control group respectively were male. The findings of the present study supportive evidence is available in the study that showed (78.2% of children were male)⁸. Present study show that of the children their onset of autistics symptom at second year of age. This study supported evidence is available in the study that showed (diagnosed at the age were2&3years)⁹.The results reveals that registered of child in a specialized center, both groups were stated of less of one year. The results reveals that majority of the children have sleep problem in both group. The findings of the present study supportive evidence is available in the study that showed (two-thirds of individuals with autism are affected by sleep problems)¹⁰.conceruning Age of the mothers were (30-34years).The researcher emphasizes is more participant in this age. Occupational were employee. The findings of the present study supportive evidence is available in the study that showed (the majority of the respondents held professional jobs)¹¹. The results reveal that there are no statistical significant association between mothers' age and their knowledge concerning autism child. The findings of the present study supportive evidence is available in the study that showed (there are significant association between child and their mothers and their knowledge about autism)¹⁵. The results reveal that there is statistical high significant association between mothers' level of education and their knowledge there are denote level of education affected on mothers' knowledge.

Table 1. Distribution of Demographic Characteristics of Child in The Study and Control Groups Regarding Autistic Child in study sample (N=60women)

Variables	Groups	Study		Control	
		Freq.	%	Freq.	%
Age of Child	3 years	4	13.3	8	26.7
	4 years	9	30.0	6	20.0
	5 years	3	10.0	6	20.0
	6 years	5	16.7	3	10.0
	7 years	3	10.0	5	16.7
	8 years	3	10.0	1	3.3
	9 years	3	10.0	1	3.3
	Total	30	100.0	30	100.0
Gender of child	Male	21	70.0	23	76.7
	Female	9	30.0	7	23.3
	Total	30	100	30	100.0

Cont... Table 1. Distribution of Demographic Characteristics of Child in The Study and Control Groups Regarding Autistic Child in study sample (N=60women)

Onset of symptom in autistic child	First years of age	4	13.3	2	6.7
	Second years of age	12	40.0	9	30.0
	Third years of age	7	23.3	16	53.3
	Fourth years of age	5	16.7	3	10.0
	Five years of age	2	6.7	0.	0.00
	Total	30	100.0	30	100.0
Diagnosis of child in autism	First years of age	2	6.7	0	00.0
	Second years of age	7	23.3	3	10.0
	Third years of age	9	30.3	16	53.3
	Fourth years of age	4	13.3	9	30.0
	Fifth years of age	8	26.7	2	6.7
	Total	30	100.0	30	100.0

Table 2. Distribution of Socio- Demographic characteristics for parents in the Study and Control Groups Regarding Autistic Child in the study sample (n=60mother)

Variables	Groups	Study n=30mother		Control n=30mother	
		Freq.	%	Freq.	%
Age of Mother	20-24 years	4	13.3	7	23.3
	25-29 years	7	23.3	6	20.0
	30-34 years	9	30.0	9	30.0
	35-39 years	5	16.7	5	16.7
	40-44 years	2	6.7	3	10.0
	45-49 years	3	10.0	0	00.0
	Total	30	100.0	30	100.0
Occupational Status of mothers	Employee	17	56.7	16	53.3
	Free businessman	7	23.3	10	33.3
	Housewife	6	20.0	4	13.3
	Total	30	100.0	30	100.0
Socio-economic status	Low	5	16.7	4	13.3
	Moderate	13	43.3	12	40.0
	High	12	40.0	14	46.7
	Total	30	100.0	30	100.0
Residency	Urban	25	83.3	26	86.7
	Rural	5	16.7	4	13.3
	Total	30	100.0	30	100.0
Property of the house	Own's House	19	63.3	16	53.3
	Rent's House	11	36.7	14	46.7
	Total	30	100.0	30	100.0

Table 3. Distribution of Mothers' Knowledge score between The Study and Control Groups at Three Periods (Pre; Post-1 and Post-2 Tests)

Period	Knowledge score	Study		Control	
		Frequency	Percent	Frequency	Percent
Pre-Test	Low	7	23.3	2	6.7
	Moderate	23	76.7	28	93.3
	High				
	Total	30	100.0	30	100.0
		1.77		1.850.133	
Post 1 –Test	Low	0	0.00	2	6.7
	Moderate	10	33.3	28	93.3
	High	20	66.7	0	0.00
	Total	30	100.0	30	100.0
		2.36 0.188		1.91 0.166	
Post 2 –Test	Low	0	0.00	13	43.3
	Moderate	14	46.7	17	56.7
	High	16	53.3	0	0.00
	Total	30	100.0	30	100.0
		2.53 0.507		1.69 0.504	

Table 4. Distribution and Association of Mothers' Knowledge with Their Age.

Variables	Mothers' Knowledge			
	No.	Pre-Test Mean ± S.D.	Post 1-Test Mean ± S.D	Post 2-Test Mean ± S.D.
Age (Years)				
20-24	4	1.25 ± 0.500	2.75 ± 0.500	2.75 ± 0.500
25-29	7	1.86 ± 0.378	2.86 ± 0.378	2.43 ± 0.553
30-34	9	1.78 ± 0.441	2.44 ± 0.527	2.44 ± 0.527
35-39	5	1.80 ± 0.447	2.60 ± 0.548	2.60 ± 0.548
40-44	2	2.00 ± 0.000	3.00 ± 0.000	2.50 ± 0.707
45-49	3	2.00 ± 0.000	2.67 ± 0.577	2.67 ± 0.577
Total	30	1.77± 0.430	2.67 ± 0.479	2.53 ± 0.507
		F =1.701 d.f.= 24 P = 0.173	F = 0.818 d.f.= 24 P = 0.549	F = 0.281 d.f.= 24 P = 0.919

Table 5. Distribution and Association of Mothers’ knowledge with Their Level of Education

Variables	Mothers’ Knowledge			
	No.	Pre-Test Mean ± S.D.	Post 1-Test Mean ± S.D.	Post 2-Test Mean ± S.D.
Level of Education				
Read and Write	2	2.00 ± 0.00	3.00 ± 0.00	2.50 ± 0.707
Primary school graduate	2	1.00 ± 0.00	3.00 ± 0.00	2.50 ± 0.707
Intermediate school graduate	1	2.00 ± 0.00	3.00 ± 0.00	3.00 ± 0.000
Secondary school graduate	8	1.88 ± 0.354	2.75 ± 0.643	2.50 ± 0.535
Institute graduate	8	1.50 ± 0.535	2.50 ± 0.533	2.63 ± 0.518
College graduate	9	2.00 ± 0.00	2.56 ± 0.00	2.44 ± 0.527
Total	30	1.77 ± 0.430	2.67 ± 0.479	2.53 ± 0.507
		F =4.160 d.f.= 24 P = 0.007	F = 0.792 d.f.= 24 P = 0.566	F = 0.250 d.f.= 24 P = 0.936

Table 6. Distribution and Association of Mothers’ knowledge with Their Marital Status

Variables	Mothers’ Knowledge			
	No.	Pre-Test Mean ± S.D.	Post 1-Test Mean ± S.D.	Post 2-Test Mean ± S.D.
Marital Status				
Married	25	1.76 ± 0.436	2.64 ± 0.490	2.48 ± 0.510
Widowed	1	2.00 ± 0.000	3.00 ± 0.000	3.00 ± 0.000
Divorced	4	1.75 ± 0.500	2.75 ± 0.500	2.75 ± 0.500
Total	30	1.77 ± 0.430	2.67 ± 0.479	2.53 ± 0.507
		F =0.144 d.f.= 27 P = 0.866	F = 0.325 d.f.= 27 P = 0.725	F = 0.921 d.f.= 27 P = 0.410

CONCLUSION

The results indicated that mothers had moderate level of knowledge about the child of autism for all items of the scale before apply program. After apply program there are no significant correlation between age, gender, level of education, social status, number of autistic children, mother’s profession and between mother’s knowledge about autism.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Pediatric Nursing Department,

College of Nursing, University of Baghdad, Baghdad city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Evaluation Study of Risk Factors (Alcohol, Smoking, Age, Family History, and Obesity) Associated with both Rheumatoid Arthritis and Cancer

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ABSTRACT

This research has been done to evaluate if there is a reduction of the results of risk factors associated with both Rheumatoid Arthritis and Cancer. It has been found that among the most common risk factors among the two diseases are; Alcohol, Smoking, age, family history, and obesity. Smoking has been found to have higher results in both diseases as compared to the other factors. Also, obesity has been found to have significantly reduced as a risk factor for cancer. However, although most of the risk factors have reduced significantly, the prevalence of both diseases is still high and hence there is a need for further research to evaluate the other risk factors which are associated with both RA and Cancer.

Keywords: Cancer, Rheumatoid Arthritis, Smoking, Obesity.

INTRODUCTION

Rheumatoid Arthritis and cancer are among the lethal diseases in the human history. Many people have died of the complications which come as a result of these diseases. Rheumatoid Arthritis is a chronic disease which is marked with the inflammation of the joints. This disease mostly affects the hand joints ¹. At an advanced stage, rheumatoid Arthritis affects all the body organs which lead to complications in the heart, the respiratory system, nerves, and the eyes¹. Rheumatoid Arthritis is most common to ladies as compared to men. In a study done by the Australian Bureau of Statistics, it was found that 2% of the Australian citizen had the disease whereby 1.5% of those affected were men and 2.4% were women¹. The prevalence was higher in those people aged 65 years and above. Cancer is a genetic disease which arises due to the change of the genes which control how the body cells work. It affects the division and growth of cells. These genetic changes can be inherited from parents to offspring's or they can occur due to the errors which

occur during the division of cells or due to the damage of the DNA which is caused by certain environmental exposures ². Every individual's cancer has a unique combination of genetic changes and as cancer grows, more changes may occur. The genetic changes which occur affect three main types of genes that are Proto-oncogenes, tumor suppressor genes, and the DNA repair genes². Since this disease happens due to genetic changes, it is hard to treat it but it can be maintained and controlled. In the recent past, the prevalence of the disease has decreased due to the increased research in the field and advancement in technology which has helped in controlling the hazards which cause cancer. On average, in the developed countries 0.3% of every 100000 people are undergoing cancer treatment as compared to 0.6% in every 100000 people in the past ten years ³. Though there is a significant decrease in the prevalence of cancer and Rheumatoid Arthritis, the numbers of those affected are still high. This paper will discuss the results of these two diseases based on data collected from different regions and evaluate if there is a significant decrease in the prevalence of the two diseases.

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METHODOLOGY

Many studies have been done to assess if there is a reduction in the risk factors for both cancer and rheumatoid arthritis. Many of those studies have proved

that there is a significant decrease with other contracting such information. This study will focus on accessing if there is a reduction of those risk factors. This current research study was a quantitative research study which used questionnaires to collect data, which was then analyzed to come up with results, findings and a conclusion.

Study design, sample and sampling procedure

A research design is the conceptual framework within which a study is conducted. It gives a blueprint for data collection, analysis, and measurement¹⁷. This study will be a descriptive research which will be conducted by issuing of questionnaires through a survey. The sample size of this study will be 150 participants globally who will be invited to participate in the survey after meeting the selection criteria. This large sample size has been chosen so that during analysis, the assumption of normality can be made. This is in line with the central limit theorem which states that as the sample size approaches infinity, the data approaches the normal distribution¹⁸. The study will use purposive sampling. This is a non-probability sampling method which allows a researcher to choose a given sample based on set rules. It is the most convenient method of sampling for an online survey since the researcher does not meet physically with the participants so that he or she can apply probability sampling methods²⁰. Only participants who have been suffering from cancer or rheumatoid arthritis will be allowed to participate.

Questionnaire design

The researcher will design the questionnaire and upload it online as a survey and then people who have had cancer and RA complications will be allowed to participate. The first few questions in the questionnaire will be designed such that they will determine if that specific participant is eligible for the study so that the researcher will be able to eliminate all the non-eligible participants and get the required sample.

Data collection

After the survey has been conducted, the data will be downloaded into an excel file and for cleaning and selection of the sample based on the set rules. Only a sample of 150 participants will be selected for the analysis.

Variables and data analysis

Both parametric and non-parametric analysis will be used in the process of data analysis. This is because the questionnaire will contain questions which will lead to the collection of both nominal and scale data hence need to use both analysis methods. Parametric analysis is convenient for scale data and non-parametric analysis is convenient for scale data²¹.

RESULTS AND DISCUSSION

Out of the 150 participants, 54.7% (82 out of 150) were males and 45.3% (68 out of 150) were females suggesting that men had a higher risk of developing either cancer or RA. Also, 70% of the participants were responding to the cancer questions with only 30% that is 45 out of 150 responding to the RA questions. This shows there is a higher prevalence of cancer as compared to RA **Table 1**. Out of the 105 participants who were answering the cancer questions, the researcher found that the minimum age was 18 years with the maximum being 87 years. The mean age was 51 years suggesting that those people within the age brackets of 50 years and above had a higher risk of developing cancer.

Obesity

The 105 participants who were victims of cancer were asked if they have ever had obesity at one time in their lives. Only 5.9 percent of the participants acknowledge to have suffered from obesity with 62% saying that they had never suffered from obesity. This suggests that there is a higher reduction of obesity as a risk factor for cancer.

Smoking

The cancer patients were asked if they have ever smoked in their lifetime. 76% of the participants claimed to have smoked with only 24% who claimed to have never smoked in their lifetime. This shows that smoking is still a higher risk factor for cancer. Out of the 105 cancer participants, only 25% said that they had taken beer with 74% saying that had not taken. This suggests that the results for alcohol as a risk factor for cancer had significantly decreased contradicting a research which was done on 2016 and suggested that there was no significant decrease of alcohol and its risk to cancer-related complications.

Rheumatoid Arthritis**Obesity**

Out of the 45 victims, 66% claimed that they were obese before they developed the RA complications with only 33% who stated that they were not obese. This shows that the results for obesity as a risk factor for RA has not reduced hence rhyming with De la Rosa research of 2018.

Alcohol

Many studies have listed alcohol as one among the highest risk factors of RA. Dogan found that those people who had taken alcohol in any time of their life had 4 times higher risk of developing RA as compared to those who had not taken it. In this study it was found that 90% of the participants who had RA were once drunkard as compared to only 10% who had never taken alcohol in their life. This shows that alcohol is still a higher risk factor for RA.

Cancer risk factors**Alcohol, Tobacco, and their risks of cancer development**

Alcohol has been linked as a risk factor for cancer development. Excessive use of the alcohol damages the body tissues. Those cells which are damaged by the alcohol may try to repair themselves which in turn can lead to DNA changes hence increasing the chances of Cancer Development⁵. Also, the bacteria which live in the Colon and the Rectum can convert alcohol into acetaldehyde which has been shown to cause cancer⁵.

Obesity, Diet and their risk of cancer development

Obesity is a condition in which a person has unhealthy or distribution of fats in the body. Obesity is directly related to diet⁵. Those people who rely on poor diet have a higher risk of developing obesity. On the other hand, those people who develop obesity have a higher risk of developing cancer. According to research done in 2004, obese women had four times risk of developing endometrial cancer as compared to those who were not obese⁷. The study also stated that obese men or women had twice the risk of developing Gastric cardiac cancer, Liver cancer and Kidney cancer as compared to those who were not obese⁷ In another study, the prevalence of

Meningioma type of cancer increased by about 50% in obese people as compared to 20% of those people who were not overweight⁸. Gallbladder and breast cancer affected more than 60% of obese people as compared to 12% of those who were not obese⁹. Ovarian cancer in women was found to affect 45% of obese women as compared to only 16% of those who were not obese¹⁰. From this analysis it is evident that obesity is among the risk factors for cancer.

Rheumatoid Arthritis risk factors

Rheumatoid Arthritis occurs when the immune system attacks the Synovia. The resulting inflammation thickens the synovia which can destroy the cartilage and the bone within the joint. There are many risk factors associated with rheumatoid arthritis. Among the most common risk factors are; smoking and obesity¹¹. Also, there are some risk factors which cannot be controlled like age, family history, and gender.

Smoking as a risk factor for Rheumatoid Arthritis

Smoking has been listed as one among the extrinsic risk factors of rheumatoid Arthritis. This is because smoking increases the oxidative stress in the body which is believed to increase the risk of rheumatoid arthritis¹². In a Swedish population, it was found that the main predictor of severe RA was smoking which had a risk ratio of 2.45. [12] In a Korean population it was found that smoking was closely associated with RA with a risk ratio of 5.006 in comparison to alcohol drinking¹². This shows that smoking is among the highest risk factors which are associated with Rheumatoid arthritis.

Age and gender as a risk factor for rheumatoid arthritis

RA has been found to affect women more than men. In a research conducted to evaluate the prevalence of women to men with RA, it was found that the ratio of women to men was 3:1 with women making up to 75% cases of the RA¹⁵. The ratio decreased to 2:1 after 15 years suggesting that as age increases the prevalence reduces for women¹⁵. Among the behavioral tendencies which make women to have higher risk than men are; hormones, genetic, and lifestyles.

Table 1. Risk factors for cancer according to gender.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	82	54.7	54.7	54.7
	Female	68	45.3	45.3	100.0
	Total	150	100.0	100.0	

Table 2. Risk factors for cancer according to age.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
age	105	18	87	51.56	18.447
Valid N (listwise)	105				

Table 3. Risk factors for cancer according to Obesity.

Obesity					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	9	5.9	8.6	8.6
	No	96	62.7	91.4	100.0
	Total	105	68.6	100.0	
Missing	111	45	29.4		
		3	2.0		
	Total	48	31.4		
			100.0		

Table 4. Risk factors for cancer according to smoking

Smoking					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	79	51.6	76.0	76.0
	no	25	16.3	24.0	100.0
	Total	104	68.0	100.0	
Missing	111	46	30.1		
	System	3	2.0		
	Total	49	32.0		
Total		153	100.0		

Table 5. Risk factors for cancer according to alcohol

Alcohol		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	27	17.6	25.7	25.7
	No	78	51.0	74.3	100.0
	Total	105	68.6	100.0	
Missing	System	48	31.4		
Total		153	100.0		

Table 6. Risk factors for RA according to alcohol

Obesity		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	30	66.7	66.7	66.7
	No	15	33.3	33.3	100.0
	Total	45	100.0	100.0	

CONCLUSION

This research has found that most of the risk factors for cancer are still the risk factors for RA. Majority of those risk factors tend to affect people at the age of fifty years and above and hence lead to the development of both cancer and RA. However, the results for many of the risk factors of the two diseases has reduced significantly with only smoking for both RA and cancer remaining as a higher risk factor. The participants of the study were drawn from all walks of life hence representing the picture of the trend of both diseases. Also, the research was conducted using a survey hence everybody was able to participate since identity was hidden.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Public Health, Maysan Health Department, Maysan governorate, Iraq and all experiments were carried out in accordance with approved guidelines.

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Identification of Active Pharmaceutical Ingredients in *Thevetia neriifolia* Juss Leaf Callus using Analysis of GC-MS

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ABSTRACT

Plants of *Thevetia neriifolia* are recorded from the most important medicinal plants that used in folklore medicine in different countries. Most of its parts were used to treat different diseases and having antioxidant, antimicrobial and anti-inflammations activities. Callus induction was occurred by culturing of leaf explants that were taken from eight years old trees on Murashige and Skoog (MS) medium supplemented with the auxin 2,4-D at 3.0 mg. l⁻¹. After the gaining of suitable amount of callus and extracted with hexane, the screening of active phytochemicals was achieved by using the analysis of GC-MS. The results showed the presence of forty different compounds that diagnosed in the callus extract with different retention times and peak areas, the main compounds that having various pharmaceutical features including: Hexatriacontane (23.095%), Nonacosane (8.849%), .beta.-Amyrin (8.060%), 2-Methylhexacosane (6.870%), .alpha.-Amyrin (4.446%), Octacosane (4.309%), Phenol, 2,2'-methylenebis-(1,1-dimethylethyl)-4-methyl- (4.030%), Vitamin E (3.134%), .beta.-Sitosterol (3.254%), Isopropyl myristate (2.777%), 1,2-Benzisothiazol-3-amine tbdms (2.886%), Pentatriacontane (1.716%) Squalene (1.170%).

Keywords: *Phytochemicals, medicinal plants, GC-MS technique, Thevetia neriifolia, callus.*

INTRODUCTION

Plant tissue culture is an important and potent source for production of effective secondary metabolites (or phytochemicals). This technique carries many important benefits in the production and extraction of active compounds from small explants in small areas with short periods of time over the year without resorting to the significant depletion of large-scale cultivated plants that caused by traditional methods^{1,2}. The medicinal plants play an important vital-role in everyday human life as they are natural factories for the production of many effective compounds that contribute to the treatment of various infections and diseases. Several studies have been carried out on most medicinal plants for the purpose of increasing the production of active phytochemicals (like phenolic compounds, alkaloids, terpenoids, tannins, steroids, flavonoids and glycosides) on the commercial and pharmaceutical scale. These studies included: the selection of plants with high productivity for effective compounds and manipulation of the conditions of culture or using of precursors, biotic and abiotic elicitors, metabolic engineering and culturing of plant tissue and

organs through the use of different techniques of plant tissue culture^{3,4}. *Thevetia neriifolia* Juss (belongs to the family Apocynaceae) is one of the medicinal plants, and most of its parts were used in folk medicine as anti-septic, disinfectant, anti-bacterial and anti-fungal infections. It is ; therefore, used in the treatment of acute heart disorders, arthritis, gout, ulcers, tooth-ache, acne, nausea, abdominal-pain, diarrhea, dysrhythmias and as strong anti-oxidants. The medicinal importance of this plant is due to its containment of medically effective compounds, such as alkaloids, phenols, glycosides and terpens^{5,6}. Several organic solvents have been used to extract the active secondary metabolites from medicinal plants, including chloroform, methanol, ethanol, hexane and petroleum ether. These active compounds have been quantified using various chromatographic techniques based on standard compounds of the active compounds⁷. Gas chromatography-mass spectrometry (GC-MS) technique is one of the most advanced and effective techniques for screening and identifying the active secondary metabolites that exist in any plant sample without resorting to the use of standard compounds. It provides a library that contain a wide range of mass-

spectrometers for compounds that can be compared with crude materials separated from plant samples^{8,9}. The main objective of this study is focused on the extraction and investigate the active secondary metabolites (phytochemicals) in the callus induced from leaves of *Thevetia neriiifolia* plant using GC-MS technique.

MATERIALS AND METHOD

In vitro-induction of callus from leaf explants

This research was carried out in the plant tissue culture laboratory of Department of Plant Production Techniques at Al Musaib Technical College. Intact and healthy leaves were taken from the *T. neriiifolia* plant (eight-years old) and washed well with running-water and liquid soap to remove dirt from them. Then, they were immersed in a 2% solution of sodium-hypochlorites in the laminar-air-flow cabinet for 15 min., after that, they were rinsed thoroughly with sterile distilled water twice for 2 min. each. The sterile leaves were cut into pieces of 5-10 mm long used as explants and cultured in glass-jars (3*15 cm) containing 20 ml of full-strength MS medium¹⁰ supplemented with 30 g. l⁻¹ sucrose, 3.0 mg. l⁻¹ 2,4-Dichlorophenoxy acetic acid (2,4-D) and 7.0 g. l⁻¹ agar for solidifying before autoclaving at 121 °C and 1.04 Kg. cm⁻¹ for 20 min. Cultures were incubated in the growth-room at 25 ± 2 °C and light-intensity of 1000 lux for photo-period of 14 h. After five weeks, the callus that formed on the explants was sub-cultured on the same formula of medium to increase the biomass of callus for drying and extraction.

Callus extraction and GC-MS analysis conditions

The callus from previous experiment was dried at a temperature of 70 °C in the oven and grinded to fine powder. Extraction process was performed by adding 5 ml of n-hexane to 5 mg of callus powder and left for 6 hrs, the mixture was then centrifuged at 4000 rpm for 10 min. The phytochemicals were identified in the crude-extract of callus using GC-MS(Agilent 19091S-33UI) apparatus equipped with National Institute of Standard and Technology (NIST)Library; column HP-5MS capillary column (cross-bond 5% diphenyl-95% dimethylpolysiloxane): 30m(L)× 250µm(i. d.) with a 0.25 µm film thickness; injection temperature: 290 °C; column temperature: 40 °C held to 2 min., rising 4 °C. min⁻¹, then rising to 290 °C and held for 5 min.; injection mode: split: split at ratio 1 : 20; injected volume: 5 µl. The carrier-gas was Helium (99.99 %); acquisition mass

range: 40-600 m. z⁻¹. The compounds of the extract were identified by comparing their retention indices with NIST library.

RESULTS AND DISCUSSION

The results indicated the efficacy of the auxin 2,4-D in the induction of the callus from leaves of *T. neriiifolia* and increase its biomass, and this is in agreement with many previous studies in the induction of callus using 2,4-D alone and from different explants and different plant species they studied, such as the induction of callus from leaves and stems of *Gymnema sylvestre*¹¹; seeds of *Boerhaavia paniculata* (Souza *et al.*, 2014) and leaves, petioles and internodes of *Terminalia arjuna*. Results presented in Table –1 and Figure – 2, revealed the presence of 40 compounds of active phytochemicals that found in the hexane-fraction of the leaf callus of *T. neriiifolia* and detected with GC-MS, from which the major dominant compound was Hexatriacontane(23.095 %), followed by the compounds: Table 1 Other compounds that were appeared in less than one-percentage were: Hentriacontane (0.377 %); 1-Decanol, 2-hexyl- (0.657 %); Indazol-4-one,3,6,6-trimethyl-1-phthalazin-1-yl-1,5,6,7-tetrahydro- (0.262 %); 2-Dodecen-1-yl(-)succinic anhydride(0.274 %); Nonadecyl trifluoroacetate (0.224 %); 1H-Indene,5-butyl-6-hexyloctahydro- (0.173 %); 1-Nonadecene (0.327 %); Oleic acid (0.202 %); Ethyl iso-allocholate (0.130 %); Benzene,2-fluoro-1-methyl-4-nitro (0.578 %); 1,2-Cyclohexanedicarboxylic acid, hexyl isohexyl ester (0.801 %); 1,2-Cyclohexanedicarboxylic acid, hexyl nonyl ester (0.924 %); N-(3-Chlorophenyl)-bis(2,2,3,3-pentafluoropropane)amide (0.385 %); Octasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13,15,15-hexadecamethyl- (0.236 %); 1H-Indole-2-carboxylic acid,6-(4-ethoxyphenyl)-3-methyl-4-oxo-4,5,6,7-tetrahydro-, isopropyl ester (0.105 %); Batilol (0.447 %); Cyclobarbitol (0.319 %) and Propiophenone, 2'-(trimethylsiloxy)-(0.257 %). Chandar and Ramasamy (2016)¹² referred in their study that the compound Indazol-4-one,3,6,6-trimethyl-1-phthalazin-1-yl-1,5,6,7-tetrahydro-, was isolated for the first time from the ethanolic-extract of *Combretum albidum* leaves. In the current study, this compound was isolated from the hexane extract of *Thevetia neriiifolia* leaf callus, this displays the efficacy of this method for extraction of different active phytochemicals from various plant parts and callus. It was known that the plants belonging to the family Apocynaceae, including the genus *Thevetia*

possess characteristics and recipes make them from the important medicinal plants in treating diseases or as antimicrobial for many pathogenic bacteria such as: *Staphylococcus aureus*, *Bacillus subtilis*, *Salmonella typhi*, *Klebsiella phenonemia* and some fungal strains such as: *Aspergillus niger*, *Candida albicans*, *Fusarium oxysporum* and *Penicillium spp.*(13). This may be due to the presence of various active phytochemicals in such plants with medicinal and pharmaceutical uses. The current study showed that there are various medicinal and pharmaceutical ly active compounds that have been diagnosed in the crude extract of leaf cal lus of *T. nerifolia* plant using GC-MS analysis. Sixteen different compounds of the identified phytochemicals that have been reported to possess different pharmaceutical and therapeutic activities such as anti-inflammatory, anti-oxidant, anti-microbial and anti-cancer activities, making them of special pharmaceutical importance compared to synthetic drugs and anti-oxidants¹³⁻¹⁶. Also, the compound 2-Methylhexacosane has been reported as a reducer of blood-cholesterol and as an anti-microbial¹⁷. In addition, Isopropyl myristate (is an ester of isopropyl-alcohol with myristic acid; a common-fatty acid) which enters into different pharmaceutical industries as a thickening-agent, emollient and skin-enhancer or as anti-oxidant and anti-microbial¹⁷. On the other hand, the compound 2-Dodecen-1-yl(-) succinic anhydride has a structure similar to phenytoin that used as anticonvulsant-agent, thus making it as a natural medicine for treating convulsion, as well as for its activity as anti-oxidant and anti-microbial¹⁸. Oleic acid is a mono-unsaturated fatty acid which has many important therapeutic benefits including anti-cancer, anti-androgenic, anti-oxidant, anti-fungal, anti-bacterial, anemia-genic, anti-inflammtory, inhibition of 5-.alpha.-reductase and dermatili-genic¹⁹. Moreover, Nikalje *et al.*(2017) revealed that the oleic acid can delay or

hinder the progression of the disease adreno-leuko dystrophy(ALD), the deadly disease that causes damages to the brain and the adrenal glands. Additionally, oleic acid has capability of the regulation of many functions in human body such as blood-clotting, blood-pressure and immune response to the infections resulting from wound-injuries, also, it is possibly responsible for the increasing of high-density lipoprotein-cholesterol (HDL) and decreasing low-density lipoprotein-cholesterol (LDL)²⁰. In the study of Ju *et al.*(2014), they revealed to the isolation of the Batilol compound for the first time from *Styela clava* plant. In the current study , this compound was also diagnosed in the leaf cal lus extract of *T. nerifolia*. Batilol has a medical importance by giving it to prevent radiation disease with X-ray and radio-therapy, as well as anti-oxidant activity. Results also showed the presence of the Cyclobarbitol, which is used medical ly in the treatment of insomnia and as anesthetic , anti-convulsant, neuro-transmitter antagonist, skeletal-muscle relaxant²¹. Another important compound is Nonacosane, which has multiple activities including anti-hypertensive activity, also shows angiotensin, vasodilator, AT2-receptor antagonist, Sal-uretic effects, anti-oxidant and anti-bacterial. Vitamin E is one of the most effective compounds that has been diagnosed in the current study and is necessary for a large number of important activities. It reduces the risk of Alzheimer’s and Parkinson’s disease symptoms and as anti-tumor agent. Also, it has anti-inflammatory and analgesic activity, protects cell-membranes from damages and preventing the formation of plaque in the arteries by preventing of low-density lipoprotein-cholesterol oxidation, thus leads to the lowering of cardio-vascular disease risk. Additionally, its effectiveness as anti-oxidant is represented by delaying or preventing the agerelated growth of cataracts of eye. Moreover, it is commonly used in skin-care creams and lotions.

Table 1. The phytochemicals of *Thevetia nerifolia* leaf cal lus analyzed with GC-MS

R.T.*	Compounds	Molecular Formula	MW*	Area	%of Total
34.239	Henteriacontane	C ₃₁ H ₆₄	436	9 144 983	0.377
36.833	l-Decanol, 2-hexyl-	C ₁₆ H ₃₄ O	242	15 933 717	0.657
37.596	Isopropyl myristate	C ₁₇ H ₃₄ O ₂	270	67 356 788	2.777
41.770	Tetrapentacontane, 1,54-dibromo-	C ₅₄ H ₁₀₈ Br ₂	917	9 743 469	0.402
41.944	Indazol-4-one,3,6,6-trimethyl-1-phthalazin	C ₁₈ H ₁₈ N ₄ O	306	6 359 926	0.262
46.168	2-Dodecen-1-yl(-) succinic anhydride	C ₁₆ H ₂₆ O ₃	266	6 650 811	0.274
46.552	Nonadecyl trifluoroacetate	C ₂₁ H ₃₉ F ₃ O ₂	380	5 421 072	0.224

Cont... Table 1. The phytochemicals of *Thevetia nerifolia* leaf cal lus analyzed with GC-MS

49.709	1H-Indene,5-butyl-6-hexyloctahydro-	C ₁₉ H ₃₆	264	4 191 648	0.173
50.351	1-Nonadecene	C ₁₉ H ₃₈	266	7 928 002	0.327
51.074	Phenol, 2,2'-methylenebis-(1,1-dimethylethyl)-	C ₂₃ H ₃₂ O ₂	340	97 744 461	4.030
53.434	Oleic acid	C ₁₈ H ₃₄ O ₂	282	4 898 197	0.202
53.706	Ethyl iso-allocholate	C ₂₆ H ₄₄ O ₅	436	3 153 098	0.130
55.391	Benzene,2-fluoro-1-methyl-4-nitro	C ₇ H ₆ FN ₂ O ₂	155	14 021 273	0.578
56.047	2-Methylhexacosane	C ₂₇ H ₅₆	380	166 612 218	6.870
56.655	2H-pyran-2-carboxylic acid,6-butoxy-3,6-dihydro-,ethyl ester	C ₁₀ H ₁₄ O ₄	198	40 454 385	1.668
57.074	1,2-Cyclohexanedicarboxylic acid, hexyl isohexyl ester	C ₂₀ H ₃₆ O ₄	340	19 430 664	0.801
57.189	1,2-Cyclohexanedicarboxylic acid, nonyl 3-pentyl ester	C ₂₂ H ₄₀ O ₄	368	36 450 676	1.503
57.480	1,2-Cyclohexanedicarboxylic acid, heptyl isobutyl ester	C ₁₉ H ₃₄ O ₄	326	35 264 075	1.454
57.918	1,2-Cyclohexanedicarboxylic acid, hexyl nonyl ester	C ₂₃ H ₄₂ O ₄	382	23 627 355	0.924
58.380	Squalene	C ₃₀ H ₅₀	410	28 385 990	1.170
58.878	N-(3-Chlorophenyl)-bis(2,2,3,3,3-pentafluoropropane)amide	C ₁₂ H ₄ ClF ₁₀ NO ₂	419	9 338 266	0.385
59.614	Octacosane	C ₂₈ H ₅₈	394	104 492 795	4.309
60.385	Octasiloxane, 1,1,3,3,5,5,7,7,9,9,11,11,13,13,15,15-hexadecamethyl-	C ₁₆ H ₅₀ O ₇ Si ₈	579	5 732 530	0.236
61.045	1H-Indole-2-carboxylic acid,6-(4-ethoxyphenyl)-3-methyl-4-oxo-4,5,6,7-tetrahydro-, isopropyl ester	C ₂₁ H ₂₅ NO ₄	355	2 545 475	0.105
61.260	Batilol	C ₂₁ H ₄₄ O ₃	344	10 847 536	0.447
61.564	Olean-12-ene	C ₃₀ H ₅₀	410	90 928 952	3.749
61.968	Cyclobarbitol	C ₁₂ H ₁₆ N ₂ O ₃	236	7 739 023	0.319
62.300	Propiophenone,2'-(trimethylsiloxy)-	C ₁₂ H ₁₈ O ₂ Si	222	6 237 361	0.257
62.905	Hexatriacontane	C ₃₆ H ₇₄	506	560 112 255	23.095
63.549	Vitamine E	C ₂₉ H ₅₀ O ₂	430	76 017 136	3.134
64.106	5-Methyl-2-phenylindolizine	C ₁₅ H ₁₃ N	207	30 925 643	1.275
64.413	Pentatriacontane	C ₃₅ H ₇₂	492	41 616 033	1.716
64.978	1,2-Benzisothiazol-3-amine tbdms	C ₁₃ H ₂₀ N ₂ SSi	264	69 994 593	2.886
65.570	Benzo[h] quinoline, 2,4-dimethyl-	C ₁₅ H ₁₃ N	207	31 104 573	1.283
66.109	Nonacosane	C ₂₉ H ₆₀	408	214 601 483	8.849
66.507	.beta.-Sitosterol	C ₂₉ H ₅₀ O	414	78 908 439	3.254

CONCLUSION

The results of the current study show the medical important of the *Thevetia nerifolia* plant to contain many medically and pharmaceutically active phytochemicals that are diagnosed with GC-MS technique. These compounds can be used for curative purposes such as vitamin E, oleic acid, .beta.-sitosterol, alpha and beta-amyrin, squalene, hentriacontane, hexatriacontane, octacosane, nonacosane, isopropyl myristate, 1-nonadecene, and ethyl iso-allocholate which are useful in the treatment of many bacterial, fungal and

viral infections and many diseases. The medical and pharmaceutical effectiveness of many compounds in this plant requires in-depth studies in various fields.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al-Musaib Technical College, Al-Furat Al-Awsat Technical University, Iraq and all experiments were carried out in accordance with

approved guidelines.

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Impact of Multimedia Teaching in the Development of Positive Thinking among Students

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ABSTRACT

The goal of this research is to find out the impact of Multimedia Teaching in the development of positive thinking among students, and the researcher used the empirical research method as a method for conducting his research and that which included an independent variable (Multimedia) and dependent variable (Development of Positive Thinking). The researcher also used the empirical design of partial regulation to control the research variables, and before starting to apply the experiment, the researcher matched by the following variables (Time age calculated per years, academic attainment for parents, Danliz test of intelligence, first course degrees). After conducting the equivalence between the two research groups, the researcher set the necessary application requirements for the experiment including the study plans, multimedia programs and the positive thinking test for the two research groups. After completion the experiment application, he applied his instruments to the two research groups. After correcting the students' answers, the researcher obtained data of the empirical and control groups where he treated those data statistically using (te-test) for the independent samples. The result showed superiority of the empirical group, which was studied through multimedia, on the control group studied by the variable of positive thinking development.

Keywords: *Multimedia, Positive Thinking, Development*

INTRODUCTION

Interest is focused on education being a tool for change, especially in developing countries, and has become a means of making a new human being. It aims at helping the individual to grow in physical, mental, emotional and social aspects so that he can adapt to himself and to others¹. Education is an important factor in the building of individuals and societies. Nowadays, it has become a cornerstone of all the developments in this world and is an important factor in bringing individuals to the social ladder within their societies. It increases their qualifications as much as the level of education and teaching they achieve². The curriculum is the means of education in achieving its objectives, it is a link between the teacher and the learner, without which the teacher cannot achieve his educational targets, so our curriculums must be sophisticated and renewable to

convoy the changes that occur in the community, and must be based on sound bases and principles to be able to develop the society and modernize it in a way which enables it from launching towards future horizons³. The process of teaching aims, in some senses, to create desired changes and developments in the behavior and morals of the learner and to acquire him skills, information, knowledge, attitudes and values, in order to develop the educational goals which try to achieve behavioral changes at the learner. The teacher must transfer the information and knowledge required in common ways that attract the interest of the student and his desire to learn taking into account his features and his mental and social characteristics⁴. Since we live in a time of science and technology, so we need scientific education, which makes an aware, critical and thought-loving individual. Multimedia is a new technology that allows students to control and come close to multimedia using the computer. It combines audio, image, text and video. The basic multimedia capability is implied in allowing teachers and learners to dig deeper into topics from a larger angle and larger windows⁵. Multimedia is a new technology in teaching and education. It provides students with a

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gradual integration into the inputs of the educational process through computers. It also provides the student with an educational environment in which all the various educational means are available in an integral unit to receive disconnected data and information selected from various sources to be in one system controlling its sound recordings, drawings, animations, video clips, etc. in an integral system that ensures the student to achieve the desired goals efficiently and effectively through active interaction⁶. It represents a mixture of audio and visual means to present certain data in one or more form. Then such means varied from static and moving images to animations, texts and music. The development of positive thinking: All what distinguishes man in his innovations and achievements lies in the system and performance of thinking he has. The high achievements of man lies in ideas, without the positive ideas, the humanity to be collapsed since a long time, and all what attracts your thinking and move in the positive direction, you'll see it in your performance and work.

METHODOLOGY

The research methodology deals with the research procedures and methodology in terms of experimental design, selecting the research community and its sample, equivalence of groups, control of foreign variables, setting multimedia programs, research tools and experimentation procedures and selection of appropriate statistical methods.

Research Methodology: The researcher used the experimental method of partial regulation, which consists of the two groups. The first experimental group and the second control group, because it is suitable for the objectives of the current study. The experimental group is studied through the multimedia according to the development of positive thinking, and control group studied according to the usual method.

Experimental Design: Experimental design includes the description of the community that composes the members of the experiment and identifying the methods by which the members of the experiment are chosen. It is considered one of the most dangerous tasks that the researcher has to undertake when conducting a scientific experiment, where the safety and truth of the design are the basic guarantee to reach reliable results.

The research community and its sample: It means all the characteristics of the phenomenon studied by the

researcher. The current research community represents second intermediate class students, all of them in the secondary and intermediate day schools of the Directorate of Education of Karbala (Hindiya district), where the number of classes is not less than two. The researcher randomly selected (Al-Ameer intermediate school) and found that it has three classes for the second intermediate class (A-B-C) and in the random drawing method, (C) class selected and which represented the experimental group with (31) students that studied by multimedia. (B) Class represented the control group and its number (33) students which's studied according to the usual way.

The equivalence of the two groups of the research: the researcher was cautious before to start the experiment on the equivalence of the two groups of research statistically in the variables that are believed to affect the results of the research. He obtained information about students through their school card, as well as he distributed a form with Information written on.

Control of foreign variables: One of the most important characteristics of experimental work in its broad concept is to be a valid work, and the control of the foreign variables is one of the important procedures in experimental research. In order to obtain an acceptable rate of internal validity of experimental design, the researcher controlled the foreign variables including experiment circumstances and combined actions. During the experiment period, nothing affected the conditions of the experiment, and the maturity factor. The researcher was able to control this variable by random selection of students as well as conducting tests in a given time period and under the same condition and measurement tool. He controlled this variable through using the same tool with the two groups. This variable was controlled in the experiment where no student was withdrawn or transferred during the experiment period.

Preparation of the research requirements: One of the important and basic research affairs, which according to the research steps are carried out. These requirements selected are represented in (Determination of the scientific material for the experiment). The researcher selected the scientific material to be taught to the two groups of research during the duration of the experiment conduction for the academic years (2017 - 2018). The material included the last two chapters of the geography book of the Arab world to be taught for the

second intermediate grade. The behavioral goals were formulated and the researcher formulated (60) behavioral goals based on three levels of (bloom) classification within the knowledge field which are Definition-Distinction -Application, based on concepts determined previously. The study plans were prepared for the two groups of research represented in the multimedia for the experimental group and the usual method of the control group. And they're (16) plans for each group according to the content of the subject.

Number of responses alternatives: The method of measurement requires that the measured shall identify his responses to each of his phrases and to indicate one of the alternatives before him. And the response alternatives determined as (apply to me always, apply to me sometimes, do not apply to me).

Selection of the grade estimation balance: The study was based on (Likert balance) in the estimation of the test scores, because it is suitable for the sample of the research. The balance is summarized in putting paragraphs and in front of each paragraph a triple scaling of the response, versus the three weights (3-2-1) for the positive items, while the negative paragraphs is the reverse of the positive paragraphs and takes (1-2-3).

Instructions to answer the test items: The test instructions include a set of instructions suitable for students of the second intermediate class in order to facilitate the answer to the paragraphs, including, (choosing the appropriate alternative to your personality, choosing one alternative for each item, leaving empty paragraphs that contain more than one answer.

The test validity: In order to approve the test validity, the researcher relied on two kinds of validity which are apparent validity and logical validity.

Apparent validity: It is one of the easiest types of validity, as it requires the presentation of the test in its preliminary form on a group of experts and specialists who are related to the test subject (8). Therefore, the researcher depended the rate 80% and more to be considered valid. And the apparent test validity was achieved in all its items and so considered valid.

Logical Validity: The researcher achieved this kind of validity through the definition of positive thinking and clarification of its components and the formulation of its paragraphs, The researcher was keen that they

cover and suit positive thinking, so he showed them on the arbitrators in order to know their views, and got the approval of everyone.

Survey application to test positive thinking:

The first survey application, the test was applied to a sample of students of the second intermediate class who were (30) students in order to identify the clarity of the test instructions and find out the appropriate time to answer its items by recording time on each student's paper after completion of the test.

The second survey application, was applied to a sample of 100 students in order to calculate the psychometric properties of the paragraphs. After correcting the answers, the empty forms were excluded. After that, responses were analyzed by the following:

Construction validity: The validity of construction can be identified by matching the theoretical and practical results. This means that a theoretical hypothesis has been developed for a given subject and a sample has been taken to examine the extent to which the reality is identical, and the results appeared identical.

The differentiated power: One of the basic tasks, extraction of the differentiated power. The researcher extracted the differentiated power of the test paragraphs and appeared that all of them were indicative. The calculated T value was greater than the statistical value of (2.000) and with a degree of freedom (62) at the indication level of (0.05). By that, the (30) test paragraphs are distinct paragraphs.

Reliability: The reliability of the test was obtained by the alpha- Cronbach equation, which is one of the most suitable methods to calculate stability. The stability of the test reached (0.88), which is a good stability factor.

Application of the test tool: The two groups were informed about the test date, one week before it, and it was implemented after completion of the teaching of the subject (content) and in one day under the supervision of the researcher himself.

Statistical means: The researcher used the equation (Alpha Cronbach) to do the equivalence between the two groups of research in the test. The equation is as follows: $(N / N-1) (MG A2 F / A2 K) (9)$.

RESULTS AND DISCUSSION

The results showed supremacy of the students of the experimental group, who studied the material using the multimedia according to the positive thinking test, on the students of the control group who studied the same subject by the usual way according to the positive thinking test, thus the null hypothesis is rejected and the

alternative is accepted. (there is a difference of statistical indication at a level of 0.05 between the mean scores of the experimental group students who studied using the multimedia and the mean score of the control group students who studied using the usual method in the positive thinking test. This is in line with Al-Shimari's study, which assured the supremacy of experimental group on the control group.

Table 1. The equivalence of the two groups

Variable	Group	Sample size	Mean	Difference	Freedom degree	T value		Indication level
Time age	Experimental	31	172.19	88.43	62	Calculated	Statistical	Not statistically indicative
Calculated per months	Control	33	171.13	87.92		0.461	2.000	
First course grades	Experimental	31	68.71	279.75		0.306	2.000	
	Control	33	69.97	277.63				
Danliz test for intelligence	Experimental	31	24.68	48.96		0.715	2.000	
	Control	33	23.52	39.05				

CONCLUSION

After conducting the equivalence between the two research groups, the researcher set the necessary application requirements for the experiment including the study plans, multimedia programs and the positive thinking test for the two research groups. After completion the experiment application, he applied his instruments to the two research groups. After correcting the students' answers, the researcher obtained data of the empirical and control groups where he treated those data statistically using (te-test) for the independent samples. The result showed superiority of the empirical group, which was studied through multimedia, on the control group studied by the variable of positive thinking development.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Babylon Government, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Post-Tonsillectomy Risks in a Long term: Meta-Analysis Study

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ABSTRACT

Tonsillectomy is the most common surgery in treatment of children with snoring and sleep apnea. Many of these children have not had any severe throat infections. We aim to evaluate the long term risk of diseases after adeno-tonsillectomy in childhood. We utilized health data on ~3000 individuals born between January 1980 and January 2010. This included healthy cases and controls who were not diagnosed with focal diseases during the surgery observation period (i.e. from birth to 9 years of age) and who had no surgery performed during the follow-up period from 9 to maximally 30 years of age. We found significantly high risks for many diseases, with effects on respiratory, allergic and infectious disorders after removal of adenoids and tonsils being most pronounced. Surgical removal of tonsils and adenoids early in life are associated with longer-term health risks.

Keywords: tonsillectomy, adeno-tonsillectomy, long term risks, surgical removal of tonsils.

INTRODUCTION

Tonsillectomy with or without adenoidectomy is one of the most commonly performed surgical procedures in children in western countries ¹. The most common indications are recurrent upper respiratory infections (URIs) and obstructive sleep apnoea. For children with obstructive sleep apnoea due to adenotonsillar hypertrophy, adenotonsillectomy has proven effective ²⁻⁴. Historically, the functions of tonsils and adenoids have intrigued scientists and medical professionals alike ^{5,6}. Current research suggests that these tissues play specialized roles in immune development and function. For example, the tonsils help protect directly against pathogens ^{7,8} and indirectly by stimulating further immune responses via communication with the rest of the lymphatic system ⁷⁻⁹. Surgeons often remove adenoids and tonsils to treat common childhood illnesses (e.g. recurrent tonsillitis, middle ear infections). Research on the consequences of these surgeries primarily relates to perioperative risks ⁷⁻¹⁰ and the ensuing short-term consequences of surgical procedures for the symptoms

to be treated. Those tonsils (particularly the adenoids) tend to atrophy with age, being largest in childhood and absent in adulthood ¹¹, has suggested that their absence would not affect adult health⁷. However, this does not exclude the possibility that these lymphoid tissues are most immunologically active in early life because they have a critical role in normal immune system development ^{7,8}. AT is a relatively safe procedure but complications do occur. These include postoperative hemorrhage, anesthetic and airway risks, aspiration, pulmonary edema, atlantoaxial subluxation, mandible dislocation, eustachian tube injury, nasopharyngeal stenosis, velopharyngeal insufficiency, and psychological trauma ¹². Mortality rates for tonsillectomy have been estimated to be between 1 in 16,000 to 1 in 35,000 and these deaths are attributed to bleeding, aspiration, cardiopulmonary failure, electrolyte imbalance, or anesthetic complications¹³. Complications are more common in patients with craniofacial disorders, Down syndrome, cerebral palsy, major heart disease, or bleeding disorders and in children younger than 3 years old with proven OSA ¹⁴.

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MATERIALS AND METHOD

Study sample obtained from the Danish health registries.

We utilized health data on ~3000 individuals born

between January 1980 and January 2010. This included healthy cases and controls who were not diagnosed with focal diseases during the surgery observation period (i.e. from birth to 9 years of age) and who had no surgery performed during the follow-up period from 9 to maximally 30 years of age.

Surgery groups:

There are three main types of tonsils: pharyngeal tonsils (hereafter referred to as the adenoids), palatine tonsils (hereafter referred to as the tonsils) and lingual tonsils. Adenoids are located towards the posterior wall of the nasopharynx, tonsils are located along the anterolateral walls of the oropharynx, and lingual tonsils are located at the base of the tongue.

We focused on surgery removing the first two (adenoidectomy, tonsillectomy), for the lingual tonsils are not commonly removed. We included adenotonsillectomy where adenoids and tonsils are removed in the same surgery. Surgery codes are based on early ICD operation classification codes from Danmarks Statistics (up to 1996) and the later Nordic Medico-Statistical Committee (NOMESCO) Classification of Surgical Procedures (NCSP) from 1996 onwards including: adenoidectomy, 2618, EMB30; tonsillectomy, 2614, EMB10; adenotonsillectomy, EMB20. There was no surgical procedure code for adenotonsillectomy prior to 1996, so this type of surgery was recorded when both surgical codes (2618, 2614) were entered on the same date.

Selecting disease groups:

We selected diseases based on whether they were likely to be affected by changes in the immune system (i.e. infections, allergies), and we added other disorders because they have been implicated in previous studies examining shorter-term health impacts for some of the focal surgeries of our study (i.e. respiratory infections).

Statistical design and analysis:

We used Cox regressions to model the relative risk for each of the 28 diseases up to age 30 (with age as timescale), depending on whether surgery occurred within the first 9 years of life. We validated the assumptions of the Cox regression model and ensured proportional hazards by stratifying for sex, birth cohort, birth season and demographic parity before estimating proportional hazards.

Estimating risks for non-immune diseases and conditions that surgeries aim to treat:

To quantify whether disease risks due to the focal surgeries are likely to be justified given their proposed health benefits, we calculated relative risks, absolute risks and number needed to treat for conditions that these surgeries treat using the same samples and statistical setup as described above. Conditions that adenoidectomy, tonsillectomy and adenotonsillectomy treat sinusitis, labyrinthitis, otitis media, and (chronic) tonsillitis

To test whether these surgeries may affect risk for diseases known to be unrelated to the immune system, we estimated risk for osteoarthritis, cardiac arrhythmias, heart failure, acid-peptic disease and alcoholic hepatitis

Testing for biases in general health before undergoing surgery:

With access to complete medical records from birth, we were able to test whether or not any such biases could influence the assessment of surgery effects on incident risk of disease.

The null hypotheses tested were that there was no difference in general health between cases and controls for: (1) age at first disease diagnosis, or (2) age at any disease diagnosis for diseases recorded before surgery. Neither null hypothesis could be rejected, indicating that cases were no more sickly than controls prior to surgery for diseases that occurred in the first 9 years of life (see Supplementary Methods - testing for biases in early general health between cases and controls, for further details and findings).

RESULTS AND DISCUSSION

We use relative risk, absolute risk, and number needed to treat to gain a balanced view of the actual general health effects that adenoidectomy, tonsillectomy or adenotonsillectomy were likely to have in the first 30 years of life in Denmark. We found that disease risks typically increased after any of the three surgeries were performed. For some, relative risks translated into substantial changes in absolute risk with the number needed to treat showing that only a few surgeries had to be performed to cause significant individual harm.

The risk of respiratory disease

Tonsillectomy nearly tripled the relative risk of

diseases of the upper respiratory tract (RR=2.72, 95% CI=1.54-4.80 Table 1, 2) and resulted in a substantial increase in absolute risk (ARD=18.61%, Table 1) and a small number needed to treat (NNT-harm=5, Table 1). Thus only about five tonsillectomies would need to be performed to cause diseases of the upper respiratory tract to appear in one of them. This suggests that the negative health consequences for this procedure in the overall population can be considerable. Adenoidectomy more than doubled the relative risk of chronic obstructive pulmonary disorder (COPD, RR=2.11, 95% CI=1.53-2.92, Table 1, 3) and diseases of the upper respiratory tract (RR=1.99, 95% CI=1.51-2.63) and nearly doubled the relative risk of conjunctivitis (RR=1.75, 95% CI=1.35-2.26). This resulted in a substantial increase in absolute risk for upper respiratory tract disorders (ARD=10.7%, Table 1), but gave only very small increases for COPD (ARD=0.29%) and conjunctivitis (ARD=0.16%), consistent with the corresponding NNT values (NNT-harm: diseases of upper respiratory tract=9; COPD=349; conjunctivitis=624, Table 1). Although relative risk increases were reasonably similar for these diseases, the large differences in absolute risk were due to the overall prevalence of these disorders in the population. For example, diseases of the upper respiratory tract occur 40-50 times more frequently (i.e. in 10.7% of control individuals up to 30 years of age) than do COPD (0.25%) and conjunctivitis (0.21%).

Other long-term disease risks

For some diseases, even modest increases in relative risk (RR 1.17-1.65) resulted in relatively large increases in absolute risk (i.e. 2 to 9%) and relatively low number needed to treat values (i.e. NNT-harm < 50), which was largely due to the high prevalence of these diseases in the population (risk in controls ranged from 5 to 20%, Table S4). They mainly included respiratory diseases (groups including: all, lower, lower-chronic, asthma, pneumonia), infectious diseases (all), skin diseases (all), musculoskeletal (all) and eye/adnexa (all). For example, adenotonsillectomy significantly increased relative risk of infectious diseases by 17% (RR=1.17, 95% CI=1.10-1.25, Table 1, 4), but because infectious diseases are relatively common (i.e. 12%, Table 1), the absolute risk increase was 2.14%, so that about 47 adenotonsillectomy surgeries would need to be performed for an extra infectious disease to occur as a result of one of these surgeries (Table 1). When all 28 disease groups were considered, there were small but significant and

consistent increases in relative risk for most of them: 94% of disease risks were significantly increased before Bonferroni correction, 78% after. Thus, the negative health consequences of these surgeries within the first 30 years of life are likely to be widespread, affecting a range of tissues and organ systems, underlining the importance of the uninterrupted presence of adenoids and tonsils for normal development. The removal of these organs early in life appears to slightly but significantly perturb many processes important for later-life health. The many interesting patterns of disease risk based on covariates included in the analysis highlight the complexity of the factors influencing the focal disease risks of our study. For example, consider covariates that significantly modified risks of diseases of the upper respiratory tract and their largest increases in relative (RR=1.99-2.72) and absolute risk (ARD=10.77% 18.61%) after adenoidectomy and tonsillectomy. The risks for these diseases slightly decreased for offspring born to older mothers (RR=0.96, 95% CI=0.95-0.98 for both surgeries), slightly increased (tonsillectomy analysis) when maternal bleeding occurred during pregnancy (RR=1.07, 95% CI=1.03-1.12), increased (both analyses) with APGAR5 score (RR=1.09, 95% CI=1.04 1.13, both surgeries), increased (both analyses) when mothers had a previous induced abortion (RR=1.09, 95% CI=1.06-1.12, both surgeries), increased in immigrants relative to Danish nationals (RR=1.40, 95% CI=1.33-1.47, both surgeries), decreased in those living anywhere in Denmark other than Copenhagen (RR=0.69 to 0.93), and increased when fathers or mothers had a history of the same disease (RR=1.29 to 1.38). All such effects were accounted for in our risk estimates and their significance. In 1998 two reviews were published on trials of the efficacy of (adeno) tonsillectomy for recurrent throat infections in children^{15,16}. Both concluded that the available studies were of poor quality. In daily practice most children suffering from recurrent throat infections undergo tonsillectomy combined with adenoidectomy and not tonsillectomy alone; in the Netherlands 90% of tonsillectomies in children are combined with adenoidectomy, in the USA this percentage is 84%, in Canada 75%, and in England 32%. (Adeno) tonsillectomy is one of the most commonly performed surgical procedures in children in western countries; in 1998, for example, 65/10 000 underwent T_iAds in England and 50/10 000 in the United States¹⁷.

Table 1. Impact of tonsillectomy on risk of Respiratory – upper disease

Respiratory - upper						
	exp(coef)	LCL	UCL	SE	Z	Pr(Z)
surgery	2.7275	1.5479	4.8062	0.2890	3.4715	0.0005
paternal age	1.0015	0.9868	1.0165	0.0075	0.2086	0.8347
maternal age	0.9667	0.9503	0.9833	0.0086	-3.8974	<0.0001
gestation length	0.9926	0.9809	1.0045	0.0060	-1.2117	0.2256
maternal bleeding	1.0770	1.0332	1.1226	0.0211	3.5040	0.0004
fetal oxygen deprivation	0.8364	0.6316	1.1075	0.1432	-1.2466	0.2125
pregnancy oedema	1.1379	1.0373	1.2483	0.0472	2.7367	0.0062
apgar5 score	1.0880	1.0405	1.1376	0.0227	3.7046	0.0002
birth weight	1.0024	0.9913	1.0137	0.0056	0.4313	0.6662
preexisting hypertension	1.1326	0.8669	1.4797	0.1363	0.9131	0.3611
preexisting diabetes	0.9443	0.7705	1.1572	0.1037	-0.5522	0.5807
previous induced abortion	1.0955	1.0657	1.1260	0.0140	6.4950	<0.0001
previous spontaneous abortion	1.0321	1.0014	1.0637	0.0153	2.0553	0.0398
education level	1.0128	0.9999	1.0258	0.0065	1.9505	0.0511
parental income	0.9899	0.9764	1.0035	0.0070	-1.4477	0.1476
country	1.4076	1.3397	1.4788	0.0252	13.5635	<0.0001
region Sjælland	0.8285	0.7998	0.8582	0.0179	-10.4782	<0.0001
region Syddanmark	0.9349	0.9076	0.9631	0.0151	-4.4418	<0.0001
region Midtjylland	0.7404	0.7177	0.7638	0.0158	-18.9470	<0.0001
region Nordjylland	0.7012	0.6730	0.7306	0.0209	-16.9242	<0.0001
mother with disorder	1.3801	1.3365	1.4251	0.0163	19.6833	<0.0001
father with disorder	1.2905	1.2480	1.3345	0.0170	14.9346	<0.0001

Table 2. Impact of adenoidectomy on risk of Respiratory – COPD disease

Respiratory - COPD	exp(coef)	LCL	UCL	SE	Z	Pr(Z)
surgery	2.1195	1.5349	2.9268	0.1646	4.5620	<0.0001
paternal age	0.9527	0.8649	1.0495	0.0493	-0.9807	0.3267
maternal age	0.9454	0.8460	1.0566	0.0567	-0.9888	0.3227
gestation length	1.0242	0.9455	1.1094	0.0407	0.5867	0.5573
maternal bleeding	1.2796	0.9911	1.6520	0.1303	1.8918	0.0585
fetal oxygen deprivation	0.6305	0.0883	4.5002	1.0026	-0.4598	0.6456
pregnancy oedema	1.5897	0.9917	2.5483	0.2407	1.9255	0.0541
apgar5 score	1.1194	0.8310	1.5080	0.1520	0.7424	0.4578
birth weight	0.8669	0.8040	0.9347	0.0384	-3.7147	0.0002
preexisting hypertension	0.0000	0.0000	Inf	699.1457	-0.0186	0.9851
preexisting diabetes	1.1143	0.2766	4.4894	0.7109	0.1523	0.8789
previous induced abortion	1.1268	0.9378	1.3540	0.0936	1.2752	0.2022
previous spontaneous abortion	1.0182	0.8283	1.2515	0.1052	0.1713	0.8639
education level	0.9994	0.9169	1.0892	0.0439	-0.0136	0.9891
parental income	0.8112	0.7408	0.8883	0.0463	-4.5148	<0.0001

Cont... Table 2. Impact of adenoidectomy on risk of Respiratory – COPD disease

Country	1.1506	0.8256	1.6037	0.1693	0.8285	0.4073
region Sjælland	0.8304	0.6644	1.0378	0.1137	-1.6337	0.1023
region Syddanmark	0.6986	0.5690	0.8576	0.1046	-3.4268	0.0006
region Midtjylland	0.5772	0.4634	0.7190	0.1120	-4.9042	<0.0001
region Nordjylland	0.7104	0.5463	0.9238	0.1340	-2.5508	0.0107
mother with disorder	1.9286	1.3686	2.7177	0.1749	3.7534	0.0001
father with disorder	1.6667	1.1832	2.3478	0.1748	2.9226	0.0034

Table 3. Impact of adenotonsillectomy on risk of Infectious diseases

Infectious - all	exp(coef)LCL		UCL	SE	Z	Pr(Z)
surgery	1.1771	1.1080	1.2505	0.0308	5.2852	<0.0001
paternal age	0.9953	0.9816	1.0091	0.0070	-0.6677	0.5042
maternal age	0.9702	0.9550	0.9858	0.0080	-3.7259	0.0001
gestation length	0.9896	0.9787	1.0007	0.0056	-1.8208	0.0686
maternal bleeding	1.1192	1.0773	1.1628	0.0194	5.7807	<0.0001
fetal oxygen deprivation	0.8632	0.6697	1.1125	0.1294	-1.1361	0.2559
pregnancy oedema	1.0653	0.9742	1.1649	0.0455	1.3888	0.1648
apgar5 score	1.0487	1.0048	1.0946	0.0218	2.1792	0.0293
birth weight	0.9941	0.9838	1.0046	0.0053	-1.0977	0.2723
preexisting hypertension	0.9798	0.7500	1.2799	0.1363	-0.1494	0.8811
preexisting diabetes	1.0066	0.8394	1.2071	0.0926	0.0717	0.9428
previous induced abortion	1.0968	1.0690	1.1252	0.0130	7.0702	<0.0001
previous spontaneous abortion	1.0436	1.0147	1.0733	0.0143	2.9790	0.0028
education level	0.9911	0.9793	1.0031	0.0061	-1.4516	0.1465
parental income	0.9868	0.9743	0.9995	0.0065	-2.0335	0.0419
country	1.2756	1.2171	1.3368	0.0239	10.1711	<0.0001
region Sjælland	0.7852	0.7605	0.8107	0.0162	-14.8414	<0.0001
region Syddanmark	0.6859	0.6664	0.7060	0.0146	-25.6594	<0.0001
region Midtjylland	0.7030	0.6834	0.7231	0.0144	-24.4581	<0.0001
region Nordjylland	0.6169	0.5936	0.6411	0.0196	-24.5919	<0.0001
mother with disorder	1.3806	1.3373	1.4254	0.0162	19.8202	<0.0001
father with disorder	1.2319	1.1911	1.2740	0.0171	12.1469	<0.0001

CONCLUSION

We found significantly high risks for many diseases, with effects on respiratory, allergic and infectious disorders after removal of adenoids and tonsils being most pronounced. Surgical removal of tonsils and adenoids early in life are associated with longer-term health risks.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Public Health, Maysan Health Department, Maysan governorate, Iraq and all experiments were carried out in accordance with approved guidelines.

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Potential Adverse Effects of Radio Frequency-Electromagnetic Fields RF-EMF

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ABSTRACT

The last decade has witnessed a significant mobile phone usage thus raising public concern as to whether this daily use exposes people to the electromagnetic fields EMF. Many researchers are interested in the human neurophysical functioning. The study will also attempt to investigate the effects of EMF-RF exposure from the mobile phones signals on children as well as adults. There are small changes that are observed on the EEG regarding the alpha frequency spectral power. Additionally, acute RF-EMF exposure has no effects on human cognitive functioning. Children are considered vulnerable, and therefore the risk of their central nervous system and brain being affected is high because the skull is considerably thinner and still developing.

Keyword: *Radio Frequency, Electromagnetic Fields, Children, Adults*

INTRODUCTION

There has been an increased use of mobile phones due to the paid evolution of the Information and communication technologies for more than a decade now. The telecommunication provides people with services such as phone connection, information, entertainment or even learning opportunities over different media platform. The present wireless technology depends heavily on the network base stations fixed antennae, the relay of information through radio frequency signals that are transmitted at the speed of light ¹. The increased use of mobile phone, as well as the growth in the number of base stations, has led to concerns from the public due to the constant exposure to radio frequency (RF) electromagnetic fields (EMF) emitted by the wireless communication devices and mobile phones. Other sources of radio frequency emissions are television, microwave ovens, remote controls, and radio. The emitted RF-EMF is absorbed by the skull to the brain thus altering physiology, human functioning and behavior, as well as neurological functions since the brain is largely exposed

during the calls, received via a mobile or cordless phone ². The public is greatly anxious because they are misled to believe that the electromagnetic emissions from the mobile phones are equivalent to the radiations from radioactivity or nuclear. Mobiles gadgets are used by adults, children plus adolescents, and they were using at an early age. Thus children have developed brain and central nervous system while their skull is moderately thin thus they are potentially susceptible to the exposure to RF-EMF ³. Due to the increase in the number of mobile phones users it is crucial to investigate whether there is any potential impact on the cognitive functions of the brain as a result of mobile phones usage. This study will center on the brain activity and neurobehavioral performance of humans. *RF fields*; the RF is found in the EMF spectrum and occupies the frequency range between 3Hz and 300GHz. The Microwave radiation falls under this band as a subset of RF in the range between 300MHz and 300GHz. Although there are various sources of RF, one of its sources is the mobile phone base stations, radio and television transmitters in the frequency ranges from 200 kHz-900MHz. Others are the welding machines, military radar systems, and plasma etchers. The mobile phones fall in the frequency range of 450-2600MHz. The first generation mobile phones were in the ranges of 450-900 MHz while the third generation lies between 1800-2600 MHz and uses Universal Mobile Telecommunication System (UMTS).

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However, the G4 phones operate below 50MHz range ⁵.

The brain is near the mobile phone antenna; thus, the source of RF-EMF is more likely to reach it to some extent and therefore, the radiations are of significant scientific concerns. The second concern is the risk of the brain cancer. Some of self-reported symptoms and complaints are headaches and sleep problems. One hypothesis related to RF-EMF exposure is thermal warming effect causing rise to the tissues surrounding the brain when receiving a mobile call. The estimated value in terms of °C is very low. The highest brain temperature from the different mobile phones was 0.25 °C ⁶. Although the warming effect may be too insignificant to cause damages to the brain, pulsed oscillatory signals may have a direct interference with the brain electric oscillatory activity ⁶, induction of the DNA-damage and extracellular-signal-regulated kinase (ERK) activation. Therefore, it can be concluded that there is no evidence that there is RF-EMF interrelation with the biological systems^{7,8} *Neurophysiological effects*; human brain is a composite system whose functions are affected by any external inference leading to the motor-function and brain oscillation. Electroencephalogram (EEG) is used to investigate various facets of brain functions. One aspect that is investigated is sleep which is an important part of human functioning. Sleep deprivation affects performance, and this problem is one of the self-reported complaints after exposure to RF-EMF ⁹.

MATERIALS AND METHODS

The study design used for this research was qualitative research design. It was an exploratory research whereby different articles and other forms of literature were used to collect relevant data to the topic, and finally, a conclusion was made. A literature review was conducted on relevant experimental studies on RF-EMF from mobile phones. The survey focused on the effects of the exposure of EMF, RF, from mobile phones on cognitive function, neurophysiology, brain activity, memory and performance measures. The measurement methods in these studies under analysis are Evoked Potential (EP), Electro-Encephalogram (EEG) and Event-Related Potential (ERP). The review incorporated the studies on RF-EMF effects on adolescents and children. The analysis included the evaluation of the abstract, outlined outcomes, methodology and experiment design to ensure they are consistent with the topic. *Cognitive processes*; a study by Krause et al. on brain activity after

exposure to EMF using 902MHz and PM 217Hz when visual working memory task is being done. The outcome was alpha 8-10Hz showing that the exposure can have considerable brain responses modification during the task ¹³. *Neurobehavioral performance and RF*; certain studies indicated the considerable effect on slow brain potential when a person is exposed to EMF. Others reported no effect on the performance when exposed to RF exposure ^{14,15}. Evaluation of RT-MF exposure on children confirmed a potentially higher susceptibility because their immunity and regulatory system is still developing. Additionally, their cellular activities are higher than grown up and therefore, the vulnerability probability during exposure is higher. More so, the children skull is at the formative stage, and thus their brain is highly vulnerable because of the small depth of skull as well as less firm ear thus brings the phone closer to the head. A child's head is also small in relation to the penetration depth of the RT-EMF, showing that its brain is deeply exposed. The tissues of the child's brain have a high ability to absorb due to its high water content that serves as an unfavorable influence. Thus despite the structural differences between a child and an adult head, the earlier have different mobile phone use patterns. Some children were to use cell phones at a younger age, they lack headsets, and they spend a long time on calls, unlike adults. The study by Kramarenko and Tan on children of 12-years-old and adults indicated that young ones are more vulnerable and are exposed to adverse health effects when they use mobile phones than grownups¹⁶.

Meta-analysis

Various RT-EMF exposure and neurobehavioral performance meta-analysis have been conducted. For example 10 single and double-blinded controlled trials were conducted by Barth et al. in young adults using GSM 900 MHz exposure. The meta-analysis showed that the cognitive performance was moderately supported by the EMF exposure. There were temporary memory measures when RT was raised, and the error surged as well. Thus the meta-analysis indicates that there are minimal but noteworthy accumulated effects of RF-EMF exposure on working memory, and attention although with uneven direction ¹⁷. Additionally, pooled meta-analysis shows that the effects are insignificant and without uniform direction thus their implications on the daily human performance are uncertain ¹⁷⁻¹⁹. Thus comparing the RT-EMF induced changes to the effects

of hormonal shifts or caffeine, it shows that even severe exposure cannot have any effect on human functioning. However, the data on the signal effects on the children are too limited to make assumptions. More so there is no convincing scientific data that clearly indicate that children are more vulnerable to RT-EMF thus no recommendation is offered in regard to limiting the mobile usage by children.

RESULTS AND DISCUSSION

The telecommunication is undergoing rapid changes thus affecting peoples' daily lives and interactions. The mobile phones are received near the head, and thus the RF-EMF radiations from the phone are absorbed by skull to the brain to a certain degree. The study focused on the possible effects of RF-EMF released by the wireless devices on the human brain activity as well as the neurobehavioral performance. The analyses of RF-EMF signals on the EEG indicated a substantial increase in alpha band. The study by Roschke et al. found that the RF-EMF had no impact even when the exposure duration dropped from 15 -3.5 minutes¹¹. Studies indicated that although the effects of the exposure were found during sleep, the contact takes place before the rest or sleep. The analysis of EEG during cognitive processing shows varying outcomes. One of the studies is Krause et al. that was duplicated but still reported null findings¹³. Generally, the publications under review indicated that any brief or acute exposure of the mobile phone's signal of 900MHz magnitude could cause considerable alterations in human brain activity. Some of the dependable outcome during sleep, rest and cognitive processing includes the upturn of alpha frequency power for the duration of the person is exposed to RF-EMF and after the exposure. Other frequency bands and variable have inconsistent results. The study on the effects of RF on the neurobehavioral performance such as neurophysiological tasks had erratic results. The studies focused on the different task and decreased the RT or increase performance¹⁵. A meta-analysis on a polled data conducted by Barth et al. on ten studies discovered that a minute but measurable, the pooled impact of RF-EMF exposure existed on cognitive activities such as working memory and attention¹⁷. Thus it can be concluded that there is the certain potential that exists between neurobehavioral outcomes and RF-EMF exposure. The study on the long-term effects did not observe some effect on repeated RF-EMF exposure on the administered tasks. In the Besset et al.²⁰ the treatment group was exposed to RF-EMF for

120 min each day for a certain number of days at the same time being administered to neurobehavioral tasks the following day after the contact with 900MHz RF-EMF signals. However, there were no effects that were found. The researchers concluded probably the duration between exposure and testing allowed the recovery of function. The literature review did not identify any other studies on cumulative exposure effects of RF-EMF exposure on neurobehavioral performance and brain activity. It is unclear whether RF-EMF might have long-term effects on children due to high cumulative lifetime contacts. Leitgeb et al.²⁰ provide a summary of why children are more susceptible to RF-EMF exposure over adults. Kramarenko et al.¹⁶ indicate that effects induced slow waves are visible in children than in adults how because the study did not use any form of blinded study design, it was criticized. However, there were no effects of RF-EMF on children's neurobehavioral performance that were observed. It is also worth noting that there are limited studies focusing on the impact of acute RF-EMF exposure on children's cognitive functions and brain activities. Although there is no effect on neurobehavioral performance that is observed in adults, there may be minute alterations in children's brain activity. More so, there is a possibility of higher risk due to long-term cumulative effects of RF-EMF exposure on children than adults^{22,23}. The variation that was recorded in the RF-EMF exposure studies may have been caused by the lack of standardized outcome measures on brain waves as well as the sensitivity of the cognitive tasks. Additionally, the issue of the existence of different experimental protocols in addition to EMF parameters that are highly variable. The methodologies applied in the research had limited validation. The EEG is prone to artifacts, and therefore minimal changes in the movement of the eye can cause the objects to be affected in their connections with recoding electrodes²⁴. Additionally, some studies had a relatively small number of participants, while some of them were affected by factors such as distraction, motivation, and boredom thus influencing their cognitive performance. Other factors are that both males and females may have had different RF-EMF exposure responses and thus equally sized groups of the two genders would have recommended for evaluating RF-EMF exposure. More so, the differences in blinding design could have affected the study results; thus some studies recorded positive findings on the single blinded design however on duplicating the positive study with a double-blinded design and with

many participants the results were different from the previous studies. The timing of the study also may have influenced the outcome. For instance, the delayed effect

of RF-EMF exposure could have affected the desired outcomes. The presence of these effects could be because of the problem with the cross-over designs whereby the wash-out effects are not considered²⁵.

Table 1. The Electromagnetic Fields (EMF) spectrum

Frequency (Hz)	Wavelength (m)			Static Fields
3×10^2	10^6	Non-ionising radiation	Low frequency	Power lines
3×10^5	10^3		Radiofrequency & Microwaves	Radio & TV
3×10^8	1			Mobile phones
3×10^{11}	10^{-3}			Infrared
3×10^{14}	10^{-6}	Optical radiation	UV	Visible light
3×10^{17}	10^{-9}	Ionising radiation		
3×10^{20}	10^{-12}			

CONCLUSION

There has been increased use of mobile phones by both adults and children thus raising concerns as to whether the exposure to the RF-EMF from these wireless communication devices could affect the brain activities. The literature review of various studies that have been conducted regarding the effects of the exposure to such signals shows that there are consistently small changes in the alpha frequency on EEG during cognitive activities rest and sleep during the RF-EMF exposure as well as after similar to GSM phone signals. Medically, the implications of these minute changes in the brain are still unknown. The human is also affected by the hormonal shifts and caffeine in the same way it can be altered by the RF-EMF signals. On the hand, the neurobehavioral performance is not affected by the exposure. Thus acute exposure of the head to the RF-EMF does not affect the human cognitive functioning either negatively or positively. There are limited studies on the effects of the RF-EMF exposure on children. Although children are more susceptible to mobile phone users, it is unknown what cumulative effect will have the neurobehavioral performance and brain activity after long-term exposure.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Public Health,

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Prognostic Role of STAT-3 Upregulation in Oral Squamous Cell Carcinoma

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ABSTRACT

Oral squamous cell carcinoma is a challenging tumor for clinicians because of its ability to recur and spread despite progressive advancement in treatment options. Researchers studied wide range of histopathological parameters in order to achieve powerful prognosticator enabling them to reduce the consecutive destructive effects on patients with this type of horrible malignancy. Of these parameters, depth of invasion, perineural invasion and lymphovascular invasion have been studied widely. This study was intended to investigate the prognostic effect of STAT-3 overexpression on oral squamous cell carcinoma cells behavior in relation to the depth of invasion, perineural invasion, and lymphovascular invasion. In this retrospective study STAT-3 expression was examined in fifty specimens of primary oral squamous cell carcinomas by immunohistochemistry. The expression labelling indices then correlated with three histopathological parameters closely related to tumor cell invasion and metastases. Strong expression of STAT-3 was detected in 25 cases, which represent 50% of all cases. The expression of STAT-3 was correlated statistically significant with tumor depth of invasion, perineural invasion and lymphovascular invasion. This study suggested that STAT-3 is a powerful signaling contributors for invasive and metastatic ability of OSCC cells.

Keywords: *Oral squamous cell carcinoma, STAT-3, depth of invasion, lymphovascular invasion, perineural invasion.*

INTRODUCTION

Squamous cell carcinoma (SCC) is the chief malignant tumor in the oral cavity constituting approximately 94% of the whole these malignancies ¹. The expectation of biological behavior of oral squamous cell carcinoma (OSCC) still constitutes an obstacle for researchers. Conventional histopathological and clinical parameters failed to predict the prognosis in patients with this type of devastating malignancy and the overall survival rate not exceed 50% despite advancement in treatment modalities ². Even at early diagnosis around 30% of patients exhibit tumor spreading to regional/cervical lymph nodes ¹. Strenuous efforts have been done by countless number of researchers in order to determine reliable parameters that can be employed as powerful

prognosticators of metastatic spread to the lymph nodes, tumor recurrence, and diminished survival in patients with OSCC. Among these parameters; depth of tumor cell invasion, perineural invasion and lymphovascular invasion have been given distinct consideration ^{3,4}. The depth of invasion (DOI) represents the extension of tumor cells beneath the epithelial surface. However, when the epithelium was shattered the investigators renovate a surface line and measure from it ⁵. The differences between the researchers are clear about the optimal depth point that determines the hazard and linked to the poor prognosis. They considered cutoff points of 2 mm ^{6,7}, 4mm ^{8,9}, 5mm ¹⁰ and other different values. Meta-analysis however, suggested 4 mm as the optimal cutoff point in OSCC ¹¹. Diverse definitions have been applied for PNI but the most widely accepted one was that proposed by Batsakis in 1985 who defined PNI as “the ability of cancer cells to invade in, around, and through nerves” ¹³. PNI is a well-recognized pathologic sign that can be detected without lymphovascular invasion. Through nerve, the tumor cells can spread to

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a distant site without evidence of any local invasion. However, PNI in some malignancies may be regarded as the only mechanism for metastatic spread¹². The exact pathogenesis behind PNI is quiet uncertain. Nerve growth factor (NGF) and tyrosine kinase A (TrkA) receptor have been shown to contribute in the mechanism of PNI¹⁴. More recent researches showed that PNI may resulted from shared molecular communications between cancer cells and the microenvironment of the nerve. Tumor cells may act probably in different way in this new microenvironment and may exhibit more aggressive behavior. These outcomes ended the previously assumed concept that PNI is a merely process driven by cancer¹⁵. Among head and neck cancers, PNI was reported more frequently in squamous cell carcinoma. The incidence rate may reach as high as 80%¹². STATs family can be separated into two main categories based on functional specificity into one consists chiefly of three members “STAT2, STAT4, and STAT6”. This group triggered by a limited number of cytokines and perform a crucial role in T-cells development and in the signaling of IFN- γ . The other group contains “STAT1, STAT3, and STAT5” which is involved in “development of mammary gland, response to growth hormones, and embryogenesis”. In addition, this group critically involved in oncogenesis by adjusting essential cellular functions such as cell cycle and apoptosis²². Translocation of STATs into the nucleus enable them to bind to specific regions on the DNA and initiating the transcription of the target genes²³. Activation of STAT proteins is a temporary process. Thus, within short period of time the triggering signals deteriorate and the STATs transfer back to the cytoplasm²⁴.

MATERIALS AND METHODES

Patients: This retrospective study utilized fifty formalin fixed paraffin embedded blocks from fifty patients with primary oral squamous cell carcinomas who were treated with total surgical removal retrieved from the archives of oral pathology laboratory of the oral diagnosis department at the college of dentistry/ Baghdad University and Ghazi Al-Hariri hospital laboratory. For every specimen, the histopathological data were tabulated and documented. Depth of tumor invasion measured from the epithelial basement membrane to the deepest invading cell. Ocular micrometer was applied to estimate the actual depth of invasion. It is positioned in one of microscope eyepieces; however, the distance between the etched lines depends upon the objective lens

used. In order to calculate the exact distance between the lines of an ocular micrometer, it is essential to be calibrated by a stage micrometer. The inscribed lines on a stage micrometer are precisely 0.01 mm. In order to calibrate the ocular micrometer for a particular objective lens, the ocular and stage micrometers are superimposed, and the number of ocular graduations per stage micrometer graduation is determined.

Immunohistochemical staining: The immunohistochemical procedure was performed according to the abcam IHC protocol using (Anti-STAT3 antibody (ab76315)IgG, Rabbit monoclonal in a dilution of (1/50) according to Abcam (Cambridge, UK) and human kidney tissue was used as a positive control to STAT3. The sections were deparaffinized, rehydrated in graded alcohols, exposed to endogenous peroxidase block in 3% hydrogen peroxide and boiled in citrate buffer at 90°C for 7 minutes. The slides were incubated with primary antibody overnight at 4°C, and then washed and incubated with secondary antibody at 37°C for 25 minutes. Finally, the sections were developed with DAB chromogen and counterstained with hematoxylin. The immunoreactivity of STAT3 was classified as: Negative (-) (<10% of tumor cells were stained or no staining), Weak positive (+) (11–50%), Positive (++) (51–75%), strongly positive (+++) (>75%)²⁵.

Statistical analyses: All statistical analyses of the present study were performed by statistical package for social sciences (SPSS version 22). Data were summarized using mean \pm SD for quantitative variables and number and percentage for qualitative variables. Mann-Whitney test was used to compare the differences in immunohistochemical expression scores among different clinicopathological parameters.

RESULTS AND DISCUSSION

Both brown cytoplasmic and nuclear localization of STAT-3 was noticed in OSCC tissue samples. The minimum, maximum, and mean scores of STAT-3 were (14, 96, and 63.50). Strong expression was detected in 25 cases, which represent 50% of all cases. In this study, minimum and maximum tumor depth measured were 1.25mm and 8.75mm respectively. The mean depth was 4.04mm. Accordingly tumors with depth less than 4 mm were 28 and those with depth equal or more than 4 mm were 22. Out of 50 cases of OSCC; LVI and PNI were present in 30 (60%) and 24 (48%) cases respectively.

significant statistical relations were detected with LVI, PNI, DOI as shown in table 1. LVI and PNI considered to be risk factors for loco-regional recurrence in oral squamous cell carcinoma in numerous series^{17,26,27}. The incidence of these parameters in OSCC is a controversial issue. Current study showed that the incidence of LVI and PNI was 60% and 48% respectively. One study reported that the incidence of LVI in nodal negative patients was 19% and 51% in nodal positive patients¹⁷. Numeral studies stated that the rate of PNI in head and neck squamous cell carcinomas range from 14% to 63%^{28,29}. It should be mentioned that the differences in determining the exact incidence of both parameters in oral squamous cell carcinoma may be attributed to the difficulties in estimation of both parameters by hematoxylin and eosin staining and the size of the studied sample. Multiple researches have indicated that the depth of the tumor is a strong factor of prognosis and can predict lymph node metastasis in OSCC³⁰. However, the accurate clinically optimum cutoff value not agreed yet. A value of 4mm considered to be a cutoff point by meta-analysis conducted by Huang et al¹¹. Substantial progress has been done regarding STATs structural and functional association since their detection as a main controllers of cytokine signaling. Growing evidences extracted from several studies showed the significant role of STATs particularly STAT3 in a number of cellular processes contribute to the malignant phenotype. Such overexpression (cytoplasmic/or nuclear) or unsuitable activation which occurs in a diversity of cancers is not simply adventitious but it was correlated with increased aptitude of tumors (including oral SCCs) to invade and metastasize. In this study, strong expression of STAT3

was observed in 50% of the cases. Such expression was linked to the increased tumor depth, LVI, and PNI. The capability of cancer cells to invade the ECM is a critical step for cancer progression and metastatic spread. STAT3 implication in such process was supported by strong evidences particularly through matrix metalloproteinases regulation³¹. In addition, tumor invasion and metastasis could be blocked by targeting STAT3³². It was reported that STAT3 activation may disrupt the function of recruited immune cells for tumor benefit through increased immunosuppressive factors production or through inhibition of proinflammatory cytokines production³³. Come in accordance to the results of this study Zhao et al, in 2012 suggested that STAT3 in tongue SCC may participate in the motility, metastasis, and progression. They explained the capability of STAT3 to enhance invasion due to its suppressive function on phosphatase and tensin homolog (PTEN) and E-cadherin. Another study directed by Suiqing et al, in 2005 stated that overexpression of STAT3 was associated with increased invasion, and metastasis in cutaneous SCC. Furthermore, constitutive activation of STAT3 was documented by several studies in most HNSCC cells. Despite the tumorigenic effect of STAT3 is mentioned widely in various cancer types, suppressive role of STAT3 in cancer have been cited in some studies. A cohort study, performed by Pectasides et al, in 102 patients with HNSCC, found that high level of STAT3 nuclear expression related with a favorable prognosis. These contraries in outcomes may be ascribed to the specificity of used antibody directed against STAT3 or to the factors related to methodology used.

Table 1. STAT-3 expression scores in relation to the histopathological parameters.

Histopathological parameter		STAT3 expression		No of cases	Mean ± SD	P value	
		++	+++				
Lymphovascular invasion	Present	6	4	20	30	2.46±0.81	0.005 MW
	Absent	10	5	5	20	1.75±0.85	
Perineural invasion	Present	3	2	19	24	2.66±0.70	0.00 MW
	Absent	13	7	6	26	1.73±0.82	
Depth of invasion	≥ 4 mm	2	5	15	22	2.59±0.66	0.005 MW
	< 4 mm	14	4	10	28	1.85±0.93	

CONCLUSION

Overexpression of STAT-3 was observed in all studied samples of OSCC. This expression was correlated significantly with LVI, PNI, and DOI suggesting that STAT-3 is a powerful signaling contributors for invasive and metastatic ability of OSCC cells.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Oral Diagnosis, College of Dentistry, University of Baghdad, Baghdad city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Security and Interoperability Issues in IoT based Healthcare Architectures

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ABSTRACT

Internet of Things (IoT) creates smart devices final construction blocks in evaluation of cyber-physical smart comprehensive structures. The IoT has a relief of application areas, containing healthcare. IoT period is re-planning modern healthcare with appointing technological, social, and economic perspectives. IoT makes chances in several areas. Though, this rise in contiguity makes many outstanding issues. This paper presents a field of some of basic issues challenging spread abroad acceptance of IoT. Especially, it concentrates on security and interoperability issues in the IoT. It is deduced that there is a necessity to expand a various technology attitude to IoT security.

Keywords: *Internet of Things (IoT); Security; Healthcare; Interoperability.*

INTRODUCTION

IoT connects the net with sensors and a numerous of systems, basically utilizing IP-based communications. Human beings provide most of the substances and data found on net yet, thus in IoT, humble systems are often the dynamic principle that presents the data. There are a lot of applications for IoT; containing healthcare systems, that are the basic concentration of this paper. Healthcare systems utilize a collection of gathered systems to make an IoT web allocated to healthcare evaluation, containing controlling patients and automatically finding conditions where treat interventions are needed¹. Medical systems such as other computer devices can be delicate to security attacks and these attacks can impact the security and execution of the system. The susceptibility additions by rising the relation of medical systems and hospitals to the internet. In another view, two essential agents of vicinity and affect measure can be calculated forcible in the security of a system. In the other hand, a system that has more vicinity to man life and so has a greater effect on its environment, is more essential in units of security. It can be mentioned that

a set of medical systems among the internet of thing systems is one of the most essential sets from this view. In the next couple of years, the medical section is hoped to give an evidence the spread broad acceptance of IoT and growth along the new applications and eHealth IoT systems. The IEEE explains interoperability as “capability of two or more devices or elements to truck data and to utilize data that has been trucked”. Other explanations of interoperability are former suitable regarding to especial application’s necessities or requirements³. So, various groups of interoperability have been appeared. Semantic interoperability, Cross-domain interoperability, Syntactic interoperability, and Technical interoperability are illustrations of these groups. All these sorts of interoperability are required to protection integrated and incongruous relations in the IoT. Obtaining interoperability is essential for gathering hybrid objects with each other along various relation webs. It subdues the goal to have millions of sensors, receivers, little and smart systems linked to Internet if these systems can’t in fact join together in a path or another. As a matter of fact, for IoT to growth, objects joining to relation networks, that can be incongruous, require to can touch with other objects or applications. The remaining paper is organized as follow: In Section 2 we describe security requirements in IoT based health care and we describe security challenges in IoT Environment. In Section 3 we present security issues

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in IoT based healthcare architectures. In Section 4 we present interoperability issues in IoT based healthcare architectures.

2- Security challenges and requirements in IoT based healthcare

2-1- Security requirements in IoT based healthcare

A critical necessity of IoT is that the systems must be gathered, that let it to perform special jobs, like feeling, relating, data progressing, and so on. The IoT can achieve, transfer, and progress the data from the IoT end-nodes through web to perform upper complex jobs. The IoT ought to can present applications with powerful security support. The device architecture has to present effective securities for the IoT that connects the interruption among the physical systems and the moral worlds ⁴. Information security is discovered as Data Locality, Data Integrity, Data Access, Data Confidentiality, Data Authentication, and Data Availability.

A. Data Locality

Data locality is able to be presented reliability to the SaaS user by Service level agreement (SLA) to assure where the information is safety saved. So, multi-owner, hybrid consumers' information is saved at the same place ⁵. Here, doctor save all of the data according to patient health in cloud therefore, doctor does not realize where the data is saved away. In several term, this able to be an issue. Regarding to durability and data security rules in different countries, data locality is of most great importantly in several architectures of administrations ⁶.

B. Data Integrity

Integrity of data is one of most critical components in each device. Integrity of data is easily obtained in a self-assured device with an odd information degree ⁷. The space device has to assure the integrity of medical evidences. Especially, it has to assure the integrity of medical evidences even about the miscreant locals. Integrity considered that your data is remains as it is accepted user which is able to modify our data. The security mechanisms have to distinguish any meddling of data ⁸. Integrity intends protecting the reality and durability of information. In the health care device, it returns to the reality which information has not been meddled with illegal usage ⁹.

C. Data Access

Access of data issue is basically regarded to security policies presented to clients while reaching information ⁷. A healthcare device is able to utilize a cloud presented through some other provider to save the medical information. This healthcare device will have its own security policies on the basis of which every doctor or sick can have reach to a special group of medical information. Policies of security may justify some attentions where in some of client are not given reach to specific measure of data. These policies of security have to be annexed here with cloud to put off unbeknown of information by unbeknown clients ⁸.

D. Data Confidentiality

Confidentiality can be obtained by reach auditing and encryption methods in healthcare devices ⁹. There has long been care along a patient's health manage privacy and confidentiality ¹⁰. Data confidentiality define the security of a confidential information from present that is regarded as the essential issue in a healthcare device. Encryption can present better confidentiality for this sentimental information by presenting an allotted guide on a safe connection channel among the safe device shapes and their modulator ¹¹.

F. Data Authentication

Authentication is the authenticity verify way, i.e. it verifies the client's individuality, with assimilating the information obtained from the structure with those saved in the basis. It ought to be noted that the structure integrity is not essential. Medical and non-medical applications may need data authentication ⁹. The individuality of sections has to be quietly founded before executing any other activities. Protecting the confidentiality of the data saved in it, assuring that only authorized activities are performed ¹². Just as health-care manages includes sentimental data, the space devices have to assure their confidentiality. In addition, only authorized employees ought to have reach to confidential medical manages ⁸.

G. Data Availability

Availability that's intend information are available whenever and anywhere required ⁴. The health-care manages have to be available in all period of time. Medical manages are often developed, and thus patients perhaps require for improvement of manages

⁸. In healthcare device medical information must be accessible to authorized sections at all period of times. Availability is fatal for doctor since these systems are allocated to healthcare situations of their patient. Regretfully, a doctor could be delivered unavailable along the obstruction of the radio channel.

2-2- Security challenges in IoT based healthcare

In IoT based healthcare devices, most of the smart objects are commonly small, cheap, with restricted security abilities. The existing jutting cryptographic algorithms are weak to progress since the low CPU eras and low forcible encryption. The usage of IoT cloud healthcare needs sensors and systems to connectsafely and divide sensors information and Electronic Patient Health Information (EPHI) to presentcurrentsystem to patients and medical doctors. In this way, security investigators still ask how honesty and safe is the communicationamong these systems. Applying and saving EPHI in cloud systems (general and special) is a basic security danger of spam since cloud servers can be geographically shared all over the world occasioning a problem of IP based blockage.

There are apparentlycompeting, complex security necessities to be developed on a stage with secretlyrestrictedreferences ⁴:

_ Authenticate to hybridwebssafety

_ Assure that information are accessible to hybridproviders

_ Scheduleletter of credits and managingreach to applications and patient's secretlydata

_ Schedule privacy caresamong thehybridclients

_ Presentpowerful authentication and datasecurity (integrity and confidentiality) that are not simplyaccepted.

_ Remainaccessibility of the information or the system

_ Permission for development in the encounter of namelessdangers

_ Quitervicesusceptibilities and expandingfirmwareparties

_ Equipment and develop secretly agreement in IoT health cloud properly

_Protect IoT health webs and reduce the danger of informationinjury

3- Security issues in IoT based healthcare architectures

In improbable healthcare reduction in IoT environments, regarding to security susceptibility not just for medical information dividing confidentiality, , and patient privacy but as well as for IoT place is necessity ^{13,14}. Ida et al. modify IoT place susceptibility in three basic groups containing hardware susceptibility, web susceptibility and application susceptibility. They providelatestanswers for Cloud and IoT security suggested particularly to secure health data. They complete by delivering a suggestion of utilizing a divided security architecture in both two cloud application and systemssurfaces ¹⁵. So, in this paper, health security dangers in IoT places are explained briefly according to the perusedresearch. According to the systematic assay of research, to defeat the security susceptibilityissues, some necessitiesought to be convinced for IoT based Healthcare Architectures. Hereof, some illustrations have been presented as modified in continues. Kraijak et al. ¹⁶ summarized a general comment of IoT, agreement sand generic architecture, applications, privacy and security cares, performance and its comingdrifts. It is placed as aprefatory paper useful to a great listener changing likewebinvestigators, chief information officers (CIO), data technology professional, advisor, and resolutionproviders in marketing company and etc. They stressed that specialissuesought to be demonstratedalong the allinformationconnectionprogress. In addition, in their research, Maksimović et al. ¹⁷ proposed to provide some of privacy and security issues in healthcare places. They explained some authentication techniquesrequired to reviewed client's individuality. Their answer can be utilized to control human essential parameters and some of the environmental parameters impressing health. So, arrangingmethods to end-users and being possible to formcropsregarding to their requirements is useful for both two clients and establishedpromoter. Gupta et al. ¹⁸ showed a cloud of objects model for assay of client's processes in healthcare. Their architecture is according tomounted sensors of implement rather than utilizingSmartphone sensors or wearable sensors to saveworth of the primary healthrelated parameters. Architecture ofcloud middle is createdfrom a Cloud informationhead, Public cloud, Private cloud, and utilizes the XML Web devices for protect and rapidconnection

of data. For a cloud based security mechanism, they asserted reliance, integrity, privacy, and authentication regulations in reach to health information. To assay security natures of this architecture, writers suggest AES and RSA algorithms, sequential for public and private cloud environment. This agreement warrants secretly of data in cloud. In this paper, to assimilate these two structures, decryption and encryption period were computed. The conclusions mentioned that RSA algorithm was stronger and more safe than AES technique. Moosavi et al.¹⁹ described a security plan for medical sensors. They assayed important attributes of provided model, i.e., energy-execution and security along software and hardware first process and histrionic. The suggested model, such as SEA, works on the ground of an entrance in fog surface to perform authorization mechanisms. Their plan formed of i) a safe and authorization architecture and effective end-user authentication according to testimonial based DTLS handshake, ii) safe end-to-end connection according to the sitting continuation, and iii) strong dynamic according to the gathered smart entrances. In addition, Santos et al.²⁰ showed a new m-health system architecture, utilizing RFID labels and created around IoT, to begin an in consistent medication manage device for Ambient Assisted Living (AAL), particularly achieved aged people treat in outpatient clinic. Basic thing of this m-health system architecture is to let aged patients to self-control their health in dynamic, external part of any particular health treat giving amount, either with controlling their illness or by aiming them to manage the opportune and proper usage of their medication. They described digital autographs and concurrent and in concurrent algorithms testimonials, like the most proper answers to defeat m-health security cares. According to Lee et al.¹⁴, provided a service-oriented security framework for inconsistent medical systems and necessities for safe inconsistent medical systems in the IoT. Dangers in device-directional IoT stages are shared into system dangers, genesis dangers, and system dangers. In this essay, a device-directional architecture for inconsistent scheduling of health devices in IoT has been offered. In addition, like in an IoT device, systems and new tele-health objects will always be connected, and this framework can defend most of security necessities in such environment. Furthermore, this framework empowers information secretly, security, and accessibility for enabled clients like patients and under-treatment ones.

4- Interoperability issues in IoT based healthcare architectures

Ordinarily, interoperability of software, hardware, space, servers, and other infrastructures is regarded to standards²¹. Though along the latest years, several applied answers have been offered to utilize with IoT technology, there is no single standard for interoperability of IoT devices²². Shortage of interoperability makes issues containing the improvement of incongruous IoT stages, low device reuse, and end-user discontent. In addition, as IoT technology is yet in its primary, with no technical concord between elements, it is obvious that in the close coming, notable distinct between devices will happen in order to the extension of different standards. Environment of IoT is encountered with a high surface of variety. System, applications, marketing and information are between basic elements in IoT that ought to be regarded for interoperability.

CONCLUSION

We have studied basic security and interoperability issues in IoT based healthcare architectures. Ordinary IoT architectures contain in basic security susceptibility issues the space in system (sensor and/or smartphone), information transfer (sensor to smartphone and smartphone to cloud) and cloud space. Just as wearable's are being communicated to social webs, the dangers to detect special and sentimental data are upper. It is essential to distinguish susceptibilities of these systems due to block epilepsies. The basic impediments to spread broad improvement of IoT in healthcare trade are security and interoperability issues. Supplying client necessity is basic agent impacting great acceptance of IoT. In as much as, on the ground of all, IoT is a new technology, there is a necessity to make known clients about its activities and abilities. So, the device ought to be easy and client-amicably, to render easy having effect on each other learning for patients. One of possible answers to defeat issues distinguished is energetically containing secretly clients in all of the steps of device extension.

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Ethical Clearance: All experimental protocols were approved under the College of Nursing, University

of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Social Stigma Circumstances toward Tuberculosis in Hilla City / Iraq: Community Insight

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ABSTRACT

Tuberculosis is still a main public health problem in many developing countries. Objectives: are to identify the socio-demographic characteristics of the sample, to assess the social stigma circumstances of the disease throughout the insight of the community, and to find out the relationship between the sample socio-demographic data and the social stigma circumstances. A descriptive study was conducted on convenient random sample of 200 of both genders of the clients who visit the primary health care centers in Hilla city from the period (first of October 2017 to first of September 2018). The results of the present study have indicated that the overall assessment reveals that the majority of (61.5%) were positive social stigma towards patients with TB. The study concluded that there is a significant association between the social stigma and the sample demographic characteristic regarding age, educational level and occupation.

Keywords: Tuberculosis, Social Stigma, community insight.

INTRODUCTION

Tuberculosis (TB) is a contagious, infectious disease and remain a main global health issue, it is a social and biological disease caused by mycobacterium tuberculosis. TB causes illness to health for around 10 million persons each year and is one of the highest ten causes of death worldwide ¹. There are two types of TB:- latent tuberculosis (LTB) refers to the infection with M. tuberculosis and the body have capable to fight the bacteria. LTBI cannot spread the infection to others ². Active tuberculosis is another type of TB which can causes sickness and develops the symptoms of disease which are: (cough that lasts more than 3 weeks, fever, night sweats, chills, and weight loss), and can spread the disease to others. About 10-15% of latent infections progresses to active disease ^{3,4,5}. Tuberculosis can spread through the air, TB germs don't grow on surfaces ⁶. Effective TB treatment is difficult due to the unusual structure and chemical composition of the mycobacterial cell wall which inhabits the entry of drugs and makes many antibiotics ineffective ^{7,8}. TB is still a main source

of morbidity and mortality worldwide. In 2016, an estimated 10.4 million persons have been infected with TB and 1.3 million death from TB disease. Between 2000 and 2016, an estimated 53 million TB deaths, 44 million death among people with HIV-negative and 9 million deaths among people with HIV-positive ¹. The recent turmoil and conflicts in the Iraq and increasing the number of displaced people, and refugees led to increase the number of TB cases and has one of the maximum TB prevalence rates in Iraq country, with more than 15,000 persons infected yearly after year 2014 according to Iraq Ministry of Health and the report of the International Organization for Migration (IOM) ^{9,10}. In 2014, the total number of TB cases were 8,341, these cases reported by non- National Tuberculosis Control Program (NTP) in Iraq ¹¹. TB stigma effect on TB patient and make him/her face: Isolation within the family: TB patients experience isolation at home such as forbade the food sharing, utensils or bed sharing ¹³. Isolation within society: The community members expressed a desire to stay away from TB patients. Marriage prospects ^{15,17}. Physical and Psychological Health: TB patients abstain from seeking health care and treatment adherence to avoiding seeing them by people ^{18,19}. TB patients may be exposure to depressive symptoms and emotional distress because of attitude of community against them ²⁰. Financial burden:

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Because of stigma the patient with TB experience rejection and losing job²¹.

variables related stigma against TB patient by the community (21 items).

MATERIALS AND METHOD

Design of the study

A descriptive analytical study throughout the period from the first of October 2017 to the first of September 2018.

Setting of the Study

The current study was conducted in Hilla city / Primary health care centers in Hilla, which represent the community population in Hilla city.

Sample of the Study

A convenient random sample of 200 of both genders of the clients who visit primary health care centers in Hilla city are selected.

Instrument of the Study

Demographic Information:

General Information: Socio demographic data sheet consist of (9 items) categorized as general information about person such as (age, gender, marital status, level of education, occupation, residency, personal history of TB, family history of TB and any known person with TB.)

Community Perspective toward TB Patient's Families.

This part presented the variables related stigma against TB patient's family (9 items) which was comprised of the following information: TB would cause an embarrassment, less and shame to the family, if family member can transmitted the disease, if family member asked to stay away from a social group, prevent children to play with other children who have a parents with TB, there is a difficulties in marriage for other family members because of TB, visit a home of TB patient and avoid to eat or drink with family members who have TB.

Community Perspective toward TB Patients.

This part was measured by two following: Theme (1): Isolation within family: (8 items). Theme (2): Isolation within community: This theme presented

Rating and Scoring

The instrument was related through the use of (3) level type Likert scale for the assessment of social stigma toward tuberculosis patient from community insight. The rating and scoring of the instrument was (3) agree, (2) uncertain, and (1) disagree. Table (1) shows the distribution of the demographical characteristics of the sample. The highest percentage of sample represented (19%) were aged between (22-27) years old; (52%) females; (57.5%) married; (43%) secondary education; (33%) employed; (83.5%) are urban residence. In regarding personally, family history of TB and other known person of previous TB, it constituted with negative responses (96.5%, 93.5%, and 89%) respectively. Table (2) indicates that the majority of the sample (49%) were positive in relation to patient's family stigma. (57.5%) positive view as patient isolated within family. (53%) positive responses towards isolated within community in concerning their perspective. Table (3) reveals a majority of (61.5%) were positive social stigma towards patients with TB in Hilla City. Table (4) shows there is a non-significant association between the community insight towards patients with TB and their demographic characteristics at $p\text{-value} > 0.05$. Except community insight with their age, educational level, occupation, personal family and known previous history with TB, there is a significant association at $p\text{-value} \leq 0.05$. In (table.1) Findings of the present study reveal that the percentage of the age group distributed somehow equally, the (22-27) years old represent the highest one. This results came along with some studies when represents that (75%) are within (21-30) years old²³. Regarding gender, results indicate about fifty percent of the subjects are females, this result supported by a study was mentioned that the majority of their sample were female (58%)²⁴. The marital status of present study participants, showed that the sample are married constitute about fifty eight percent out of the total number of the study participants. This result was supported by finding of a study found out that (43%) of their sample were married²¹. findings indicate that most of the participants, forty three percent of our study sample, are secondary school graduated. This results supported by a study found out that majority of study sample (40%) were completed secondary school²⁶. The present study found out that only thirty three present were employed.

A study supported the present results mentioned that (39%) of study sample were employed¹⁸. Concerning residency the present study indicated that majority of the sample resident at urban areas. This result was supported by a study reported that (60%) of their sample were from urban area²⁷. The current study revealed that there was a negative responses regard history with TB as personally, family, and other known person of previous TB. This is consistent with a study illustrated that majority of the sample (70.3%) were did not know person with TB²⁸. In (table. 2). The present study documented from the results that there were unexplained stigma against TB patients and their families. A study found that there was an evidence proven that the community stigmatized and discriminated the whole family members if one of them has TB²⁹. As many studies proved that patient will be isolated within his small community (the family) the

current study came with the same results, this consistent with a study found out that TB patient faced several forms of negative attitude from close people and household member¹³. In (table.3) the final assessment showed a positive perspective towards patients with tuberculosis and considered a social stigma in Hilla City. Some studies findings that there was immense stigma observed¹⁸. In addition, the results of a study survey clearly showed that TB stigma is greater than HIV stigma.^[17,32] In (table. 4) A non-significant association between the community insight towards patients with TB and their demographic characteristics at p-value >0.05 was reported except community insight with sample age, educational level, occupation, a study disagree with our results and findings that age and education level were insignificantly associated with stigma scores²³.

Table 1. Distribution of Study Sample by their Demographic Characteristics

Demographic data	Rating	Frequency	Percent
Age (years)	18-22	32	16.0
	23-27	38	19.0
	28-32	35	17.5
	33-37	31	15.5
	38-42	22	11.0
	43-47	16	8.0
	>48	26	13.0
	Total	200	100
Gender	Male	96	48.0
	Female	104	52.0
	Total	200	100
Marital Status	Single	51	25.5
	Married	116	58.0
	Divorced	12	6.0
	Widowed	15	7.5
	Separated	6	3.0
	Total	200	100
Educational Level	Unable to red and writ	2	1.0
	Read and writ	13	6.5
	Primary School	36	18.0
	Secondary school	86	43.0
	Diploma	30	15.0
	Bachelor	25	12.5
	Post-graduate	8	4.0
	Total	200	100

Cont... Table 1. Distribution of Study Sample by their Demographic Characteristics

Occupation	Employee	66	33.0
	Unemployed	45	22.5
	Retired	9	4.5
	Housewife	58	29.0
	Students	17	8.5
	Others	5	2.5
	Total	200	100
Residency	Urban	167	83.5
	Rural	33	16.5
	Total	200	100
Any Personal History of Previous TB	Positive	7	3.5
	Negative	193	96.5
	Total	200	100
Any Family History of Previous TB	Positive	13	6.5
	Negative	187	93.5
	Total	200	100
Any Other Known Person of Previous TB	Positive	21	10.5
	Negative	179	89.5
	Total	200	100

Table 2. Distribution of Community Perspective by their Overall Themes

Themes	Scale	F	%	M.S.	S.d.	Assessment
Patient's Family Stigma Perspective.	Agree	99	49.5	2.47	0.54	Positive
	Uncertain	96	48.0			
	Disagree	5	2.5			
	Total	200	100			
Patient Stigma Perspective as Isolation within Family.	Agree	115	57.5	2.53	0.58	Positive
	Uncertain	76	38.0			
	Disagree	9	4.5			
	Total	200	100			
Patient Stigma Perspective as Isolation within Community.	Agree	106	53.0	2.45	0.64	Positive
	Uncertain	78	39.0			
	Disagree	16	8.0			
	Total	200	100			

Table 3. Overall Community Insight about Patient with Tuberculosis

	Scale	F	%	M.S.	S.d.	Assessment
Community Insight	Agree	123	61.5	2.56	0.59	Positive Responses
	Uncertain	66	33.0			
	Disagree	11	5.5			
	Total	200	100			

Table 4. Statistical Relationship between Overall Community Insight towards Patients with TB and Sample Demographic Characteristics

Demographic data	Scale	Overall Community Insight			Total	obs.	d. f	crit.
		Agree	Uncertain	Disagree				
Age (years)	18-22	21	8	3	32	30.626	12	21.026
	22-27	21	15	2	38			
	28-32	22	12	1	35			
	33-37	18	11	2	31			
	38-42	14	7	1	22			
	43-47	11	4	1	16			
	>48	16	9	1	26			
	Total	123	66	11	200			
P-value= 0.039 →S								
Gender	Male	55	34	7	96	1.936	2	5.991
	Female	68	32	4	104			
	Total	123	66	11	200			
	P-value= 0.380 →NS							
Social State	Single	31	15	5	51	9.698	8	15.507
	Married	67	44	5	116			
	Divorced	10	2	0	12			
	Widowed	9	5	1	15			
	Separated	6	0	0	6			
	Total	123	66	11	200			
P-value= 0.287→NS								
Educational Level	Unable to read and write	1	1	0	2	24.789	12	21.026
	Read and write	7	4	2	13			
	Primary School	26	7	3	36			
	Secondary school	45	35	6	86			
	Diploma	22	8	0	30			
	Bachelor	17	8	0	25			
	Post-graduate	5	3	0	8			
	Total	123	66	11	200			
P-value= 0.014 →S								
Occupation	Employee	38	25	3	66	22.970	10	18.307
	Unemployed	30	12	3	45			
	Retired	4	5	0	9			
	Housewife	38	18	2	58			
	Students	10	4	3	17			
	Others	3	2	0	5			
	Total	123	66	11	200			
P-value= 0.043 →S								

CONCLUSION

The majority of study sample were young adult, female and marriage as socially state, educated secondary and employ. The results of this study reported a high social stigma toward tuberculosis disease. Age, education, occupation, and history of personally, family, and their known previous tuberculosis have been affected their insight towards patients with TB.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing, Faculty of Nursing, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Administrative Reformation and its Impact on Reducing the Psychological Pressure of Workers: Case Study in the Forensic Medicine Department in Babylon Governorate

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ABSTRACT

The present study aims at knowing the level of the psychological pressure of the workers at the department of the forensic medicine in Babylon governorate. The sample of the study includes doctors, chemists, testers, criminal evidences, nurses and the other subordinate figures. Secondly, it aims at knowing the role of administrative reformation in reducing the psychological pressure of the workers. The questionnaire device is used in collecting data whose measurements have been developed according to Arabic and foreign previous studies that tackled the variables of the present study and its accommodation on the local environment. It has been made sure of the sincerity of the questionnaire by using the accredited statistical means within the application of (SmartPLS) program and by using the intentional sample (78) as the number of suitable questionnaires for percentage (96%). The study has shown the existence of the workers' psychological pressure in the forensic medicine department since the procedures of the administrative reformation have not been enough for reducing it.

Keywords: *Workers' psychological pressure, demonstrative reformation, and forensic medicine department.*

INTRODUCTION

The quick and continuous change nowadays causes stress to workers since the psychological effects differ from one place to another and from career to career. This stress has its own negative impact on the outcome of the work and the aims of the institution ¹. The studies of ² state that the workers in health and education institutions are suffering from stress in their jobs. The nature of health career make its workers exist in places where they must in a direct contact with the sick for a long period of time, using certain instruments which may have a negative effect on their health now and in the future. This is what makes researchers make sure of the relation between the absence and the attendance of the job because of their psychological pressure as there is a relation between their psychological health and the job pressure ³. In the scope of the present study, forensic medicine receives different cases of death, like those caused by murdering,

drowning, hanging and others which workers used to deal with. In addition to that, there are unknown decadent bodies whose reasons of death need to be investigated. Furthermore, the nature of the place regarding the smell and pollution all these are motives for psychological pressure of workers ⁴. For these reasons, the Iraqi House of Representations issues a specific law for lessening the burdens and keeping the future rights of the specialists of this career. The economic side has an important role in workers' lives because financial matters are considered to be the main motive for working properly otherwise decreasing it will be one of the sources of psychological pressures and this will have its negative effect on the conduct ⁵. A person does not work separately but within social environment which needs a serious support from the hands of the organizations by enhancing positive association among workers to reach the aims of organizations. Whitehead & Holmes (2011) ⁶ refer to the importance of knowing the events of the stressed life to measure the psychological pressures of workers through having a set of events whose percentages are distributed to (100%) and consists of (43) points. The role of family relationships is important in specifying the events that

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occur to the member. Akintayo (2010) states that persons who have good relationships with relatives or friends are the happiest persons who could make good efforts in their career and vice versa.

MATERIALS AND METHODS

Depending on the research efforts of each of the following (7), in which there is the independent variable the administrative reformation (one dimensional) that consists of (11) items. In addition, there is the subordinate variable the psychological pressure of workers along its dimensions: (health dimension, economical dimension, work dimension, life circumstances, social relationships, and personal and family dimension) that wholly consists (39) item.

Research Measurement

In accordance to the researchers acquaintance on most of studies like the study of (7), it is found that these studies as different in the number of items that measure the variable of the psychological pressure of workers since there has been constructed a developed measure consisting (36 item). The researchers have relied on the similar items since they admit the research objectives in five dimensions.

Population and Research Sample

The Research population consists of the sum of clinical, pharmacist, laboratorial, nursing, sanitary, administrative, technological, mechanic, and service staff in forensic medical department in Babylon governorate

Preliminary Data Analysis

Mahalanobis Test: In order to test the outliers along all of the item, it has been resorted to Mahalanobis test through SPSS program. Throughout this test, Mahal. Distance module could be found for each item. The case (questionnaire) becomes outlier when Mahal. Distance is higher than Chi-Square value (Kline, 2016). Since the questionnaire is consisting of (48) items on 0.001 statistically significant degree and the value of chi-Square for df that is between the values (40-50) is ranging from (73,403-86,662), the test has been applied on a number of residual questionnaires which are (75) ones as in table (1). It appears from table (1) that there are no outliers since the values of Mahal. Distance module are less than those of Chi-square in order to give accurate results in

the statistical analysis.

Response Rate: The questionnaires are distributed into (78) into all of the workers in the department of forensic medicine limited to the period from (15-11-2017) to (1-12-2017). The number of the residual questionnaires have been (75) with 96% response rate. All of the questionnaires are suitable to be statistically analysed as in table (2).

Descriptive Statistics of the Workers' Psychological Pressure

Statistical Descriptive Analysis of Health Dimension

It appears from the results of descriptive statistics that the general mean for health dimension is higher than working mean (3) which has attained (3.571). This implies that the employees' answers show a spread of some source of psychological pressure sources emerging from (health dimension) for employees in department of forensic medicine in Babylon governorate. This occurs with a general slandered error (0.0637) which indicates the accuracy of the answers. The general slandered deviation was (0.786) and the general variance was (0,640) and this confirms that there is a reduction in the answers' dispersion from the mean.

Statistical Descriptive Analysis of Economic Dimension

It looks from the results of descriptive statistics that the general mean for economic dimension is higher than working mean (3) which has attained (4.118). This implies that the employees' answers trend to a spread of some source of psychological pressure evolving from (economic dimension) for employees in department of forensic medicine in Babylon governorate. This occurs with a general slandered error (0.0480) which indicates the accuracy of the answers. The general slandered deviation was (0.591) and the general variance was (0,416) and this confirms that there is a reduction in the answers' dispersion from the mean.

Statistical Descriptive Analysis of Work Dimension

It looks from the results of descriptive statistics that the general mean for work dimension is higher than working mean (3) which has reached (3.898). This entails that the employees' answers trend to a spread

of some source of psychological pressure evolving from (work dimension) for employees in department of forensic medicine in Babylon governorate. This occurs with a general standard error (0.0846) which indicates the accuracy of the answers. The general standard deviation was (0.554) and the general variance was (0.621) and this confirms that there is a reduction in the answers' dispersion from the mean.

Statistical Descriptive Analysis of Life Circumstances Dimension

It appears from the results of descriptive statistics that the general mean for life circumstances dimension is higher than working mean (3) which has reached (3.031). This entails that the employees' answers tend to a spread of some source of psychological pressure evolving from (life circumstances dimension) for employees in department of forensic medicine in Babylon governorate. This occurs with a general standard error (0.067) which indicates the accuracy of the answers. The general standard deviation was (0.835) and the general variance was (0.525) and this confirms that there is a reduction in the answers' dispersion from the mean.

Statistical Descriptive Analysis of Social Relationships Dimension

It appears from the results of descriptive statistics that the general mean for social relationships dimension is higher than working mean (3) which has reached (3.005). This entails that the employees' answers lean to a spread of some source of psychological pressure evolving from (social relationships dimension) for employees in department of forensic medicine in Babylon governorate. This occurs with a general standard error (0.055) which indicates the accuracy of the answers. The general standard deviation was (0.686) and the general variance was (0.493) and this approves that there is a reduction in the answers' dispersion from the mean.

Statistical Descriptive Analysis of Personal and Family Dimension

It seems from the results of descriptive statistics that the general mean for personal and family dimension is higher than working mean (3) which has reached (3.170). This entails that the employees' answers tend to a spread of some source of psychological pressure evolving from (personal and family dimension) for employees in department of forensic medicine in Babylon governorate. This occurs with a general standard error (0.083) which indicates the accuracy of the answers. The general standard deviation was (0.475) and the general variance was (0.365) and this confirms that there is a reduction in the answers' dispersion from the mean.

Statistical Descriptive Analysis of Administrative Reformation Dimension

It seems from the results of descriptive statistics that the general mean for administrative reformation variable is higher than working mean (3) which has reached (2.265). This entails that the employees' answers tend to a spread of some source of psychological pressure evolving from (administrative reformation) variable for employees in department of forensic medicine in Babylon governorate. This occurs with a general standard error (0.039) which indicates the accuracy of the answers. The general standard deviation was (0.786) and the general variance was (0.438) and this confirms that there is a reduction in the answers' dispersion from the mean.

Evaluation of the Measurement Model

The items with 0.4 saturation and less have been deleted to check the increase of reliability coefficient throughout the increase of the external saturation values of the other items. It is found that all the external saturation values of the items, reliability coefficient values (1- 0.6), and Cronbach Alfa (more or equals 0.7.) are accepted according to the principle of (Hair et al., 2017: 94). Thus, the measurement sample is followed of the variable workers' psychological pressure along with its (23) items and the values are as in table (3).

Table 1. Mahalanobis Test

Residuals Statistics^a					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.7205	2.7216	1.5987	.54889	75
Std. Predicted Value	-1.600-	2.046	.000	1.000	75
Standard Error of Predicted Value	.047	.182	.108	.025	75
Adjusted Predicted Value	.5426	2.6632	1.5952	.55276	75
Residual	-.44415-	.85307	.00000	.21571	75
Std. Residual	-1.835-	3.525	.000	.891	75
Stud. Residual	-2.195-	3.812	.006	1.010	75
Deleted Residual	-.63511-	1.12931	.00347	.27905	75
Stud. Deleted Residual	-2.231-	4.049	.013	1.034	75
Mahal. Distance	4.776	84.794	30.796	14.607	75
Cook's Distance	.000	.255	.010	.024	75
Centered Leverage Value	.032	.562	.204	.097	75

Table 2. Response Rate

Distributed questionnaire	78	100
Number of non-residual questionnaire	3	4
Number of residual questionnaire	75	96
Number of anomalous questionnaire	0	0
Number of questionnaires not fully filled	0	0
Number of questionnaires suitable for statistical analysis	75	100

Table 3. Measurement sample of workers' psychological pressure

	Dimensions Measurement	Reliability coefficient	Cronbach Alfa	Items	Saturations
Psychological Pressure of Workers	Health Dimension	0.877	0.823	HD 1	0.828
				HD2	0.891
				HD4	0.912
	Economic Dimension	0.838	0.798	ED2	0.871
				ED3	0.721
				ED4	0.923
				ED6	0.838
	Work Dimension	0.783	0.722	WD1	0.792
				WD2	0.754
				WD5	0.845
				WD6	0.918
	Life Circumstances	0.827	0.766	WD8	0.607
				LD2	0.743
				LD3	0.861
				LD4	0.811
	Social Relationships	0.909	0.899	LD5	0.895
				CR1	0.899
				CR3	0.866
				CR4	0.902
	Personal and Family Dimension	0.747	0.712	CR5	0.971
PFD2				0.782	
PFD3				0.788	
				PFD5	0.671

CONCLUSION

It appears from testing the hypotheses that the relation between demonstrative reformation and the psychological pressure of workers is a negative one. Consequently, demonstrative reformation can contribute in reducing the workers' psychological pressure. Similarly, it is clear from in the descriptive analysis of data that there is psychological pressure in the workers in the department of forensic medicine in Babylon governorate. In addition, (economic dimension) head the first grade in being a source of workers' psychological pressure in accordance to their opinions. By testing the hypotheses, it is found that the highest value that the psychological pressure of workers can be affected by is via their economic dimension and the ability to elevate this side. Also, it discerns from the workers' answers that (work dimension) has attained the second grade, (health dimension) has achieves the third grade by being a source of psychological pressure for

workers. The latter two are higher than the remainder sources of psychological pressure (social relationships, life circumstances, personal and family dimension). The researchers consider the dimensions that are set as universal to measure the psychological pressure of workers; however, the answers reached to affirm that the economic side, work circumstance, and health dimension are the most areas that form the nature of the psychological pressure of workers in the department of forensic medicine in Babylon governorate. Furthermore, testing the hypotheses has admitted the first main hypothesis that administrative reformation contribute in limiting the psychological pressure of workers in an amount of (R^2) of the explanation amount. The testing of the sub-hypotheses has shown, on the one hand, the acceptance of three hypotheses about the idea of the administrative reformation impact throughout (economic, work, and health) dimensions since the relationship is of a statistically significant indication. On the other hand, it has shown the rejection of the other

sub-hypotheses which is the impact of administrative reformation on the psychological pressure of workers which are (social relationships, life circumstances, personal and family) dimensions since the relationship is not of statistically significant indication. Also, it could be so because the administrative reformation adopted by the general administration has no such items that treat the pressures which emanate from (social relationships, life circumstances, personal and family) dimensions. It is denoted from the descriptive analysis of the demonstrative reformation that general administration do not adopt the actuality of administrative reformation and needs enough time to handle the psychological pressure of workers in the department of forensic medicine in Babylon governorate. From what precedes, it appears the necessity to apply the law of forensic medicine which includes articles related to economic sides in the first place so as to increase the living grade of workers specifically after retiring. In order to promote the health dimension for workers and taking care of their health, it is needed to make health card. It is required to do the dusting of hominization halls to avoid infection transformation. Furthermore, workers in such career should be given obligatory vacations for the nature of the work they exert. In addition, they should take fees which accord with their exerted effort. Finally, they should go through training courses.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Business Administration, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effect of IL-6 Expression on the Behavior of Oral Squamous Cell Carcinoma Cells (An immunohistochemical Study)

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ABSTRACT

oral squamous cell carcinoma (OSCC) was and still constitutes a major challenge for medical researchers. Many researchers link between TNM stage, tumor grade, tumor depth of invasion, mode of invasion, perineural invasion, and lymphovascular invasion with locoregional recurrence and poor survival in-patients with OSCC and they concluded that these parameters could be used as prognosticators in this tumor. IL-6 is a multifunctional member of interleukin 6 superfamily of cytokines which has broad biological events like participation of immune response regulation, hematopoiesis, acute phase reactions, and oncogenesis. The purpose of this study was to evaluate the behavioral significance of IL-6 expression on oral squamous cell carcinoma cells. Fifty formalin fixed- paraffin embedded tissues of primary OSCCs were examined by immunohistochemistry for IL-6 expression. The expression scores of IL-6 then statistically correlated with different clinical and histopathological parameters to evaluate the possibility of IL-6 to change the behavior of OSCC cells. Positive expression of IL-6 was detected in 45 cases (90%) among them (31 cases; 62%) showed high level of expression, (14 cases; 28%) were low. only five cases (10%) showed negative expression. Statistical analysis of this expression displayed non-significant relations with clinicopathological parameters studied.

Keywords: oral squamous cell carcinoma, IL-6, prognosticators

INTRODUCTION

Squamous cell carcinoma (SCC) is the most predominant oral epithelial tumor constituting more than 90% of entire oral malignancies¹. Multiple genetic mutations that modify the functions of proto-oncogenes, tumor suppressor genes, genes of apoptosis or DNA repair genes are required for the development of this horrible tumor². These genetic alterations give the tumor cells growth and survival benefits by increasing the construction of growth factors, number of cell surface receptors, increasing levels of transcription or intracellular messenger factor, and increase ability to evade the apoptosis. Loss of tumor suppressor gene actions lead to cellular proliferation, weakening of cell

to cell adhesion, increased capability for invasion and distant metastasis³. In spite of considerable progress in diagnosis and treatment modalities of oral squamous cell carcinoma (OSCC) that improved the prognosis, failure of treatment may occur mainly due to wide local invasion and/or local lymph node metastases which are often found even at initial diagnosis (4). Efforts have been made by many researchers in order to discover dependable parameters that can be utilized as prognosticators of metastatic spread to the lymph nodes, recurrence of tumor, and reduced disease survival in patients with OSCC since the behavior of the tumor is greatly unpredictable. Many parameters (clinical, and histopathological) were studied broadly including TNM stage, tumor grade, depth of invasion, pattern of tumor invasion, tumor budding, perineural invasion, lymphovascular invasion, and lymphoplasmacytic response^{5,6}. It is well known that inflammation especially chronic one is involved in the pathogenesis of cancer. Etiologically, 15 to 20% of all cancers are associated

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with inflammation⁷. Tumor cells produce inflammatory agents including cytokines in order to facilitate stromal invasion⁸. IL-6 is a multifunctional member of interleukin superfamily of cytokines which has broad biological events like participation of immune response regulation, hematopoiesis, acute phase reactions, and oncogenesis⁹. IL-6 was initially recognized as a B cell stimulator factor-2 due to its capability to drive B cells differentiation into antibody generating plasma cells¹⁰. Structurally the glycoprotein IL-6 consists of 184 amino acids with a molecular weight of 26 kDa¹¹. IL-6 synthesized by different cells including “macrophages, fibroblasts, dendritic cells, T-lymphocytes, B-lymphocytes, endothelial cells, keratinocytes, and certain tumor cells”. These cells release IL-6 in response to variable stimuli such as “infection, burns, trauma, and neoplasia”. In turn, IL-6 stimulating many CD130 and CD126 expressing cells^{12,13}. Upon binding of IL-6 to the IL-6 receptor, the resulting complex recruits gp130 subunits to form hexamer composed of two IL-6 molecules, two IL-6 receptor, and two gp130 subunits. The downstream action of the IL-6 thus achieved through stimulation of JAK/STAT, PI3K/AKT and MAPK signaling pathways¹⁴.

MATERIALS AND METHOD

Fifty paraffin-embedded blocks of oral squamous cell carcinoma, were retrieved from the archive of the oral pathology department/ College of Dentistry / Baghdad University. Two 5 µm slides were prepared for each tissue block. The first was stained with hematoxylin and eosin for histopathological evaluation and the other for immunohistochemical staining with IL-6. For each case clinical data including age, gender, anatomical site, and clinical stage according to TNM staging system were tabulated. In addition, histopathological parameters like tumor grade which was evaluated according to WHO grading system, Depth of tumor invasion which was measured from epithelial basement membrane to the deepest invading cell, pattern of invasion (examined at the host/tumor interface Type 1: represents tumor invasion in a broad pushing well delineated borders, POI Type 2 represents tumor invasion with solid cords, bands and/or strands, POI Type 3: represents small groups or cords of infiltrating cells, POI Type 4: represents wide-spread cellular dissociation in small groups and/or in single cells) were obtained. The immunohistochemical procedure was performed according to the abcam IHC protocol using anti-IL-6 antibody (ab9324, USA) in a

dilution of 0.125µg per ml.

Immunohistochemical Scoring

The percentage of cancer cells that expressed IL-6 was calculated as labeling index (LI). The LI was computed by dividing the number of the positively stained cells by that of all the cancer cells. The patients were divided into three groups as follow: negative group = LI <5%; Low IL6 group = 5% ≤ LI <30%; High IL6 group = LI ≥30%¹⁵.

Statistical Analysis

All statistical analyses of the present study were performed by statistical package for social sciences (SPSS version 22). Data were summarized using mean±SD for quantitative variables and number and percentage for qualitative variables. Mann-Whitney test and Kruskal-Wallis test were used as appropriate to compare the differences in immunohistochemical expression scores among different clinicopathological parameters.

RESULTS AND DISCUSSION

Expression of IL-6 in oral squamous cell carcinoma and adjacent non-tumoral mucosa

IL-6 immunostaining pattern was brown cytoplasmic diffuse or patchy involved tumor cells and the infiltrating lymphocytes. Similar pattern of expression was observed in the dysplastic epithelium with a tendency for stronger expression toward the basal layer. In contrast; faint or negative cytoplasmic expression was observed in the adjacent normal epithelium. High expression score was detected in 31 cases with an index mean of (40.61). Negative and low scores were detected in 5 and 14 cases respectively. Regarding tumor site, the highest percentage of high positive scores were observed in the alveolar ridge and the tongue, which were represent (75% and 73%) respectively. With respect to the mode or pattern of invasion, the greatest difference in mean indices of IL-6 expression was observed between mode 1 and mode 4; nevertheless, non-significant relation was noticed (p value= 0.16). As observed from table 1 non-significant relations were detected with all clinical and histopathological parameters. Amongst numerous cytokines studied, IL-6 has been given special attention because it has a pleotropic effect and its pathophysiologic role in tumor progression has been

proposed and reinforced by in vivo and in vitro studies¹¹. This study revealed that 90% of the studied samples showed positive cytoplasmic expression of IL-6 in tumor cells among them high level of expression was detected in approximately 68%. Only 5 cases (10%) were negatively expressed IL-6. Similar observations were reported by many researchers^{7,15,16}. Cytoplasmic expression of IL-6 indicate that oral squamous cell carcinoma (OSCC) cells are capable to produce such proinflammatory cytokine in their living course. Researchers described this proficiency to the effect of the catecholamines released due to the chronic stresses associated with oral cancer or to the effect of treatment (17). The discrepancies in mean IL-6 expression labelling indices in this study were not enough to reach significant statistical relations particularly in tumor grade, tumor stage, lymphovascular invasion, perineural invasion, pattern of invasion, and tumor depth of invasion. In contrast, some researchers found that high IL-6 expression correlated significantly with advanced tumor grade, advanced stage, perineural invasion, vascular invasion, lymph node metastasis, distant metastasis, and tumor recurrence in OSCC and other tumors¹⁵⁻²³. The researchers proposed different mechanisms by which IL-6 may induce invasion and metastatic potential of tumor cells. Yadav and his coworkers suggested that IL-6 may activates STAT3/SNAIL signaling pathway enabling epithelial mesenchymal transition (EMT) of head and neck cancer cells and knockdown of STAT3 significantly reversed IL-6 induced EMT changes¹³. Another study documented that IL-6 Trans-signaling (IL-6TS) has a specific action on metastatic potential of cancer cells by lowering adhesive ability, increasing motility and migration of these cells. In addition, IL-6TS

has an inhibitory effect on maspin (tumor suppressor gene) since maspin inhibits metastatic potential of cancer cells^{24,25}. Further study showed that IL-6 stimulates a network of cytokines which give rise to the invasive tumor in human carcinoma model²⁶. Similarly, IL-6 enhances the expression of both MMP-1 and MMP-9 enzymes which are participate in tumor cell invasion and metastasis¹⁹. Enhancement of cancer stem cell phenotype is another way by which IL-6 contributes to tumor progression and metastasis²⁷. IL-6 may induce tumor immune tolerance by retarding the differentiation of dendritic cells thus facilitating metastatic spread²⁸. It is worth to mention that the majority of previous studies that studied IL-6 in patients with OSCC or other tumors were based on its serum concentration. However, the tissue expression of IL-6 found to be clinically more important than its serum level as a factor related to the prognosis²⁹. In addition, the antagonistic effect of some other cytokines in tumor microenvironment may play a role in inhibiting the probable role of IL-6 in tumor progression and invasion or the IL-6 signaling may trigger the expression of some proteins that neutralize its effect through a negative feedback loop³⁰. Beside that IL-6 expression alone in tumor cells appear not enough. In order to be functional, IL-6 signaling requires the presence of both membrane IL-6R and gp130 a (transmembrane cytokine receptor)³¹. Moreover, monoclonal antibody (used in this study) binding to IL-6R may be disrupted or interrupted confirming the need for multiple clones directed against different epitopes on IL-6R. Finally, the biological behavior of IL-6 in cancer cells is complex and depend on the balance between growth promoting effect and growth inhibitory effect of some other signaling pathways³².

Table 1. IL-6 expression scores in relation to the clinical parameters.

Clinical parameter N.		IL-6 score				P value
		low	high	Mean score± SD		
Age	< 55	3	6	12	1.42±0.7	0.421MW
	≥ 55	2	8	19	1.60±0.6	
Gender	Male	3	4	20	1.62±0.68	0.110 MW
	Female	2	10	11	1.39±0.65	

Cont... Table 1. IL-6 expression scores in relation to the clinical parameters.

Site	Tongue	1	5	17	1.69±0.55	0.122 KW
	Buccal mucosa	2	6	4	1.16±0.71	
	Alveolar Ridge	0	2	6	1.75±0.46	
	Lower lip	2	0	2	1.00±1.15	
	Floor of mouth	0	1	2	1.66±0.57	
Stage	I	3	1	8	1.41±0.90	0.665 KW
	II	1	4	8	1.53±0.66	
	III	1	4	4	1.33±0.70	
	IV	0	5	11	1.68±0.47	

Table 2. IL-6 expression scores in relation to the clinical and histopathological parameters.

Tumor grade	Well differentiated	3	5	21	1.62±0.67	0.293 KW
	Moderately differentiated	2	6	7	1.33±0.72	
	Poorly differentiated	0	3	3	1.50±0.54	
Lymphovascular invasion	Present	1	11	18	1.56±0.56	0.899 MW
	Absent	4	3	13	1.45±0.82	
Perineural invasion	Present	3	6	15	1.50±0.72	0.946 MW
	Absent	2	8	16	1.53±0.64	
Depth of invasion	≥ 4 mm	2	5	15	1.59±0.66	0.460 MW
	< 4 mm	3	9	16	1.46±0.69	
Pattern of invasion	Mode 1	0	2	6	1.75±0.46	0.523 KW
	Mode 2	2	1	7	1.50±0.84	
	Mode 3	1	6	12	1.57±0.60	
	Mode 4	2	5	6	1.30±0.75	
Tumor budding	< 5 buds	0	3	4	1.57±0.53	0.974 MW
	≥ 5 buds	5	11	27	1.51±0.70	
Lymphocytic response	Grade 1	4	7	25	1.58±0.69	0.108 KW
	Grade 2	0	2	4	1.66±0.51	
	Grade 3	1	5	2	1.12±0.64	

CONCLUSION

Despite high positive expression of IL-6 which was detected in 62% of the studied samples, non-significant statistical relations were recorded with all clinicopathological parameters indicating absence of autocrine or paracrine effect of IL-6 produced by OSCC cells on their biological behavior or may highlight the

presence of antagonistic effect of other proteins that may inhibit the probable effect of IL-6 on tumor cells through negative feedback mechanism or lack of soluble IL-6R expression which is required for IL-6 signaling.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Oral Diagnosis, College of Dentistry, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effect of MST approach in The Clever Mental Thinking of Pupils

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ABSTRACT

This research aims to identify the approach effect of mathematics , science and technology (MST) in the clever mental thinking of pupils in the fifth class of primary school, the researcher put the null hypothesis which states that : There is no statistical differences at level (0.05) between average marks of experimental group who are learning according to MST approach and pupils' average marks of the control group who are learning according to the usual method in the clever mental thinking test , the researcher applied his experience in the second course of the academic year (2017-2018) for verification , the research sample made up of (600) pupils in the fifth class of primary school in Al-Nisour primary school , randomly they were distributed into two groups , (30) pupils in each group , the two groups are equaled by variables (age , IQ test marks , science degree in the first course of the academic year (2017-2018) based on the importance of the content of the scientific approach and its behavioral aims , the researcher made a test for the clever mental thinking that consists of (40) items of multiple choice questions (MCQs).

Keywords: *MST approach, The clever mental thinking*

INTRODUCTION

The mind is a term almost used to describe and express the higher functions of the human brain, especially those functions in which human be conscious, like argument, thinking , intelligence , memory , analysis and all the emotional emotion that is exposed to. While the brain is main part of the neurological (nervous system) in all vertebrates and a lot of invertebrates, and it's responsible for all information and analysis it, as well as the management and control of most the body organs, also it's a source of information production ¹. Consequently, the mind is a morale word that means the ability of thinking that distinguish between human and other organisms, while the brain is a physical term that is content within the human skull, that contains brain, the stem of brain and cerebellum, the brain usually made up of 80 % of water, and the rest is fat, it's average weight is about 1400 grams. The brain consists a lot of neurons cells between 100 – 150 billion neurons cells, although

the brain weight doesn't exceed 2% of the weight of the body but it consumes 30% of the body energy. In additional to consumption about 20% of oxygen allocated to the whole body, the human brain has the ability to memorize more than two millions information per second ². Thinking is a cognitive process and a basic element in knowledge to human, it's characterized by its social nature and its systemic work that makes it interact with the elements of its construction, which affects and influenced by the other cognitive processes such as perception, imagination, learning and memory ³. The smart thinking doesn't grow automatically and it's not accidental product nor needs an automatic product, the clever thinking to regular and meaningful learning and continuous training. The efficiency of thinking isn't only a natural ability that accompanies the natural growth of the individual , knowledge itself isn't an alternative to knowledge of thought processes , surely knowledge is important but it often becomes ancient , while thinking skills are always new , that is able to acquire and infer knowledge regardless of place , time and the types of knowledge that use the thinking skills in dealing with , undoubted that knowledge in any field makes a basic base of thinking in this field , the most successful

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people in thinking about any object they are the most knowledgeable about it but knowledge isn't enough, it must be accompanied by an awareness of the thinking process in order to the person be smart and productive in this object⁴. As a result of the development of science, mathematics and technology in recent decades, one of the most important aims of the MST approach is to prepare learners to play a constructive role as adults and as citizens of a technologically advanced society, because of these developments which have an important effect on the human community, in order to be able to use science, mathematics and technology to improve the life in the community, in addition to that many jobs in the present time and future require more knowledge of science, mathematics and technology, the matter that requires that the learners have more knowledge of these fields of study, so Science, mathematics and technology in everyday life are not separate or distinct, but they are used as a whole in analyzing and solving problems in various fields.

METHODOLOGY

It includes a brief description of the procedures that were carried out in order to achieve the aim of the research, starting with the research methodology and experimental design, defining its society and its characteristics that made between the two groups of the research, (experimental and control), as additional to preparing the necessary requirements and the instruments of the research, also the procedures of the experimental Applying and presentation for the most important statistical methods that are used, As the following:

Experimental Design of the Research

The researcher chose an experimental design of partial control type, containing of two groups; the first one is experimental groups exposed to the independent variable, the approach of the MST, and the second one is control that is taught in the usual method.

Research Community and Sample

Research Community

The research community represents the fifth grade pupils in primary school "day" for boys of the academic year (2017-2018) which falls under the borders of the city center of Hilla.

A - Sample of Schools: The researcher chose Al-

Nosur primary school for boys to be a field for the research in order to provide the conditions of research and to show the cooperation of the school administration on the other hand.

B-Sample of pupils: The primary school for boys for the fifth grade consists of two sections, in the simple random sampling method, to determine the two groups of research, (A) section was chosen to represent the experimental group and (B) to represent the control group, so the number of each group was (30) pupils.

Preparing The Research Requirements

The Clever Mental Thinking Test

The researcher has prepared the clever thinking test after considering on the literatures that concerning with this subject according to the following steps:

Identify The Purpose of The Test: The purpose of the research represented in measuring the clever thinking of pupils in all the experimental and control groups, in order to verify the aims of the research.

Reformulated The Test Items : To measure the clever thinking of the two research groups, the researcher prepared an objective test as multiple choice questions, made up of (40) test items as MCQs through (MST approach) in proportion to the age and educational stage of the pupil (fifth class of primary).

Preparing The Test Information: The researcher has prepared the information on how to answer the test items taking into account these things: easy, clear, understandable, short and it able to explain what do the pupils have to do, as well as the researcher put instructions to explain how can answer these questions.

The Exploratory Experiment: In order to investigate of the safety, clarity, difficulty of the items test according to stability, the researcher has applied the test on a sample that consists of (40) pupils in the fifth class of primary in Al-Jamhouriah primary school (day) in the city center Al-Hillah, after the researcher makes sure of these subjects are covered by the experience, it became clear that the items were clear and not mysterious to the pupils and the average time to answer these questions is (58) minutes.

The Statistical Analysis of The Test Items: The purpose of the analysis of the test items is to improve the

test through find out about the weak items and work on reformulation and exclusion of the invalid one , on this basis the researcher analyzed the test items to recognize the difficulty of the item , and its strength as well as the effectiveness of the alternatives aren't correct , and as follows :

Item Difficulty: After the researcher had counted difficulty coefficient of all the test items, he has found out that it's between (0,73-0,28) , that means all the test items are acceptable, so Blom believes that the test items are acceptable if the difficulty coefficient between (0.80 – 0.20).

The Strength of Items Discrimination: When calculating the strength of the distinction of each test items, he found out that it between (0.66-0.32), hence Ebel refers to all the items are new if its discriminating strength is (0.30) or more than this.

The Effectiveness of The Incorrect Alternatives: The researcher calculated the effectiveness of wrong alternatives for all the test items , he has found it between (0,31-0,9) when the gravity be minus and great was attractive and effective and recommended to keep it in the item , the researcher decided to keep the wrong alternatives without changing.

The Test Reliability: The test reliability means that the test will give the same results if it is returned to the same group and in the same conditions. The stability of the test does not mean to be valid , If the test is valid, it should be stable. The stability of the test has calculated into two halves , so the researcher divided the test items into two parties , the first one includes the marks of odd items and the second includes the marks of vertebrates even items, then according to correlation coefficient between the parts of test by using the correlation coefficient (Pearson), the coefficient of stability has reached (0.81) and corrected by the equation of (Spearman - Brown) (0.90) so this is a good mark, since only the test is described by stable if the value is stability of (0,80) or more.

The Statistical Methods

The researcher used the t-test for two independent samples to make the equal between the experimental and control groups, the Pearson correlation coefficient equation, the coefficient of difficulty coefficient, the equation of the item distinction, the equation of the

effectiveness of the wrong alternatives and The statistical pouch SPSS.

RESULTS AND DISCUSSION

Through comparing the marks of the clever thinking test for the pupils of the two research groups, that was applied after the experience to know the effect of the independent variable (MST) in the clever thinking of the experimental group pupils, the average of the pupils' marks in the experimental group reached (32.04) with variation (12.26) while the average of the pupils' marks in the control groups reached (24.69) with difference of (18.38). Using the T-test of the two independent samples to recognize the significance of the differences between these two averages, that shows there is a statistically significant difference between the two groups Table 1. The previous table shows that the calculated T value (7,231) is larger than the T-table value (2) with freedom degree (58) at the level of significance (0.05) that indicating there is a statistically significant difference between the average marks of the pupils of the two research groups. Therefore, the null hypothesis is refuses and the alternative hypothesis accepts that there is a statistically significant difference is reached at a level of (0.05) between the average of the pupils' marks of the experimental group who learnt science according to the MST and the average of the pupils' marks of the control group who learnt science in the traditional method of clever thinking. The results of the research are consistent with many previous research results that showed the positive effect of the MST Approach as an experimental variable on a number of dependent variables. The researcher also used Kolmogorov-Smirnov test of the normal distribution ,which is the non-scientific test of normal distribution, that is controlled through (P) value , so if probability (P) is bigger than level of the significance adopted , that means there is no difference between the aggregate distribution function of the sample and the theoretical distribution function of the equinoctial distribution, which means acceptance of the null hypothesis, i.e. the distribution is equinoctial. After using the test showed that probability of (P) value bigger than the significance level, which was adopted by the researcher, that is (0.05) which is lead to all the members of the two groups follow the normal distribution. The results showed that the pupils of the experimental group who have studied according to the MST approach in the clever thinking of the pupils go better than the control group who studied in the usual method, the researcher

believes that this result can be attributed to the following reasons:

The MST approach helped the pupils of the experimental group to absorb the approach more effectively than the pupils of the control group who have studied the same approach in the traditional method, which is almost entirely dependent on the teacher and on keeping what is within the specific book without absorbing or performing any necessary mental processes.

Education through the MST approach encouraged pupils to develop the questioning ability of science in many classes, so the process of questioning is the basis of scientific discoveries and innovations.

The MST approach gave the pupils an opportunity to develop their scientific curiosity, The use of this approach led the pupils to get the explanation of scientific phenomena and learn what satisfied their curiosity.

This excellence can also be attributed to the effectiveness of the MST approach, which involves the use of various educational methods used to enhance clever thinking skills. These include participatory learning, side conversations, learning by raising questions, making comparisons, identifying characteristics or identifying existing evidence to support the outcome and reflect on the importance of results and critical judgment on the results, which helped pupils to express their ideas and hopes and adjust it, Thus, the MST has enhanced aspects of thinking skills and the tools required to understand phenomena, rationalize objects, and be able to make decisions rationally away from the blind intolerance of other views. Prediction, observation and interpretation interfere and shared with the pupil's clever thinking skills, which leads to raising the developmental balance of these skills.

Table 1. The results of the T-test of the marks of the two research groups of pupils in the intelligent thinking test

Group	Sample size	SMA	variance	Standard Deviation	Freedom	The t-values		Indication level On(0,05)
						Calculated	tabular	
experimental	30	32,04	12,26	3,5	58	7,231	2	statistically
Control	30	24,69	18,38	4,28				

CONCLUSION

the psychometric characteristics has been verified, at the end of the experience which had continued 9 weeks, the researcher has applied the clever mental thinking test on the pupils of the two groups , after results has gotten and analyzed which showed that the pupils of the experimental group who have learnt according to MST approach got the better of the pupils of the control group who have learnt according to the usual method in the variable of the clever mental thinking.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols

were approved under the College of Basic Education, University of Babylon, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effect of Vitamin D and Leucine - Enriched whey Protein Nutritional Supplement on Measures of Sarcopenia in Older Adults

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ABSTRACT

The study seeks to test the hypothesis that Vitamin D and Leucine – enriched with Proteins affects Measures of Sarcopenia among the Older Adults. Loss of muscles is highly linked to old age; other aspects affected include strength, and mass of muscles, a condition commonly known as Sarcopenia. Sarcopenia poses a threat to independence, performance as well as the quality of life of the affected person. Aspects of Sarcopenia could be influenced positively by nutritional supplements hence, preventing mobility disability.

Keyword: *Protein Nutritional Supplement, Sarcopenia, Vitamin D*

INTRODUCTION

Preserving independence living, function and physical mobility is essential as a person ages and enters the old age generation^{1,4,11}. Sarcopenia is a big risk for diseases such as fractures, falls and reduced mobility, and also leads to long-term and hospital care admission directly. The loss of muscle function as a result of old age, strength and mass known as Sarcopenia make the largest component of physical frailty. Besides, Sarcopenia is related to reduced independence, increased disability and low quality of life leading to death³. However, the progression and onset of Sarcopenia are multidimensional because it involves absorption, marginal nutrient intake, neuromuscular deterioration, altered metabolism, and physical inactivity¹⁰. One of the main interests here is the component of marginal nutrient intake¹³. This is because the component of marginal nutrients intake is a modifiable risk^{5,17}. Vitamin D status and inadequate protein intake are correlated with muscle strength¹⁶. Older adult muscle is less resistance to anabolic stimuli which include mixed meals and exercise despite the adequate intake of protein compared to young adults

^{13, 18}. This condition is known as anabolic resistance. In light of that, recent recommendations mainly focus on the daily intake of proteins. Geriatric patient with the chronic and acute disease should take at least at least 1.2 for healthy adults. On the other hand, older people should take at least 1.0 g/kg BW/day. Furthermore, since older adults have high sensitivity of older muscle to lower dose of amino acid, it means that dietary protein must GET distributed per meal to at least 25g of high-quality protein¹⁹. This will help older adults in the stimulation of muscle protein synthesis. The study hypothesized that improvement of muscle function, strength, protein, and independence among Sarcopenia older adults could GET achieved through the provision of targeted nutritional²⁰. The study explored the safety and efficacy of this concept¹⁴. Besides, this study is not without limitation. The studies handgrip strength and primary outcome is a proxy measurement which is well validated for lower body strength. Though the study showed that leg press strength and handgrip are well indicating the effect of the intervention, the handgrip strength did not¹⁶.

MATERIALS AND METHOD

This study was a quantitative research study which used self- reported questionnaires to collect data, which was then analyzed to come up with findings and a conclusion. This study has been conducted to show the Effect of Vitamin D and Leucine - enriched when Protein Nutritional Supplement on Measures of Sarcopenia

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in Older Adults. This study followed the randomized, double-blind, controlled and multicenter with active and control group study among Sarcopenic older adults ².

Design and sample

This was a controlled and multicenter with active and control group study among Sarcopenic which took a 13 week the randomized, double-blind. The institutional review board approved the study. Additionally, the procedure of the current study was performed on the ethical laws of the Declaration of Helsinki for human medical research. The participants in the study were recruited in 6 countries of Europe from 18 study centers: United Kingdom, Sweden, Italy, Ireland, Germany, and Belgium. Participants were only allowed to take part in the data collection if they were not affected by any major impairment, between 20-30 kg/m² body mass index. Potential participants were people with liver or kidney failure, acute inflammation, anemia, malignancies or present with contraindication for vitamin D or using any medication were excluded. Participants were then randomized to receive an iso-caloric control or active products. The control product was not supposed to have any micronutrients or protein, and only fats, carbohydrates, as well as any other trace elements. On the other hand, the active products contained, per serving, fibers, minerals, a mixture of vitamins, 800 IU vitamin D, 9g carbohydrates, 3g fat, 3 g total Leucine and 20 grams' whey proteins. Both were delivered to be reconstituted with at most 150mL of water as 40 g powder and taken twice daily by the participants before lunch and breakfast to provide adequate protein bolus ¹². In stratification and randomization, the study used permuted block randomization to the control or active group. The study used a computer to generate the randomization sequence by blinded statistical. The blinded statistical was however not involved in the analysis or collection of data. Also, the randomization code was not to be broken till the modeling statistical of secondary and primary results was ready. To determine the measures of the results, during the designated weeks, those tasked with the responsibility of overseeing the research were able to assess the outcomes. Hydraulic hand dynamometer was used to measure handgrip strength. The two measures of grip strength were recorded in kg. The participants were allowed to stand upright with the arms held in a parallel position to the rest of the body. The study calculated the maximum strength of grip by taking measurements of both hands then too the average high measurements.

SPPB which was the other main aspect of measure includes three components: balance, chair stand test, and gait speed. Each component was scored from 0-4 where 0 meant not possible, and 4 meant the best performance. Summation of the components was done and gave a total score which ranges from 0-12. On the other hand, the individual outcome on the functions of the physical muscles: balance score, speed of gait, and chair stand were defined as a separate subordinate outcome in the study ²¹. Questioners of self-reported physical activities, activities of daily living and Appendicular muscle mass were other secondary outcome used to measure Appendicular muscle mass. The European version of the physical activity scale was used to measure the self-reported amount of activity. The level of independence was measured by the Barthel index with a possible score between 0-100. Also, the researcher used the EQ-5D to measure the health-related quality of life both as visual analog scale and index between 0-100. Self-completed intake diaries were used to measure the product compliance. Fasting insulin and glucose, on the other hand, were measured at screening. The study safety assessment included recording medication use by the participants, medical history, adverse events via telephone calls and nutritional supplementation. Other safety measures included monitoring gastrointestinal tolerance, vital signs, inflammatory status and evaluation of laboratory parameters to the renal functions and the liver.

The development of a questionnaire

The self-reported questionnaire of physical activities related to quality of life with Appendicular muscle mass were other secondary outcome used to measure Appendicular muscle mass ²⁰. The questions were drafted based on the previously conducted studies' literature search although the study did not indicate any authenticated questionnaire

Data collection

The self-reported questionnaires of physical activities were used to collect data and detect an effect size 0.05point differences in SPPB. The use of data monitoring committee randomized additional of eight participants. This followed the blinded interim analysis.

Variables and data analysis

The European version of the physical activity scale

was used to measure the self-reported amount of physical activity. Also, the level of independence was measured by the Barthel index with a possible score between 0-100. Also, the researcher used the EQ-5D to measure the health-related quality of life both as visual analog scale and index between 0-100. Additionally, each component was scored from the 0-4 scale where 0 meant not possible, and 4 meant the best performance. The components were summed in a total score which ranges from 0-12. Data analysis was performed to treat all the randomized participants. This was done regardless of whether all the participants finished full study protocol. The treatment by time in this model was used in the interaction of coefficient to estimate the potential different change in the outcome between control and active group. The MMRM of the outcomes included predefined covariates baseline age, sex, and protein intake¹³. Additionally, the study did not make any adjustment for secondary outcome multiple testing due to the nature of the study which is explanatory. The continuous variables were long-term transformed before the MMRM analysis. Imputation was undertaken for a total of 16 participants for missing¹⁷ majorly the protein intake by the use of the group mean intake. The study used the Mann-white U test to categorize variables that MMRM could not use in the analyses. The demographic details consisted of age mean, sex, living situation, handgrip strength, mental health condition, protein intake and fasting glucose concentration²⁰. Also, the demographic details also consisted of gait speed and nutritional assessment. The one-way ANOVA that analyses test and variance was used in the study to carry out Bivariate analysis as appropriate. Conversely, the multiple linear regressions were used to conduct multivariate analysis on the effect of Vitamin D and Leucine - enriched whey Protein Nutritional Supplement on Measures of Sarcopenia in Older Adults. The independent variables in the bivariate analysis were statistically significant. SAAS software

was used to perform all the statistical analyses according to the already set statistical analyses plan. Independence statistics can be used to repeat the statistical analyses to confirm the findings.

RESULTS AND DISCUSSION

The study indicated that SPPB and the Handgrip strength improved in both groups. As per the chair stand test, the active group improved in comparison to the control group. Additionally, the active group was found to have acquired more Appendicular when compared to the control group. Screened adults for participation were to determine the effect of Vitamin D and Leucine - enriched whey Protein Nutritional Supplement on Measures of Sarcopenia^{3,14}. 380 of the participants were randomized to control groups and to intervention or active groups. After the intervention, all the visits were completed by 302 participants. In both the groups, there were similar baseline background characteristics (table 1). 77.7 years was the mean age. Nutritional intervention among Sarcopenic older adults led to improvement in chair standability and significant gains in muscle mass in the active group^{21,23}. The exercise was considered as the ideal intervention for improving physical activity performance and increasing muscle strength among Sarcopenic older adults. The study also aimed at investigating isolated effects of targeted interventions on nutrition. This suggested that Protein Nutritional Supplement could improve muscles of Sarcopenic older adults because it can stimulate muscle protein synthesis²². The study focused mainly on the effects of protein synthesis. Conversely, to assess the changes in muscle function, strength and mass among Sarcopenic older adults, only a few long-term nutritional interventions have been done²⁴. However, in frail and prefrail older adults (n=65) it was demonstrated that nutritional supplements affected the improvement in SPPB, though it never resulted in muscle strength or mass difference¹⁵.

Table 1. Clinical characteristics and Baseline Demographic

	Control n=196	Active n=184
Sex, female n (%)	129 (65.8)	120 (65.2)
Age, mean (SD), y	78.1 (7.0)	77.3 (6.7)
Living situation, n (%)		

Cont... Table 1. Clinical characteristics and Baseline Demographic

Mini Mental State Examination, Living independently	29.0 (28.0e30.0) 167 (85.2)	29.0 (27.0e30.0) 162 (88.0)
Institutionalized	19 (9.7)	18 (9.8)
Hemoglobin concentration, median (IQR), mmol/L	8.5 (8.0e8.9)	8.4 (7.9e8.9)
Protein intake, median (IQR), g/kg body weight/day No malnutrition	1.0 (0.8e1.2) 176 (89.8)	(0.9e1.2) 168 (91.3)
Risk of malnutrition	19 (9.7)	15 (8.2)
Malnutrition	1 (0.5)	1 (0.5)
Handgrip strength male Fasting insulin concentration, median (IQR), mmol/L	27.1 (22.0e32.1) 9.0 (6.0e14.0)	26.8 (22.0e30.8) 9.0 (5.0e13.0)
Fasting glucose concentration, median (IQR), mmol/L	5.2 (4.9e5.7)	5.2 (4.9e5.8)
Handgrip strength female, median (IQR), kg <20 kg n (%)	16.8 (14.2e20.5) 94 (74.0)	16.5 (13.5e21.5) 80 (69.6)
Handgrip strength male, median (IQR), kg <30 kg n (%)	27.1 (22.0e32.1) 45 (69.2)	26.8 (22.0e30.8) 45 (70.3)
Class I Sarcopenia	164 (84)	154 (84)
Class II sarcopeniay	32 (16)	30 (16)
Appendicular muscle mass	17.5 (3.8)	17.9 (4.1)

Table 2. Muscle strength and function outcome

	MEAN (SD) BASELINE	CHANGES FROM BASELINE	ESTIMATES BETWEEN CONTRO-ACTIVE AND GROUP DIFFERENCE MEAN (95%)	P
Handgrip strength, kg Control	20.6 (7.5)	0.79 (3.6)		
Active	20.9 (7.9)	0.54 (3.2)	0.30	.44
Chair-stand time Control	17.6 (14.6, 20.6)	-1.2		
Active	17.1 (15.2, 21.2)	-2.5	-1.01	.018
PPB Control	7.5 (2.0)	0.77 (1.45)		
Active	7.5 (1.9)	0.86 (1.38)	0.11	.51
Balance test Control	3.0	0.00		
Active	3.0	0.00	N.A	.89

CONCLUSION

Overall, the study resulted in improvement in lower extremity function and muscle mass. The study also indicated proof of the principle that geriatric patient might benefit from specific nutritional supplementation alone especially for those who are not able to do exercise on their own. The study results encourage further investigations.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Public Health, Maysan Health Department, Maysan governorate, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of the Numbered Heads and the Active Hand Strategy in the Achievement for the Fifth Grade in Primary in Science Approach

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ABSTRACT

The purpose of this research is identify The Impact of The Numbered Heads and The Active Hand Strategy in the Achievement for the Fifth Grade in Primary in Science approach. Experimental design with partial adjustment (experimental group , control group) , which has post-test in achievement of pupils, that made up of (81) pupils of the academic year (2017-2018) , with (25) pupils studied according to the active hand strategy , and (26) pupils studied according to numbered heads strategy , and (30) pupils studied according to the usual method , the three research groups has equaled statistically by depending on single-variance analysis in the variables (age of pupils , the marks of science approach in the mid-year). After identify the scientific approach for the (eighth , ninth , tenth , eleventh and twelfth) behavioral aims reformed and prepared (32) teaching plans for each group , and prepared achievement test that consists (40) items that were multiple choice question according to (understandable , comprehension and applying) , while the validity depended on the midterm retail , the item difficulty of items , the strength of discrimination and the effectiveness of the wrong alternatives are used.

Keyword: Science Approach, Fifth Grade, Numbered Head.

INTRODUCTION

The educational technology belongs to antiquity, hence the Greeks developed education , education has developed rapidly in that era, recently the educational importance has increased significantly by who interested in teaching and education in universities , schools and educational institutions, Technology aims to the best methods to develop the education, increase the educational levels and solve problems in order to reach more effective learning, The technology is the result of interaction among Human, approaches and instruments. The education is a process of change and continuous growth in human that aims to prepare human to reach to complete physical, mental and emotional growth¹. The Textbook becomes the support of curriculum because it includes the information that the learners need to in

all knowledge fields that is the only source which the learner gets, the teacher's role is to teach the learners to absorb all the information in the textbook then makes a test ² , the teachers can depend on the schedule results of their pupils and work to take into account the individual variance between the levels of their preparedness , knowledge and previous experiences through relying on homework , dialogue sessions , discussions and teaching the mini-groups , all the students can learn and get experiences gradually ^{3,4} , teaching in mini-groups as a typical method to communicate information to the students and encourage them to participation and contribution in the educational process which may be leads to increase the achievement level to the category of learners particularly and the success of the educational process generally ⁵. The cooperative education strategy is distinctive for training and work to overcome difficulties, the pupils are divided into small and heterogeneous groups (include different levels of knowledge) each group made up of (2-5) members , the pupils of one group cooperate in achieving a common aims , the teacher's role is to make the process more

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easy, and makes all the members cooperate in the work⁶. When the scholar (Spencer Kagan) developed this strategy which the teacher divided the pupils into teams, each team consists of (3-5) member of each group, the teacher gives a number to each pupil in the group and explain the task to be studied by using blackboard and worksheet recently prepared, the teacher asks a question and asks the pupils to discuss it together in all groups in order to make sure that every pupil in each group has taught and knows the answer, after that the teacher choose a number randomly and the pupil who carries this number have to give the answer that agreed by all the members of group, in this way social interaction and positive interdependence are achieved in order to achieve teaching and achieve the aim. The active hand strategy is one of the active teaching and one of the modern teaching strategies that used to prove the aims and teaching skills and also it can be used to review and prepare the lesson, the idea of the active hand is using the hand form, thus the questions write down on the palm of the hand and the answers are on the fingers⁷.

METHODOLOGY

Experimental design

The researcher adopted the partial experimental design because it's more suitable of the study conditions so the researcher adopted two experimental groups and one control group, as in the table (1).

Identify the research community and choose the sample

The research community includes the pupils of the fifth class in public primary school (day study) that belongs to the general education of Babylon / city center of the academic year (2017-2018) that consists of three sections (A, B, C) that have chosen randomly as in the table (2)

Adjusting the extraneous variables

The researcher tried as much as possible to avoid the effect of a lot of variables in continuing the experience and its results, these are some variables: Selected the persons of the sample: the sample was selected randomly of the three research groups as well as the statistical equivalence in the variables (age, the marks of science in the mid-year) that found out the sample members are equal. Maturity element: there was no difference between the students of the three research

groups that concerning of maturity as well as the experience that they do in the same period. The accidents: the experiment has not been incurred to accidents or emergency situations that obstruct traffic (accidents, floods and etc...). Exhaustion of the experience: didn't get a case of interruption, transfer or absence except some personal cases through the period of the experience, the researcher used the same measure instrument for the three research groups (the study achievement).

Preparing the study plans

See some of the literature and previous studies that deal with the numbered heads and the active hand strategy that included the study of (Daniel Paul Baker, 2013) and (Al-Fatlawi, 2015), preparing (96) educational plans by (32) educational plans for each one of the three research groups.

The statistical analysis of the test items

The analysis of the test items is one of the main processes that can be used by the researcher to check the vocabulary, and identify the quality and the effectiveness, each item of the test items has special characteristics, the aim of analyzing the test items is to know the difficult degree of each item (item difficulty), the possibility of differentiation between the difference levels of the pupils and the effectiveness of the wrong alternatives of the test, therefore the researcher corrected the answers of the pupils of the second survey sample that involves (100) pupils.

The effectiveness of the wrong alternatives

That means the ability of the wrong variant in the test items to attract the pupils of the low performance class to choose it. The greater the negative, the more attractive and effective to retain it in item. The researcher applied the equation of the effectiveness of alternatives on each of the items of the test and found that the wrong alternatives have attracted to it a number of pupils in the lower group more than the pupils of the upper group and this indicates to its effectiveness, so the alternatives are all suitable.

The test stability: adopted the method of fragmentation

Seventh: applying the experience:

The researcher herself has studied the two

experimental groups and the control group.

The researcher prepared the study plans for the two experimental groups and the control group, so prepared (64) plans for the two experimental groups according to the numbered heads strategy and the active hand and (32) plans for the control group according to the usual method.

The experience has finished on Monday (30/4/2018).

The researcher applied the achievement test in its final form on Wednesday (25/4/2018) on the three research groups in the same time, and the marks of the three research groups have been got.

Statistical instruments

Analysis Of Variance one-way (ANOVA)

This method was used to identify the significance of the statistical differences between the three research groups at the statistical equivalence of a number of variables and to analysis of the final results.

$$F = (A S G) / F = \text{The F value}$$

A S B = Average squares between groups

A S W = Average squares within groups

(Al-Bayati, 2008 : 259)

Chi – Square

This method was used to identify the significance of variables

$$\text{Chi}^2 = M_g$$

Whereas:

N = notable repeating

E = Expected repeating

(Al-Tarayhi and Hassan, 2013 : 141)

Item difficulty

$$D = (N - N - U) + (N - N - L) / N_2$$

whereas :

(N - N - U) = Number of the pupils who answered correctly in the upper group. (N - N - L) = Number of the pupils who answered correctly in the lower group.

N₂ = number of the pupils in the upper and lower groups.

Item Discrimination

$$\text{Item Discrimination} = (N C U) - (N C L) / N$$

whereas :

N C U = number of the correct answers in the upper group.

N C L = number of the correct answers in the lower group.

N = number of the students of one of the two groups.

Equation of the effectiveness of the wrong alternatives

$$\text{The effectiveness of alternatives} = (N R U - N R L) / N$$

Whereas :

N R U = number of the pupils who chose the wrong answer of the upper group.

N R L = number of the pupils who chose the wrong answer of the lower group.

N = number of the students of one of the two groups.

(Abo Fouda and Najati, 2012 : 123)

RESULTS AND DISCUSSION

This chapter includes a presentation of the researcher's findings and its interpretation according to the research aims and hypotheses, then show the conclusions, recommendations and suggestions. There is no statistically significant difference at the level (0.05) between the mean marks of the pupils of the experimental group who are going to study the science according to the numbered heads strategy and between the average marks of the control group pupils who are going to study the same approach according to the usual method in the achievement test. There is no statistically significant difference at the level (0.05) between the mean marks of the pupils of the experimental group who are going to study the science according to the active hand strategy and between the mean marks of the control group pupils who are going to study the same approach according to the usual method in the achievement test. There is no statistically significant difference at the level (0.05)

between the mean marks of the pupils of the experimental group who are going to study the science according to the active hand strategy and between the mean marks of the experimental group pupils who are going to study the same approach according to the numbered heads strategy in the achievement test. To investigate the validity of the three null hypotheses, the researcher adopted a balance between the three groups by adopting a single-variance analysis, table No. (3). Scheffe Method was adopted to balance among the three research groups, table No. (4). The results show that there are statistically significant differences between the mean marks of the two experimental groups and the control group in the

achievement test, whereas the results show that the two experimental groups that depended on the active hand and the numbered heads strategies got the better of the control group that depended on the usual method in teaching, which go back to the following reasons: The active hand and the numbered heads strategies are one of the modern methods of teaching accepted by pupils as new methods of learning that differ from the traditional method by allowing them to move from recipients to active participants in the classroom. The learning by using an active hand strategy has allowed pupils to have a scientific tendency to fill the void with scientific activity by summarizing the scientific approach into basic points that include the most important study subjects.

Table 1. Experimental design (two experimental groups and one control group).

Group	Equivalence	Independent variable	Dependent variable
Control (A)	1- age by months 2- educational achievement of parents 3- pre-achievement in science approach	The usual method	The achievement
Experimental (B)		The active hand strategy	
Experimental (C)		The numbered heads strategy	

Table 2. Identify the research community.

Group	Section	Total pupils	Total excluded pupils	Total of students after exclusion
Control	A	33	3	30
Experimental	B	26	1	25
Experimental	C	28	2	26
Total	3	87	6	81

Table 3. Investigate the validity of the three null hypotheses,

Contrast source	Freedom degree	Total of squares	Mean of squares	F-valuable		Significance level (0.05)
				calculated	tabular	
Between groups	2	496.15	248.07	6.127	3.15	statistically function
Within groups	78	3157.85	40.49			
Total	80	3654	288.56			

Table 4. Schaeffer Method was adopted to balance among the three groups.

Comparisons		First		second		Third	
groups		first experimental	control	Second experimental	control	Second experimental	first experimental
Arithmetic mean		31.20	25.60	30.12	25.60	31.20	31.12
Two values of Scheffé	calculated	5.281		3.507		0.185	
	Tabular	2.51					
Significance level (0.05)		Functional				Non-functional	

CONCLUSION

Effectiveness of the numbered heads strategy in the achievement of pupils in the fifth class in primary for the experimental group by compared with the usual method. Effectiveness of active hand strategy in achievement of pupils in the fifth class in primary of the experimental group by compared with the usual method.

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Conflict of Interest: None to declare.

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The Impact of Using Tablets on Developing Listening Skill & perception as a Brain Process of EFL Primary School Pupils

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ABSTRACT

Listening is a very complicated process in which several different knowledge and skills work together simultaneously. The aim of the present study is to investigate empirically the impact of using Tablets on listening skill & Perception on Iraqi EFL pupils'. Tablets contains features such as recording and playback of audio and video clips, download applications and other specifications with a portable carrying device due to its light weight and size. The present study is limited to the fourth-grade male and female pupils in the primary schools in Baghdad City for the academic year 2017-2018. The sample of the study includes 40 pupils as the experimental group and 40 as the control group. Then, it is ensured that the two groups are equal through a statistical analysis of a number of variables such as age, parents education, achievement scores in English in the mid-year examination. After administrating the posttest, the results of the study indicated clearly that the achievements of the experimental group who has been exposed to Tablets higher than that of the control group who has been exposed to the traditional method recommended in the prescribed textbook.

Keywords: Tablets, Listening Skill, Perception, Brain Processes.

INTRODUCTION

The human brain is a complex and innovative system for processing information. Information processing begins by entering sensory organs, which turn physical stimuli such as touch, heat, sound waves, or light photons into electrochemical signals. Sensory information is frequently converted by brain algorithms in both bottom-up and top-down processing. For the brain to process information, it must first be stored. There are multiple types of memory, including sensory, working, and long-term. First, the information is coded. There are specific types of coding for each type of sensory stimuli. For example, verbal input can be encoded structurally, indicating what the printed word looks like, or phonetically, indicating what the word looks like, or a word, indicating what the word means. Once the information is stored, it must be preserved¹. There are many models of how to organize knowledge

in the brain, some depend on how people retrieve their memories, others rely on computer science, others rely on neurophysiology. Hence, the researcher adopted Tablets to Develop Listening Skill and perception of young learners. Developing perception will enhance brain processes. Developmental cognitive neuroscience is a field of science that combines neurology and psychology to better understand how the physical brain affects the mind and vice versa. Perception is the organization, identification, and interpretation of sensory information in order to represent and understand the presented information, or the environment⁴. The perceptual systems of the brain enable individuals to see the world around them as stable, even though the sensory information is typically incomplete and rapidly varying. Human and animal brains are structured in a modular way, with different areas processing different kinds of sensory information. Some of these modules take the form of sensory maps, mapping some aspect of the world across part of the brain's surface. These different modules are interconnected and influence each other. For instance, taste is strongly influenced by smell⁵.

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METHODOLOGY

The following statistical procedures which followed by the researcher in order to reach the aim of the study and prove its hypothesis. The following procedures are:

The experimental design can be defined as “ a set of procedures which are used by the researcher for the purpose of testing the hypothesis by achieving valid results which show the relationship between the independent and dependent variables, and the choice of research design depends on the aim of conducting the study ^[8].

The population of this study is the fourth grade/pupils of the Bilad Al-Arab primary school for the academic year 2017- 2018. The total number of pupils in the fourth grade in this directorate (The Directorate General of Education- Baghdad –Karkh /2 (33632)

Equivalence of Subjects: In order to ensure that both the EG and the CG are equivalent, the two groups are equalized in the following variables:

The subjects' age.

The level of parents' education.

The students' scores in the mid-year examination.

The learners' scores in the pre –test.

Controlling Extraneous Factors In any experiment study, the dependent variable may be affected by many extraneous variables in addition to the independent variable. Cohen et al. (2000, 126) state that in any experiment there are some variables other than the independent variable that may influence the dependent variable. The researcher tries to control these extraneous variables in order not to contaminate the obtained results.

Instruction Period Time variable is the so significant factor in any experiment. In the present study, the experiment started on the 22nd of February and ended on 19th April, 2018, so it lasted two months. The researcher himself taught the experimental and the control groups two lessons per a week. The lessons were arranged for both groups on Sunday and Monday in an alternate way.

Instructional Materials

The researcher started his procedures for both groups

(Control and Experimental) based on the definition of instructional material whereas integrated recent technology represented by Tablets inside the classroom for EG. On the other hand, the researcher depended completely on the traditional method to teach CG that taught the pupils on pupil's book and activity book assist by flash cards.

The Control Group

At the beginning, the researcher, as a teacher and at the same directory, applied the traditional methods of teaching listening comprehension assist in this planning teachers of the material. Then the researcher used the traditional methods in order to teach the control group. The material was used for teaching the control group was used according to Teacher's Guide of English for Iraq (Garnet).

Validity of the Tests

Validity is defined as the answer to the question: Does the test measure what it is supposed to measure? To address this question, we use systematic studies to determine whether the conclusions of test results are justified by evidence. Hence, ¹⁰ and ¹¹ state that validity is the match between curriculum goals and test coverage. In the present study, the researcher is concerned with applying two main types of validity; i.e., face validity and content validity.

Face Validity

According to ¹² Face validity is the degree to which a test appears to measure the knowledge or ability it claims to measure, based on the subjective judgment of an observer. While Mousavi (2012) pointed that test will have face validity when the item of the test measure what is supposed to measure.

Content Validity

Content validity refers to the items of the test which should cover particular behavior or skill that should be measured (ibid: 157). While ¹³, mentions that in order to determine content validity, the content specification or table of specification should be designed in which it will show all the areas that should be measured in appropriate parts. The following tables show the specification of both versions (pre-posttest see appendix (B) & (C)) that the researcher adopted in his study.

RESULTS AND DISCUSSION

According to the aim of the study, which is to examine empirically the impact of using Tablets on Developing Language Listening Skill. It is hypothesized that there is no statistically significant difference between the mean scores of the of listening skill performance of pupils of both the CG and the EG. The researcher used t –test formula for two independent samples (Control and Experimental groups) in order to prove the above hypothesis, The results indicated for each strategy and total score of both groups as follows;

Listening for gist: In order to find out the differences between the mean scores of the two groups, t-test formula for two independent groups has been used where the mean scores of EG was 6.225 with an SD 1.527 and the mean scores of CG was 5.275 with an SD 1.664. The calculated t. test value is found out to be (2.660) which is higher than the tabulated t. test value which is (2.000), at the level of significance of (0.05) and a degree of freedom of (78), as shown in (Table 1). This means that there are statistically significant differences between the experimental group and the control group in Listening for gist, and in favour of the experimental group. This indicates that the Tablets which suggested by the researcher helps the pupils to develop their listening for gist more than the traditional method presented in the textbook.

Listening for specific words:

In order to find out the differences between the mean scores of the two groups, t. test formula for two independent groups has been used that the mean scores of EG was 5.975 with an SD 1.441 and the mean scores of CG was 5.625 with an SD 2.306. The calculated t. test value is found out to be (0.814) which is lower than the tabulated t. test value which is (2.000) , at the level of significance of (0.05) and a degree of freedom of (78). As shown in (table 2). This means that there are no statistically significant differences between the experimental group and the control group in Listening for specific words, and there is no impact for Tablets on developing this strategy.

Listening for specific Details

In order to find out the differences between the mean scores of the two groups, t. test formula for two independent groups has been used that the mean scores

of EG was 6.125 with an SD 1.539 and the mean scores of CG was 5.450 with an SD 1.431. The calculated t. test value is found out to be (2.031) which is higher than the tabulated t. test value which is (2.000), at the level of significance of (0.05) and a degree of freedom of (78). As shown in (table 3). This means that there are statistically significant differences between the experimental group and the control group in Listening for details, and in favour of the experimental group. This indicates that the Tablets which suggested by the researcher helps the pupils to develop their listening for specific details more than the traditional method presented in the textbook.

Listening for stress: In order to find out the differences between the mean scores of the two group, t. test formula for two independent groups has been used where the mean scores of EG was 6.100 with an SD 1.464 and the mean scores of CG was 5.200 with an SD 1.244. The calculated t. test value is found out to be (2.962) which is higher than the tabulated t. test value which is (2.000), at the level of significance of (0.05) and a degree of freedom of (78). As shown in (table 4). This means that there are statistically significant differences between the experimental group and the control group in Listening for stress, and in favour of the experimental group. This indicates that the Tablets which suggested by the researcher helps the pupils to develop their listening for stress more than the traditional method presented in the textbook.

Total Score: In order to find out the differences between the mean scores of the two groups, T. test formula for two independent groups has been used that the mean scores of EG was 24.425 with an SD 3.186 and the mean scores of CG was 21.550 with an SD 4.157. The calculated t. test value is found out to be (3.472) which is higher than the tabulated t. test value which is (2.000), at the level of significance of (0.05) and a degree of freedom of (78). As shown in (table 5). This means that there are statistically significant differences between the experimental group and the control group in Total score, and in favour of the experimental group. This indicates that the Tablets which suggested by the researcher helps the pupils to develop their listening skill more than the traditional method presented in the textbook. This proves that there are statistically significant differences between both groups in Listening subskills test except listening for specific word. This indicates that the Tablets suggested by the researcher helps the pupils to develop their listening subskills more than the traditional

activities presented in the textbook. Therefore, the aim of the study is achieved which investigates whether Tablets technique can effect pupils listening skill and them perception or not. While the null hypothesis is refused, therefore, the alternative hypothesis should be used which indicates that there is statistically significant difference between EG who are taught listening skill by using Tablets suggested by the researcher, and control group who are taught listening skill by using traditional method recommended by the traditional textbook. The results of the present study also indicate the importance of activating background knowledge of the pupils in

which it enables the pupils to prepare themselves for listening through Tablets, That Tablets make opportunity to listen to the tracks repeatedly with concerning speech rate, clarify of the sound, accuracy of pronunciations, tone of the speech, pause, level of the sound speaker, a companion sound with the speaker such as sound of broken something, encouragement of population during the race. These merits available in Tablets assist fundamentally in develop listening skill. Also roles of the teacher by permission to the learner recording the lesson to give opportunity to them to review any missing information during listening process.

Table 1. T. test value of Experimental group and control group in listening for gist

Group	No.	Mean	SD	t.test		Level of Sig.	Degree of freedom
				Comp	Tabul		
Control	40	5.275	1.664	2.660	2.000	0.05	78
Experimental	40	6.225	1.527				

Table 2. T. test value of Experimental group and Control group in Listen for specific words

Group	No.	Mean	St.D	t. test		Level of Sig.	Degree of freedom
				Calcul.	Tabul.		
Control	40	5.625	2.306	0.814	2.000	0.05	78
Experimental	40	5.975	1.441				

Table 3. T. test value of Experimental group and Control group in Listening for details

Group	No.	Mean	SD	t. test		Level of Sig.	Degree of freedom
				Calcul	Tabul		
Control	40	5.450	1.431	2.031	2.000	0.05	78
Experimental	40	6.125	1.539				

Table 4. T. test value of Experimental group and Control group in Listen for stress

Group	No.	Mean	St.D	t.test		Level of Sig.	Degree of freedom
				Calcul	Tabul		
Control	40	5.200	1.244	2.962	2.000	0.05	78
Experimental	40	6.100	1.464				

Table 5. T. test value of Experimental group and Control group in Total score.

Group	No.	Mean	SD	t. test		Level of Sig.	Degree of freedom
				Comp	Tabul		
Control	40	21.550	4.157	3.472	2.000	0.05	78
Experimental	40	24.425	3.186				

CONCLUSION

After analyzing the data of the study, the aim of the present study which examined empirically Impact of Using Tablets on Developing Language Listening Skill EFL pupils has been achieved since the results of the posttest indicated that the performance of the EG is higher than the CG. In other words, the results show that EG develop their listening skill. According to the hypothesis of the present study, it has been refused since the results indicate that there are significant differences between the mean scores of the EG which taught listening Skill by using Tablets and the CG which taught listening Skill by following the traditional method recommended by the textbook. Therefore, the alternative hypothesis is used. The aim of teaching listening skill is to enable the learners to be conscious of the importance of listening and how to listen, therefore, teacher should help the learners how to listen correctly through Tablets in order to get more benefit from listening. The researcher concludes that the ultimate aim of teaching listening skill is not to enable the learners to produce but rather to be able to understand the spoken text. Tablets enables the learners to be more active and increase their motivation through encouraging them to listen to the native speaker.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Babylon Government, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Risk of Rheumatoid Arthritis in Patient with Type 2 Diabetes Mellitus Receiving DPP4 Inhibitors

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ABSTRACT

Dipeptidyl peptidase-4 (DPP4) could be a transmembrane compound protein that encompasses a perform within the immunologic response. It additionally referred to as CD26, DPP4 inhibitors (DPP4i) are oral glucose-lowering drug for type two diabetes mellitus (T2DM). **Objectives:** This study aim to measure the risk of incident rheumatoid arthritis (RA) associated with DPP4i in patients with T2DM. **Case presentation:** A 42-years-old male with history of RA presented to the outpatient due to hand tingling that was worse in the mornings. He also complained of excessive thirst, finding himself drinking more water than usual and waking up in the night to urinate. There was no vomiting or nausea and no other symptoms. He did report feeling hungry. He had no family history of diabetes, and reported taking his medication for RA every day. The differential diagnosis for her thirst included dehydration, psychogenic polydipsia, diabetes mellitus, diabetes insipidus, and anxiety. The patient had normal vital signs and was well appearing; labs were ordered for him: labs revealed a FBG level of 215 mg/dL, PPG level of 265 mg/dl. Normal renal function tests and normal other investigations. He started combination therapy between DPP4 inhibitors and metformin.

Keywords: Diabetes, rheumatoid arthritis, RA, DPP4i, T2DM, CD26.

INTRODUCTION

Since 2005, new pharmacologic categories of medication potentiating the activity of the incretin hormones are discovered in second or third-line treatment of sort a pair of polygenic disease mellitus: analogs of glucagon-like amide one (GLP-1) and dipeptidyl peptidase-4 (DPP-4) inhibitors. Dipeptidyl peptidase-4 (DPP4) inhibitors, like sitagliptin, saxagliptin and linagliptin, square measure oral glucose-lowering medicine that may be used as monotherapy or combination medical aid with different oral hypoglycemic agents for sort a pair of DM (T2DM) ^{1,2}. Sitagliptin was the primary DPP4 matter (DPP4i) approved by the United States Food and Drug Administration (FDA) for adults with sort a pair of polygenic disease in Gregorian calendar month 2006, followed by saxagliptin, FDA-approved in July 2009, and linagliptin in May 2011 ³. On the one

hand, variety of studies according shriveled levels of DPP4 activity in patients with arthritis (RA), ⁴ seven whereas studies instructed a possible role of DPP4i as a completely unique medical aid for many inflammatory diseases by inhibiting T cell proliferation and protein production, ⁶ nine ⁸ some cases of inflammatory disease doubtless relating to use of DPP4i are according ⁹. The objective of this study was to estimate the reduced risk of incident general AD as well as RA in patients with polygenic disease beginning a DPP4i drug compared with those beginning non-DPP4i oral hypoglycemic agents. We tend to hypothesised that patients beginning a DPP4i would have a reduced risk of incident RA and different AD compared with those beginning non-DPP4i medicine solely. Numerous studies have proven that the Th17 cell-driven reaction response and its connected inflammatory cytokines (including IL-17, IL-22, GM-CSF and TNF) play an awfully necessary role within the pathological process of RA ^{10,11}. Membrane-bound kind of DPP-4 is found on leucocytes as well as T cells, wherever it's referred to as CD26. Immune activation will increase DPP-4/CD26 specificion; CD45RO+ memory T cells express a lot of CD26 ^{12,13}. Inhibition of CD26 activity ends up in reduced T cell activity ¹⁴. Curiously,

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CD26 will increase T cell activation by increasing the co-stimulator CD86 on antigen-presenting cells in an exceedingly method that needs accelerator activity¹⁵. CD26 associates with different membrane proteins on T cells, as well as the aminoalkanoic acid enzyme CD45 and also the ectoenzyme ADA (ADA), which could be necessary for the co-stimulatory activity of CD26^{13,16}. However, inhibition of DPP-4 accelerator activity might not block of these immune activities; the flexibility of soluble CD26 to bind enzyme and sweetening of T cell proliferation will typically occur even once the situation of DPP-4 has been mutated^{17,18}. DPP-4 cleavage will have an effect on chemokine activity or receptor specificity; thus, inhibition of DPP-4 might alter WBC taxis¹⁹. Interestingly, in human reaction diseases like arthritis, multiplied CD26 levels on leucocytes square measure discovered, nevertheless there's shriveled DPP-4-associated proteolytic enzyme activity²⁰.

Case Presentation

This 42-years-old male farmer presented with a chief complaint of excessive thirst, recent onset of finger tingling, and also complained of generalized joint pain. Although he went to bathroom a lot of time at night, he reported having to wake up six to eight times per night to urinate. He also reported being hungry after dinner, which was abnormal for him. There is no nausea or vomiting. The patient had no known family history of diabetes, but he has personal history of rheumatoid arthritis since 5 years.

His medications included:

Methotrexate: 7.5 mg as single dose per week

Celecoxib: 200 mg PO /12 hr

Omeprazole: 20 mg once daily at morning

Steroid: 2.5 mg PO per day

Vital signs: his heart rate was 96 beats / minute, blood pressure was 125/80, and temperature was 37.30

On general examination: free chest, cardiac and abdominal examination. On examination of upper arm there was Z-thumb and some rheumatoid nodules on the skin.

A basic metabolic panel was done, which ruled out an anion gap metabolic acidosis, and a urinalysis was performed, which confirmed glucosuria and ketonuria.

The patient undergo some laboratory investigations like: CBC which appear normal ,renal function tests which were normal, FBG level which was 215 mg/dl ,PPG level which was 265 mg/dl and HBA1C which was 8.5% . He also did routine investigations like: Chest X-ray, ECG and Abdominal U/S which were all normal.

The patient was diagnosed with: DM with RA

Management and outcome:

Our patient was started with combination therapy between DPP4 inhibitors and metformin.

He started with saxagliptin : 5 mg PO per day as DPP4 inhibitor and metformin :1500 mg /day PO divided per 12 hr with meal.

After period of this regimen we found that DM was controlled but we also observed that the risk of RA was reduced. So we started to study another cases to prove the relation between DPP4 inhibitors and reducing the risk of RA.

We also started to search in other previous studies to prove this result. And we found a lot of result that support that DPP4 inhibitors reduce the risk of autoimmune diseases like RA.

DISCUSSION

Until now, the medical specialty result of DPP4i on AD has not been examined despite biological mechanisms and case reports that recommend an attainable relationship. In a very giant population-based cohort of T2DM patients, we tend to found a shrivelled risk for RA and composite AD among initiators of DPP4i combination medical aid compared with initiators of non-DPP4i combination medical aid. Subgroup analysis examination DPP4i to sulfonylureas conjointly showed a shrivelled risk for alternative AD and composite AD, though the danger for RA wasn't considerably reduced. When examination DPP4i to TZD combination medical aid initiators, no distinction within the risk of RA was seen²¹. It is acknowledged that DPP4 (CD26) is gift in numerous tissues and cells as well as lymphocytes and monocytes as a transmembrane compound protein and is related to immune-regulatory functions^{3,5}. Thirty five DPP4i inhibits lymph cell proliferation and protein production,⁶ nine⁸ thirty six each acknowledged to be concerned in AD pathological process. As polygenic disorder is fairly common in patients with pre-existing

AD,²⁴ it would be price considering a study that examines a job of DPP4i as a unique treatment of AD in patients with T2DM. In a cohort study that revealed in 2014, it proved that the incidence rates for RA are slightly on top of the incidence rate of RA from the Rochester medical specialty Project within the USA²⁵. In conclusion, initiating DPP4i combination medical aid seems to be related to a shriveled risk of AD as well as RA compared with initiating non-DPP4i combination medical aid. In a giant cohort of diabetic patients, that initiating combination medical aid with dipeptidyl proteolytic enzyme four (DPP4) inhibitors showed a shrivelled risk of incident RA²⁶. It's conjointly been reported that CCL20 (a substance of CCR6) recruited CCR6+ arthritogenic Th17 cells to the rheumy joints, and administration of anti-CCR6 mAbs considerably inhibits inflammatory disease²⁷. Though the considerably associated SNP rs12617656 has not been examined for its effects on DDP4 expression, a SNP (rs3093024) in CCR6 has been reported to have an effect on the CCR6 expression level. Additionally, a tri-allelic dinucleotide polymorphism of CCR6 (CCR6DNP) in robust linkage situation with rs3093024 showed effects on factor transcription. The CCR6DNP genotype was related to with the presence of IL-17 within the sera of RA patients²⁸. Currently, multiple gene_gene interactions are reported in RA, however solely the shared epitope_protein aminoalkanoic acid enzyme non-receptor kind twenty two (PTPN22) interaction has been replicated convincingly²⁹. A previous study determined that CCR6+ Th17 cells, however not IFN-g+ Th1 cells, will join forces with secretion fibroblasts from patients with early RA and more drive chronic harmful unwellness by causing IL-6 and IL-8 and therefore the tissue harmful enzymes MMP-1 and MMP-3³². This interaction is fascinating, because it highlights a job for Th17 cells in RA unwellness processes. High CD26 and CCR6 expression could be a hallmark of Th17 cells³³. Hirota et al.²⁹ showed that IFN-g will inhibit each CCR6 and CCL20 (the acknowledged substance for CCR6) production. Curiously, Bengsch et al. Found that CD26 expressed on Th17 cells will negatively regulate the chemotactic CD4+ lymph cell response to the inflammatory chemokines CXCL9_12. Presumably, the cell sorts regulated by CD26 inflammatory cells expressing the receptor CXCR3 (including IFN-g-producing Th1 cells) since all acknowledged ligands of CXCR3 (CXCL9_11) cleaved by CD26. Similarly, cells expressing the CXCL12 receptor CXCR4 can also be

regulated. Therefore, CD26 might facilitate Th17 cells to provide CCR6 by inhibiting the supply of IFN-g and will eventually cause associate redoubled susceptibleness to RA. Indeed, within the Han Chinese GWAS, the analysis of ACPA-positive patient's vs. ACPA-negative patients disclosed that each rs12617656 and rs1854853 had a robust association result with ACPA-positive RA³³. While a pooled analysis of information from ten, 246 patients treated with DPP-4Is within the North American nation had been revealed. Among the reported adverse events that may be concerning sitagliptin, hurting occurred at a frequency of zero.2 incident events per one hundred patient-years, that wasn't considerably completely different to non-exposed patients. The joint symptoms in patients treated with DPP-4I were so thought-about to be comparatively rare. However, analysis of patients whiney of polyarthralgia indicated that polyarthropathy could also be the reason behind the multiple joint inflammation discovered in T2DM patients treated with DPP-4I, a condition which could be unmarked at routine follow-up in diabetic clinics. There are two reported cases of RA related to sitagliptin treatment and a lot of recently, three cases of DPP-4I associated polyarthritis are reported [36], two of whom had chronic inflammatory conditions, Sjögren's syndrome (SS) and hepatitis B infection (HBV). Plasma SDF-1a in RA patients has been reported to be considerably elevated compared with healthy adults or OA patients. In another study, plasma SDF-1a level at the onset of polyarthropathy was under in controls. Moreover, whereas body fluid sCD26 level was shrivelled in active RA patients, no statistically important distinction in sCD26 level among the polyarthropathy cases and management cohorts was discovered during this study, indicating potential variations in biomarkers between RA patients and therefore the polyarthropathy patients with T2DM treated with DPP-4I. In conclusions, these results per associate association between DPP-4I medical aid and therefore the risk of polyarthropathy, with a concomitant decrease in plasma SDF-1a level in affected patients. More pharmacoepidemiological and pathological studies ought to be conducted to substantiate or refute these findings.

CONCLUSION

According above presentation this is a case of type 2 diabetes mellitus and rheumatoid arthritis.

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Conflict of Interest: None to declare.

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Assessment of Caregivers' Awareness about Home Care of Neutropenia among Children with Leukemia at Oncology Wards in Baghdad City

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ABSTRACT

Objective(s): to assess the awareness of caregiver about homecare neutropenia among children with leukemia at oncology wards, and to find out relationship between level of awareness of caregivers and demographic variable. A descriptive study carried out at Baghdad City from 1st of February 2018 to 30th of September 2018. Non-probability sample of (50) males and females caregivers was selected from the oncology wards in Child Welfare, Child's Central, Al-Kadhmiya and Baghdad Teaching Hospital. To achieve the purposes of the study, a questionnaire format was designed and constructed by the researcher depending on the extensive review of available, related literatures and studies. The first part is related to caregivers' demographic characteristics and the second part (three domains) is related to daily activities of caregivers about home care neutropenia among children with leukemia at oncology wards. Data were analyzed through the application of descriptive statistical analysis (Frequency, Percentage, Mean and Standard deviation) and inferential statistic (significance and correlation coefficient). The study revealed that the majority percentage of caregiver's responses toward personal hygiene domain were 82% don't know about use a moisturizers to prevent dry skin, also 60% don't know that use of mouth wash contain alcohol was contraindicated for child.

Keywords: Assess; Awareness; Caregivers'; Neutropenia; Home care

INTRODUCTION

Neutropenia is a blood condition (granulocyte disorder), that characterized by a deficiency of neutrophils which is a type of white blood cell that defends the body against bacterial and fungal infections. They are made in bone marrow and contain microscopic granules with proteins (enzymes) that digest invading bacteria viruses, fungi, and parasites ¹. If the child has neutropenia, close attention should be given to personal hygiene, like hand washing in order to decrease the risk of infection. Many factors can share the onset of low level of neutrophils such as some types of chemotherapy, cancers that affect the bone marrow directly such as leukemia lymphoma, and myeloma². Infections are the

major cause of mortality and morbidity in children. The risk of infections is principally related to the intensity and duration of the immune suppressive chemotherapy ³. Caregivers of children with neutropenia require knowledge, skills, and judgment to carry out the tasks of care for their sick children. Caregivers may help the patient with daily tasks such as bathing, eating, cleaning the home and preparing meals. Also, caregivers must have jobs to handle the requirements and support the needs of their children who require such assistance and this care helps them stay at home versus living in a facility⁴. The capacity of caregivers to take on the care of the child with neutropenia may have a significant influence on both health outcomes and cost. Children suffer from many health problems and complications as a result of the disease process or the course of treatment. The caregivers may have more knowledge and skills for managing their children illness ⁵. The care of children with neutropenia is a complex procedure that requires the

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use of specialized knowledge of the mothers. To enhance knowledge of mothers concerning the disease, causes, cure and prevention. The knowledge will eventually become an indispensable tool that can be shared to others and will never go out of style. Appropriate care and assessment of children with neutropenia is an important part for improvement the health status of the children and decreased the complication ⁶.

MATERIALS AND METHOD

A descriptive study was carried throughout the period from 1st of February 2018 to 30th of September 2018. Non-probability sample of (50) caregivers about home care neutropenia among children with leukemia at oncology ward in Child Welfare, Child's Central, Al-Kadhmiya and Baghdad Teaching Hospital. To achieve the purposes of the study, a questionnaire format was designed and constructed by the researcher depending on the extensive review of available, related literatures and studies. The study instruments (questionnaire) consisted of two major parts. The first part was related to caregivers' demographic characteristics such as age, gender, educational level, employment, degree of kinship, source of knowledge, income, and the second part was related to daily activities of caregivers about home care neutropenia among children with leukemia at oncology wards. It consisted of three domains (personal hygiene, health and safety of family, and life style). Each domain had 12 items about different aspect of the related domains. The questionnaire was rated on a three likert scale (know, uncertain, and don't know) and was scored as 3 for (know), 2 for (uncertain), and 1 for (don't know). The validity of the questionnaire was established through a panel of (10) experts of different specialties related to the field of the present study. They were asked respectively to review the questionnaire for clarity and adequacy in order to achieve the present study objective. Study sample was excluded. Data were analyzed through the application of descriptive statistical analysis (Frequency, Percentage, Mean and Standard deviation) and inferential statistic (significance and correlation coefficient) and by using SPSS version 20.

RESULTS AND DISCUSSION

The present study revealed that 92% of the sample were females and 64.0% of the caregivers were mothers. These results agreed with a study done by Scarpelli, et al. (2008) who indicated that the higher percentage of their

sample 76% was mothers. The caregivers were mostly the patient's spouse, partner or closest relatives, and females were more tuned to the caring function at home ⁷. The current study revealed that 40% of the sample were at age ranging 20-30 years old. These results disagreed with a study done by Al-Jauissy (2010) who indicated that the higher percentage of caregivers age were between 19 to 50 years old⁽⁸⁾. With regards to caregivers level of education the present study showed that 20% each level were literate and Intermediate school graduates. These results agreed with a study done by Alexander (2009) who reported that the majority of parents were not having much education, and he found that 25% were illiterate and 45% have their education till grade ten ⁹. The present study showed that 86% of the study sample was unemployed. These results agreed with a study done by Al-Jauissy (2010) who indicated that the most of caregivers' occupation 76.3% were housewives. This result indicated that the main occupation of females in our society was being housewives ⁸. The present study found that 44.0% of the caregivers got knowledge related to awareness from nurses. The results of this study disagreed with results obtained by Al- Ibady (2011) who demonstrated that nurses themselves didn't get information from any resource also include a high percentage 52.5%⁽¹⁰⁾. This could be due to the nature of the nurses are considered closer to patients, in addition to spend more time with patients. The current study showed that 40% of the families were having a barely sufficient income to cover their expenses. The results of this study disagree with results obtained by Atlanta, et al. (2008) which mentioned that the majority of cancer caregivers were belong to the lower socio economic status class. The concerns relating to the family's wellbeing change in role and responsibilities, relocation, travelling, difficulty arranging blood and its products, and financial difficulties facing after the diagnosis of leukemia ¹¹. Also, agreed with a study done by by Scarpelli, et al. (2008) which mentioned that the cancer caregivers were living with intermediate socio economic status class ⁷. The current study showed that the majority of the caregiver's response toward personal hygiene domain were 82% don't know about use a moisturizers to prevent dry skin, also 60% don't know that the use of mouth wash contain alcohol was contraindicated for child. These results agree with study done by Hasan, et al. (2011), who conducted a study on assessment of home care management for caregiver's having leukemic adolescent patient in Erbil city which

shows the majority of caregivers had poor practices regarding preparing meals, with poor practice regarding oral hygiene¹². The present study revealed that the high percentages of caregiver's response about health safety domain were 78% don't know about use mouth wash which contain alcohol item. And 62% of caregiver's response were don't know about avoid putting natural plants inside the house. Also 46.0% don't know about do not use suppositories items. And showed that the caregiver's response toward life style domain were 64% "don't know that the exercise daily important for child" item. And 54% were, Don't know that avoiding the sun, rain and cold. Also 42% were don't know about ensure the use of pasteurized milk. This result agree with

study done by Hasan, et al.(2011), who found that the caregivers of adolescent leukemia patients had deficit in knowledge and low practices regarding home care management¹². The present study stated that there were significant relationships between personal hygiene and lifestyle of family caregiver with their income. There were significant relationship between level of education and source of knowledge, and also there were significant relationship between income and employments of the caregivers at $p \leq 0.05$. This study agrees with the study done by Scalone, et al. (2008) which stated that there is no significant relationship between age of mothers with their practice regarded desferal therapy¹³.

Table 1. Socio-demographic Characteristics of caregivers among children with Leukemia

Variables	Classification	Frequency	%
Gender	Male	4	8.0
	Female	46	92.0
	Total	50	100
2- Age group	20-30 years	20	40.0
	31-40 years	19	38.0
	41-50 years	6	12.0
	51-60 years	5	10.0
	Total	50	100
Mean \pm SD = 33.2 \pm 12.5			
3- Level of Education	Illiterate	9	18.0
	Literate	10	20.0
	Primary school	9	18.0
	Intermediate school	10	20.0
	Secondary school	6	12.0
	Institute graduate	3	6.0
	College and above graduate	3	6.0
	Total	50	100
4- Employment	Unemployed	43	86.0
	Freelancers	5	10.0
	Government employee	1	2.0
	Retired	1	2.0
	Total	50	100
5- Degree of kinship	Mother	32	64.0
	Father	4	8.0
	Sister	2	4.0
	Aunt	7	14.0
	Grandmother	5	10.0
	Total	50	100

Table 2. Caregiver’s Responses toward Personal Hygiene Domains

No	Items	Know		Don't Know	
		f	%	f	%
1	Hand washing with soap and antibacterial, especially before and after eating, using the bathroom, playing, touching animals and others	44	88.0	6	12.0
2	Daily bathing, especially during summer	41	82.0	9	18.0
3	Use a moisturizer to prevent dry skin	9	18.0	41	82.0
4	Genital areas of the male and female hygiene after urination and defecation	49	98.0	1	2.0
5	Use an electrical razor instead of using ordinary razor	24	48.0	26	52.0
6	Pruning the hair and nails once every two weeks to ensure cleanliness	32	64.0	18	36.0
7	Wearing clean clothes, and change underwear every day	48	98.0	2	4.0
8	Dental floss prohibited	20	40.0	30	60.0
9	Not sharing eating’s’ utensils with others	30	60.0	20	40.0
10	Avoid any injuries or scratching to the skin	36	72.0	14	28.0
11	Use a toothbrush after meals and before going to sleep	35	70.0	15	30.0

Table 3. Caregiver’s Responses toward Health Safety Domain

No	Items	Know		Don't Know	
		f	%	f	%
1	Avoid approaching people suffering from colds and flu - Measles - smallpox - or any other type of infection.	41	82.0	9	18.0
2	Avoid crowded places as markets and places of public entertainment.	30	60.0	20	40.0
3	See the doctor immediately when: increase in temperature than 38° Celsius-difficulty in breathing, pain-blood in urine or stool.	39	78.0	11	22.0
4	Keep the house clean.	42	84.0	8	16.0
5	Do not use suppositories.	27	54.0	23	46.0
6	No vaccinations only after doctor consultation.	47	94.0	3	6.0
7	Wash hands before and after eating.	47	94.0	3	6.0
8	Shoes should be left at door mats	42	84.0	8	16.0
9	Avoid contact with the stool or urine	47	94.0	3	6.0
10	Avoid putting natural plants inside the house.	19	38.0	31	62.0
11	Do not use mouthwash which contains alcohol.	11	22.0	39	78.0
12	No pets inside the house	28	56.0	22	44.0

CONCLUSION

the majority of caregivers response toward personal hygiene domain were 82% don't know that the use a moisturize to prevent dry skin item, also the high percentage of caregivers response about health safety domain were 78% don't know a bout use mouth wash which contain alcohol item. And the caregiver's responses toward life style domain were 42% were don't know about ensure the use of pasteurized milk.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Antioxidant Enzyme Responses of *Juncus Aschers. (Et Buch.) Adams* to Some of Environmental Stresses and use it as Indicators

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ABSTRACT

Reported in this paper responses of *Juncus Aschers. (Et Buch.) Adams (Juncus A.)* plants antioxidant, The catalase (CAT), ascorbate peroxidase (APX), superoxide dismutase (SOD) and peroxidase activity (POD) as a scavenger of ROS for mitigating the environmental stress. The study was deal with monthly study of eighteen physico-chemical parameters during the period from January 2017 to June 2017, and 4 sites were selected from Baher Al-Najef Depression (BAND) at the Al-Najef Al-Ashraf city /Iraq , The results showed positive correlation between air and water temperature, and positive correlation between annual precipitation with DO, EC, TDS, TSS, SAL, HCO₃⁼, CO₃⁼, Cl⁻, SO₄⁼ and pH, While BOD, PO₄⁼ and NO₃⁼ showed negative correlation. During the sampling path, physical chemical factors were found to be much higher in second site compared to the other site. In the spring, the high concentration of pollutants from it in the winter. This led to high activity of antioxidant enzymes. Current experience has indicated that in a stressful conditions, (*Juncus A.*) Plants overcome stress by altering the activities of the stress enzyme, suggesting evidence of an adaptive mechanism to thrive in a stressful environment and the appropriateness of (*Juncus A.*) Of environmental condition (as indicators), especially under modified climatic conditions.

Keywords: *Juncus Aschers.*, *Environmental stress*, *Antioxidant enzyme*, *catalase (CAT)*, *ascorbate peroxidase (APX)*, *superoxide dismutase (SOD)* and *peroxidase activity (POD)*.

INTRODUCTION

Studies show that (*Juncus A.*) grows in the soil of different pH, salinity, fertility and textures, and achieve high productivity under different climatic conditions¹. *Juncus* has demonstrated its ability to reduce the pollution of the surrounding environment and has been a unique system, where environmental stress is the most restrictive factor². To survive stress, many physiological and biochemical changes occur in different plant species³. Plant interactions with water stress are significantly different at different organizational levels depending on the severity and duration of stress as well as plant species and their growth stage⁴. Under environmental stress,

the plant uses many adaptive strategies in response to various abiotic stresses such as high nutrients⁵, low oxidation potential of sediments and toxic substances; high salt, cold, heat and excessive osmotic pressure, ultimately affecting plant growth and productivity⁶. Plant cells and tissues show many metabolic responses to environmental stress, some of which may have adaptive importance⁷. The level of reactive oxygen species (ROS) in plants is controlled by synchronous action of enzymatic and nonenzymatic antioxidants. Among enzymatic antioxidants catalase (CAT), ascorbate peroxidase (APX), superoxide dismutase (SOD) and peroxidase activity (POD) are important scavengers of ROS⁸. The physiological effects of Environmental stress on this plant have not been well studied⁹. (BAND) also have not been well studied too. In the present study, A sub-acute experiment was conducted to examine the combined effects of Environmental stresses on (*Juncus A.*) by testing antioxidants defense system of the plant to identify their potential role as biomarkers (indicators).

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To this aim we tested the following hypotheses:

Some physical and chemical characters of (BAND) water.

The climate factors in (BAND) .

The combined effects of Environmental stresses on (*Juncus A.*) by testing antioxidants defense system of the plant in (BAND) .

MATERIALS AND METHODS

-Determination of the (BAND)

(BAND), located in the province of Najaf in Iraq. It is separated from the Euphrates River only fifteen kilometers. (BAND)width is about 16 kilometers southeast. However, in the middle , shrinks to about (10 km). Which extends to a distance of (40 km) northwest of Najaf to the southwest of the city of Al-Hira. While it is bordered to the east by the Mashkhab-Najaf road and on the western line linking Iraq's strategic oil from the south to the north-west. Four different sites were selected in BAND.

1. Site 1 contains various chemicals from the southern nutrient tributaries (household detergents and pesticides from agriculture).

2. Site 2 contains various chemicals from industry and municipal wastewater.

3 - Site (3) contains the amount of salts from the ground wells.

4 - Site (4) is located near the strategic oil line, which is often suffering from oil pollution.

-Environmental characteristics of the (BAND)

-Water samples were collected monthly from January / 2017 to June / 2017. Where samples were collected from a depth of 30 cm below walls surface for each of studies stations and using polyethylene containers for physical and chemical analysis of water and used glass bottles 250 ml (Winkler bottles) transparent and the other opaque to measure dissolved oxygen(DO) and oxygen biochemical demand (BOD5) .

- water temperature(C°), pH, Electrical Conductivity (EC) , Salinity and Dissolved Oxygen(DO), were measured by using Multi Lab pilot V 4.4 (5.03), turbidity by using a nephelometer Lamotte (WTW)U.S.A 1979 .

- TDS(Total dissolved solids),TSS(Total suspended solids), Bio-oxygen demand (BOD5),Calcium(Ca⁺²) , Magnesium (Mg⁺²), Chlorides(Cl⁻¹), Sulphate(SO₄⁻²), Carbonates(CO₃⁻³), bicarbonates(HCO₃⁻²), nitrate(NO₃⁻²), phosphate (SO₄⁻²) using adopted methods of American Public Health Association (APHA,2003) .

.The climatological features of the sites included mean annual precipitation (mm/m2), mean annual temperature (C°).

Plant materials

Plant materials were harvested in four different locations in each region. Plants were harvested twice during the study. Season at the end of winter, spring. The sample collected in the ice bucket and in the shortest possible time brought to the laboratory. The plant samples were cleaned with tap water and distilled water, the fresh plant material (expanded leaves and not completely damaged) was separated from the whole plants and kept in cool place -20C for studies. The leave samples were homogenized (0.5 g) in the 0.1 m cold phosphate ice solution (pH 7.5) containing 0.5 mL molar of EDTA with pre-formed grout and mortar. The homogeneity was transferred to centrifuge tubes and centrifuged at 4C في in the Beckman refrigerated centrifuge at 15000 r.p.m. For 15 minutes. The floating material was transferred to 30 mL of tubes and reference was made to the enzyme extract.

Enzyme assays:

Superoxide Dismutase (SOD) activity determination: According to Marklund and Marklund (11), reaction mix is consisting of 50 µl crude enzyme extract with 2 ml of tris buffer and 0.5 ml of pyragallol (0.2 mM) which absorbs light at 420 nm. Control solution contains the same materials except for the enzyme extract that was replaced by dH₂O. As a blank, dH₂O was used. Single unit of enzyme is defined as the amount of enzyme that is capable of inhibiting 50% of pyragallol oxidation.

Catalase (CAT) (EC 1.11.1.6) activity was measured according to Beer and Sizer (12), with minor modifications. The reaction mixture (1.5 mL) consisted of 100 mmol L⁻¹ phosphate buffer (pH 7.0), 0.1 mmol. L⁻¹ EDTA, 20 mmol. L⁻¹H₂O₂ and 20 µL enzyme extract. The reaction was started by addition of the extract. The decrease of H₂O₂ was monitored at 240 nm and quantified

by its molar extinction coefficient (36 M⁻¹cm⁻¹) and the results expressed as CAT units mg⁻¹ of protein (U = 1 mM of H₂O₂ reduction min⁻¹. mg⁻¹protein).

Ascorbate peroxidase (APX)(EC 1.11.1.11) activity was determined according to Nakano and Asada (13). The reaction mixture contained 50 mM potassium phosphate (pH 7.0), 0.2 mM EDTA, 0.5 mM ascorbic acid, 2% H₂O₂, and 0.1 mL enzyme extract in a final volume of 3 mL. The decrease in absorbance at 290 nm for 1 min was recorded and the amount of ascorbate oxidized was calculated using extinction coefficient (ε = 2.8 mM⁻¹ APX was defined as 1 mmol. mL⁻¹ per min at 25°C. cm⁻¹). One unit of Ascorbate oxidized as 1 mmol. mL⁻¹ ascorbate oxidized per min at 25°C.

Peroxidase (POD) (EC 1.11.1.7) activity was estimated according to Hemeda and Klein (14). The reaction mixture contained 25 mmol. L⁻¹ phosphate buffer (pH 7.0), 0.05% guaiacol, 10 mmol. L⁻¹ H₂O₂ and enzyme. Activity was determined by the increase in absorbance at 470 nm due to guaiacol oxidation (E = 26.6 mM⁻¹ cm⁻¹).

Statistical analysis

Analysis of variance was performed using SAS version 9.1(SAS Institute Inc., Cary, NC, USA) (15). The data were presented as the means for each treatment. Means were compared using the LSD test at the 0.05 probability level.

RESULTS AND DISCUSSION

In order to determine the nature and extent of physical-chemical stress on macrophytes, eighteen parameters of water and climate were compared between four different locations for six months. Table (1) shows the spatial and temporal changes of the physical chemical parameters of water (BAND). The detergent of household and pesticide from the runoff from the southern tributaries of the nutrient to site-1 contains different chemicals. The municipal wastewater collected at Site 2 also contains various chemicals from the industry. S-3 water has been reduced by mountain salts from the earth walls. Site-4 is located near the strategic oil line, so the higher values were respectively the location 2> location 3> 4> 1, for all physical chemical parameters. Due to high temperature and evaporation the DO, EC, TDS,TSS and SAL were high in spring in all the four sites and due to heavy rainfall in winter the water got

diluted so all those components were lowered down. The same pattern was also seen in HCO₃⁻, CO₃⁻, Cl⁻,SO₄⁼ and pH concentrations (Table 1).While BOD,PO₄⁼, NO₃⁼ was arise in winter and decreases in spring due to thrive plants in spring. The one way ANOVA was executed based on the physico-chemical parameters to reveal the differences between four sites. The COND, TDS, TSS, SAL, HCO₃⁼, CO₃⁻, Cl⁻,SO₄⁼ and pH were higher in Site 2 than the other sites(Table 1). The results showed positive correlation between air and water temperature, and positive correlation between annual precipitation with DO, EC, TDS,TSS, SAL, HCO₃⁼, CO₃⁻, Cl⁻,SO₄⁼ and pH, While BOD,PO₄⁼ and NO₃⁼ showed negative correlation.

Antioxidant enzyme activities:

In contrast to four sites, the activity of SOD, CAT,APX and POD in (*Juncus A.*) were significantly (at P < 0.05) high in Site 2 and Site 3 than other sites (Figs. 1,2,3,4) The SOD activity did not change significantly (at P < 0.05) in winter and spring season but increased significantly in different sites, we observed in SOD activity high in Site 2 and Site 3 than 4 and at last site 1(Fig.1). The activity of CAT increased significantly (at P < 0.05) in spring than in winter season and increased significantly in different sites, we observed in CAT activity high in Site 2 > Site 3 > 4 and at last site 1.. However, the CAT activity was higher in cold stress than in the pollutant stress (Fig.2). (Fig. 3) showed the highest activity of stress enzyme APX in the contaminated sites at spring seasons than in winter. The APX activity was increased significantly (at P < 0.05) in site(2) followed by (3) and (4) at last (1). The POD activity was highest in site(2) followed by (3) and (4) at last (1).but not change significantly (at P < 0.05). (Fig. 4) showed the highest activity of stress enzyme POD in the contaminated sites at spring seasons than in winter. The results showed that the site 2 contains the highest concentration of studied parameters and each duration of the study. This means that the waste water that was dumped in this site was the highest percentage of pollution and therefore the plants developing in this site suffer from stress more than the rest of the plants of other sites. Followed by site 3, whose water contains a high proportion of salts and salts is another type of stress factor on plants developing in that region. The Site 4 and Site 1 were the lowest concentrations of the studied parameters. Therefore, the plants of these sites are the least affected by the stress compared to the other studied

sites. When observing the results of the enzymes, their effectiveness increases with the increase of pollutants in the environment in which the plant grows. Physical and chemical factors of water body if increased Its threshold level caused some stress to its biomass. The imbalance between active oxygen production and elimination is often caused by many chemicals. The antioxidant

enzyme, such as SOD, CAT, APX, and POD, protects tissues against reactive oxygen species. Water quality deteriorates (BAND). Therefore, factors such as EC, TDS, TSS, and SAL are significantly high in site 2> site 3> 4> 1. In addition the higher concentration of pollutants in the contaminated sites stimulates the oxidative stress in the wetland macrophytes (Figs.1,2,3,4).

Table 1. Temporal variation of physico-chemical parameters of water in four stations in (BAND) by mean value of two seasons .

Sequence	Season Station	The mean value in Winter				The mean value in Spring				unit
	parameter	Station (1)	Station (2)	Station (3)	Station (4)	Station (1)	Station (2)	Station (3)	Station (4)	
1	precipitation	2	2	2	2	0	0	0	0	(mm/m2)
2	air temperature	29	30	27	27	39	40	38	37	(Silesia)
3	Water temperature	24	25	20	21	32	33	31	30	(Silesia)
4	pH	8.3	8.7	8.6	8.1	8.9	9.5	9	10	
5	Electrical conductivity (EC)	1007	3302	2903	1202	1708	3930	3540	1770	(μ S / cm)
6	Total Dissolved Solids (TDS)	462	549	843	856	572	787	1.019	1.340	(mg / L)
7	Suspended solids (TSS)	1.654	1.270	0.876	0.912	2.325	1.530	1.210	1.721	(mg / kg)
8	Nitrate(NO_3^{-2})	0.492	0.589	0.325	0.302	0.432	0.356	0.345	0.231	(mg / L)
9	Phosphate(PO_4^{-2})	2.540	3.100	3.021	4.654	2.211	1.762	1.342	0.865	(mg / L)
10	Water hardness	375.4	241.6	354.7	345.4	386.7	260.2	342.6	337.7	(mg / L)
11	Chloride(Cl^{-1})	167.67	1704.7	506.92	864.01	178.2	2490.2	633.43	953.63	(mg / L)
12	Carbonate(CO_3^{-3})	114.5	116.1	117.4	115.5	118.8	123.5	123.2	121.3	(mg / L)
13	Bicarbonate (HCO_3^{-2})	97.6	112.5	98.6	98.2	100.6	114.4	102.3	97.9	(mg / L)
14	Sulfate(SO_4^{-2})	265.8	850.3	771.8	331.5	296.2	959.3	654.5	413.5	(mg / L)
15	Dissolved Oxygen (DO)	5.9	5.25	6.83	5.65	2.09	1.15	2.18	2.70	(mg / L)
16	Bio-oxygen demand(BOD)	0.68	0.84	1.013	1.019	0.60	1.09	1.48	1.50	(mg / L)
17	turbidity	3.36	5.84	4.5	3.4	7.21	5.33	5.91	6.74	(cm)
18	Salinity	6	23,8	17.6	7.2	10.2	28.8	21.7	12.2	(ppt.)

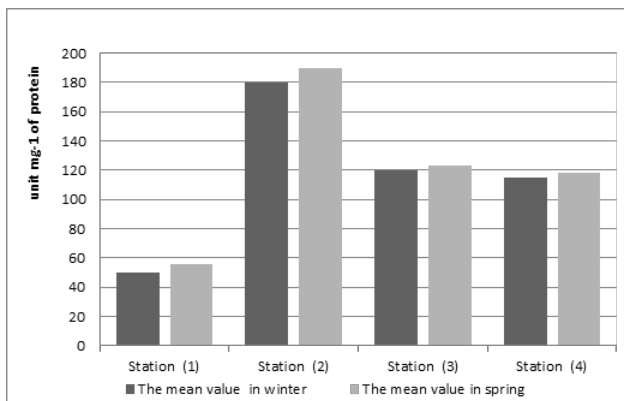


Figure 1. SOD response in different stations

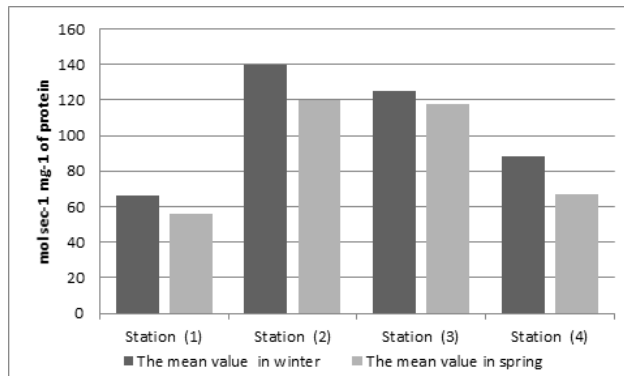


Figure 2. CAT response in different stations

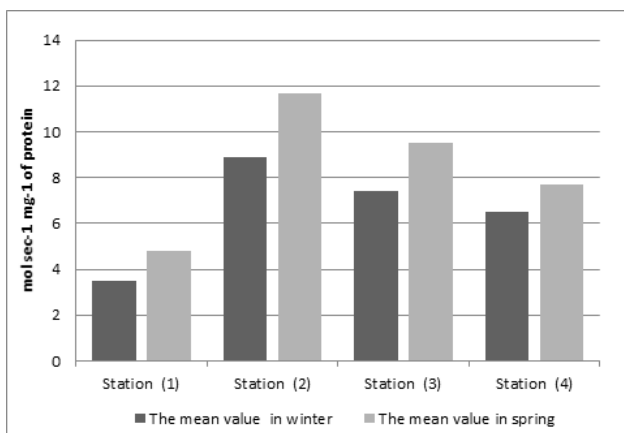


Figure 3. APX response in different stations

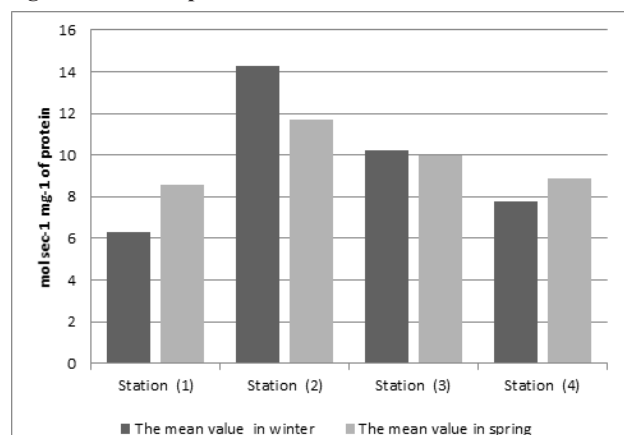


Figure 4. POD response in different stations

CONCLUSION

SOD, CAT, APX and POD provide the first defense line against oxygen toxicity in individuals. Generally in oxidative stress condition the SOD catalyzes dismutation of superoxide radical which in turn forms water and hydrogen peroxide. After that hydrogen peroxide being the substrate, it gets detoxified by CAT, APX and POD. The present study indicates that higher activity of CAT in (*Juncus A.*) Collected from contaminated sites was higher in winter due to cold stress of (*Juncus A.*). The higher activity of APX and POD in spring due to higher concentration of pollutants than in winter. This clearly indicates that the enhanced production of superoxide radicals create an oxidative stress to the (*Juncus A.*) as pollutants indicator.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Environmental Sciences, Faculty of Sciences, Kufa University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Anti-Quorum Sensing Nanonetwork

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ABSTRACT

Molecular communication is a bio-inspired communication mechanism, where information is exchanged through transmitting, propagating and receiving molecules between two nanometer-scale devices. The characteristics and rules that govern molecular communication are motivated by the communication in biological systems. In this paper a model of nanomachines is considered, one of these nanomachines has some special responsibilities to direct and control processes of the network. These nanomachines, communicate through a shared unguided medium by stipulating and controlling diffusion processes to form a nanonetwork. A protocol is proposed in which these nanomachines attempt to jam the communication among bacteria, through exploring the biological process of quorum sensing in bacteria. This process is a form of consensus among bacteria population. In order to activate bacteria to perform its task (whether it is a useful or harmful), bacteria need to reach consensus first. Thus, these nanomachines attempt to jam the communication among bacteria, through diffusing a molecule which has been tested in biological experiments to lock the bacteria receptors. The nanomachines follow Poisson distribution to diffuse their jamming molecule. Eventually, the proposed protocol is employing the network's nanomachines to prevent bacteria from reaching consensus and eventually from performing harmful activities.

Keywords: *Nanonetworks, Molecular Communication, Consensus, Poisson distribution, Quorum Sensing*

INTRODUCTION

A nanomachine is the basic functional unit of any nano-system. The component in these nanomachines is able to perform a specific task such as communication, computation, data storing, sensing and/or actuation at a nano level. The interaction between these nanomachines forms a nanonetwork. Thus, a nanonetwork expands the capabilities and applications of single nanomachine; where communication and sharing information are enabling nanomachines to execute more complex tasks in a distributed manner¹. Molecular Communication can be considered as interdisciplinary which combines the research fields of nanotechnology, biotechnology, and communication technology. A wide range of research focus on studying the use of chemical communication by living cells. Quorum sensing process^{2,3} is an example of signalling between bacteria, where bacteria can use it to estimate the density of their population in the environment

through estimating the concentration of a certain type of molecules. The observation that communication in the biological systems is usually done through molecules, has gave inspiration to molecular communication. In literature there are several works which explore molecular communication, most of these research are focusing on characterising the information transmission by nanomachines and analysing the performance of these devices. The authors in⁴ define the idea of molecular communication, and demonstrate the research challenges. Some research⁵⁻⁷ focused on studying the consensus problem in molecular communication. Mainly⁵ trying to map the quorum sensing to consensus problem under diffusion based molecular communication. Their goal is to study consensus problem by spreading information about an event or any variation through a diffusion based network. Through communication all nanomachines attempt to obtain the best estimate of this random variable. In this consensus problem the most significant element is diffusion. Diffusion can be defined as the spread of molecules through random motion from regions with high concentration to regions with lower concentration. All nanomachines in the nanonetwork have the ability to sense the concentration of molecules

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in the environment and produce new molecules with desired rate. This paper presents an attempt to explore security issues in molecular communication, through exploring the biological process of quorum sensing in bacteria. Where this process is a form of consensus among bacteria population. In order to activate bacteria to perform its task (whether it is a useful or harmful), bacteria need to reach consensus first. Thus, the nanomachines in the defined model are employed to prevent a harmful bacteria from launching their attack. Through proposing a protocol that nanomachines follow. Thus, these nanomachines are attempting to jam the communication among bacteria, through diffusing a molecule which has been tested in biological experiments to lock the bacteria receptors. This paper is organized as follows. In Section 2 the proposed model is described. Then, Section 3 explores the biological perspective of bacteria communication, and then presents the proposed protocol to prevent bacteria from launching an attack, through employing the network's nanomachines. Finally, Section 4 combines conclusions and prospective

future work.

METHODOLOGY

Network Environment and Communication

In this paper a system of nanomachines is considered, these nanomachines are communicating according to diffusion based molecular communication 1. Each nanomachine (where, i has the ability to sense the concentration of molecules from the environment and to emit molecules at a particular rate into the environment. One of these nanomachines is distinguished as that has some responsibilities for directing and controlling processes in the network. While the other nanomachines are distributed in different positions from within its transmission range distance . Communication between nanomachines is based on diffusing and sensing molecules. Each nanomachine from can decide to diffuse, for example, a unit of molecules at time , and any other nanomachine at distance from the nanomachine can sense the impulse of the released unit of molecules within the interval , through the following ¹¹

$$c(u, d, T) = \int_0^T u \cdot \frac{1}{(4\pi Dt)^{\frac{3}{2}}} \cdot \exp\left(\frac{-d^2}{4Dt}\right) \quad (1)$$

where D is the diffusion coefficient of the communication medium. If more than one nanomachine diffuses a unit u molecules, a receiver nanomachine j accumulates the sensed molecules through the summation of the values of $c(u, d, T)$ over diffusing nanomachines i , i.e., nanomachine j senses molecules in total during the interval $[t, t + T]$

$$\sum_i c(u_i, d_{(i,j)}, T_i) - c(u_i, d_{(i,j)}, [T_i - T]_+) \quad (2)$$

where, $d_{(i,j)}$ is the distance between nanomachines i and j , T_i is the time that passed from the diffusion of nanomachine i up to time $t + T$, i.e., nanomachine i diffused at time $(t + T - T_i)$, u_i is the unit of molecules by nanomachine i at that time, and $[T_i - T]_+$ equals to $\max\{T_i - T, 0\}$. In other words, the receiver nanomachine senses the total amount of molecules that have been in its nearest proximity in the time interval $[t, t + T]$ without being able to distinguish which molecules come from which transmitter. If the amount of sensed molecules is greater than or equal to threshold τ , it will be considered as 1, otherwise it is 0. The curve of the function. In Figure 1, $c(u, d, T)$ (the detected molecules) is computed, which represents the peak of molecular concentration sensed by receiver nanomachines at $d= 0.01, 0.5, \text{ and } 1$ from a transmitter

nanomachine. The transmitter nanomachine is assumed to diffuse $u=1$ molecule, in a medium with diffusion coefficient $D=10 \text{ cm}^2/\text{sec}$, initial value of time $t=0$ (the parameters values are based on an experiment in ¹², the value of threshold is assumed to equal $\tau=0.5$, through the experiment t is incremented by 0.01. The peak of the sensed molecular concentration is inversely proportional to the distance between transmitter and receiver nanomachines.

Time Slots Length

All the nanomachines n in the network are assumed to be synchronized, and can communicate in a predefined time slot T_0 . Where T_0 is a system parameter and its length depends on the network's geometric properties, such that $T_0 = v \frac{d_{max}^2}{D}$, where v is a constant that can be equal 1; d_{max} is the transmission range distance of $node_c$, and D is the diffusion coefficient.

Preventing Consensus among Bacteria

Quorum sensing process [2, 3] is an example of signalling between bacteria, where bacteria can use it to estimate the density of their population in the environment through estimating the concentration of a certain type of molecules. In [13, 14] quorum sensing was proposed as a valid tool for signal amplification and synchronization between nodes in a nanonetwork, respectively.

Communication among Bacteria: Biological Background

Bacteria are one cell organisms, their life is based on nutrition consumption, then growing and dividing into two cells, and that process continues. However, bacteria in its different types interact with human body. Bacteria have very important roles in human health, but there are types of bacteria that can cause terrible harm to the human body 3. However, one bacterium cannot do any harmful or useful role inside the human body, it needs to communicate with other cells of its type first by releasing a certain type of molecules (known as autoinducer) 2. As the number of bacteria increases the concentration of that molecule increases in the environment, when the concentration of this molecule reaches a certain threshold, that can allow the bacteria to recognize how many neighbours it has. This process is known as quorum sensing 16. The process of quorum sensing

can be considered as a consensus between bacteria, i.e., each bacteria vote by emitting this molecule, then the vote is counted, and after this all bacteria respond to the vote 17. Thus, the harmful bacteria when they get inside the human body, wait until their number increases, and through this specific molecule they count its population, which is when bacteria recognize that they have the right population size, make all the bacteria release their toxin in a synchronized way 17. From the chemistry point of view, the autoinducer molecule in different types of bacteria consists of two parts, the left part of this molecule in every single type of bacteria is identical, but the right part is slightly different in every single type of bacteria 2. This shows, that each species of bacteria has its own language of communication and that it uses a specific molecule which can fit into a specific receptor of bacteria from the same type 3. However, bacteria can communicate with all other types of bacteria, by having a generic molecule which can be sensed by specific receptors on all types of bacteria 17.

Anti-Quorum Sensing Nanomachines

Suppose that the model discussed in Section 2, in which $n(i)$ nanomachines will attempt to jam the communication between bacteria through diffusing the modified autoinducer molecules (i.e. the anti-quorum sensing molecules). Further more, $node_c$ is responsible for detecting the release of the autoinducer molecule

from the bacteria, and then triggering the other nanomachines $n(i)$ to start diffusing the modified autoinducer to jam quorum sensing and eventually prevent bacteria from launching their attack. Consider that Q molecules are diffused by bacteria at time t into the environment with D diffusion coefficient. The molecular concentration sensed by a bacterium (or a nanomachine) at distance d at certain time t is [22]:

$$c(Q, d, t) = \frac{2Q}{(4\pi Dt)^{\frac{3}{2}}} \exp \frac{-d^2}{4Dt} \tag{3}$$

When (for example) a nanomachine releases molecules, generally the molecular concentration at any given distance gradually decreases over time. However, in the case that a nanomachine continues to emit molecules (which is what happens in quorum sensing), then the molecular concentration will keep increasing. If a nanomachine continues on diffusing molecules for a long time, the molecular concentration could approach ¹³:

$$c(Q, d) = \frac{Q}{4D\pi d} \tag{4}$$

Thus, bacteria constantly release autoinducer, until reaching a certain threshold τ_{qs} . This threshold is an important parameter for activating bacteria (i.e., launching their attack, in case of considering a harmful bacteria type) in quorum sensing phase; thus, threshold τ_{qs} value could approach the maximum achievable molecular concentration $c(Q, d)$.

$$\tau_{qs} \approx c(Q, d) = \frac{Q}{4D\pi d} \tag{5}$$

Molecular concentration of autoinducer at a certain point d in the medium is the accumulated molecular concentration from the diffusion of all the bacteria N in the environment:

$$c(Q, d, N) = \sum_{i \in N} c(Q, d_i) \tag{6}$$

Where d_i is the distance between the point d and the other bacteria in the medium:

$$\sum_{i \in N} (d_i - d)^2 \tag{7}$$

Thus, bacteria will be activated when molecular concentration approaches threshold τ_{qs} , and the time needed for molecular concentration at distance d approaches τ_{qs} is:

$$t_{\tau_{qs}}(d) \approx c(Q, d, N) = \sum_{i \in N} c(Q, d_i) \tag{8}$$

Steps to Prevent Quorum Sensing

Molecular biologist Bonnie Bassler and her team [18-21] injected the harmful bacteria into a mouse and at the same time injected the modified autoinducer molecule. At this stage, the nanomachines $n(i)$ of the defined model are deployed to diffuse the modified autoinducer.

1. $node_c$ will attempt to monitor the environment within its transmission range. If it senses molecular concentration of autoinducer greater than or equal to threshold τ , it attempts to activate the other nanomachine $n(i)$ to diffuse the modified autoinducer. The receptors of $node_c$ are assumed to be able to distinguish between the real autoinducer molecule and the modified one.

2. Thus, $node_c$ diffuses unit u of the modified autoinducer to nanomachines $n(i)$, through time slot T_0 , (T_0 is less than $t_{\tau_{qs}}(d)$). $node_c$ follows the steps in Algorithm 1 to diffuse unit u .

3. The other nanomachines $n(i)$ are activated when they sense the modified autoinducer. Then, nanomachines $n(i)$ attempt to diffuse their modified autoinducer into the environment following Poisson random distribution for k time slots (i.e. kT_0).

4. Meanwhile, $node_c$ attempts to estimate $t_{\tau_{qs}}(d)$. If kT_0 is less than the estimated $t_{\tau_{qs}}(d)$, then $node_c$ diffuses the modified autoinducer molecule again after kT_0 , in order to activate nanomachines $n(i)$ to activate them again.

5. Nanomachines $n(i)$ follow Poisson distribution to diffuse their modified autoinducer again for kT_0 .

6. After the next kT_0 finish, $node_c$ waits for $2T_0$ and attempt to sense the molecular concentration of the real autoinducer. If it is greater than or equal to the threshold τ , then it repeats the above steps; if it is not, $node_c$ keeps monitoring the environment for each T_0 . Figure (2) represents a simple experiment to implement the protocol steps to prevent bacteria from reaching consensus. The x-axis represents the time slot, while the y-axis indicates to the molecular concentration of both the autoinducer molecule diffused by the bacteria and the modified autoinducer diffused by $n(i)$. In this experiment the concentration of the autoinducer is increasing during the first time slots. When the autoinducer concentration reaches a certain threshold τ (in this experiment $\tau=0.4$), $node_c$ activates the other nanomachine $n(i)$ through diffusing unit u of the modified autoinducer. When the other nanomachines $n(i)$ diffuse the modified autoinducer, it is possible to notice that the concentration of actual autoinducer diffused by bacteria is dropping. Which indicates that quorum sensing is prevented.

CONCLUSION

In this paper, a biological process that can be considered as consensus between bacteria is discussed. This process is the key to activate bacteria to launch an attack, or to do something useful (depending on the bacteria type). Then, a network of n nanomachines are employed to perform a protocol to prevent bacteria from

reaching consensus and eventually from performing harmful activities. Experiment result shows that the concentration of the molecule which contributes in activating bacteria is decreased when the concentration of the modified version of this molecules (diffused by the $(n(i))$ nanomachines) increased in the environment. The experiment has been performed as a Matlab program and based on the protocol assumptions. The protocol steps are assumed to be in a specific transmission range of $node_c$, it is possible to assume that different networks are deployed in different positions. However, to present a more general way of preventing bacteria from launching their attacks in human body. Then the important topic of nanomachines motility needs to be explored; in order to assume that these nanomachines are moving in different positions and are attempting to monitor the environment.

Financial Disclosure: There is no financial disclosure.

Conflict of interest: None to declare.

Ethical Clearance

All experimental protocols were approved under the Department of Computer Science, Al-Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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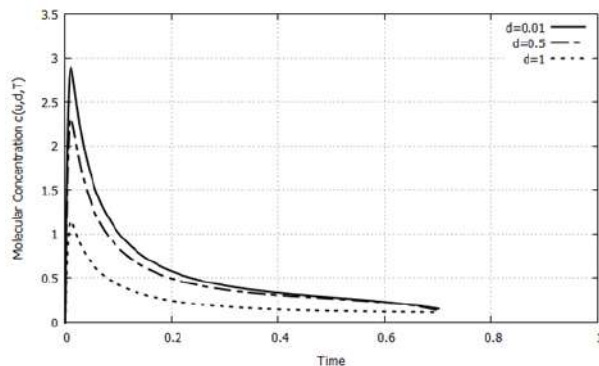


Figure 1. for different distance values

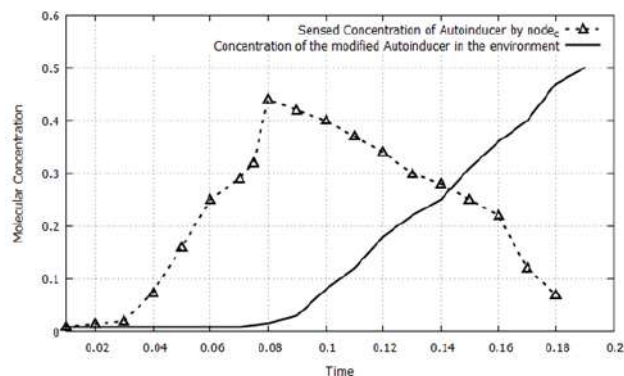


Figure 2. Experiment results after performing the above protocol steps

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Grading of Metabolic Syndrome Components as Premonitory Denotations for Cardiovascular Diseases

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ABSTRACT

To investigate the magnitude of inflammatory events related to metabolic syndrome (MetS) components in Iraqi men, 68 patients with this medical condition (who were diagnosed as being with MetS depending on IDF criteria 2005)¹¹ versus 20 apparently healthy males were enrolled in this study. Patients were divided for three subgroups depending on the number of MetS components they have. All participants were tested for their circulatory levels of certain inflammatory markers. Levels of high sensitive C-reactive protein (hs-CRP), interleukin-1 β (IL-1 β), tumor necrosis factor alpha (TNF α) and interleukin 6 (IL-6) were measured by using ELIZA technique. Triglyceride (TG), high density lipoprotein (HDL-c) and fasting blood sugar (FBS) were measured by using spectrophotometer. Levels of these inflammatory markers in the three subgroups of patients were as follow: hs-CRP (7667.817 \pm 486.412 ng/ml) in group I, (6167.548 \pm 575.558 ng/ml) in group II and (5660.655 \pm 806.428 ng/ml) in group III, IL-1 β (8.624 \pm 0.295, 8.240 \pm 0.422 and 7.837 \pm 0.182pg/ml), TNF α (9.307 \pm 0.219 pg/ml, 8.883 \pm 0.478 pg/ml and 8.196 \pm 0.122 pg/ml) and IL6 (11.428 \pm 2.421 pg/ml, 10.373 \pm 2.856 pg/ml and 8.452 \pm 0.507 pg/ml) respectively, which indicates that the highest clustering of MetS components induce the sturdiest inflammatory events .

Keywords: Cardiovascular Diseases, Metabolic Syndrome, Premonitory Denotations

INTRODUCTION

Metabolic syndrome (MetS) is generally define as a group of metabolically inter-related risk factors, including abdominal obesity, hypertension, high triglyceride (TG) levels, low high-density lipoprotein cholesterol (HDL-c) levels and high fasting blood glucose (FBG)^{1,2}. It represent a common worldwide public health problem and ranging in it's prevalence from 10% to 40%³. Metabolic syndrome increases the risk of developing T2DM and CVD^{4,5} the leading causes of morbidity and mortality in old adults⁶. The inflammatory process that may occur in those with metabolic syndrome differs from the classical inflammatory responses in certain aspects. This inflammatory events manifest itself systemically and chronically as low-intensity reaction⁷. Metabolic

complications originate when intra-abdominal adipose tissue evolves into a fat storage¹². Intra-abdominal fat is an effective endocrine organ producing adipocytokines namely Leptin, adiponectin, resistin, interleukins such as IL-1 β , IL-6, TNF α and CRP^{8,9}.

MATERIALS AND METHOD

Sixty eight patients with metabolic syndrome (MetS) among Iraqi men were selected randomly from different clinical laboratories, the diagnosis in each case was established by clinical examination¹¹. All of them were recently diagnosed as MetS patients, and not receiving any treatments when included in this study. Their age ranged from 30 to 65 years with a mean of (48.576 \pm 1.277 years). Twenty normotensive apparently healthy men were included in this study as control group with age ranging from 30 to 65 years with a mean of (45.250 \pm 2.427years). The criteria of inclusion were cases with not less than three of the five criteria of metabolic syndrome: hypertension (HTN): a systolic blood pressure (SBP) of \geq 130 mm Hg and a diastolic of blood pressure (DBP) \geq 85mm Hg were considered

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as cut-off level of high blood pressures, Fasting blood sugar (FBS) ≥ 100.8 mg/dl, Fasting Triglyceride (TG) ≥ 160 mg/dl, high density lipoprotein (HDL) ≤ 39 mg/dl and waist circumference (WC) ≥ 94 cm. The criteria of exclusion included: Any condition influencing the level of cytokines and the other inflammatory biomarkers rather than the above mentioned illnesses related to MetS.

Patients were divided into three subgroups depending on the number of MetS components they have, namely group I including those with five components, group II patients with four components and group III with three MetS components. In all patients levels of high sensitive C-reactive protein (hs-CRP), interleukin-1 β (IL-1 β), tumor necrosis factor alpha (TNF α) and interleukin 6 (IL-6) were measured by using ELIZA technique. Triglyceride (TG), high density lipoprotein (HDL-c) and fasting blood sugar (FBS) were measured by using spectrophotometer.

RESULTS AND DISCUSSION

As central obesity is provisory according to IDF¹¹, and while all patients in this study were exceeding the normal limits in this regard with a mean of (119.476 \pm 1.529 cm), 86.7% of them were having low HDL-C with a mean of (26.205 \pm 0.997mg/dl, elevated TG encompassed 85.2% with a mean of (230.955 \pm 10.604mg/dl, high blood pressure 83.8% with a mean of (140.379 \pm 1.868 mm Hg) for SBP and (91.212 \pm 1.928 mm Hg) for DBP and elevated levels of FBS 79.4% with a mean of (171.606 \pm 7.657 mg/dl). Among the patients (36) 52.9% were with all the five components of MetS, (21)30.8% with four, and (11)16.1% of them were with three of these components. Significant differences have been deduced in the group of MetS patients represented by the salient changes in the levels of inflammatory mediators. Which is attributed to what is going on of physiopathological abnormalities related to low HDL-c, elevated TG, high BP and elevated FBS beside the well-known role of excessive accumulation of brown fatty tissues in viscera in elaborating a wide range of such mediators¹⁰, provoking us to believe that someday abnormal central obesity may be seen as

a kind of disability. Sequentially hs-CRP recorded a mean of (7428.419 \pm 476.874 ng/ml) in MetS patients compared to (2204.210 \pm 439.700 ng/ml) in control group, IL1 β a mean of (8.057 \pm 0.200 pg/ml) in patients vs (6.856 \pm 0.347 pg/ml) in controls, TNF- α a mean of (8.967 \pm 0.202 pg/ml) in patients vs (7.762 \pm 0.693 pg/ml) in control, IL6 a mean of (8.425 \pm 0.927 pg/ml) compared to (4.002 \pm 1.210 pg/ml) in control group. Statistically all these differences were with significant differences (P<0.05), as detailed in (table 1). What is worthy to be mentioned here patients who were with quantitate components expressed the most extensive inflammatory events reflected by the greatest elevation in levels of the aforesaid biomarkers, i.e. the highest clustering of MetS criteria, the sturdiest elevation of inflammatory markers. In minutiae the mean of hs-CRP in MetS patients who were with the five components (group I) was (7667.817 \pm 486.412 ng/ml), in those with 4 components (group II) was (6167.548 \pm 575.558 ng/ml) and in those with three components (group III) was (5660.655 \pm 806.428 ng/ml). Statistically these differences were significant between group I and group III (P<0.041). Group I of patients also recorded the highest values of TNF α (9.307 \pm 0.219 pg/ml) followed by group II (8.883 \pm 0.478 pg/ml) and group III (8.196 \pm 0.122 pg/ml). Again these differences were significant between group I and group III (P<0.043). Repeatedly and in the same manner, even though with no significant differences, group I revealed the highest level of IL6 (11.428 \pm 2.421 pg/ml), follow by group II with a mean of (10.373 \pm 2.856 pg/ml) and group III (8.452 \pm 0.507 pg/ml), and to less extent IL-1 β (8.624 \pm 0.295, 8.240 \pm 0.422 and 7.837 \pm 0.182pg/ml) sequentially, and as detailed in (table 2). At the time Sedentary and stressful life style with unhealthy manner of eating play roles in the development of MetS in population, the plurality of its components scaling up the magnitude of noxious mediators referred to as risk factors for CVD. Dependently, it's of convenience to diagnose MetS accompanied with the number of its components which give a clue about how violent MetS is in each patient particularly which may reflect the risk in a patient for being threatened with CVD from one side, and it enlighten the fittest way how to deal with each case particularly from the other side.

Table1. Mean of the criteria of metabolic syndrome

Measurement	Group I (n=68) patient	Group II (n=30) control	Total (n=98) P value
Waist circumference (cm) (Central obesity)	119.476±1.529	91.694±1.640	0.000(H.S.)
Systolic blood pressure mmHg	140.379±1.868	120.400±1.219	0.000 (H.S.)
Diastolic blood pressure mmHg	91.212±1.928	75.500±3.571	0.000 (H.S.)
Triglycerides mg/dl	230.955±10.604	132.050±7.863	0.000 (H.S.)
High density lipoprotein mg/dl	26.205±0.997	42.700±1.265	0.000 (H.S.)
Glucose mg/dl	171.606±7.657	84.050±1.639	0.000 (H.S.)

Table 2. Subgroups with metabolic syndrome

Groups	hs-CRP ng/ml	TNFα pg/ml	IL6 pg/ml	IL-1β pg/ml
Group I	7667.817±486.412	9.307±0.219	11.428±2.421	8.624±0.295
Group II	6167.548±575.558	8.883±0.478	10.373±2.856	8.24±0.422
Group III	5660.655±806.428	8.196±0.122	8.452±0.507	7.837±0.182

CONCLUSION

Sequentially hs-CRP recorded a mean of 7428.419±476.874 ng/ml in MetS patients compared to 2204.210±439.700 ng/ml in control group, IL-1β (8.057±0.200 vs 6.856±0.347 pg/ml), TNF-α (8.967±0.202 vs 7.762±0.693 pg/ml) and IL-6 (8.425±0.927 vs 4.002±1.210 pg/ml). Levels of these inflammatory markers in the three subgroups of patients were as follow: hs-CRP (7667.817± 486.412 ng/ml) in group I, (6167.548± 575.558 ng/ml) in group II and (5660.655 ± 806.428 ng/ml) in group III, IL-1β (8.624±0.295, 8.240±0.422 and 7.837±0.182pg/ml), TNFα (9.307±0.219 pg/ml, 8.883±0.478 pg/ml and 8.196±0.122 pg/ml) and IL6 (11.428±2.421 pg/ml, 10.373±2.856 pg/ml and 8.452±0.507 pg/ml) respectively, which indicates that the highest clustering of MetS components induce the sturdiest inflammatory events .

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Biology, College of Science, Al-Mustansiriya University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Synthesis and Study anti-Bacterial Activity of New Dimidazole Derivatives

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ABSTRACT

New compound was synthesized with good yields using simple methodology. 1,3 oxazole have been synthesized and evaluated anti-bacterial activity for some them. all derivatives were synthesized from hippuric acid (A₁) was obtained by the reaction of glucine with benzoyl chloride. oxazole derivatives (A₂-A₉) was obtained by the reaction of acetic anhydride with acetic acid then to get (A₁₀-A₁₇) react with ethylene di amine that compound was closs,or get(A₁₈-A₂₆) react with ethylene di amine less hours number, then prouduct react with chloro acetyl chloride (A26-A33) . The product compounds were characterized by FTIR and 1HNMR spectra. The results enhanced the activity of new compounds as promising antimicrobial agents and the compound had highly effect against *Staphylococcus aureus* in treatment skin infection (*in vivo*) when the healing was occur after five days compare with control.

Keyword: Oxazole, imidazole derivatives

INTRODUCTION

In recent years, heterocyclic compounds had been received considerable attention due to their pharmacological and pesticidal importance¹⁻⁹. The simplest of five -membered heterocyclic compounds are pyrrole, furan and thiophene, each of which contains a single hetero atom¹⁰. Oxazole is the parent compound for a vast class of heterocyclic aromatic organic compounds. These are azoles with oxygen and nitrogen separated by one carbon oxazoles are a kind of attractive heterocyclic compounds because of their unique structures and varied applications¹¹. The wide range of biological activities of oxazoles includes anti-inflammatory¹², analgesic¹³, antibacterial and antifungal¹⁴, hypoglycemic¹⁵, antiproliferative¹⁶, anti-tuberculosis¹⁷, muscle relaxant.^[18]

MATERIALS AND METHOD

EXPERIMENTAL

Synthesis of(4-X-benzoylamino)acetic acids (A₁)

Glycine (10mmol) in 10ml of 1N sodium hydroxide was cooled at 0-5C and the cold solution was added drop wise to a solution of 10 mmol of appropriate benzoyl chlorides. The reaction mixture was continued under stirring for an additional one hour. The aqueous layer was separated and acidified with 2N hydrochloric acid. The products were collected by filtration and recrystallized from 80% ethanol as colorless needles

Synthesis of(Z)-4-benzylidene-2-phenyloxazol-5(4H)-ones (A₂-A₉)

To a stirring mixture of compound 8 (0.01 mol) acetic acid (5 ml) acetic anhydride (20 ml), aromatic aldehyde (0.01 mol) was added. Refluxed with temperature of reaction was reached to 80C° for 4hr., The mixture became almost solid, and then as the temperature rises, it gradually liquefied and turned appropriated in color. the reaction is allowed to cool. , then the mixture was poured into crushed ice and stirred for 30 min. the product was collected and recrystallized from ethanol.

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Synthesis of (Z)-3-(2-aminoethyl)-5-benzylidene-2-phenyl-3,5-dihydro-4H-imidazol-4-one(A₁₀-A₁₆)

To a mixture of compound (4) (0.01 mol) in (20ml) dry benzene, (0.01 mole) ethylene diamine was added. The reaction mixture was refluxed for 2 h. Then, the mixture was allowed to cool to room temperature. The product was recrystallized from ethanol to yield the desired compound

Synthesis of (E)-N-(2-(4-benzylidene-5-oxo-2-phenyl-4,5-dihydro-1H imidazol-1-yl)ethyl)-2-chloroacetamide(A₂₅-A₃₁)

To solution of compound (A₂) (0.006mole) in benzene (40ml) chloroacetyl chloride (0.72ml, 0.006 mole) was added drop wise the mixture was refluxed for 4h, then a reaction mixture was cooled to room temperature.

Synthesis of (Z)-7-benzylidene-5-phenyl-2,7-dihydro-3H-imidazo[1,5-a] imidazole(A₁₇-A₂₄)

To a mixture of compound (4) (0.01 mol) in (20ml) dry benzene, (10ml) ethylene diamine was added. The reaction mixture was refluxed between 4-6h. Then, the mixture was allowed to cool to room temperature. The product was recrystallized from ethanol

Evaluation of antibacterial activity

The agar well-diffusion method was used to detect antibacterial activity for (22) compounds of derivatives (A₁₀-A₃₁) against various bacterial species from gram negative bacteria, *Pseudomonas aeruginosa* and *Acinetobacter baumannii* was chosen while *Staphylococcus aureus* was used as Gram positive bacteria, and *Candida albicans* (yeast). These isolates were obtained from department of Biology/College of Science/Mustansiriyah University. The concentrations for each compound were (1000) µg/ml. Plates were prepared by spreading approximately 10⁵cfu/ml culture broth of each indicator bacterial isolates on Muller Hinton agar surface using sterile cotton swabs. The agar plates were left for about 15 min before aseptically dispensing the 50µl of each compound into the agar wells already bored in the agar plates. The plates were then incubated at 37°C for 18 - 24 h., Zones of inhibition were measured and recorded in millimeter diameter. The Dimethyl sulfoxide used as control.

Measurement LD50 for compound [A₃₀]

Five groups of 6 mice (4weeks old), weighting approximately 20 gm, from National Center For Drug Control and Research (NCDCR), were injected intra peritoneal with 0.5ml of [A₃₀] and from each concentration from the stock (500,1000, 5000,10000) µg/ml, two mice were injected with 0.5ml normal saline and two mice were injected with dilute DMSO with water as a control. After 24 h, all mice (which injected) were examined, and determined the concentration which was killed half of animals and consider LD₅₀

Evaluation of antibacterial activity *in vivo*

Skin infection in Rabbit with *Staphylococcus aureus* was done by contaminated the skin by bacterial suspension and the infection was monitoring and show the infection in skin. compound [A₃₀] was assayed for antibacterial activity against *S. aureus in vivo* for treatment the skin infection in Rabbit with 2.5 µg/ml /3 time daily for one week, Vaseline was used as ointment in the control group

Cell Lines used in this Study

Two types of cell lines have been used. Mammary adenocarcinoma cell line (AMN3) and fibroblastic and epithelial cells with normal chromosomal pictures (REF) as normal murine cell lines were used. Both of them are locally established in ICCMGR and they are maintained for use. The cells are cultured in RPMI1640 media contains 10% fetal bovine serum, glutamine (2 mmol/L), streptomycin (100 U/ml) and penicillin (100 U/ml), then incubated in 5% CO₂ at 37°C for 24 hour. In this time the cells will grow and become monolayer. Single cell then will use to determine the cytotoxicity of compound 30. The confluent monolayer cells treated with 1 ml of trypsin/versine to provide suspension of cells, then add 10 ml of prepared media. About 200 µl of the cells were culture on clean sterile 96- well microtiter plate then let the cells for 24 hr to make single monolayer to be ready to be treated with the compound 30. Next day, random dilutions from immediate filtered stock test were as follows (1000, 500, 100, 75, 50, 25 and 10) µg/ml. Exposure day, decant the media from the cells and add 200 µl from test concentrations. Each concentration was triplicated and returns the microtiter plates to the incubator. Leave wells contains only cells without treatment contains serum free media representing control cells. Three different exposure times of the cells were

included in this research, 24, 48 and 72 hour.

Cell Viability Assay

The cytotoxicity was determined after each exposure time using crystal violet. Decant the tset from the microtiter plate, add 200 μ l of the crystal violet to the wells of the treated cells for 20 min. in the incubator 37°C. The crystal violet will stain the nuclei of the viable cell and the color will be visible to the eye. Then the plates were read by ELISA reader at 495nm. And then the inhibition rate was calculated using the following equation: %Growth Inhibition = (B- A)/A \times 100 %

Were, A represent absorbance of control and B absorbance of sample

RESULTS AND DISCUSSION

Synthesis of all compounds were shown in scheme(1)for Synthesis of targer compounds (A₁) synthesized by the reaction of glycine in the presence of sodium hydroxide(10%) with benzoyl chloride through nucleophilic displacement mechanism (SN₂) The FT-IR spectrum of compound[A₁] (Fig. 1),appearing of stretching vibrationof (OH) group of carboxylic acid at(2602-3400) cm^{-1} and appearance of new absorption band at (3344) cm^{-1} due to stretching vibration of (vNH).frequency of (C=O)acid to(1745) cm^{-1} Other IR characteristics absorption bands were listed in Table (3-1), A₁:yield (93%).m.p (186-188),color (White) , FT-IR cm^{-1} , O-H (3335-2602), N-H(3315), (C=O)acid (1739),(C=O)amid (1600) , (C=C)ar 3075, C=C aromatic (1553,1487),(C-H) alph,(2997-2883), The treatment of compound (A₁) with aryl aldehyde in presence of acetic acid and acetic anhydride lead to the formation of compounds(A₂ and A₈); A₂:yield (84%), FT-IR cm^{-1} C=N(1645) ,C=O(1793),(C=C)ar(1599,1556),(C-H)ar (3080,3101) ,(C-H)alph (3012-2945) , C-O(1297). A₃ : yield (90%), FT-IR cm^{-1} C=N(1653) ,C=O(1795),(C=C) ar(1590,1554),(C-H)ar (3088,3144) ,(C-H) (2926-2951) , C-O(1234) ,C-Cl(692) , A₄:yield (89%), FT-IR cm^{-1} C=N(1654) ,C=O(1797),(C=C)ar(1598,1558),(C-H) ar (3103,3043) ,(C-H)alph (2897-2999) , C-O(1299) . A₅:yield (91%) , FT-IR cm^{-1} C=N(1674) ,C=O(1798), (C=C)ar(1586,1524), (C-H)ar (3018,2974) ,(C-H)alph (2895-2874) , C-O(1296) . A₆:yield (88%) , FT-IR cm^{-1} C=N(1657) ,C=O(1792),(C=C)ar(1581,1556),(C-H) ar (3150,3038) ,(C-H)alph (2940-3052) , C-O(1287) ,(C-Br)775. A₇:yield (90%), FT-IR cm^{-1} C=N(1653) ,C=O(1795),(C=C)ar(1599,1554),(C-H)ar (3072,3054)

,(C-H)alph (2843-2981) , C-O(1294) . A₈:yield (89%), FT-IR cm^{-1} C=N(1649) ,C=O(1795), (C=C) ar(1583,1554),(C-H)ar (2983,3059) ,(C-H) (2820-2905) , C-O(1292). A₉:yield (89%), FT-IR cm^{-1} C=N(1656) ,C=O(1795), (C=C)ar(1602,1558),(C-H)ar (3074) ,(C-H) (2928-3074) , C-O(1237) (O-H str.)3271. The compound from (A₂-A₉) react with ethylene diamine was obtained (A₁₀-A₁₆); The structure of compound [A₁₀] was confirmed by FT-IR and ¹H-NMR spectrum. FT-IR spectrum of compound [A₁₀] the following bands, two bands at (3169-3132) cm^{-1} due to stretching vibrations (asymmetric and symmetric)for (NH₂)group ,while new band at (1641) cm^{-1} belongs to stretching vibration ofamide .Spectrum also shows other characteristic The ¹H-NMR of compound [A₁₀], the following signals:Singlet at (2.50) ppm due to (NH₂) group proton. Multiplate at (7.31-7.43) ppm due to aromatic protons. A₁₀:yield (88%) m.p (178-180),color (Light Yellow) , FT-IR cm^{-1} -NH₂(3252 ,3242) , (C=C)ar(1585,1523), C=N(1641 , 1604) ,C=O(1716),(C-H)ar (3107 , 3055) ,(C-H)alph (2999) C-Cl (746) ; ¹H-NMR(PPM)(DMSO d), (4.189-4.259)(m, CH₂CH₂) , (2.504)(s,NH₂), s(7.134) for(C=CH) aliphatic proton of imidazole ring , (7.317-7.388) (m ,aromatic proton) , Recy.solvent ethanol , A₁₁:yield (86%) m.p (162-164),color (wite)), FT-IR cm^{-1} -NH₂(3323,3269) , (C=C)ar(1595,1570), C=N(1643) ,C=O(1715),(C-H)ar (3082) ,(C-H)alph (2879-2916) . A₁₂:yield (85%) m.p (248-250),color (Dark Yellow) , FT-IR cm^{-1} -NH₂(3221 , 3207) , (C=C) ar(1599,1581), C=N(1649) ,C=O(1718),(C-H)ar (3057 , 3014) ,(C-H)alph (2893-2947) other , ParaNO₂ (1518 ,1342) ; ¹H-NMR(PPM)(DMSO d), (3.175-3.570) (m, CH₂CH₂) , (2.504)(s,NH₂), s(6.516) for(C=CH) aliphatic proton of imidazole ring (7.167-7.832) (m ,aromatic proton) , Recy.solvent ethanol , A₁₃:yield (84%) m.p (195-197),color (Yellow)), FT-IR cm^{-1} -NH₂(3213 ,3157) , (C=C)ar(1597,1581), C=N(1647) ,C=O(1714),(C-H)ar (3074 ,2976) ,(C-H)alph (2895-2929) ,C-Br (7560, A₁₄:yield (88%) m.p (256-258),color (Deep red)), FT-IR cm^{-1} -NH₂(3298 ,3302) , (C=C) ar(1556,1523), C=N(1600) ,C=O(1717),(C-H)ar (3084) ,(C-H)alph (2899-2929) ; ¹H-NMR(PPM)(DMSO d), (4.217-4.309)(m, CH₂CH₂) , (2.832)(s,NH₂), s(6.845) for(C=CH) aliphatic proton of imidazole ring , (7.231-7.500) (m ,aromatic proton) , Recy.solvent ethanol. A₁₅:yield (87%) m.p (180-18),color (Yelloew)), FT-IR cm^{-1} -NH₂(3321,3205) ,(C=C)ar(1600,1581), C=N(1647) ,C=O(1714),(C-H)ar (3136 , 3030) ,(C-H)alph (2960-2997) ; ¹H-NMR(PPM)(DMSO d), (4.060-4.125)

(m, CH₂CH₂), (3.249)(s,NH₂), s(7.357) for(C=CH) aliphatic proton of imidazole ring, (7.662-7.948) (m, aromatic proton), Recy.solvent ethanol. A₁₆: yield (62%) m.p (206-208), color (Brown), FT-IR cm⁻¹: NH₂(3308,3227), (C=C)_{ar}(1599,1556), C=N(1633), C=O(1715), (C-H)_{ar}(3107, 3064), (C-H)_{alph}(2955-2918), other NO₂(1500),

Compounds(A₁₇ and A₂₄) were obtained by reaction Compounds(A₂ and A₉) with ethylene diamine of long time about 8h. The structure of compound [A₁₇] was confirmed by FT-IR and ¹H-NMR spectrum. FT-IR spectrum of compound [A₁₇] shows the following bands, indicated by the disappearance of the NH₂ stretching vibration band and appearance of new stretching vibration of (C=N). new band at (1641) cm⁻¹ belongs to stretching vibration of amide. The ¹H-NMR of compound [A₁₉], shows the following signals: Singlet at (6.82) ppm due to (C=CH) group proton. Multiplet at (7.74-8.49) ppm due to aromatic protons. - Singlet at (3.56-3.99) ppm due to (CH₂CH₂) aliphatic proton, A₁₇: FT-IR cm⁻¹ (C-H)_{ar} (3032), C=N(1641), (C=C)_{ar}(1593,1570), (C-H)_{alph}(2916-2854), other C-Cl(815)., A₁₈: FT-IR cm⁻¹ (C-H)_{ar} (3037), C=N(1635), (C=C)_{ar}(1608,1570), (C-H)_{alph}(2989-2943), other C-Br(746)., A₁₉: FT-IR cm⁻¹ (C-H)_{ar} (3070), C=N(1699), (C=C)_{ar}(1608,1570), (C-H)_{alph}(2904-2850), other (Ar-NO₂) 1512,1338 s(3.56-3.99) for (CH₂CH₂), m(7.74-8.49) for aromatic proton, s(6.82) for (C=CH) aliphatic proton, A₂₀: FT-IR cm⁻¹ (C-H)_{ar} (3051), C=N(1660), (C=C)_{ar}(1587,1566), (C-H)_{alph}(2928-2910), other C-Br(705). s(4.16-4.23) for (CH₂CH₂), m(7.51-7.97) for aromatic proton, s(7.35) for (C=CH) aliphatic proton. A₂₁: FT-IR cm⁻¹ (C-H)_{ar} (3055), C=N(1694), (C=C)_{ar}(1595,1529), (C-H)_{alph}(2943-2906), other N((CH₃)₂) 812, s(4.18-4.25) for (CH₂CH₂), m(7.31-7.56) for aromatic proton, s(7.19) for (C=CH) aliphatic proton, t(2.78-3.12) for N((CH₃)₂), A₂₂: FT-IR cm⁻¹ (C-H)_{ar} (3064), C=N(1672), (C=C)_{ar}(1606,1579), (C-H)_{alph}(2980-2929), other C-Cl(759), A₂₃: yield (62%), FT-IR cm⁻¹ (C-H)_{ar} (3041), C=N(1635), (C=C)_{ar}(1608,1568), (C-H)_{alph}(2943-2916), other NO₂(1512), A₂₄: FT-IR cm⁻¹ (C-H)_{ar} (3069), C=N(1684), (C=C)_{ar}(1589,1517), (C-H)_{alph}(2948-2835), other C-Br(705) OH(2564-3456), s(3.17-3.57) for (CH₂CH₂), m(7.16-7.83) for aromatic proton, s(6.94) for (C=CH) aliphatic proton, s(9.81) for (OH) group.

Compounds (A₂₅-A₃₁) have been synthesized by treatment of compounds (A₁₇ -A₂₄) with chloro acetyl

chloride in dry benzene. As shown in below equation. The formation of (A₂₅) was disappearance of the by stretching vibration bands for (asymmetric and symmetric) for NH₂ group. and the appearance carbonyl amide stretching vibration bands. The product (A₂₅) was confirmed by FT-IR and ¹H-NMR spectrum. FT-IR spectrum shows band at (3032) cm⁻¹ due to aromatic (C-H), bands at (1697) cm⁻¹ due to (C=O) amide, band at (1597-1518) cm⁻¹ due to aromatic (C=C). The ¹H-NMR of compound [A₂₅] shows the following signals: Singlet at (7.12) ppm due to (C=CH) group aliphatic proton. Multiplet at (7.21-7.54) ppm due to aromatic proton. Singlet at (8.81) ppm due to (NH) group near (C=O). - Singlet at (4.96) ppm due to (CH₂). Multiplet at (4.18-4.26) ppm due to (CH₂CH₂) group aliphatic proton. A₂₅: FT-IR cm⁻¹: NH(3234), C=Oamide (1697), (C-H)_{ar}(3032), (C-H)_{alph}(2982,2834), (C=C)_{ar}(1597,1518), C-Cl(696), m(4.18-4.26) for (CH₂CH₂), s(4.96) for (CH₂), m(7.21-7.54) for aromatic proton, s(7.12) for (C=CH) aliphatic proton, s(8.81) for (NH) near (C=O), A₂₆: FT-IR cm⁻¹: NH(3217), C=Oamide (1689), (C-H)_{ar}(3049), (C-H)_{alph}(2982,2852), (C=C)_{ar}(1600,1577), C-Br 705, A₂₇: FT-IR cm⁻¹: NH(3384), C=Oamide (1696), (C-H)_{ar}(3088), (C-H)_{alph}(2970,2904), (C=C)_{ar}(1600,1543), (Ar-NO₂) 1502,1344, m(4.01-4.13) for (CH₂CH₂), s(5.16) for (CH₂), m(7.74-8.75) for aromatic proton, s(7.31) for (C=CH) aliphatic proton, s(10.12) for (NH) near (C=O), A₂₈: FT-IR cm⁻¹: NH(3281), C=Oamide (1662), (C-H)_{ar}(3186), (C-H)_{alph}(3016,2995), (C=C)_{ar}(1579-1539), C-Br 758, m(3.80-4.06) for (CH₂CH₂), s(4.77) for (CH₂), m(7.54-8.32) for aromatic proton, s(6.93) for (C=CH) aliphatic proton, s(8.70) for (NH) near (C=O), A₂₉: FT-IR cm⁻¹: NH(3200), C=Oamide (1662), (C-H)_{ar}(3086), (C-H)_{alph}(3064,2945), (C=C)_{ar}(1593-1527), N((CH₃)₂) 812, m(4.11-4.21) for (CH₂CH₂), s(5.26) for (CH₂), m(7.37-7.59) for aromatic proton, s(6.92) for (C=CH) aliphatic proton, s(10.11) for (NH) near (C=O), t(3.08-3.48) for N((CH₃)₂), A₃₀: FT-IR cm⁻¹: NH(3267), C=Oamide (1670), (C-H)_{ar}(3063), (C-H)_{alph}(2926,2872), (C=C)_{ar}(1523-1510), C-Cl 754, A₃₁: FT-IR cm⁻¹: NH(3212), C=Oamide (1656), (C-H)_{ar}(3074), (C-H)_{alph}(2978,2938), (C=C)_{ar}(1576-1528), NO₂ 1502. The *in vitro* assay of the compound against different pathogenic bacteria and yeast were achieved using 1000 µg/ml concentration as illustrated by Table (1). The effect of compounds (A₁₆-A₃₁) was evaluated against *Staphylococcus aureus* (gram positive bacteria), *Pseudomonas aeruginosa* and *Acinetobacter baumannii* (gram negative bacteria), and

Candida albicans (yeast). Most of prepared compounds revealed a good activity against *S. aureus*, *P.aeruginosa*, *A.baumannii* and *C. albicans*. some compound shows highest inhibition activity against Gram –ve bacteria (*Pseudomonas aeruginosa* and *Acinetobacter baumannii*), and other had highest effect against Gram + ve bacteria (*Staphylococcus aureus*). The compound A 23 evaluated as potent antifungal agent against yeast (*C.albicans*), (Table 1).

Table 1. The effect of (A₁₆-A₃₁) (1000) µg/ml represented by inhibition zone (mm) against different bacterial species

Comp. No	Inhibition Zone			
	<i>Pseudomonas aeruginosa</i>	<i>Acinetobacter baumannii</i>	<i>Staphylococcus aureus</i>	<i>Candida albicans</i>
A ₁₀	16	16	18	–
A ₁₁	16	14	17	–
A ₁₂	14	12	16	–
A ₁₃	10	13	12	–
A ₁₄	17	13	–	10
A ₁₅	16	17	20	–
A ₁₆	12	15	18	–
A ₁₇	13	18	–	16
A ₁₈	12	14	–	20
A ₁₉	11	13	–	6
A ₂₀	12	20	–	10
A ₂₁	10	12	–	20
A ₂₂	10	18	–	20
A ₂₃	17	8	–	20
A ₂₄	11	10	–	20
A ₂₅	8	8	–	15
A ₂₆	11	12	–	11
A ₂₇	10	8	–	15
A ₂₈	16	17	16	–
A ₂₉	7	8	–	15
A ₃₀	12	22	–	18
A ₃₁	10	6	–	15

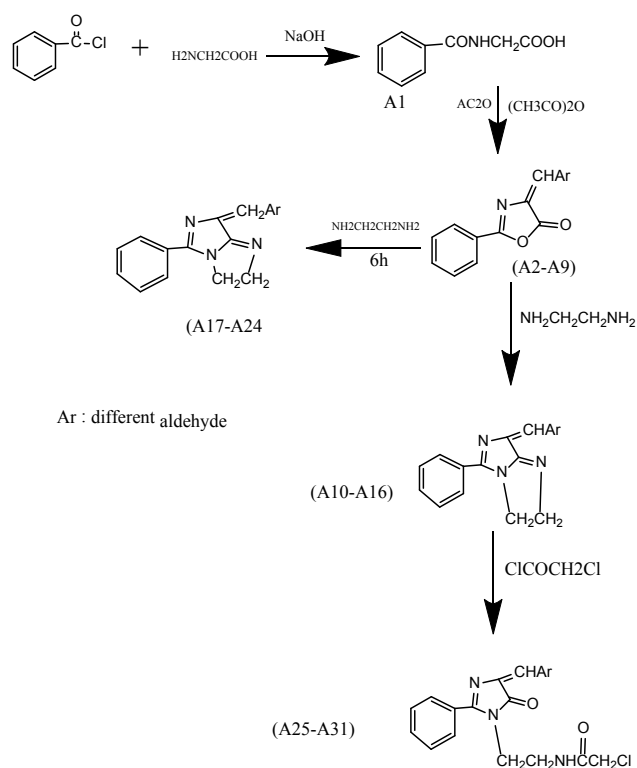


Figure 1. Synthesized of compounds (A₁-A₃₁)

CONCLUSION

The results enhanced the activity of new compounds as promising antimicrobial agents and the compound had highly effect against *Staphylococcus aureus* in treatment skin infection (*in vivo*) when the healing was occur after five days compare with control.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Chemistry, College of Science, AL-Mustansiriyah University, Baghdad and all experiments were carried out in accordance with approved guidelines.

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Assessment of Risk Management Concerning Environmental Pollution Resulting from Musayyib Electricity Generation Plant in Babylon Governorate

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ABSTRACT

Objectives: To assess the risk management concerning environmental pollution resulting from the Musayyib electricity generation plant; and to identify each of extent of coordination between the concerned authorities to monitor environmental pollution and ways to counter environmental pollution. By a non- probability sample account of (150) subjects is selected for the purpose of the present study. A questionnaire as a means for data collection, it consist of two parts; include demographic data and risks management of environmental pollution which composed of (26) items. By self-administration, data are collected from those who working in the electrical generation plant and analyzed through the used descriptive and inferential statistic approach. The study results indicated that the most of the participants are within age groups (25-35) years old, and most of them is male. In regarding education, they most of them formally graduation, and administrative work, as well the subjects have no course of training. It is also, results depicts (70.7%) of the findings are disagreed that there is managed the risks concerning the environmental pollution. There is a significant association between the risks management and participants their level of education and training course at p-value <0.05.

Key words: Assessment, Risks Management, Pollution.

INTRODUCTION

The issue of environmental pollution is of great importance at all national, regional and global levels. So it is a major problem in many societies and to varying degrees. The environmental system in many of the planets on the surface of the earth has become the victim of environmental pollution due to social activities and non-treatment methods ¹. The view of Islam and the preservation of a comprehensive view that included all the contents of the environment that the preservation of water, air and all the contents of the environment and decided to live in a clean environment free of pollutants ². Pollution is a dependent or spontaneous change in the

form of the environment resulting from human waste or change of the natural environment in a way that carries with it dangers to the living organism ³. The most critical fact to electric plant sources that they are considered renewable and own high environmental foot-print, at the levels in which they were practiced ⁴. In facts some electricity generations are the increase of population, change in over-all human culture, industry transport, consumption of buildings and industrial and needs for commercial. In 2009, "fossil fuel accounted for (80) percent of electricity production in the world". Nuclear, coal and natural fuel constituted for about (8%, 23%) also (24%) out total energy consumed in the U.S., respectively "Atlantic Council of United States, 2010". The used primarily of coal, for producing almost (50%) of electricity and natural gas is used to produce almost (18%) of United State electricity ⁵. Impacts of electricity generations related to many issues of environmental, it is own generated consider arguments that have taken many dimensions; some argue that it has resulting in increased degradation of the environment while others argue that it

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has contributed to credibility of environmental conditions by used renewable power sources. Very efforts are exciting have been made by many industries to reduce the negative environmental effects as a results of electricity generations e.g. the effort made by electricity generating companies to reduce air pollutions has been facilitated by the development of nuclear energy. There have been various comparisons in the performance of many cycles of fuel by different electricity generating companies with the aim of estimating their environmental impacts conditions and how they may be able to contribute to the circumstances of the environment ⁶. The phenomenon of environmental pollution has become a real phenomenon that threatens the health of the environment and its environment as a living organism, as a result of the increase in human activities, which led to a significant increase in the percentage of environmental pollutants from the maximum limits allowed globally ⁷. Mans is also one of the main sources of environmental pollution in its various activities, industrial, commercial, agricultural and recreational, which lead to pollution of the environment, and it is clear that humans are more dangerous to the environment than natural factors. Man's destroys an environment in his hand, thus awakening his life and the life of others on the surface of this planet ⁸. The most important sources of human environmental pollution are the power plants, especially those stations which operate on fuel, it is known that the most important air pollutants to cities are the facilities of generation and conversion of electricity, followed by the sectors of clean industries and primary industries, all contribute to pollution ⁹. The types of pollution vary according to the methods to which they are classified. If some types of pollution are caused by natural factors such as volcanoes, earthquakes, floods and storms. This pollution is achieved by nature itself. Environmental pollution caused by people's activities can be called human environmental pollution ¹⁰.

METHODOLOGY

A Study Objectives:

To assess the risk management concerning environmental pollution resulting from the Musayyib electricity generation plant.

To identify the extent of coordination between the concerned authorities to monitor environmental pollution resulting from the Musayyib electricity generation plant.

To identify ways to counter environmental pollution resulting from the Musayyib electricity generation plant.

To find out relationship between the demographic characteristics of workers and aspect of environmental pollution, monitor environmental pollution, and ways to counter environmental pollution.

Study Design: A descriptive study, using assessment approach, is carried out to assess the risk management concerning environmental pollution resulting from Musayyib electricity generation station in Babylon Governorate. A non-probability simple random account of (150) workers at generation station. A questionnaire as a means of data collection was constructed for the purpose of study. It consisted from two parts, include:

Part I: This part contains demographical data which include (age, gender, education level, nature of work, and training course).

Part II: This part is composed of (26) item and divided into (3) sections. They include: aspects of environmental pollution which composed of (8) items, coordination between the authorities concerned with monitoring the environmental pollution which composed of (8) items, and ways to counter environmental pollution which composed of (10) items.

Data analysis: Through the used descriptive statistical (SPSS) version XX analysis approach that includes, frequencies, percentages, mean of scores, standard divagation and graphical presentation of data; and inferential statistical data analysis approach that include Chi-squared test.

RESULTS AND DISCUSSION

Results represents the distribution of the workers demographic items in term of frequencies and percentage. Findings reveals that the (48%) are within first age groups (25-35) years old. Regarding gender, the greatest percentages is male, it constituted (74%) out total number of the study sample. Regarding education, most of the study sample are preparatory, it constituted (45.3%). It is obvious that the most of the study sample are administrative work and account (74.7%) out total number. Finally, results indicate that the (40.7%) of workers are no training course. The findings that based on the statistical cut off point. The aspects of environmental pollution resulting from Musayyib electricity generation station was calculated

as frequencies, percentages, arithmetic mean and standard deviation. Results depicts that the (82.7%) they agree that there is environmental pollution. In assessing coordination between the authorities concerned with monitoring the environmental pollution. Results reveals a majority of (68.7%) of the study findings are indicate disagree that there is coordination between the authorities. Regarding assessing ways to counter environmental pollution. The majority of (54.7%) out total of the sample findings are neutral to counter the environmental pollution. Results presents the association between risks management concerning environmental pollution and workers demographic characteristics. It reveals that there is a non-significant association with their characteristics at p-value (> 0.05) except, with their level of education and training course, there is a significant association with the management of risks that concerning environmental pollution at p-value (< 0.05). In regard to the characteristics of the samples relative to the present study. Results represents the distribution of the workers demographic items in term of frequencies and percentage. Findings reveals that the (48%) are within first age groups (25-35) years old. Older people can judge things better. Regarding gender, the greatest percentages is male. Women have many duties, as the duties of the house, the researchers find a few number. Regarding education, most of the study sample are preparatory. There are a lot of scientific levels specialized in the field of electrophoresis but due to the financial crises and inappropriate circumstances that are exposed to the country, revision found a few scientific levels that work in the station in terms of scientific progress (certificate). It is obvious that the most of the study sample are administrative work. Due to the lack of work in the field, many workers want administrative work because the field work is tired and no allocations were made due to the country's conditions. In regard the training course, results shown there were no training course. The worker does not want the training courses because they are expensive and the reason is due to the financial allocations, the supporting bodies and the monitoring bodies. The aspects of environmental pollution resulting from Musayyib electricity generation station. Results depicts that the available of environmental pollution. This is evidenced that there are many oils and gases that undergo in a process of electrical generation power, and versus the abundance of smells and the presence of many gases, including nitrogen and hydrogen peroxide and other for the lack of tools or standards for air spills,

it is also not available the equipment to measure the level of noise within the stations, and is not equipped with modern technical equipment for air. The study has been investigated the environmental effect due to power plans. Their findings confirm that the plants of generations have been affected the environmental purity of the surrounding region very badly. Environmental deterioration is attributed to emission of large cases of respiratory and related ailments to human beings and animal kingdom. It also impacts of process concerning with photosynthesis, balance of minerals and micro-macro nutrients in the plants, soil strata, structures and buildings get affected due to corrosive reactions, especially for workers and residents near the station⁽¹¹⁾. In regard to coordination between the authorities concerned with monitoring the environmental pollution. Disagree to coordination between the authorities. As being the number of environmental monitors in the company is not commensurate with their functional tasks as well as the non-periodic exchange of reports on the state of environmental pollution resulting from the stations and with others stations, or rather the lack of cooperation of companies concerned with the protection of the environment to reduce the effects of environmental pollution caused by stations, as in general the lack of the of surveillance system and lack of adequate and advanced environmental protection systems. Furthermore, a study that has been assessed the environmental impacts of the thermal power plant in Bangladesh. Their results it is confirm the generation of electricity and consumption of energy in general, adverse effects on the environment, and the major environmental impact is thermal power plant⁽¹³⁾. Results presents the association between risks management concerning environmental pollution and workers demographic characteristics. It reveals that there is a non-significant association with their characteristics at p-value (> 0.05) except, with their level of education and training course, there is a significant association with the management of risks that concerning environmental pollution at p-value (< 0.05). that higher education owners are more aware of the management pollution caused by the station. That most of the sample are graduates of institutes so they carry out executive functions. As for the nature of the work, the members of the sample are administrators, they perform the tasks of supervision. With regard to training courses, the increase in the number of training courses increases the knowledge of the workers at work. This results come with the results that investigated the

environmental pollution caused by power plants and its impact on environmental security. Their findings depicts that there is a significant association with the workers level of education at p-value less than (0.01). The result was higher education increasing the degree of education increased the worker's knowledge of protection and management of prevention of pollution ⁽¹⁾.

Table 1. Sample characteristics

Demographic data	Rating	No.	%
Age (years)	25-35	72	48.0
	36-46	46	30.7
	47-57	26	17.3
	58+	6	4.0
Gender	Male	111	74.0
	Female	39	26.0
Education	Preparatory	68	45.3
	Institute	29	19.3
	Bachelors	41	27.3
	Post-graduate	12	8.0
Nature of Work	Administrative Work	112	74.7
	Field Work	38	25.3
No. Training Course	No training	61	40.7
	One Course	54	36.0
	Two Course	23	15.3
	Three and more	12	8.0

Table 2. Overall Domains

Domains	Rating	No.	%	M.S.	S.d.	Assessment
Aspects of Environmental Pollution	Disagree	6	4.0	2.78	0.49	Agree
	Neutral	20	13.3			
	Agree	124	82.7			
Coordination between the Authorities Concerned with Monitoring the Environmental Pollution	Disagree	103	68.7	1.39	0.63	Disagree
	Neutral	35	23.3			
	Agree	12	8.0			
Ways to Counter Environmental Pollution	Disagree	82	54.7	1.55	0.66	Neutral
	Neutral	54	36.0			
	Agree	14	9.3			

Table 3. Statistical Association between Overall Risks Management Concerning Environmental Pollution and Workers their Demographic Characteristics

Demographic Data	Rating	Overall Assessment			obs.	d.f	crit.
		Disagree	Neutral	Agree			
Age (years)	25-35	50	22	0	2.442	6	12.592
	36-46	30	16	0			
	47-57	26	0	0			
	58+	0	0	6			
<i>P-value= 0.875 → NS</i>							
Gender	Male	70	35	6	0.813	2	5.991
	Female	36	3	0			
<i>P-value= 0.666 → NS</i>							
Education	Preparatory	49	13	6	13.471	6	12.592
	Institute	18	11	0			
	Bachelor	31	10	0			
	Post-graduate	8	4	0			
<i>P-value= 0.040 → S</i>							
Nature of Work	Management Work	80	26	6	2.865	2	5.991
	Field Work	26	12	0			
<i>P-value= 0.320 → NS</i>							
No. of training Course	No training	43	18	0	18.272	6	12.592
	One Course	33	15	6			
	Two Course	22	1	0			
	Three and more	8	4	0			
<i>P-value= 0.006 → S</i>							

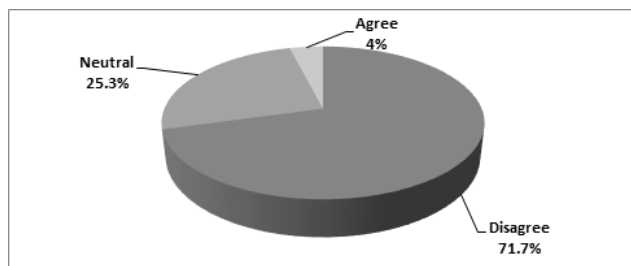


Figure 1. Distribution of study sample by their overall risks management concerning environmental pollution. Results depicts that the majority of (71.7%) out total number are disagree that there is found risks management concerning environmental pollution.

CONCLUSIONS

Study concludes that more than half of the participants are disagree that there is found risks management concerned with the environmental pollution. As well as the participants level of education and training course have been influenced their management.

Financial disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Environmental Studies, Biology, Ministry of Education- Iraq and all experiments were carried out in accordance with approved guidelines.

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Effect of Strategy within and Outside the Circle in the Achievement of Students in the Fifth Grade in Social Studies

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ABSTRACT

The objective of the research is to identify the impact of a strategy within and outside the circle in the achievement of the fifth grade pupils in social subjects, The researcher followed the method of experimental research to achieve the objectives of the research, which includes an independent variable (strategy within and outside the circle, the usual method), And a dependent variable(educational attainment)The researcher adopted the experimental design with a partial control to adjust the search variables The sample of the study was selected Safad Primary School for Boys for the academic year (2017-2018) The sample consisted of (60) students and chose (a) randomly to represent the experimental group by (30) students and (b) to represent the control group and the number of (30) Before the experiment was applied, the researcher was rewarded between the two research groups for the purpose of obtaining accurate and objective results with the following variables: (Father's education, Mother's education, IQ test, the age of time calculated in months, the previous knowledge). The researcher prepared an achievement test consisting of (40) objective paragraphs of choice type, the researcher obtained data for the experimental group and control.

Keywords: Education, curriculum, methods and strategies, social materials, active learning, strategy within and outside the circle, collection.

INTRODUCTION

Contemporary human societies are witnessing an explosion of knowledge which resulted in a scientific and technological revolution, and resulted in many rapid changes and developments in successive areas of humanitarian activities, hence, human societies are making great efforts to employ this information revolution to allow their members to benefit from the knowledge they possess. The only way to keep abreast of these developments is through education and its curricula ¹ Active learning is the way a student engages in various classroom activities rather than being a passive individual who receives information from others Active learning encourages student involvement in interaction by working in discussion groups, And

participate in the discovery of concepts and exercises based on problem solving, allowing them to participate in activities and lead to the acquisition of concepts and skills of creative thinking and investigation and problem solving, and encourages them to make decisions ² . Modern education has attached great importance to the teaching methods and strategies of active learning and considered it as the cornerstone of the teaching process because of its distinctive role in achieving its objectives And have a clear influence in the attitudes of students, and their attitudes towards the material, and depends on the success of the teacher ³ . The new strategies of active learning were characterized by shifting the focus of attention in the educational process of the teacher and his role in teaching the material to the learner and his active role in learning the material to be the focus of the educational process, And make learning linked to the abilities of the students and their readiness and abilities and their interaction with each other ⁴ . Recent strategies allow learners to work together, play an active positive role and interact with different attitudes to collect facts themselves, It also increases the effectiveness of learning, The studies conducted in this field also emphasized

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the importance of modern strategies in increasing the achievement of learners and the high rate of achievement in materials, And to increase understanding and social and personal relations between learners ⁵. The social materials have a prominent place in the school curricula because they have a significant impact and effect on the generation generation culturally, scientifically and professionally and to make them useful members of their society and their nation and for all humanity, It helps to understand the learners of the problems surrounding them and their community and their nation to contribute to the development of solutions and proposals for understanding ⁶ History is one of the social items that focus on the past in its events, And his ideas, to show the extent to which this past can affect the present man lives ⁷.

Strategy within and outside the circle:

Strategy within and outside the circle This strategy is based on the ability of students to generate questions and prediction, Brainstorming and cooperative education, This strategy stimulates students' motivation through their ability to answer questions themselves, And not feeling embarrassed because he knows that there are others who read him do not know some information ⁸. A strategic idea inside and outside the circle is to exchange ideas for a specific purpose or purpose, Where the class is divided into two teams Each team is divided into two groups So that the two groups form an internal department and an external department And meet face to face and start the students of the internal group to ask questions to the students of the external group, Then the students of the outside group move clockwise until the team completes the entire cycle, The aim is to help students acquire the skills of asking questions, predicting, Speak quietly, Move for a goal, The strategy can be implemented at the end of the lesson after the teacher has finished explaining and evaluating the lesson. It is the framework of knowledge and skills gained through the subjects taught, School achievement plays a major role in shaping the learning process, And the achievement of the school on its importance is the only variable in the process of learning because the collection process is complex and influenced by many factors such as the teacher and his abilities, And its aptitudes, moods, health, educational experience and methods of education and this is one of the factors.

METHODOLOGY

First: experimental design of the research

It includes one independent variable (Strategy within and outside the circle) and a dependent variable (Collection) so the researcher used the experimental design With partial settings For the experimental group and the control.

Second: the research community and sample:

1- Research community:

This research community consisted of fifth graders in elementary schools for boys in Babil governorate for the academic year 2017-2018.

2. Research Sample:

In order to select the sample of schools the General Directorate for the Education of Babylon was chosen The researcher chose Safad Primary School to conduct the experiment The sample consisted of two students of the fifth grade of the primary school (66) students divided into two divisions (A, B) (A) to represent the experimental group and (b) to represent the control group. After the exclusion of the students in the two groups (A and B) the total number was (60) students by 30 students in both the experimental and control groups. The equivalence of the two research groups: The researcher aimed to statistically equalize the research groups statistically in some variables that affect the results of the experiment and keen to adjust the following variables:(Father's education, Mother's education, IQ test, the age of time calculated in months, the previous knowledge).

1- Father's education

The researcher obtained the data on the collection of the parents through the school card. It was found that the two groups were statistically equivalent in this variable The results of the data showed that the value of the calculated ka (0.802) is smaller than the ka 2 value (7,815) (0,05) and to a degree of freedom (3) Table 1.

RESULTS AND DISCUSSION

Mother's education

The researcher obtained the data on the collection of mothers through the school card. It was found that the

two groups were statistically equivalent in this variable. The results of the data showed that the value of Ka_2 is (2.467) smaller than the value of the ka_2 in the table at (7,815),(0,05) and to a degree of freedom (3), and this is illustrated in the following table 2.

IQ test:

After the researcher applied the test to the two groups of research (experimental and control) The average scores of the experimental group (18.13) and the deviation (5.04) were the mean of the students of the control group (16.83) and the deviation (4.79) When the (t-test) was used for two independent samples To find out the difference between the mean scores of the two groups in the IQ test. The results showed that the differences were not significant at 0.05 and with the degree of freedom (58), the calculated T value (1.024) was smaller than the numerical value of (2,000) in this variable, the following table shows Table (3).

The chronological life calculated by months:

According to the researcher, the average age of the students was (129.6) months, while the mean of the control group was (130.27) The independent T test was (0.501) which is smaller than the T- With a degree of freedom (58) The two research groups are shown to be equal in the age variable and the following table shows Table 4.

Students' grades in social subjects for the previous academic year: The researcher The average score of the experimental group was (64.43) with a standard deviation of (15.99) while the average score of the control group was (63.8) with a standard deviation (19.5) and after the use of the T test (t-test) for two independent samples to determine the significance of the difference in grades It was found that the difference was not statistically significant at (0,05) The calculated T value (0.138) is smaller than the numerical value (2.000) Indicates the equivalence of the two search groups in this variable, and the following table illustrates this Table (5). Excellence Students of the experimental group who studied on According to a strategy inside and outside the circle On pupils Control group Who studied according to the usual method in the achievement test Thus rejecting the first zero hypothesis AND Accept Zero hypothesis Alternative : (There is a difference of statistical significance at the level of significance (0.05) Between the average scores of the experimental group Which are studying In accordance with the strategy inside and outside the circle And the average score of students in the control group Who are studying According to the normal method In the test of collection of social subjects For the fifth grade primary) And this is consistent with the studies that confirmed the superiority of the experimental group, which was studied according to a strategy within and outside the circle on the control group, which was studied according to the usual method as a study.

Table 1. Kay box results for the two sets of research in the educational achievement of parents

Level of significance (0.05)	Degree of freedom	Values (Ka 2)		College and above	Preparatory and Institute	Medium	Reads, writes and initials	Number of sample members	the group
		Table	Calculated						
Non-D	3	7.815	0.802	6	9	7	8	30	Experimental
				7	6	8	9	30	Control

Table 2. Kay box results for the two groups of research on the educational achievement of mothers

Level of significance (0.05)	Degree of freedom	Values (Ka 2)		College and above	Preparatory and Institute	Medium	Reads, writes and initials	Number of sample members	the group
		Table	Calculated						
Non-D	3	7.815	0.467	8	6	9	7	30	Experimental
				5	8	6	11	30	Control

Table 3. The arithmetical mean, variance, and T calculated and tabular value of the students of the two groups in the IQ

Level of significance (0.05)	T value		Degree of freedom	standard deviation	Arithmetic Average	Number of sample members	the group
	Table	Calculated					
Not statistically significant	2.000	1.024	58	5.04	18.13	30	Experimental
				4.79	16.83	30	Control

Table 4. The arithmetic mean, standard deviation, variance, and T calculated and tabular value of the students of the experimental and control groups in the mean age are calculated in Months

Statistical significance	T value		Degree of freedom	standard deviation	Arithmetic Average	Number of sample members	the group
	Table	Calculated					
Not a function at level 0.05	2.000	0.501	58	5.34	129.6	30	Experimental
				4.96	130.27	30	Control

Table 5. Arithmetical mean, standard deviation, and T calculated and tabular value in the half-year variable for social subjects

Statistical significance	T value		Degree of freedom	standard deviation	Arithmetic Average	Number of sample members	The group
	Table	Calculated					
Not a function at level 0,05	2.00	0.138	58	15.99	64.43	30	Experimental
				19.5	63.8	30	Control

Table 6. Calculate the experimental and control group scores in the test

Level of significance (0,05)	T value		Degree of freedom	standard deviation	Arithmetic Average	Sample size	the group
	Table	Calculated					
Statistical function	2.000	3.067	58	5.12	28.33	30	Experimental
				7.25	23.37	30	Control

CONCLUSION

The researcher was rewarded between the two research groups for the purpose of obtaining accurate and objective results with the following variables: (Father’s education, Mother’s education, IQ test, the age of time calculated in months, the previous knowledge). The researcher prepared an achievement test consisting of (40) objective paragraphs of choice type, the researcher obtained data for the experimental group and control.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Occurrence, and Preventive Measures of Injuries by Needles and Sharp Objects in Governmental Hospitals, (AL- Amara City, Iraq)

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ABSTRACT

Objectives: 1. to investigate the occurrence and frequency of injuries by needles and sharp objects among health care workers in AL- Amara city, Iraq, 2. to identify the factors that may contribute to these injuries, 3. to explore preventive measures and intervention to deal with these injuries. A descriptive exploratory survey was conducted in Al-Amarah city hospitals during the period from January 2018 to May 2018. It was use of non-probability sample (purposive) of 135 health care workers, the data was collected through the interview technique by using of constructed questionnaires, which consist of 3 parts. The result showed that most of health care workers in the sample are exposed to needle stick or sharp injury in the last 12 month, 108 participants out of 135 reported they have been needle stick and sharp injuries (80%), the majority of incidence occurred by syringe needle (46.3%). Most of injuries occur during use the needle or sharp injuries (n= 37, 34.3%). The majority of (NSI) happened during normal injection procedure (n= 36,33.3%). The main causes of injuries was workload (n=76, 70.4%).

Keyword: Injuries, Needles and Sharp, Preventive

INTRODUCTION

Injuries because needles or sharp objects considered the most important work risks¹. It is a dangerous phenomenon where statistics estimate that there are three million health care workers exposed to blood carrying an infection source every year². Globally, these injuries caused 16,000 hepatitis C, 66,000 hepatitis B, and 200 to 5000 human immunodeficiency virus (HIV) infections per year. More than 90% of these infections are occurring in Third world countries, and most are preventable^{2,3}. There are studies report the risks of occupational blood-borne viruses (BBV) infection for HCWs in developed countries where a range of prevention measures have been applied. In contrast,

the condition for HCWs in Third world countries is not well registered, and their safety is neglected issue³. It is worth mentioning that More than two thirds of health care workers have contact with blood or body fluids throughout their working lives⁴. Based on study the cost of one injury without infection about three thousand dollars⁵. The case of infection caused by injury reach one million dollars or more spend in tests, follow-up, lost time and disability payments. Liver transplantation due to hepatitis C costs hundreds of thousands of dollars. Other costs of injuries include worker reparations, overtime, and expenses related to the recruitment and training of staff to replace the worker who is sick⁵. While there are no financial accounts for citation here, there should be a cost applied to replace nurses and other health care workers who have chosen to leave the care environment because of concerns about needle sticks¹. Programs and studies carried out by the International Council of Nursing and the World Health Organization on the prevention of injuries by needles and exposure to blood borne infection concluded the need to work on the

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use of safety tools for medical interventions, as well as the training on general precautions which have proved effective for the prevention of over 80% of injuries will assure that nurses can continue to provide quality patient care ⁶. About 62% - 88% of injuries are preventable ³. The world is suffering from a lack of healthcare workers, especially nurses, in the United States, for example in USA the nursing shortage may reach 800,000 vacant positions by 2020 ². There is a lot of suffering after the injury may be physical, psychological or emotional to the injured person and waiting for the result of lab tests after the injury lead to emotional disorder ⁽²⁾. Moreover there is devastating need for nursing and medical services in Iraq. Nurses shortage especially academic nurse is an important issue in AL-Amara city, Iraq, thus there is an urgent need for the development of policies to prevent injuries to maintain nursing staff, technicians and physicians. In study conducted in Baquba City, Iraq to explore prevalence of needle stick and sharp objects injuries among 240 Health Care Workers (HCW), study suggested 46.6% injuries among physicians and 18.7% injuries among nurses ⁷. This study would provide information to the policy makers in regard to the frequency of injuries, the sources of these incidents, action taken to prevent, and the factors contributing to these incidents. Policy makers can use these data to develop further measures and policies that would help in creating a safe workplace that could be free or with minimal occurrence.

MATERIALS AND METHOD

A descriptive exploratory survey in injuries by needles and sharp objects among health care workers in AL-Amara city, Iraq 2018. Non probability Purposive sample of 135 healthcare workers 32 Physicians, 23 lab technicians and 70 nurses was selected for the study, which consists of three parts. Part (1), demographic data form, It is compressed of eight item which are concerned with the healthcare workers demographic characteristics of healthcare workers age, gender, educational level of healthcare workers, number of experience years, job title, place of the work and number of training courses on the risk of injuries by needles and sharp objects among healthcare worker and part (2), Occurrence and contributing factors. Included 5 items all questions are multiple choice Part (3) Preventive measures included 7 items all questions are yes or no. The content validity of the study instrument was determined by presenting it to a panel of 12 experts both from the academia

and its reliability was A back translation was made by two linguist to back translate the study instrument to its original language; English language. There was no remarkable mismatching between the version translated to Arabic language and the original version in English language. Data were analyzed through the use of simple descriptive statistical data analysis approach (frequency, percentage, mean of score) and inferential analysis procedures (chi-Square) were used for the data analysis.

RESULTS AND DISCUSSION

The results of table (1) show that the majority of age group of the study sample are within (25-29) years (34.8%). The above table also shows that the majority of participants are male (56%). Concerning the years of experience, half of participants who are in the group (1-5) years (50.4%), Regarding educational qualification, more than one third of participants are bachelor's degree (35.6%), About job title more than half of participants are nurses (59%), With respect to current area working more than one fifth that work in the Operation Room (22.2%). A training course (NSI) approximately half of participants are in the none training course (48.9%), About hospitals samples distributed equally among three hospitals; Al-Sadr, Al-Zahrawi, and Missan pediatric hospital (n=45; 33.3%). Table (2) presents a description of the participant's experience of needle and sharp objects injuries such as frequency of injuries and Type of needle and sharp objects, Time of occurrence, Procedures, and main causes. 108 participants out of 135 reported they have been injuries (80%), the majority of incidence occurred by syringe needle (46.3%). Most of injuries occur during use the needle or sharp injuries (n=37, 34.3%). The majority of injuries happened during normal injection procedure (n=36, 33.3%). The main causes of injuries was workload (n=76, 70.4%). Table (3) a description of the preventive measures related to injuries that taken by health care workers to prevent infections. The majority of health care worker that injured with needles and sharp objects had been disinfect the area with an alcohol swab post exposure (N=105, 97.2%), followed by those who had been taken hepatitis B vaccine pre exposure (N=82, 75.9%), those who had been wear gloves during injury (N=82, 75.9%), those who had been allow injury to bleed (n=65, 60.2%), those who received NSI package (lab tests) after injury (n=42, 38.9%), those who had been Notify manager or supervisor of the exposure (n=40, 37%). those who had been Wash injury with soap and water (n=31, 28.7%).

According to the result in table 2 the occurrence rate of NSIs is 80%, this result is agreed by study done by [Amini](#) (90%).⁸. Our research showed the most common sharp tools use was syringe needle 46.3% and it's similar to the study obtain by Mitchell in 2015 who found that syringe needle 53% was the most common used objects⁹. the majority of injuries time occur during the use of the needle or sharp objects (34.3%) similar to the result obtain by Mitchell which was (33.0%)⁹. Our study showed that the most common procedure were normal injections (33.3%) table 2. This result inconsistent with Abu-Rmeileh 2012 who find the wound suturing is the most common (33.5%)¹⁰. Based on this study the main cause of injuries was workload 70.4% table 2. This result disagree with study done by Aderaw in 2013 which showed that lack of sleep and tiredness were the major causes of injuries¹¹. The prevalence of injuries by needles and sharp objects among health care workers, especially under the current circumstances of increased traumatic injuries, psychological disturbance and economic distress, will be higher than that of neighboring countries such as KSA and Jordan, despite of the fact that they are also developing countries as well Furthermore large one setting investigated were teaching hospital where lower experience may play a major role in the incidence of needle stick injuries. In this study most of health care workers had vaccinated against hepatitis B 75.9% table 3. This similar to study done by wicker S. in 2007 who found that 78.2% take the vaccine¹² and also ascertained Ebrahimi in 2007¹³. The health care workers allow the injury to bleed without making pressure 60.2% table 3. This result agree with study done by Jahangiry in 2016 who find that 99% allow the injury to bleed. but didn't wash injury with soap and running water 71.3% table 3. This result disagree with result obtain from study done by Jahangiry in 2016 who find that 75% wash injury with soap and running water; (37.0%) from injured health care workers notify manager or supervisor of the exposure table 3. This result agree with study obtain by Kanlee in 2005 showed 40.8%⁽¹⁵⁾. The largest proportion of health care workers were wearing gloves (75.9%) table 3. This result agree with study done Jahangiry M. 2016 who find that (70.4%) HCWs wear gloves¹⁴. Finally the highest number of health care worker did not made lab test after injury (61.8%) table 1 and this disagree with study done by Kommogldmo in 2016. It is important to mention that the Iraqi health regimen is different from other countries, there is no clear policy to establish basic

rules to prevent needle stick injuries and sharp objects to protect the health care workers

Table 1. Socio-demographic and job characteristics of respondents

Variables	Frequency	Percent
Age		
20-24	23	17.0
25-29	47	34.8
30-34	20	14.8
35-39	25	18.5
40-44	11	8.1
45-49	6	4.4
50-54	3	2.2
Gender		
Male	76	56.3
Female	59	43.7
Years of Experience		
1-5	68	50.4
6-10	22	16.3
11-15	27	20.0
16-20	12	8.9
21-25	4	3.0
26-30	2	1.5
Basic Educational		
High school	26	19.3
Associate degree	44	32.6
Bachelor's degree	48	35.6
Master's degree	4	3.0
Doctorate degree	13	9.6
Job title		
Physician	32	23.7
Nurse	80	59.3
Technician	23	17.0

Table 2. Occurrence, and Distribution of respondents by injuries, type of needle, time of occurrence, procedure, and main cause

Variables	frequency	percentage
Occurrence	108	80
Type of needle , and sharp objects		
Syringe needle	50	46.3
Intravenous catheter	7	6.5
Suturing needle	23	21.3
Scalpels and scissors	4	3.7
Ampoules	17	15.7
Others	7	6.5
Time of occurrence		
Opening the needle or sharp objects		
During use the needle or sharp objects	7	6.5
Recapping	37	34.3
Break the ampoule	34	31.5
While putting the item into the disposal container	17	15.7
After use and before disposal of the tool	4	3.7
	9	8.3
Procedures		
Normal injection	36	33.3
Suturing	32	29.6
Blood collection	22	20.4
Incision and cut	15	13.9
Others	3	2.8
Main cause		
workload	76	70.4
Inappropriate training	9	8.3
Handling uncooperative patient	13	12.0
Tired and lack of sleep	6	5.6
Busy and not attention	4	3.7
Total	108	100

Table 3. PREVENTIVE MEASURES

Variables	frequency	percentage
Vaccinated for hepatitis B.		
Yes	82	75.9
No	26	24.1
Allow injury to bleed.		
Yes	65	60.2
No	43	39.8
Wash injury with soap and water.		
Yes	31	28.7
No	77	71.3
Disinfect the area with an alcohol Swab.		
Yes	105	97.2
No	3	2.8
Notify your manager or supervisor of the exposure.		
Yes	40	37.0
No	68	63.0
Did you wearing gloves during injury		
Yes	82	75.9
No	25	23.1
Have you done lab tests after injury (Receive NSI Package) .		
Yes	42	38.9
No	66	61.1
Total	108	100

CONCLUSION

The majority of health care workers are exposed to NSI and sharp objects (80%). Some factors play an effective role in NSIs while others have methods to prevent them. Therefore, the recommendations in research, education, practical application and policy regulations are necessary and urgent to be applied to reduce injuries and create a healthy working environment.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing/ University of Misan, Iraq and all experiments were carried out in accordance with approved guidelines.

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Assessment of the Patients' Knowledge about their Disease for Rheumatoid arthritis at Baghdad Teaching Hospital

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ABSTRACT

The aim of the study was to identify the patients' needs to educational program in the context of their health problems, as expressed in their subjective assessment. A descriptive study design was carried out in the Outpatient Clinics for Rheumatology at AL- Yarmouk Teaching Hospital, from April to May 2018. A non –probability (purposive) sample was selected and composed of (40) adult (male and female) patients with rheumatoid arthritis who attend to Outpatient Clinics for Rheumatology. There were 40 patients included in the study. The mean age of the participants was (41.30 ± 9.90) years. Of the 40 respondents, the largest age category was of those between 40-49 years (35%). There were 27 (67.5%) females and 13 (32.5%) males. The mean of disease duration was 21 (52.5%) years. The results of the assessing show the level of knowledge about disease of patients with RA is very low. Therefore, the results show the need for education programs about exercise, diet, relaxation technique and information about their disease. There was no significant relationship between patients' knowledge domains and clinical characteristics, in addition there were no significant relationship between patients' knowledge domains and social-demographic characteristics at $p \geq 0.01$ value.

Keywords: Rheumatoid arthritis, RA, awareness; education.

INTRODUCTION

Rheumatoid Arthritis (RA) is one of the most important chronic inflammatory diseases affecting the joints and musculoskeletal systems. It is associated with swelling, stiffness and pain and can lead to significant loss of performance and mobility in severe cases². Although, RA defined as one of autoimmune diseases when the body's immune system attacks its own tissues, but the onset of RA is not clear. However, it can be attributed to genetic liability to the disorder, several viruses and bacteria such as Epstein- Barr-Virus and Mycobacterium tuberculosis, disruption of the immunological tolerance as well as weakening the immune system of people as a result of the psychological condition.³ Moreover, because of unknown etiology, cures of RA have not been discovered yet as well. Treatments and therapies

are applied largely to reduce symptoms and delay the progress of the disease¹. RA affects 0.5% to 1% of the general population worldwide, and it is more common in women than men. Although the prevalence is surprisingly constant across the globe, regardless of geographic location and race, there are some exceptions. For instance, in China the occurrence of RA is somewhat lower ($\approx 0.3\%$), whereas it is substantially higher in other groups such as the Pima Indians in North America ($\approx 5\%$). In Iraqi populations was reported at around 1%.⁴ Rheumatoid Arthritis is a disease that requires follow-up and long-term management. "The purpose of teaching a patient is to maintain or improve health, or, in some cases, to slow down the deterioration," said Loreg.⁵ Patient education programs have to be an integral part of treatment because of the pain and disability the people with arthritis face on a daily basis. Patient education is crucial as it allows better compliance and ability to cope with the psychological, physical and the social problems associated with the disease. Therefore, it has to be a complement to traditional medical treatment.⁶ Patient education is very important for the patient to comply

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with the treatment, to change behaviors and thus to prevent disability⁷.

MATERIALS AND METHODS

Design of the Study: A descriptive study design was conducted in the Outpatient Clinics for Rheumatology at AL- Yarmouk Teaching Hospital, from April to May 2018, A non-probability (purposive) sample of (40) of rheumatoid arthritis adult patient (male & female), above 18 years. and those who were coming for follow-up for more than 1 months were included. The selection of clients was simply randomly clients who have RA, who ethical approval informed consent was obtained from each participant included in this study.

Instrument: For the purpose of data collection, a questionnaire was used, which consists of three parts, **first part** concerning the demographic data form that included the gender, age, level of education, marital status, occupational status and monthly income of the patient, **the second part** concerning clinical characteristics included, the duration of the disease the chronic disease, drugs regulation and the allergy drugs of RA, the **third part** concerning the measure of rheumatoid arthritis patients' knowledge and their its needs. The ACREU rheumatoid arthritis knowledge questionnaire⁽¹⁾, was used to collect data from RA patients, which was translated into local language "Arabic". The questionnaire consists of 31 items covering (8) domains included (prognosis/ outcome (8), joint protection (5), energy conservation (2), pain management (3), coping strategies/feelings (9), exercise (2) and medications (2). The validity of the checklist was determined through presenting it to (21) specialist experts and its reliability was determined through using Cronbach's alpha coefficient. Finally, the test-retest reliability of the ACREU rheumatoid arthritis knowledge questionnaire and 10 patients were assessed twice in four-week intervals.

Data collection: The study was implemented in the outpatient clinics for Rheumatology at AL- Yarmouk Teaching Hospital. The patient who met the study criteria, were approached in the study, the patients were invited to participate in the study and explain the study objectives.

Statistical Analysis: The data analysis through use a descriptive statistical analysis procedures and inferential analysis procedures (SPSS 21).

RESULTS AND DISCUSSION

Table (1) shows that the socioeconomic status of the 40 participants, 27 (67.5%) were females and 13 (32.5%) were males. The overall mean age was 41.30 ± 9.9 years. Moreover, 14 (35.0%) of the participants were aged between 40-49 years. Based on their educational background, the most 18 (45%) of patients graduate from secondary school, 11(27.5%), with primary education and 4 (10%) with Higher education, and 6 (17.5%) had unknown educational backgrounds., (70.0%) of patients were married, 60.0% were Housewife. concerning monthly income. 10% of the patients had monthly income less than (300,000 ID.), (25%) of patients had a monthly income between (300,000 – 600,000 ID.), and majority (40%) of the patients had monthly income between (600,000 – 900,000 ID). whereas the remaining (25%) had a monthly income of more than (900.000 ID.). The results of table (2) show medical history for patients with RA, the table revealed that the most (75.0%) of the patients had chronic disease, (67.5%) of the patients taken drugs regularly. Base on drug allergy only (10.0%) of the patients had drug allergy. Concerning duration of the disease, high percentage (52.5%) of patients the duration range was (4-6) years, and (17.5%) of patients the duration was more than 7 years. Related ESR, the majority of patients were above the normal range. Table (3) presented the RA patient knowledge related the Prognosis, Outcome, Information about disease, joint Protection, energy conservation, and pain management, the table revealed that the mean score of knowledge of patients in all domains was very, except pain management domain was rated low. Table (4) The table revealed that the mean score of knowledge related the coping strategies, exercise, and medications was very, except pain management domain was rated low. The Results of table (5) presented that their No were significant relationship between Patients' knowledge domains and social-demographic characteristics at $p \geq 0.01$ value. The Results of table (6) presented that their No were significant relationship between Patients' knowledge domains and Clinical Characteristics at $p \geq 0.01$ value. About the age group (35%) of RA patients were in the age group 40–49 years with mean age (41.30 ± 9.9) years, this results comes along with a study¹³ that found that the sample age was (41–60) years old and is coming inconsistent with the findings of the study¹⁰ mentioned that the majority of study sample ages were between^{12, 13} years. A High percentage (45%) of the present study the

patient graduate from secondary school, this result agrees with in his study ¹³ who mentioned that the most (60%) of the sample in his study are graduating from secondary school. In additional other study¹² found that the (62.7%), of the sample were graduate from the Secondary School.

Table 1. Distribution of RA patients, according to demographic characteristics (n=40)

Variable		Frequency (F)	Percent (%)
Gender	Male	13	32.5
	Female	27	67.5
Age by years	20-29	6	15.0
	30-39	13	32.5
	40-49	14	35.0
	50-59	6	15.0
	Over 60	1	2.5
	Minimum	22	
	Maximum	61	
	Mean and Std. Deviation of patients' age	41.30	9.900
Marital Status	Single	6	15.0
	Married	28	70.0
	Widow	4	10.0
	Divorced	2	5.0
Level of education	Reads and Writes	6	17.5
	Primary School	11	27.5
	Secondary school	18	45.0
	Higher Education	4	10.0
Occupational status	Government Employee	3	7.5
	Un employee	2	5.0
	Privet Work	5	12.5
	Retired	2	5.0
	Housewife	24	60.0
	student	4	10.0
Monthly income (Iraqi Dinar) (ID)	less than 300	4	10.0
	300 - 600	10	25.0
	600 -900	16	40.0
	900 - More	10	25.0

Table 2. Distribution of RA patients, according to clinical characteristics (n=40)

Variable		Frequency (F)	Percent (%)
Chronic Disease	Yes	30	75.0
	No	10	25.0
Drugs Regulation	Regular	27	67.5
	Irregular	13	32.5
Drugs Allergy	Penicillin	4	10.0
	Sulfa drugs and another	3	7.5
	No allergy	33	82.5
Duration of Disease	1 - 3 Years	12	30.0
	4 - 6 Years	21	52.5
	7 - More	7	17.5
ESR	less than 20 mm/hr.	2	5.0
	20- 29 mm/hr.	8	20.0
	30 -39 mm/hr.	14	35.0
	40- 49 mm/hr.	13	32.5
	50-59 mm/hr.	3	7.5
	Minimum (16), Maximum (56), Mean and Std. Deviation 37.48±10.028		

Table 3. Mean, stander deviation and relative sufficiency of patients' knowledge related Prognosis, Outcome, Information about disease, Joint Protection, Energy Conservation, and Pain Management. n= 40

Domains	NO	Question	Mean	S.D	Grad
Prognosis, Outcome, Information about disease	1	For some people, rheumatoid arthritis causes very few problems	2.93	0.944	Low
	2	Meeting other people with rheumatoid arthritis in a group can teach you many things.	3.00	1.038	Low
	3	Rheumatoid arthritis is different in everyone.	3.00	0,906	Low
	4	Rheumatoid arthritis affects only the joints.	2.98	0.920	Very low
	5	Your doctor will tell you everything you need to know about your rheumatoid arthritis.	3.10	0.928	Low
	6	Most people with rheumatoid arthritis end up in a wheelchair.	2.70	1.018	Very Low
	7	The cause of rheumatoid arthritis is not known.	3.00	0.906	Low
	8	Rheumatoid arthritis sometimes goes away.	3.03	0.862	Low
	Total	Mean of means	2.96		

Cont... Table 3. Mean, stander deviation and relative sufficiency of patients’ knowledge related Prognosis, Outcome, Information about disease, Joint Protection, Energy Conservation, and Pain Management. n= 40

Joint Protection	1	Splints should be worn if you have pain in your wrists when you work with your hands	3.08	1.071	Low
	2	Ice treatments often make the joints swell.	3.20	0.823	Low
	3	If you have rheumatoid arthritis, the arches in your feet may need extra support.	2.83	0.874	Very Low
	4	You can protect the joints in your hands by using the palms of your hands instead of your fingers to do chores.	2.88	0.883	Very Low
	5	It’s good for your feet to wear supportive shoes in the house instead of slippers.	3.00	0.906	Low
	Total	Mean of means	2.99		
Energy Conservation	1	To save energy, people with rheumatoid arthritis should sit when working instead of standing.	3.13	0.883	Low
	2	Most people with rheumatoid arthritis have to quit their jobs.	2.80	0.883	Very Low
	Total	Mean of means	2.96		
Pain Management	1	A damaged joint hurts more when you rest it.	2.93	0.917	Very Low
	2	It is easy for your family/friends to tell when you are in pain.	2.98	1.000	Very Low
	3	Neck pain can be caused by a poor sleep position.	3.13	0.822	Low
	Total	Mean of means	3.01		

Table 4. Mean, stander deviation and relative sufficiency of patients’ knowledge related Coping strategies, Exercise, and Medications. n= 40.

Domains	NO	Question	Mean	S.D	Grad
Coping strategies /feelings	1	The presence of rheumatoid arthritis often results in family stress.	2.95	1.011	Very Low
	2	Many people with rheumatoid arthritis are scared about the future.	3.05	0.932	Low
	3	Anger is a common reaction when someone is first told they have rheumatoid arthritis.	2.89	0.832	Very Low
	4	It is common to feel depressed when you have rheumatoid arthritis.	2.93	0.888	Very Low
	5	People with rheumatoid arthritis often lose confidence in themselves.	3.00	0.784	Low
	6	There is no relationship between stress and rheumatoid arthritis.	2.88	1.017	Very Low
	7	All people with rheumatoid arthritis get “crooked joints”	2.90	0.841	Very Low
	8	Talking about your rheumatoid arthritis with someone you trust can make you feel better.	2.88	1.090	Very Low
	9	When you are having a good day, you should get all your chores done.	3.03	0.800	Low
	Total	Mean of means	2.94		
Exercise	1	When you are in a flare, you should stop all exercise.	3.13	0.723	Low
	2	If you have rheumatoid arthritis, the ability to fully straighten and bend your joints can be lost quickly.	3.05	0.932	Low
	Total	Mean of means	3.09		
Medications	1	When you are feeling well, you should reduce your arthritis medications.	3.00	1.013	Low
	2	The pharmacist is a good source of information about your arthritis medications.	3.03	0.800	Low
	Total	Mean of means	3.01		

Table 5. Association between social-demographic characteristics and patients' knowledge related

Variable		Mean	Std. D	Test	Sig.
Gender	Male	94.0	5.99	t= 1.339	.246 (NS)
	Female	91.6	5.12		
Age	20-29	91.6	5.39	F=.318	.864 (NS)
	30-39	91.8	6.02		
	40-49	93.7	5.25		
	50-59	91.5	6.09		
	60-More	91.0	6.03		
Level of education	Illiterate	99.0	5.35	F= .600	.619 (NS)
	Reads and Writes	92.8	4.44		
	Primary School	90.1	4.81		
	Secondary school	93.1	6.36		
	Higher Education	93.2	3.40		
Marital Status	Single	93.1	7.19	F= .919	.464 (NS)
	Married	92.8	5.01		
	Widowed	90.0	7.16		
	Divorced	89.0	4.24		
Occupation	Government Employee	96.0	8.88	F= .919	.464 (NS)
	Un employee	91.5	0.70		
	Privet Work	96.6	3.78		
	Retired	93.5	9.19		
	Housewife	90.8	4.76		
	student	93.7	7.04		

Table 6. Association between Clinical Characteristics and RA patients' knowledge related.

variable		Mean	Std. D	Test	Sig.
Chronic Disease	Yes	93.0	5.66	t= 1.339	.254 (NS)
	No	90.7	4.64		
Drugs Regulation	Regular	93.0	5.74	t= .917	.344 (NS)
	Irregular	91.2	4.83		
Drugs Allergy	Penicillin	88.50	4.12	F= 2.874	.069 (NS)
	Sulfa drugs and another	87.6	6.65		
	No allergy	93.3	5.21		
Duration of Disease	1 - 3 Years	92.8	5.13	F= .061	.941 (NS)
	4 - 6 Years	92.1	5.67		
	7 - More	92.5	6.16		
ESR	less than 20	97.0	8.48	F= 1.255	.306 (NS)
	20 -29	91.2	5.11		
	30 -39	90.7	5.63		
	40 -49	93.4	4.61		
	50 - more	96.0	6.92		
Previous of Surgery	Yes	92.5	6.89	t=.007	.933 (NS)
	No	92.3	4.96		

Cont...Table 6. Association between Clinical Characteristics and RA patients’ knowledge related.

If has any Type Of Operation	Surgery for eye	94.4	7.16	F=.410	.747 (NS)
	Hernia	91.7	8.53		
	another surgery	89.5	3.53		
	Doesn't has Surgery	92.3	4.96		

CONCLUSION

Rheumatoid arthritis is a chronic inflammatory disease requiring long-term management and counselling, so focus to given to the counselling and education of the patients. On the other hand, patient education in rheumatoid arthritis (RA) is strongly recommended to support patient management.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Adult Nursing, College of Nursing, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Immunohistochemical Expression of CDX2 Protein in Iraqi Patients with Human Gastric Cancer (HGC)

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ABSTRACT

This study aimed to evaluate the IHC expression of CDX2 protein in HGC patients and control groups and also to study the correlation between IHC expression of the CDX2 and different clinicopathological variables such as: age, gender, histopathological subtype, grade, and stage of the tumor in HGC cases. the retrospectively sectional study for the period from 2014 to 2018 included a total of 60 formalin fixed paraffin embedded blocks of the HGC tissue (partial or total gastrectomy specimens) that collected from the archived materials of the Department of Pathology of Baghdad Teaching Hospital and the Center of Gastrointestinal and Hepatic Diseases, and also some samples were collected from other private laboratories. The IHC expression of the CDX2 was significantly increased in HGC group compared with control groups ($p < 0.0001$). A clinic-pathological assessment revealed that patient's samples involved 20 males and 10 females; Male to female ratio was 2:1. The age of patients was ranged between 18-76 years with a mean \pm standard error of (48.39 \pm 12.39) year. The majority of the HGC cases, in this study (53.3%) were above 48 years of age. the commonest histopathological subtype was the diffuse subtype (46.6%).

Keywords: CDX2, HGC, IHC expression

INTRODUCTION

Human Gastric Cancer (HGC) is fifth most common malignancy diseases in the world with nearly one million new cases of HGC are reported in 2012 preceded by lung, breast, colorectum and prostate cancers respectively. It is the third leading causes of cancer related death throughout the world in both sexes^{1, 2, 3}. Almost two thirds of them occur in developing countries with peak incidence in the Far East regions including China, Korea and Japan. In Iraq, HGCs have come at the 7th rank among the other body cancers in 2013 and it is the 7th commonest cancer at in men and women⁽⁴⁾. The male: female ratio equals to 1.6:1⁵. The large majority approximately 95% of HGC are adenocarcinoma⁶. Several abnormalities in oncogenes

and tumor suppressor genes have been identified in HGC. This study focused in this study on CDX2 protein, which is a good-established gastric marker protein and is usually used for the clinical evaluation of HGC. There have been many previous articles demonstration the IHC expression of CDX2 protein and prognosis of HGC, but the correlation between the IHC expression of CDX2 protein and HGC is still controversial. CDX2 protein, an intestine-specific home box gene product, plays fundamental role in intestinal development; CDX2 & CDX1 is expressed in the in hindgut related organ such as intestine that assume the responsibility of cell differentiation⁷. Several studies have been indicated that ectopic IHC expression of CDX1 or CDX2 is detected in intestinal metaplasia of the stomach. The aim this study is to assess whether the CDX2 protein could be used as a predictor in patient with HGC and also examine the relationship between the IHC expression of CDX2 protein in normal stomach and in HGC cases and its correlation with different clinicopathological risk categories such as: age, gender, histopathological type, grade, and stage of the tumor in HGC.

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MATERIALS AND METHOD

A retrospective audit study on 60 cases for the period from 2014 to 2018, the samples were divided into two groups 30 patients with HGC and 30 healthy samples with Normal stomach (as control group). 60 formalin fixed paraffin embedded blocks of the HGC tissue (partial or total gastrectomy specimens) are selected randomly from archived materials of Pathology laboratory of Baghdad Teaching Hospital and the Center of Gastrointestinal and Hepatic Diseases, and some samples were collected from private laboratories in Baghdad in this study. All clinicopathological information including age, gender, histopathological type, grade and stage of tumor were taken from the patients reports. One section of the paraffin embedded of HGC tissue blocks was stained with H&E and reviewed the histopathological diagnosis, while another one section were stained with IHC was carried out with the CDX2 monoclonal antibody (abcam, UK; optimal dilution, 1:250). Immunohistochemistry Deparaffinization and endogenous peroxidase inactivation of clinical tissues were performed For CDX2 and the samples were hydrated heating in 50 mm EDTA buffer solution (pH 7.0) at 95c was then placed in the water bath (Gallen kump, England) for 30 min for antigen retrieval. The primary anti-CDX2 antibody was applied for one hour at room temperature. After washing in PBS two times, the secondary antibody (Dako, Denmark) was applied for 30 min at room temperature, and incubation with antibody conjugated to HRP (Dako, Denmark) for 10 min at room temperature. After that, the slides were counterstained with Mayer's hematoxylin for 5min and dehydrated in alcohol prior to mounting. IHC reaction is considered positive when brown staining is nuclear for CDX2, the positive control for CDX2 IHC reaction was taken from the Colon carcinoma. Technical negative control for CDX2 was obtained by omission of the primary antibody. The results of IHC expressions of the CDX2 were analyzed in a semiquantitative fashion abased to Halder and his coworker⁸ Score 0: 0-5%, Score 1: 6-35%, Score 2: 36- 65%, Score 3: \geq 66% of tumor cells were positive. The IHC expression of the CDX2 was analyzed statistically in relationship to Clinicopathological parameters of HGC using Fisher's exact probability test, Student t-test. Values were considered statistically significant when $P < 0.05$.

RESULTS AND DISCUSSION

30 cases of control group included 17(56.6%) female and 13(43.3%) male with a mean of age 39.27 ± 4.266 and rang between 33-48 years. 30 of HGC tissue blocks were studied and the results revealed that the samples included 20 (66.6%) males & 10 (33.3%) females and male to female ratio was 2:1. The age of patients was ranged between 18-76 years with a mean \pm SD 48.39 ± 12.39 years. For age distribution of HGC cases, the samples observed that 16(53.3%) of HGC cases were above \geq 48 years, while 14 (46.6%) were <48 years. Large proportion of the histopathological subtype showed the predominance of diffuse subtype 14 (46.6%) compared to intestinal subtype 12(40%). This study revealed that the majority of cases were moderately differentiated 19 (63.3%) followed by poorly differentiated 10 (33.3%) of the cases and 1(3.3%) case of well differentiated. The majority of deeding invasion of HGC cases 23 (76.6%) falls in stage pT3 subserosa. According to TNM staging system, the majority of IHC expression of the CDX2 in HGC cases 16(53.3 %) fall in stage advanced disease (III&IV), while 10(33.3%) was in stage early disease (I&II).

CDX2 immunohistochemical expression

The IHC expression of the CDX2 in HGC cases and control groups were measured by IHC. The mean percentage of CDX2 protein was significantly increased ($p < 0.0001$) in HGC cases than in control group, the differences in frequency of distribution of cases with positive and negative expression of CDX2 of the studied cases are summarized as shown in table (1), fig. (1). CDX2 was not expressed immunohistochemically in all studied normal stomach cases (0%) and expressed in 21 (70%) cases of HGC, with significant increase in its expression with increasing of the lesions severity ($p < 0.001$). Regarding CDX2 staining scoring, the majority of cases of carcinoma 30 out of 10(33.3%) showed in score +3, while only 7 out of 30 cases of HGC (23.3%) were in score +2 and the rest of the cases showed 4(13.3%) in score +1. 9 out of 30 (30%) were negative for CDX2. The age of the patients which included 12 (40%) of HGC cases were \geq 48 years and these showed positive CDX2 expression, and 9(30%) of HGC cases were positive CDX2 expression in the age <48. Out of 20 male cases of HGC, only 12(40%) cases showed positive CDX2 expression, while out of 10 female cases of HGC, only 9(30%) cases showed positive CDX2 expression;

statistically there was no significant relation between CDX2 expression with age and gender as shown in Table (2). In consideration to the histopathological subtype, out of 14 cases of diffuse subtype HGC, 9 (30%) cases of them showed positive CDX2 expression, while out of 30 cases of intestinal subtype of HGC, only 10(33.3%) cases showed positive CDX2 expression; although these results were statistically not significant As shown in table (2). Out of 19 cases of moderately differentiated type of HGC, 16(53.3%) cases of them showed positive CDX2 expression, while out of 10 cases of poorly differentiated type of HGC, 4(13.3%) cases of them showed positive CDX2 expression. Regarding the relationship between HGC cases and stage of tumor, out of 30 cases of HGC falling in stage pT3 (subserosa), 19(63.3%) cases of them showed positive CDX2 expression, while one case falling in stage pT2 (muscularis propria) & pT4 (serosa) showed positive CDX2 expression. these results significantly detected a correlation with tumor invasion and grade tumor p value = 0.014 and 0.03 respectively. As shown in table (2). Worldwide, HGC is one of the commonest cancers after lung cancer and a major cause of mortality and morbidity, especially in developing countries⁹. The etiology of HGC includes both genetic and environmental factors such as *H. pylori*¹⁰. Multiple genetic alterations are detected not only in gastric carcinoma, but also in tumors at other sites. In HGC, CDX2 is present solely in tumor cells while it is not so in adjacent normal stomach mucosa. It is also present in nucleus of pre lesion epithelium surrounding tumor in varying degrees specially, intestinal metaplasia¹¹. In the present study has shown that CDX2 expression was significantly higher in carcinomas than normal stomach cases (70%versus 0%, p<0.0001). All control cases were negative for CDX2 expression. This observations of this study are comparable to the literatures which stated that the CDX2 was not expressed in normal stomach mucosa

with increase in its expression with increasing severity of the lesion from normal to invasive HGC^(12,13,14). Taking the age in consideration, this study revealed non-significant association between patient's age and IHC expression of CDX2. This result nearly compatible with that obtained by other study done by Abdul-Azeem & Radi¹⁵, and also with a study of Zhang *et al.*¹⁶. Also non-significant correlation was found between IHC expression of CDX2 and patient's sex. The slightly increase in the expression rate in males than females could be attributed to the higher incidence rate of HGC in males compared to females, and similar results were seen in different studies^{17,18}. Concerning the histopathological subtypes of HGC, this study shows non-statistically significant difference in IHC expression of the CDX2 in histopathological subtype of HGC, This result is consistent with done by other studies. On the contrary to the above results, some studies found different observations. Some of these studies had found a significant relationship between IHC expression of the CDX2 and histopathological subtype of HGC, the positivity rates were higher in intestinal subtype of HGC than diffuse subtype. Actually it was difficult to interpret the causes behind such conflicting data, it could be attributed to different factors such as geographical, racial, technical, analytical as well as the results have been interpreted using a wide variety of protocol variables and scores, which makes the comparison between studies rather difficult. Regarding the tumor grade of HGC, in the current study was found statistically a significant difference in IHC expression of the CDX2 among different grades of studied HGC cases. The current work showed a significant lower CDX2 in poorly differentiated and higher value was detected in moderately differentiated. This result agrees with results similar other studies. Some studies are in discordance to the present one.

Table 1. IHC expression of CDX2 among studied groups

Studied group	CDX2 expression score				expression
	0	+1	+2	+3	
Control cases	30(100%)	0(0%)	0(0%)	0(0%)	(%0)0
HGC cases	9(30%)	4(13.3%)	7(23.3%)	10(33.3%)	21(70%)
Total	39(65%)	4(16.6%)	7(11.6%)	10(16.6%)	(34%)21
p-value	P= 0.0001				

Table 2. Distribution of CDX2 expression in HGC cases in relation to different studied Clinic pathological characteristic

Clinic pathological characteristic		CDX2 expression		p-value
Age	>48	positive	9(30%)	P= 0.53 ^{N.S}
		negative	5(16.6%)	
	≥48	positive	12(40%)	
		negative	4(13.3%)	
Gender	Male	positive	12 (40%)	P=0.29 ^{N.S}
		negative	8 (26.6%)	
	female	positive	9 (30%)	
		negative	1 (3.3%)	
Subtype of tumor	intestinal	positive	10(33.3%)	P=0.24 ^{N.S}
		negative	2(6.6%)	
	diffuse	positive	(30%)9	
		negative	5(16.6%)	
	mixed	positive	2(6.6%)	
		negative	2(6.6%)	
Tumor grade	Well differentiated	positive	(3.3%)1	P= 0.03
		negative	0(0%)	
	Moderate differentiated	positive	(53.3%)16	
		negative	3(10%)	
	poorly differentiated	positive	(13.3%)4	
		negative	6(20%)	
Tumor invasion	pT2	positive	(3.3%)1	P= 0.014
		negative	(3.3%)1	
	pT3	positive	19(63.3%)	
		negative	4(13.3%)	
	pT4	positive	1(3.3%)	
		negative	4(13.3%)	
TNM stage	I&II	positive	10(33.3%)	P=1.00
		negative	4(13.3%)	
	III&IV	positive	11(36.6%)	
		negative	5(16.6%)	

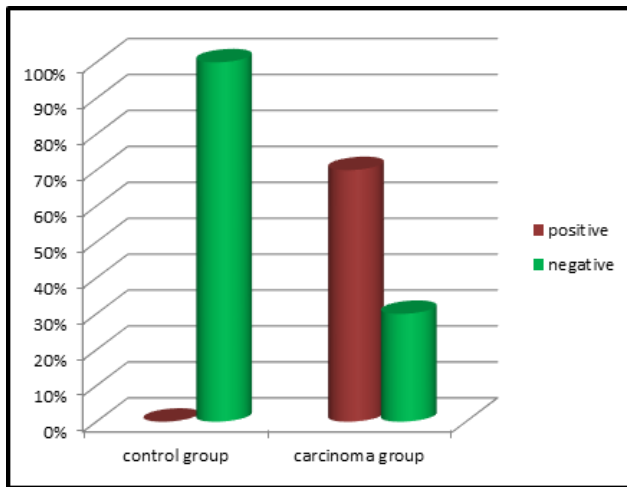


Figure 1. IHC expression of CDX2 among studied group

CONCLUSION

This study showed that the IHC expression of the CDX2 was increased in carcinoma tissue, the overall expression of CDX2 in HGC cases in the present study was 70% and there was no significant correlation between IHC expression of the CDX2 and different clinicopathological variables such as: age, sex of patients, histopathological subtype and TNM stage. While there was significant correlation between IHC expression of the CDX2 and tumor grade in which CDX2 expression was more common in moderately differentiated type HGC cases than in poorly differentiated type. From the above results it is obvious that CDX2 plays an important role in the progression of the gastric neoplastic transformation and has utility to differentiate premalignant from malignant lesions of the HGC, and this might improve the accuracy, precision and sensitivity of gastric lesions diagnosis. The relationship between the IHC expression of the CDX2 and the tumor grade may be a useful additional prognostic factor.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Biology/ College of Education for Pure Science (Ibn- AL-Haitham)/ University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Association between Transcription Factors 7-like 2 (rs7903146) Polymorphism and Some Renal Biomarkers with Type 2 Diabetic Nephropathy Complications

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ABSTRACT

Diabetes mellitus as the most prevalent metabolic disease is a multifactorial disease which is influenced by environmental and genetic factors. In this systematic review, we assessed the association between genetic variants and diabetes/its complications in studies with Iraqi populations. Conducted in this study was to investigate the possible role TCF7L2 rs7903146 (C/G) variant on susceptibility of T2DM among Iraqi type 2 diabetic patients with nephropathy complications and its relations with some type of kidney biomarkers. This case-control study included 100 T2DM patients and 100 patient with kidney failure 100 healthy person (control group). The results confirm the association between the TCF7L2 rs7903146 polymorphism and increase risk for type 2 diabetes in Iraqi an populations.

Keywords: Single nucleotide polymorphism; type 2 diabetes mellitus; transcription factor 7-like 2 (TCF7L2).

INTRODUCTION

Type 2 diabetes is associated with impaired insulin secretion. Both 1st and 2nd phase insulin secretion are reduced, but the effect is particularly pronounced for the 1st phase. Although both genetic and environmental factors are thought to play a role, the processes culminating in impaired insulin secretion are not completely understood, but both genetic and environmental factors are thought to play a role. Over the past 2 years, genome-wide association scans have transformed the genetic landscape of type 2 diabetes susceptibility. TCF7L2, the susceptibility gene with the strongest effect on disease susceptibility discovered to date, was conferred pre genome-wide association¹. In 2006, with rapid replication TCF7L2 of its consequence on diabetes susceptibility in multiple population was positional candidate gene that mapped to region spanning 215.9kb on human chromosome 10q25 with replicated linkage to T2DM¹¹. The incidence and prevalence of diabetes mellitus (DM) have increased sharply throughout the world. According to the latest report, the

prevalence of DM has increased to 11.7% in China² and 9.1% in the world³. The total number of adult diabetes is expected to rise to 642 million by 2040³. Diabetic nephropathy (DN), one of the most serious complications of DM, is a progressive kidney disease caused by damage to the capillaries in the kidneys' glomerular. End-stage renal disease (ESRD) is the most severe form of chronic kidney disease. Also known as Stage 5 chronic kidney disease or kidney failure. DN is the leading cause of ESRD in the Europe, Japan, and the United States⁴. DN was also the major cause for 40.4% of newly developed ESRD in the United States^{5,6}. In the UK, it was estimated that around one third of patients with ESRD were due to diabetes⁷. In Korea, according to the Fifth Korea National Health and Nutrition Examination Survey in 2011, the prevalence of DN was 26.7%⁸. In China, the Shanghai Diabetic Complications Study reported that the prevalence of DN was 26.2%⁹. The expenditure for people with DN are extraordinarily high. In the Medicare population alone, DN-related expenditures among this mostly older group were nearly \$25 billion in 2011¹⁰. Therefore, earlier diagnosis and prevention of DN become imminent. However, the mechanism of DN is complicated, in addition to the risk of poor glycemic control and hypertension, inherited factors are considered to play an important role in its progression.

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A systematic review showed that the prevalence rate of type 2 diabetes in Iraq was 10.2% of the population, ranking ninth in the Arab world, the world's thirty most in terms of injuries. Transcription factor 7-like 2 (TCF7L2) gene is located on chromosome 10q25.3¹¹, which encodes a transcription factor with a high-mobility box and functions in gene activations related to downstream events of the when signaling pathway. TCF7L2 has been revealed as an susceptibility gene for type 2 diabetes¹². There are at least four well-studied single nucleotide polymorphism (SNP) markers in the human TCF7L2 gene, which are associated with T2DM. viz, rs 7903146, rs7901695, rs12255372 and rs11196205. Previous studies have shown an association between T2DM and rs7903146 polymorphism of (TCF7L2) gene. There is no inclusive information for genetic association studies of diabetes in Middle Eastern population including Iraqi an population. The aim of this study was to investigate the possible role TCF7L2 rs7903146 (C/G) variant on susceptibility of T2DM among Iraqi type 2 diabetic patients with nephropathy complications and its relations with some type of kidney biomarkers.

MATERIALS AND METHOD

Study design

A case – control study.

Patient's classes

One hundred (100) patients with type 2 diabetes mellitus and one hundred (100) patients with type type 2 diabetes mellitus with Kidney failure who admitted to some of Iraqi teaching hospital as well as one hundred (100) healthy person (control group).

Sample collection and processing

Blood samples were collected in the morning by venipuncture using (10 mL) disposable syringes. Blood was divided into two parts :

The first will be used for (biochemical analysis) 8ml was put in the gel tube and left to clot for 30 minutes in room temperature and then separated by centrifugation at 4000rpm for 5 minutes .

The second will be used for (molecular analysis) 2 ml blood was put into EDTA tube , mixed gently and put on shaker for DNA extraction .

Parameters to be measured:

Glycated hemoglobin (HBA1c)

serum Urea and creatinine levels

serum lipid profile (total cholesterol, HDL,LDL,VLDL,TG)

serum glucose level.

Genotype analysis

Genomic DNA was be extraction from both healthy and patient groups.

The purity and concentration of extraction DNA was be assessed by specific prime.

AGAGAGCTAAGCACTTTTTAGACAC C allele

AGAGAGCTAAGCACTTTTTAGACAG G allele

AGATGAAATGTAGCAGTGAAGTG Generic primer

Selected PCR protocol to verify the SNP at the axon of intended gene, in addition to another one at intone.

Amplifying the segment of gen contain SNP by PCR and electrophoresis techniques.

correlation studies between the different phenotyping and genotyping data obtained.

The preferred condition which provided the best result was addition of:

12.5 µL mater mix

1.5 µL C allele

1.5 µL G allele

1.5 µL Generic primer

5 µL DNA sample

4.5 µL nuclease free water. A total reaction volume is a 26.5 µL that added to the 500µl PCR tube at 25° C then, centrifuged for 30 seconds at 2000 xg in a micro centrifuge for mixing the sample tubes and then placed in thermocycler.

Statistics

Genotype and allele frequencies were calculated

for the described SNPs. The groups were compared using the χ^2 test to analyze the statistical significance of the difference in allelic distribution of various polymorphisms in patients and controls. Values of $p < 0.001$ were considered statistically significant. Odds ratio was performed using MedCalc for Windows, version 7.4.1.0 (MedCalc Software, Mariakerke, Belgium)

RESULTS AND DISCUSSION

Clinical and biochemical characteristics of study subjects. The current study included 300 subjects (100 DM, 100 DN and 100 healthy individuals). The clinical and biochemical characteristics of the recruited individuals were presented in Table (1). It shows significant differences in (Glucose, Urea, Creatinine, Triglyceride, Cholesterol, LDL, HDL, VLDL, HbA1C) in the group of DM/DN patients when compared with those of the health group. However, no significant difference was seen in Age.

Genotype SNP rs7903146 for DN

Allele-Specific PCR Assay to Genotype SNP rs7903146 in TCF7L2 Gene for Rapid Screening the patient with DN The amplification product of TCF7L2 Gene polymorphism was obtained to have a size of 197 bp. The PCR product was electrophoresed on 1.5% agarose and directly visualized with ethidium bromid under UV light. The amplification and the size of the resulted amplicons were confirmed by agarose gel electrophoresis analysis Figure (1).

Genotype SNP rs7903146 for DM

Allele-Specific PCR Assay to Genotype SNP rs7903146 in TCF7L2 Gene for Rapid Screening the patient with DM The amplification product of TCF7L2 Gene polymorphism was obtained to have a size of 197bp. The PCR product was electrophoresed on 1.5% agarose and directly visualized with ethidium bromid under UV light. The amplification and the size of the resulted amplicons were confirmed by agarose gel electrophoresis analysis Figure (2). Through the results described in the research we can conclude the following: High concentration of glucose, lipids (TG, TC) and lipid proteins (LDL, VLDL) with low concentration of (HDL) in blood type 2 diabetic patients and also in kidney patients compared to control group. This is consistent

with many previous studies[13,14]. Which indicate a higher glucose concentration in patients with type 2 diabetes than in control group. The reason for the high level of glucose in people with type 2 diabetes is due to lack of insulin secretion or a defect in the resistance of insulin receptors in the body or in the pancreas and dysfunction of the pancreas and metabolism. There was no apparent significant relationship between the age of type 2 diabetic patients and renal failure patients. It was found that the relationship between the level of lipids (TG, TC) and glucose is significant in the blood type 2 diabetics and control group and also this relationship is significant morbidity between these lipid and kidney patients with diabetes. The relationship between lipid protein analysis (LDLc, VLDL) was significantly higher in the blood of type 2 diabetic patients and diabetic kidney patients than in control group. It was also found that the proportion of these lipid proteins higher in patients with diabetes kidneys than in patients with type II diabetes. The relationship between high density lipoprotein (HDLc) and glucose is significantly reversed in the blood of type 2 diabetics, as well as in the blood of kidney patients compared to control group, where they are inversely insignificant. (HDLc) was found to be lower in patients with diabetes than in patients with type 2 diabetes who did not have kidney disease. The relationship between the level of sugar cumulative (HbA1C) positive morbidity in the blood of patients with diabetes type II compared to the level in the control group. The relationship between blood glucose of type 2 and kidney and ages patients is not significant with control group. As for urea, it was found that there was a significant relationship between the proportion of urea in patients with type 2 diabetes and control in the control group. While the relation was significant between the proportion of urea in people with kidney disease and control group. The ratio of creatinine in the serum of people with diabetes is significantly lower with its level in the control group, while this relationship is significantly stronger among kidney patients and its level in control group. In the genetic analyzes (CC, CG, GG), the statistical results showed that there is significant difference between the disease and control group and this is evident in the values of (P-Value) in addition to the value of OR (Odds ratio)

Table 1. The standard deviation, rate and probabilistic level of some clinical and biochemical characteristics is in serum of patients' and control group

Parameter	Control subjects Mean ±SD	DM Mean ±SD	DN Mean ±SD	P value
No (M/F)	100(59/41)	100(42/58)	100(49/51)	-
Age (y)	50.456.2	53.588.6	49.59 8.21	No significant
Glucose (mg /dl)	101.4 7.53 A	26294.4 b	136.783.9 c	<0.001
Urea (mg /dl)	30.64 8.59 B	31.7 15.4 b	177.7 62.4 a	<0.001
Creatinine (mg /dl)	0.8410.171 B	0.9850.302 b	10.2 4.7 a	<0.001
Triglyceride(mg /dl)	108.6 35.6 B	195.7 124 a	126 86.3 b	<0.001
TC (mg/dl)	147 29 B	206 54.3 a	153.2 50.8 b	<0.001
HDL (mg/dl)	41.8 11.7 A	39 10 a	29.4 10 b	<0.001
LDL (mg/dl)	84 30.5 C	127.9 48.4 a	98.4 39.2 b	<0.001
VLDL (mg/dl)	21.7 7.11 B	39.1 24.8 a	25.317.26 b	<0.001
HbA1C(%)	5.06 0.36 C	10.214 2.24 a	6.03 1.6 b	<0.001

Table 2. Results of the assessment of genotype and allele frequencies DN

TCF7L2	Control n=100	DN n=100	Unadjusted OR (95% CI)	P value
Co dominant				
CC(Reference)	89	10		
CG	6	85	126.08 (43.91-326.1)	<0.01
GG	5	5	8.9 (2.19-36.14)	<0.01
Dominant				
GG+CG	11	90	72.8 (29.45-180)	<0.01

Cont... Table 2. Results of the assessment of genotype and allele frequencies DN

Recessive				
CC+CG(Reference)	95	95		
GG	5	5	1 (0.28-3.56)	1
Additive				
2(GG)+CG	16	95	5.93 (3.25-10.83)	<0.01
MAF%	16%	95%		

Table 3. Results of the assessment of genotype and allele frequencies DM

TCF7L2	Control n=100	DM n=100	Unadjusted OR (95% CI)	P value
Codominant				
CC(Reference)		89	15	
CG	6	78	77.13 (28.54-208.5)	
GG	5	7	8.306 (2.33-29.62)	<0.01
Dominant				
GG+CG	11	85	45.84 (19.93-105.4)	<0.01
Recessive				
CC+CG(Reference)		95	93	
GG	5	7	1.43 (0.43-4.66)	0.55
Additive				
2(GG)+CG	16%	92	5.87 (3.21-10.72)	<0.01
MAF%	16%	92%		

CONCLUSION

Conducted in this study was to investigate the possible role TCF7L2 rs7903146 (C/G) variant on susceptibility of T2DM among Iraqi type 2 diabetic patients with nephropathy complications and its relations with some type of kidney biomarkers .this case –control study included 100 T2DM patients and 100 patient with kidney failure 100 healthy person (control group). The results confirm the association between the TCF7L2 rs7903146 polymorphism and increase risk for type 2 diabetes in Iraqi an populations.

Financial disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al-Furat Al-Awsat Techniques, Kufa, Iraq and all experiments were carried out in accordance with approved guidelines.

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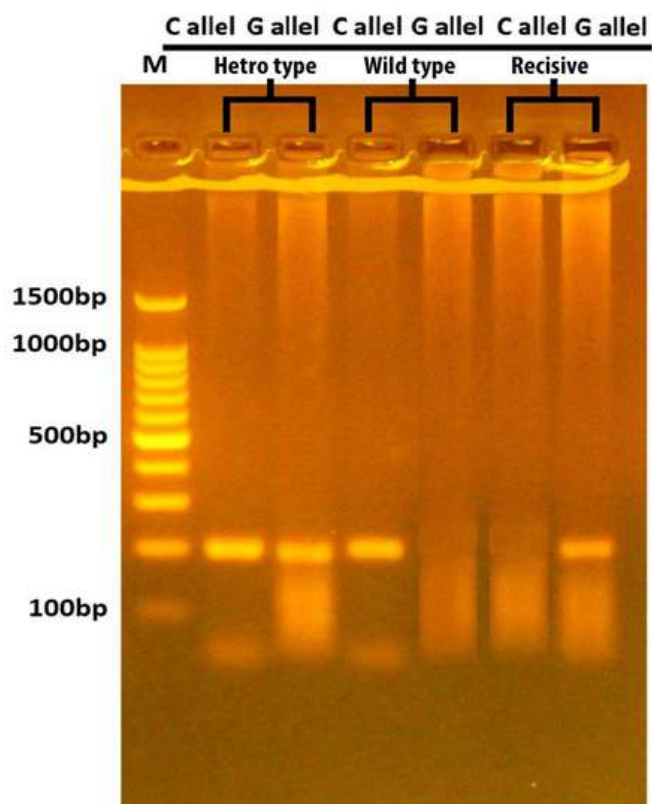


Figure 1. Product of TCF7L2 gene polymorphism analyzed by agarose gel electrophoresis. Line 1: DNA marker , line 2-3 heterozygous , line4-5 wild type, line 6-7 homozygous.

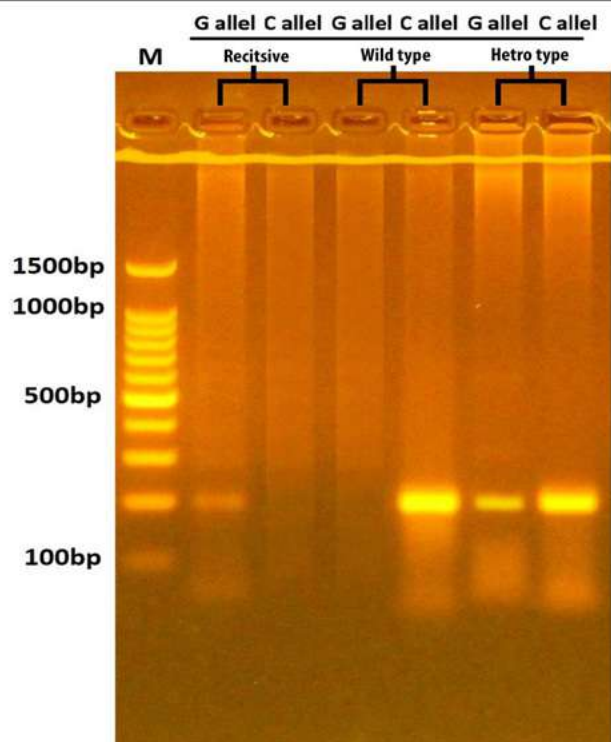


Figure 2. Product of resisten gene polymorphism analyzed by agarose gelelectrophoresis. Line 1: DNA marker 2, line 2-3 homozygous, line4-5 wild type, line 6-7 heterozygous.

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Effect of Vitamin D Deficiency in Pregnant Woman

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ABSTRACT

Vitamin D deficiency (VDD) is a serious health problem for pregnant woman and their children. Because of the poor cultural and economic situation suffered by society and the adoption of the wrong system of nutrition and insufficient exposure to the sun and incorrectly. Vitamin D deficiency results in complications for newborns, which include low birth weight, low growth and respiratory infection. The ratio of the mother also causes vitamin D deficiency to several complications, including pregnancy diabetes due to a change in the proportion of glucose in pregnancy, septicemia and bacterial vaginosis. This complication may be due to lack of vitamin D supplementation by pregnant women. The association of vitamin deficiency during pregnancy with biochemical reactions affects the fetus in the formation of the skeleton, resulting in children with congenital rickets and fractures. Objectives: To assess the vitamin D deficiency in pregnant woman and her fetus health state, to identify the effect of vitamin D deficiency in pregnant woman and her fetus.

Keywords: *Effect, Vitamin D deficiency, pregnant woman*

INTRODUCTION

The world community today is suffering from some unhealthy behavioral changes towards the lack of exposure to the sun and incorrectly, in addition to the lack of intake of cod liver oil or so-called omega-3, which leads to risk of skin cancers and the exposure of children to rickets¹. Vitamin D has fat solubility and also has the ability to form a steroid hormone inside the body, and plays an important role in the balance of calcium and phosphorus in the shortage causes rickets in children, and osteomalacia in adults². Vitamin D deficiency lead to weak body immunity, the body's willingness to develop cancer, cardiovascular disease, diabetes, rheumatic diseases, weakness and chronic pain in the muscles, and neuropsychiatric weakness³. The aim of this study is to assess the status of vitamin D in this case of the mother and its effect in the newborn, in the case of failure program to introduce programmed support for pregnant women and inadequacy of giving pregnant women vitamin D supplements. Will lead to weak fetal growth and thus develop into the birth of

disabled children and the most dangerous of them hit the rickets⁴. World ranging from 18-84% depending on the country and the habits worn by the country⁵. Therefore, mothers and their children should consult the health centers and hospitals for the necessary tests for vitamin D, and receive important instructions to prevent vitamin D deficiency during pregnancy and lactation its impact on the fetus and the newborn in childhood, in order to reduce the future development of chronic diseases in adulthood⁶.

METHODOLOGY

A descriptive study on non-probability sample (purposive sample) of one hundred Twenty (120) women to assess the effect of vitamin D deficiency in pregnant women who attending outpatient clinic for seeking treatment at Baghdad General Teaching Hospital, clinic of Mother and Child Center in Sheikh Omar, Advisory clinic at ALawiya Teaching Hospital. The questionnaire form was consisted of (4) main parts: Demographic characteristics, Reproductive Information Medical conditions, and Life Style Information. The data were collected by using interview method and self-report techniques with study participants. The data were collected by using interview method and self-report techniques with study participants after obtaining permission from each of them according to

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the inclusion criteria.

Statistical analysis methods

Statistical data analysis approaches were used in order to analyze and assess results of this study which classified in two parts, descriptive statistics, such that tables observed frequencies, percentages, association tables, and inferential statistics, such that [Chi-Square test for testing the independency, Binomial test for testing two categories nominal scale, statistical hypothesis based on (C.C.) Contingency's Coefficient test.

RESULTS AND DISCUSSION

The study showed that the highest percentage (28%) of study sample at age group (22 – 34) years (table 1), (35.8%) of study sample years of marriage are ranging between (5-9) years (table 1), (87%) of study sample their socio-economic level were low (table 1). The highest percentage (38%) of study sample for the ratio of the number of pregnancies to the group (3-4) times (table 2), the highest percentage (30%) of study sample for the number of abortions (table 2), the highest percentage (50%) of study sample for number of living children (table 2), the highest percentage (14%) of study sample for the number of stillbirths (table 2), the highest percentage (43%) of study sample for delivery type of cesarean (table 2), the highest percentage (57.8%) of study sample for using breastfeeding reported feeding period less than or up to one year (table 2), the highest percentage (35%) of study sample for using artificial feeding (table 2). The highest percentage (79%) of study sample who suffer from hair loss (table 3), the highest percentage (67.5%) of study sample who suffer from difficulty boarding stairs (table 3), the highest percentage (65.8%) of study sample who suffer from difficulty to getting up after sitting position (table 3), the highest percentage (64%) of study sample who suffers from problems in the gums and teeth (table 3), the highest percentage (60%) of study sample who suffer from pain in the bones especially from the bones of the spine and thigh (table 3), the highest percentage (49%) of study sample who have difficulty washing the head (table 3). The highest percentage (90.8) of study sample who prefer light clothing (table 4), the highest percentage (83%) of study sample who eat eggs twice a week especially egg yolk (table 4), the highest percentage (80.8%) of study sample who take supplements during pregnancy (table 4), the highest percentage (55.8%) of

study sample who eat fish at least twice a week (table 4), the highest percentage (54%) of study sample who prefer to wear dark clothing (table 4), the highest percentage (42.5%) of study sample who exposed to the sun for certain hours a day (table 4). Relative to subject "Women's Age", studied sample are focused at the three age groups, bounded (22 - 34) years, and they are accounted 90(75%) with mean and standard deviation 28.14, and 6.14 yrs. respectively, then followed by subject "Marriage years", which shows that studied sample are focused at the first three groups, bounded (<5 - 14) yrs, and they are accounted 105(87.5%) with mean and standard deviation 8.53, and 4.84 yrs. respectively. 8(6.7%) of studied sample are not the lonely wife includes, as well as most of them are selected from urban residents and accounted 109(90.8%). Results shows that "Socio-Economic Status" accounted through applying of WHO instrument, which consists of several components such that, occupation, education levels, crowding index, and a particular properties (House ownership, possession car, available of specific requisite materiel). Three social and economical levels represented by the preceding contents (Low, Moderate, and High). Vast majority of studied sample had low evaluated, and they accounted 105(87.5%), and the leftover had moderate, and accounted 15(12.5%). According to preceding results, vitamin D deficiency regarding pregnant woman can be considered as indigent disease classified. Table (2) shows the observed frequencies, and percents of the studied "Reproductive Health Side" parameters, such that "Number of pregnancies, Number of abortions, Number of living children, Number of stillbirths, Type of delivery, Type of feeding, Breastfeeding period, Fetal birth defects, Size of fetus normal or abnormal, and size of head's fetus normal or abnormal", with their comparisons significant, to explore behavior of studied parameters either they randomly or none randomly distributed comparing with their an expected outcomes, which showed that significant differences in at least at $P < 0.05$ among different classes of that parameters. Relative to subject of "Number of pregnancies", studied sample are focused mostly at the first three classes, and they are accounted 110(91.7%). Results shows that "Number of Abortions", recorded vast majority with who had one time, and they accounted 30(25%). Number of living children are focused mainly at the first class, and they are accounted 61(50.5%), then followed by the number of stillbirths for who had applicable are focused at only, and are accounted 17(14.2%). Delivery type of

cesarean from a total sample are formed 52(43.3%). Among studied sample, 42(35%) using artificial feeding, and among breast feeding women, 26(57.8%) reported feeding period less than or up to one year. 10(8.3%) who has fetal birth defective, and the same percent for whom had abnormal size fetal, as well as 7(5.8%) registered for who had abnormal head's size. Table (3) show descriptive statistics regarding medical information for effectiveness of vitamin D deficiency in pregnant woman, such that "Frequencies, and percents, Mean of

score, Standard deviation, Relative sufficiency", as well as comparisons significant. Results shows that an overall evaluations of medical information, as well as personal style side and reproductive health side are reported no significant relationships at $P > 0.05$, except with number of pregnancies, type of delivery, and breastfeed period concerning medical information which shows significant relationship at $p < 0.05$.

Table 1. Descriptive Statistics of Socio-

Demographical Characteristics variables for studied women

SDCv.	Groups	No.	Percent
Women's age	< 20	7	5.8
	20 - 24	31	25.8
	25 - 29	34	28.3
	30 - 34	25	20.8
	35 - 39	17	14.2
	40 >	6	5
	Mean ± SD	28.14 ± 6.14	
Marriage years	< 5	28	23.3
	5 - 9	43	35.8
	10 - 14	34	28.3
	15 >	15	12.5
	Mean ± SD	8.53 ± 4.84	
Wife's Plurality	No	112	93.3
	Yes	8	6.7
Residency	Urban	109	90.8
	Rural	11	9.2
Socio-Economic Status	Low : 89 - & less	105	87.5
	Mod. : 90 - 120	15	12.5
	High :121 - 150	0	0.0

Table 2. Distribution of studied Reproductive Information Parameters with comparisons significant

Reproductive Health Side	Groups	No.	Percent	C.S. (°) P-value
Number of pregnancies	< 3	29	24.2	$\chi^2 = 22.733$ P=0.000 (HS)
	3 - 4	46	38.3	
	5 - 6	35	29.2	
	6 >	10	8.3	
Number of abortions	Non applicable	76	63.3	Binomial P=0.024 (S)
	Once a time	30	25	
	Twice a time and more	14	11.7	
Number of living children	Non applicable	12	10	$\chi^2 = 37.722$ P=0.000 (HS)
	< 3	61	50.8	
	3 - 4	38	31.7	
	5 >	9	7.5	

Table 2. Distribution of studied Reproductive Information Parameters with comparisons significant

Number of stillbirths	Non applicable	101	84.2	$\chi^2 = 11.842$ P=0.001 (HS)
	Once a time	17	14.2	
	Twice a time and more	2	1.7	
Type of delivery	Non Applicable	12	10	$\chi^2 = 40.267$ P=0.000 (HS)
	Normal	42	35	
	Cesarean	52	43.3	
	Both	14	11.7	
Type of feeding	Non Applicable	12	10	$\chi^2 = 25.800$ P=0.000 (HS)
	Natural	45	37.5	
	Artificial	42	35	
	Both	21	17.5	
If you answer breastfeeding what is your breastfeeding period's monthly?	Non applicable	54	45	Binomial P=0.110 (NS)
	Up to 12 m.	26	21.7	
	> 12 - 24 m.	40	33.3	

Table 3. Distribution of Medical Information with Comparisons Significant

The Medical Information	Resp.	No.	%	MS	SD	RS	C.S. (*)
Do you suffer from pain in the bones especially the bones spine and femoral ?	No	47	39.2	0.61	0.49	61.0	P=0.022 S
	Yes	73	60.8				
Have you had broken limbs ?	No	98	81.7	0.18	0.39	18.0	P=0.000 HS
	Yes	22	18.3				
Do you have diseases in the joints and Spine (sliding in the joints) ?	No	89	74.2	0.26	0.44	26.0	P=0.000 HS
	Yes	31	25.8				
Do you have difficulty getting up when you sit down ?	No	41	34.2	0.66	0.48	66.0	P=0.001 HS
	Yes	79	65.8				
Do you have difficulty when you boarding stairs ?	No	39	32.5	0.67	0.47	67.00	P=0.000 HS
	Yes	81	67.5				
Do you have difficulty washing your head ?	No	61	50.8	0.49	0.50	49.0	P=0.927 NS
	Yes	59	49.2				
Do you suffer from hair loss ?	No	25	20.8	0.79	0.41	79.0	P=0.000 HS
	Yes	95	79.2				
Do you have problems with your gums and teeth ?	No	43	35.8	0.64	0.48	64.0	P=0.003 HS
	Yes	77	64.2				
Do you suffer of diabetic ?	No	116	96.7	0.03	0.18	3.30	P=0.000 HS
	Yes	4	3.3				
Do you suffer of chronic kidney failure?	No	102	85	0.15	0.36	15.0	P=0.000 HS
	Yes	18	15				
Do you suffer of cardiac problems ?	No	86	71.7	0.28	0.45	28.0	P=0.000 HS
	Yes	34	28.3				
Do you suffer of chronic liver failure ?	No	120	100	0.00	0.00	0.00	P=0.000 HS
	Yes	0	0				

Table 4. Distribution of Personal Style Side with Comparisons Significant

The Personal Style Side	Resp.	No.	%	MS	SD	RS	C.S. (*)
Do you drink milk daily ?	No	98	81.7	0.18	0.39	18.0	P=0.000 HS
	Yes	22	18.3				
Do you eat fish at least twice a week ?	No	53	44.2	0.56	0.50	56.0	P=0.235 NS
	Yes	67	55.8				
Do you eat eggs twice a week, especially egg yolk ?	No	20	16.7	0.83	0.37	83.0	P=0.000 HS
	Yes	100	83.3				
Are you exposed to the sun for certain hours a day?	No	69	57.5	0.42	0.50	42.0	P=0.121 HS
	Yes	51	42.5				
Would you prefer to wear light clothing?	No	11	9.2	0.91	0.29	91.0	P=0.000 HS
	Yes	109	90.8				
Would you prefer to wear dark clothing?	No	55	45.8	0.54	0.50	54.0	P=0.411 NS
	Yes	65	54.2				
Do you take supplements during pregnancy ?	No	23	19.2	0.81	0.40	81.0	P=0.000 HS
	Yes	97	80.8				

Table 5. Distribution of Medical Information with Comparisons Significant and relationships an overall evaluation of medical information, as well as personal style side and SDCv.

Main Domains	No.	PGMS	PPSD	Evaluation Positive %
Medical Information	120	42.857	16.225	57.78 (Pass)
Personal Style Side	120	60.833	16.512	60.833 (Pass)
SDCv.	Medical Information		Personal Style Side	
	C.C.	P-value	C.C.	P-value
Women Age	0.231	0.239 (NS)	0.083	0.975 (NS)
Marriage years	0.281	0.061 (S)	0.161	0.362 (NS)
Wife's Plurality	0.054	0.551 (NS)	0.093	0.304 (NS)
Educational level	0.164	0.653 (NS)	0.192	0.464 (NS)
Occupation	0.110	0.227 (NS)	0.025	0.780 (NS)
Residency	0.007	0.935 (NS)	0.057	0.535 (NS)
Socio-Economic Status	0.042	0.646 (NS)	0.014	0.878 (NS)

Table 6. Relationships an overall evaluation of medical information, as well as personal style side and reproductive health side

Reproductive Health Side	Medical Information		Personal Style Side	
	C.C.	P-value	C.C.	P-value
Number of pregnancies	0.277	0.019 (S)	0.138	0.504 (NS)
Number of abortions	0.258	0.077 (NS)	0.121	0.420 (NS)
Number of living children	0.159	0.248 (NS)	0.190	0.131 (NS)
Number of stillbirths	0.055	0.811 (NS)	0.201	0.372 (NS)
Type of delivery	0.250	0.027 (S)	0.050	0.872 (NS)
Type of feeding	0.007	0.935 (NS)	0.057	0.535 (NS)
Fetal Birth Defects	0.066	0.487 (NS)	0.100	0.286 (NS)
Breastfeed period	0.213	0.017 (S)	0.114	0.350 (NS)
Size of Fetus	0.143	0.112 (NS)	0.056	0.541 (NS)
Size of Head's Fetus	0.080	0.380 (NS)	0.001	0.989 (NS)

CONCLUSION

Approximately third of the study samples their age group (22-34) years, more than third study samples years of marriage are ranging between (5-9) years, more than three fourth of the study samples their socio-economic levels were low, more than third of study sample for the ratio of the number of pregnancies to the group (3-4) times, third of study sample for the number of abortions, half of than third study samples years of marriage are ranging between (5-9) years, study sample for number of living children, more than third of study sample for delivery type of cesarean, more than half of study sample for using breastfeeding reported feeding period less than or up to one year, more than three fourth of study sample who suffer from hair loss, more than tow third of study sample who suffer from difficulty boarding stairs, more than tow third of study sample who suffer from difficulty to getting up after sitting position.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of AL-Nahrain, Health Center, Iraq and all experiments were carried out in accordance with approved guidelines.

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Environmental Assessment of the Quality of Water and the Hydrochemical Formula Used for Some Groundwater Wells in Karbala Governorate

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ABSTRACT

The ground water in the study area is classified according to the total dissolved solids it is concluded that the water in the type is brackish water. The electrical conductivity in water of the study area is Excessively Mineralized Water. The study found that there is an increase in the concentrations of positive and negative different ions such as calcium, magnesium, sodium, potassium, sulfate, chloride, carbonates, bicarbonates and nitrates due to natural and anthropogenic¹. The Hydro chemical Formula and Water Type is the quality of the prevailing water is NaSO₄- in the wells of the study area. The study found that when comparing the results of the research with the global measurements, the water type is not suitable for human consumption. Regarding the drinking of animals, it is found that it is suitable for consumption. When compared to industrial use, it was found to be unfit for industry. As for the construction found useful for use. Their use to irrigate irrigation is not useful.

Keyword: Hydrochemical Formula, Assessment, Groundwater

INTRODUCTION

Water is considered as the origin of life. It represents the most important agent of natural resources over the earth. Water as a part of our environment has a capacity to fill human needs for aesthetic appreciation. Due to the present conditions in Iraq, which are characterized by a shortage of surface water supply as a result of retaining water of the Tigris and Euphrates Rivers within the neighboring countries¹. In addition to the dry conditions during the present period which started some years ago. There is a need to search and find other sources of water supply from ground water resource on regional scale, The study area is located in the Mesopotamia Plain and 105 km from Baghdad in the south-west and is confined between the eastern latitudes (44 ° 40 54- 43 ° 54 °10)

and north latitude (32 ° 21 42-32 ° 40 °54). It is located on the edge of the desert in the west of the Euphrates and on the left side of the Husseiniya plateau, bordered to the north and west by Anbar province and from the south by the province of Najaf and from the east by Babil Province. Aim of the study: Studying the hydrochemical properties of groundwater in Karbala governorate and the nature of this water. Determination of the validity of groundwater for different uses by comparing them with the Iraqi and global determinants.

METHODOLOGY

GEOLOGY OF THE STUDY AREA

1-Stratigraphy

More than 80% of the map area is covered by Quaternary sediments. Pre- Quaternary exposed rocks are represented by Dammam, Euphrates, Nfayil, Injana, Zahra and Dibdibba formations, with age ranges from Eocene to Pliocene-Pleistocene. While the studied unexposed formations within the map area are indicated by. Umm Er Radhuma Formation and Tayarat Formation

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ground surface ².

2-Exposed Formation

The following formations are exposed in the map area:

Dammam Formation (Eocene)

Dammam Formation is composed of variable carbonate rocks mainly limestone, dolomitic limestone and dolomite, with marl. It is characterized by the presence of cavities, fractures, fissures and joints ³. The depositional environment is marine water of open platform.

Euphrates Formation (Lower Miocene)

The Euphrates Formation is exposed in several localities and consists of basal breccia, limestone and marl. The matrix is composed of carbonate material with some clayey and sandy admixture ³.

Nfayil Formation (Middle Miocene)

The Nfayil Formation is exposed in the southern and western parts of area. Generally, consists of sandy dolomitic and gypseous marl with inter bedded calcareous, sandy claystone, fossiliferous limestone and sandstone, with limestone intercalations.

The Injana Formation is exposed along both ridges of Tar Al-Najaf and Tar Al-Sayid, and in the eastern bank of Al-Razzaza Lake. It consists of silty, sandy calcareous claystone and sandstone.

Zahra Formation (Pliocene – Pleistocene)

The Zahra Formation is exposed as spot scanty, cropping out southwest, and south of Al-Razzaza Lake. It is composed mainly of calcareous sandstone, sandy carbonate and sandy and chalky limestone.

Dibdibba Formation (Pliocene - Pleistocene)

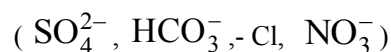
The Dibdibba Formation is well exposed along both ridges of Tar Al- Najaf and Tar Al-Sayid, occupying the top most part of the exposed sequence, forming the top rock of the plateau between Karbala and Najaf.

1-Laboratory work

The Hydrochemical study of the candidate water within the study area included the analysis of well water (20) wells, which ranged between (6 - 272) meters for

the season of water increase. The positive ions (K +, Na +, Mg²⁺, Ca²⁺) and negative ions (, -Cl ,) , As well as (pH), electrical conductivity (E.C.), total dissolved salts (T.D.S.). Tests were conducted in the General Authority for Drilling of Wells and Groundwater of the Ministry of Water Resources

The Hydrochemical study of the candidate water within the study area included the analysis of well water (20) wells, which ranged between (6 - 272) meters for the season of water increase. The positive ions (K +, Na +, Mg²⁺, Ca²⁺) and negative ions,



As well as (pH), electrical conductivity (E.C.), total dissolved salts (T.D.S.).

Tests were conducted in the General Authority for Drilling of Wells and Groundwater of the Ministry of Water Resources.

Hydrochemistry of groundwater The chemical composition of groundwater is the double result of water entering the groundwater reservoir and the interactions with the rocks containing different minerals⁵.

Physical Properties

1- Hydrogen ion concentration (pH)

The maximum pH values we rerecorded in well (3) were (7.8) .and minimum values were (7.1) in well (10) and the mean (2155.6). The pH of water is controlled by the equilibrium achieved by dissolved compounds in the system. In natural waters. Table 2

2- Total Dissolved Solids (TDS)

The maximum TDS values were recorded in well (6) (40000 mg/L) and, the minimum value was recorded in well (1) (1070 mg/L). By comparing the TDS values with those reported by (6), it is concluded that the water in the type is brackish water also by (7),(8) and (9).

3-Electrical conductivity (EC)

In water of the study area, EC ranges from 1400 – 11970µs/cm with 3877 µs/cm in average When comparing what exists in 18 we note that The relationship between electrical conductivity and mineralization Located within Excessively Mineralized Water.

Major Ions

1-Calcium ion (Ca²⁺)

The highest concentration of calcium ion in the water of the study area was 612 mg / l in well (10), while the lowest concentration of calcium was (70) mg / L in well (8). The overall concentration of calcium was 264.05 mg / l. Figure (1) shows that all groundwater models in the study area exceeded the permissible drinking water limit of 75 mg / l according to international standards ¹⁰. The increase in the concentration of calcium in the water of the study area is due to the effect the process of ion exchange between sodium and calcium.

2-Magnesium ion (Mg²⁺)

The results of Table 2. showed that the highest concentration of magnesium ion in the water of the study area was (305) mg / L in well (1) while the lowest concentration of magnesium (66) mg / L in well (8). The overall concentration of magnesium in the studied aquatic models was 142.5 mg / L. The high concentration of magnesium ion in the water of these regions is due to the effect of the ion exchange process and the effect of evaporation processes.

3-Sodium (Na⁺)

The highest concentration of sodium in the water of the study area was (1020) mg / L in well (1), while the lowest concentration was (85) mg / L in well (8). The general rate of sodium concentration in aquatic models (332.74) The high concentration of sodium in water is due to the dissolving of sodium salts concentrated in the soil as a result of watering of plants. Household cleaning agents also increase sodium as a result of containing sodium hypochlorite, which is transferred from the sewage system to the groundwater system by means of dispersion.

4-Potassium (K⁺)

The highest concentration of potassium ions in the water of the study area was (120) mg / L in well (19) while the lowest concentration of potassium (3.5) mg / l in well (4). The overall concentration of potassium in the water of the study area was 53.01 mg/l

Anions

1-Sulfates (SO₄)

The water of the study area is characterized by the abundance of sulphates where the highest concentration of sulphate (2349) mg / l in well (1) (2.35). The lowest concentration of sulphate was (375) mg / l in well (8). The total sulfur concentration in the water of the study area was 954 mg / l. Figure (2) shows that all candidate water models in the study area exceeded the drinking water limit of 12 mg / l according to international standards (11). The high concentration of sulphate in the water of the study area is due to the presence of sulfur salts in the soil, as well as the presence of secondary gypsum.

2-Carbonates (CO₃) and bicarbonates (HCO₃)

The highest concentration of bicarbonate ion in the water of the study area was (979) mg / L in well (1), while the lowest concentration of bicarbonate (50) mg / l in well (6). The overall rate of bicarbonate was 363.65 mg / l. The increased concentration of bicarbonates in these waters resulted in the melting of sodium bicarbonate in the soil due to irrigation processes, as well as the effect of wastewater through the drainage system in these areas.

4-Chloride (Cl)

Table (3) shows that the highest concentration of chloride in the water of the study area was (1328) mg / L in well (1), while the lowest concentration of chloride was 176 mg / l in well (16). The chloride concentration in the water area of the study area was 598.5 mg / l .

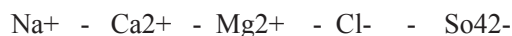
5-Nitrate (NO₃)

The lowest concentration was (0) mg / L in well (12). The overall nitrate concentration in the studied aquatic models was 4.29 mg / l. It should be noted that all candidate water models in the study area fall within the permitted drinking water limit of 50 mg / L according to international standards (10).

Hydrochemical Formula and Water Type

The hydrochemical formula of water can be determined by taking the concentrations of main cations and anions in (meq %) (mill equivalent percent) in water with total dissolved solids concentration (TDS) as (mg/l) or (g/l).

The hydrogeological formula of the study area was as follows:



	SO_4^{2-}	Cl^-		
T.D.S.	40.55	39.48		pH
4911.5	38.60	30.09	27.54	6.21
	Na^+	Ca^{2+}	Mg^{2+}	

The water quality can be determined by positive and negative ions in units of epm% whose concentration is greater than 15% by placing the negative and positive ions on their decreasing concentrations

So the quality of the prevailing water is NaSO₄- in the wells of the study area Table (3) shows the hydrochemical formula and the water type in the study area. Four types of water are shown: Sodium sulphate (1, 2, 4, 5, 9, 10, 11, 12,13,14 ,, 18,19) And calcium sulphate represent the well (20). Calcium chloride represents the two wells (3, 15), indicating that sulphates are predominant in the sense of negative ions, while sodium ions (6, 7, 8,) Is predominant for positive ions in most water models studied.

Table 1. The location of the study wells

Side	Location	Date of excavation	Depth meters	Latitude	Longitude	Well number
ALHOR	Razzaza Forest Project	1-3-2014	48	324054.2	435410.6	1
ALHOR	Qassem Abboud	1-3-2014	25	323955.3	435745.2	2
ALHOR	Ali Hussein / 2	1-3-2014	18	324030.4	435717.4	3
Husseiniya / Black innovation	Sayed Mahdi	1-3-2014	25	323440.9	435735.3	4
Husseiniya / Black innovation	Hussein Odeh Al-Ghanmi / 1	1-3-2014	40	323418.7	435729.0	5
Husseiniya / Black innovation	Hamza Farhan Abdul Hussein	2-3-2014	6	32412.30N	44417.10E	6
ALHOR / Habbaniyah	Hussain Sabah Hussein	2-3-2014	11	32422.90N	44149.10E	7
Husseiniya	Mohamed Adab	2-3-2014	2.0	32418.70N	443060E	8
Husseiniya	Metzraflah / 2	2-3-2014	40	32339.99N	44046.03E	9
Husseiniya	Jaber Haddam/1	2-3-2014	64	322737.20N	44133.50E	10
Husseiniya / Black innovation	Hadi Abdul / 2	3-3-214	65	322612	440256	11
Husseiniya / Black innovation	Mustafa Karbala / 2	3-3-214	257	32°2134	440554	12
Husseiniya / Black innovation	Kassem Kokz	3-3-214	54	322532	440610	13
Alraehbeaa	Khalf daib	3-3-214	50	322548	440605	14

Cont... Table 1. The location of the study wells

Alraehbeaa	Abdallah	3-3-214	45	322559	440632	15
Khassef	Mohsen Karim Alwan	4-3-2014	6	324059.2	440431.5	16
Husseiniya	Majid Hamid Ali	4-3-2014	6	324059.4	440433.4	17
Husseiniya	Abdulmam Amhourd	4-3-2014	9	324116.6	440509.8	18
Allhaerat	Hussein Kazem	4-3-2014	60	322129	441215	19
Allhaerat	Mohamed Fadel	4-3-2014	-	322142	441130	20

Table 2. Explains the physical properties of the wells of the study area

No. of well	pH	Ec ($\mu\text{S}/\text{cm}$)	T.D.S. ($\mu\text{g}/\text{l}$)
1	7.24	11970	7727
2	7.12	5300	3500
3	7.81	5160	3550
4	7.12	3430	2502
5	7.20	3870	2867
6	7.31	1427	1070
7	7.24	2510	1956
8	7.18	1400	1095
9	7.18	4120	7686
10	7.10	4020	3000
11	7.61	3910	2932
12	7.21	4240	3963
13	7.31	3490	2685
14	7.30	3530	2900
15	7.20	3940	2617
16	7.41	1257	1100
17	7.3	1768	1280
18	7.41	5290	40000
19	7.30	4500	3900
20	7.77	2410	1900
Range	7.1-7.81	1400-11970	1070-40000
Mean	7.32	3877.1	4911.5

Table 3. Shows the hydrochemical formula and water type in the study area.

Well No.	Hydro chemical Formula	Water Type
	TDS (7727) 7.24pH	Na – Ca – Mg – Cl – So4
	TDS (3500) 7.12pH	Na – Ca – Mg – Cl – So4
	TDS (3550) 7.81pH	Ca –Mg – Na – So4 – Cl
	TDS (2502) 7.12pH	Na – Ca – Mg – Cl – So4
	TDS (2867) 7. 2pH	Na – Ca – Mg – Cl – So4
	TDS (1070) 7.31pH	Mg – Ca – Na –Cl – So4
	TDS (1956) 7.24pH	Mg – Ca – Na –Cl – So4
	TDS (1095) 7.18pH	Mg – Na –Ca –Cl – So4
	TDS (7686) 7.18pH	Na – Ca –Mg –Cl – So4
	TDS (3000) 7.1pH	Na– Ca –Mg –Cl – So4
	TDS (2932) 7.61PpH	Na – Ca –Mg –Cl – So4
	TDS (3963) 7.21pH	Na –Mg– Ca –Cl – So4
	TDS (2685) 7.31pH	Na –Mg– Ca –Cl – So4
	TDS (2900) 7.3pH	Na – Ca –Mg –Cl – So4
	TDS (2617) 7.2pH	Ca –Mg – Na – So4 – Cl
	TDS (1100) 7.41pH	Mg – Ca – Na – Cl– So4
	TDS (1280) 7.3pH	Mg – Ca – Na – Cl – So4
	TDS (40000) 7.41pH	Na– Ca –Mg –Cl – So4
	TDS (3900) 7.3pH	Na– Ca –Mg –Cl – So4
	TDS (1900) 7.77pH	Ca –Mg – Na – So4 – Cl

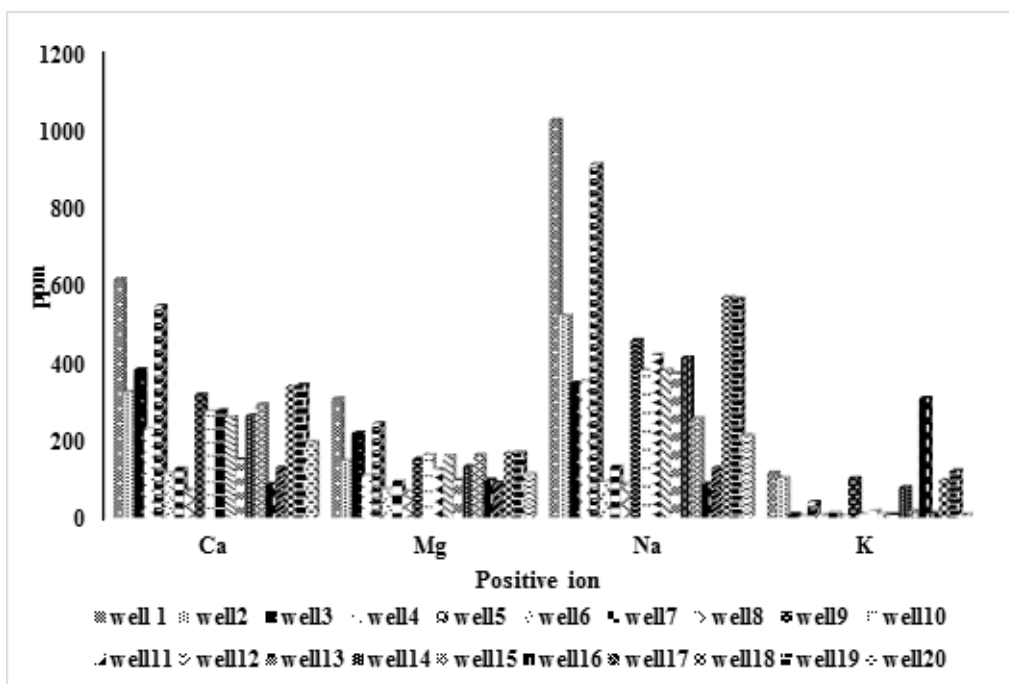


Figure 1. Shows positive ion concentrations in the study area

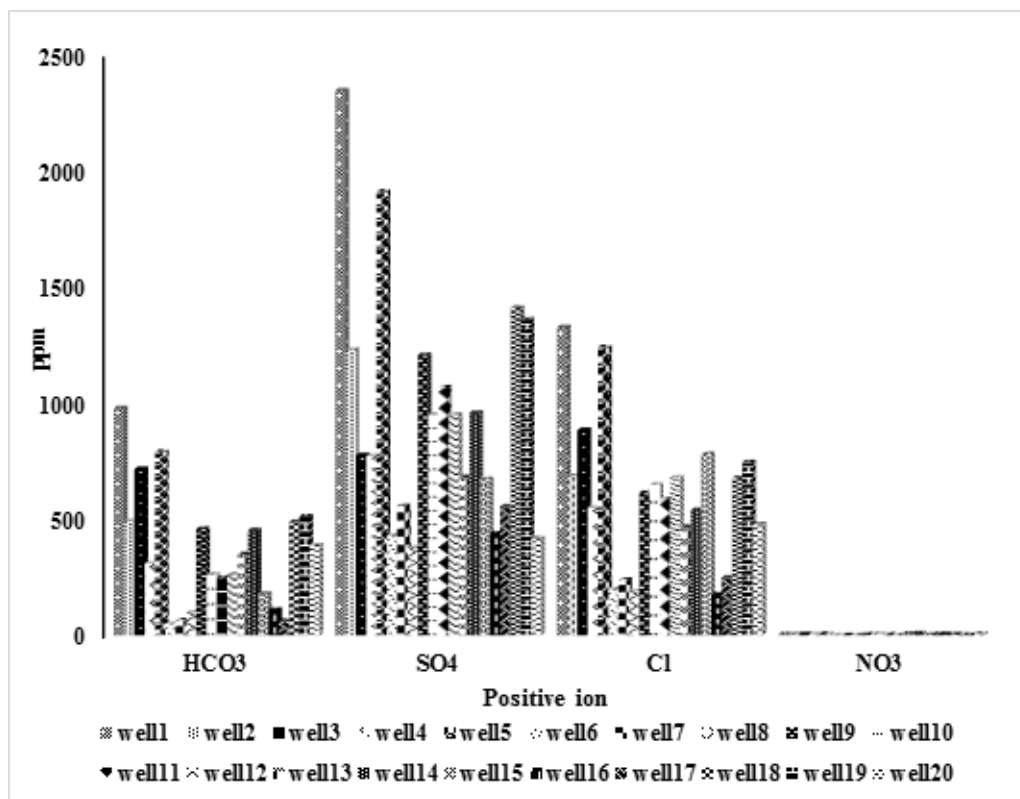


Figure 2. Shows the concentrations of negative ions in the study area

CONCLUSION

The Hydro chemical Formula and Water Type is the quality of the prevailing water is NaSO₄- in the wells of the study area. The study found that when comparing

the results of the research with the global measurements, the water type is not suitable for human consumption. Regarding the drinking of animals, it is found that it is suitable for consumption. When compared to industrial

use, it was found to be unfit for industry. As for the construction found useful for use. Their use to irrigate irrigation is not useful.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Education for Pure Science (Ibn Al-Haitham), University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of an Educational Program on Nurses' Knowledge toward Restraint and Seclusion for inpatients at Psychiatric Teaching Hospitals

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ABSTRACT

A quasi-experimental design is carried throughout the present study with the application of test-retest approach of pre-test, post-test I, and post-test II; for the study sample, the sample consisted of (25) nurse ((11) male and (14) female) were selected from AL-Rashad Psychiatric Teaching Hospital in Baghdad City, during the period of 1st November 2017 to 16th September 2018. In the pre-test; post-test design in the dependent variable is measured before implementing the program and two after implementing the program for nurses. The data was collected by questionnaire which consisted of two parts, first part consists socio demographic data, Second part is about restraint and seclusion which designed through the use of multiple choice question, a numerical value was given to each rating point; (1) for right answer, and (0) for the wrong answer. In the present study, data were analyzed through the use of statistical package for social sciences (SPSS), version 21. The finding of the study indicated that The nurses had little training about how to deal with agitated patients in psychiatric wards. Most of the nurses who participated in the study have preparative school graduates, and they have an extremely low level of knowledge more than others.

Keyword: *educational Program, Knowledge, Restraint, and Seclusion.*

INTRODUCTION

Violence and aggressive behavior are major concerns in psychiatric wards and patients requiring admission often display agitated behavior which can put at risk the health and safety of the patients and the staff that supporting them. Concerns for patients and staff safety in acute settings have been expressed worldwide¹. Violence and aggressive behavior is common, especially in mental health settings, In clinical practice, restrictive measures (restraint and seclusion) might partially prevent unwanted behaviors, but do not fully eliminate them, at least when used independently¹. Psychotic behaviors are the most frequent reasons for using patient restrictive measures (restraint and seclusion) even without any signs of potential violence¹². The National Institute for Mental Health in England⁽¹⁸⁾ and the National Institute for Health and Clinical Excellence¹⁸ have published guidelines emphasizes the importance of using preventive measures to manage violent behavior in healthcare, highlighting safety priorities in mental health.⁽²⁰⁾, despite the fact that studies have reported quite

similar reasons for restraint and seclusion. These reasons include threats or use of violence against oneself or other people, attempts to escape, aggression towards property, inability to care for oneself and agitation/disorientation¹⁵. Although coercive interventions (restraint and seclusion) can be effective as a last resort in preventing injury to patients and maintaining their security⁵. Thus the use of this interventions (restraint and seclusion) is one of the indicators of the quality of psychiatric treatment in hospitalized patients⁹. The use of seclusion and restraint in psychiatric practice is a controversial issue in the hospitals of Iraq, as a recent study have shown seclusion to be a predominant restrictive measure. In contrast to many surrounding countries, in this study a psycho-educational program is arranged in such a way that the protection of the physical integrity of the patient is more important than professional considerations with respect to the treatment of severe mental illness. Despite its importance, there is no studies in Iraq have been conducted on the use of restraint and seclusion in psychiatric practice. Lack of knowledge or understanding of alternatives to restraint has been identified as a barrier

to reducing these measures⁴. Other barriers include staff and resource limitations, environmental constraints, policy and management issues, beliefs and expectations of staff, inadequate review practices and communication barriers. Psychiatric nurses are one of the most important groups who have a significant role in providing care for psychiatric patients. Because of the nature of the nursing profession, psychiatric nurses are the first people who are in contact with psychiatric patients. The role of them in this condition is to help the patients understand and control on their violence and aggression. We conducted this study because the nursing staff has the primary role in carrying out the practical procedure. The psychiatric nursing needing for novel and effective methods to address violence and aggressive behavior of patients on psychiatric wards. And to increase nurses' knowledge and experiences of restraint and seclusion with psychiatric patients in hospitals, and how these experiences are applied. Objectives of the study: To identify the effectiveness of an educational program on the nurses' knowledge for the study sample. Compare the levels of nurses' knowledge before and after the educational program.

METHODOLOGY

Study Design and Study Sample: A quasi-experimental design is carried throughout the present study with the application of test-retest approach of pre-test, post-test I, and post-test II; for the study sample, the sample consisted of (25) nurse ((11) male and (14) female) were selected from AL-Rashad Psychiatric Teaching Hospital in Baghdad City, during the period of 1st November 2017 to 16th June 2018. In the pre-test; post-test design in the dependent variable is measured before implementing the program and two after implementing the program for nurses. The questionnaire consisted of three parts:

Part 1: covering letters to obtain the agreements of the nurses to participate in the present study.

Part 2: socio-demographic data sheet contains information regarding; Gender, age, level of education, years of experience in nursing, and years of experience in psychiatric field. **Part 3:** This part of the questionnaire includes the knowledge about the restraint and seclusion: it consist of (50) items scale of knowledge about restraint and seclusion.

Part 4: The educational program is the most

important part in this study because it measure the nurses' information. The researcher focuses and depending on books, researches, and WHO reports talk about the subject for constructing the program.

Data Collection: The data collection was carried out from February 15th 2018 to September 13th 2018. Data was collected after obtaining the permission from the Directorate of Hospitals. The researcher met each nurse staff of the study for explain the objectives of the study, then filled by the nurses. All the (participants) nursing staff of the study both groups (25 study group) are exposed to pre-test, to determine their performance in the restraint and seclusion. The participants need approximately (30) minutes to complete all items of the questionnaire. All the nursing staff of the study group is exposed to the educational program at AL-Rashad Psychiatric Teaching Hospital, and exposed to the first post-test after the educational program was finished immediately to measure changes in their knowledge regarding restraint and seclusion. And all the participants of study group are exposed to the second post-test after three months of the first post-test to measure changes in their knowledge regarding restraint and seclusion.

Data analysis: The domain is designed through the use of multiple choice question, a numerical value was given to each rating point; (1) for right answer, and (0) for the wrong answer. In the present study, data were analyzed through the use of statistical package for social sciences (SPSS), version 21.

RESULTS AND DISCUSSION

In the present study, data were analyzed: Regarding gender the table shows that the highest percentage of the participants (56.0%) were females. According the age (48.0%) were at age group between (30-39 years). For the level of education (64.0%) of the sample are from the preparative nursing schools. Also the table reveals that the highest percentage of the sample (56.0%) were experience in nursing at period ranging (1-5 years). And for the years of experience in psychiatric field (76.0%) of the sample were ranging from (1-5 years). The study sample have extremely low and low levels of knowledge; (80.0%) (n= 20) and (20.0%) (n= 5) in phase one; while have low, intermediate and good (20.0%) (n= 5), (44.0%) (n= 11) and (36.0%) (n= 9) at phase two, and at phase three the participants of the study group have low, intermediate and good levels of knowledge;

(12.0%) (n=3), (52.0%) (n= 13) and (36.0%) (n= 9). The table indicates that a non- significant relationship between demographic characteristics and knowledge about restraint and seclusion for the study sample. The results of table 4. show that:

1- The within subjects test indicates that the interaction of time and group is significant (F= 164.349, p= 0.00).

2- The main effect of time is significant (F= 131.493, p= 0.00).

3- The between groups test indicates that there the variable group is significant F= 164.349, p= 0.00). The significant interaction indicates that the male group and female group are changing over time and they are changing in different ways, in other words, in the figure 1 the lines of the two groups are not parallel. In the figure 1 for this particular situation it is clear that the male group is increasing in knowledge over time and the female group is increasing in knowledge over time. Regarding the differences in the knowledge about restraint and seclusion within the three phases (table 5) indicates that there is a high significant differences in levels of knowledge between phase one and phase two (sig.= 0.00) and phase three (sig.= 0.00). This result shows that there is a changing in levels of knowledge between phase one and phase two and phase three. This table shows also that there is no change in levels of total knowledge between phase two and phase three (sig.= 0.33). The result of the study showed that participants of both gender were males 44.0% and females 56.0% who are participated in the study. This results is disagree with Yas (25) who stated that there is a shortage of female nurses who are working in the psychiatric hospitals. Also the (table 1) indicated that the age of the study sample, most of them 48.0% were at age (30-39) years old; these

findings agree with the results of Mohammed (17) who has reported that most common age is around (30-39). This is considered this group of age for the sample is the productive age of the person and it is more preferred than other age to work in psychiatric hospitals to be able give care to psychiatric patients. According to the nurses' education levels, the study has showed that the majority of them 64.0% were preparative school graduates and most of them female. This level of study is in Iraq only because of the urgent need for nurses working in hospitals for the shortage of nursing staff in general, which caused the opening of a number of nursing preparative schools for female to plug the shortage of the nursing staff, including mental hospitals. These results disagree with the findings of Mohammed(17) who reported in his study that 41.0% were medical institution group who participated in his study. The table shows that the highest percentage of the study sample 56.0% were having (1-5) years of experience in nursing. These results coincide with the findings of Mohammed(17) who has reported (1-9) years that most common years of experience in nursing for his study are 55.2%. This can be explained by the fact that new nurses have been appointed because of the need for nurses to work in this field (nursing field) in this hospitals because of increasing the number of admitted psychiatric patients to the hospitals. According to the nurses' years of experience in psychiatric field, the results show that majority of them 76.0% are having (1-5) years of experience in psychiatric field. There was major increase in the level of knowledge for both groups who are participated in the program and they were keen to join in all sessions of the program and reacted well to what they heard in these sessions (Table 4, & 5; Figure 1). This study is the first study in Iraq that includes an assessment of nurses' knowledge regarding restraint and seclusion, and the effect of educational program for these nurses.

Table 1. Distribution of the nurses according to their sociodemographic data

Demographic		F	%
Gender	Male	11	44.0
	Female	14	56.0
	Total	25	100.0
Age	20-29 years	10	40.0
	30-39 years	12	48.0
	40-49 years	2	8.0
	More than 49 years	1	4.0
	Total	25	100.0

Cont... Table 1. Distribution of the nurses according to their sociodemographic data

Level of Education	Preparative	16	64.0
	Institution	0	0.0
	College	9	36.0
	Total	25	100.0
Years of Experience in Nursing.	1 - 5	14	56.0
	6 - 10	4	16.0
	11 - 15	5	20.0
	16 - 20	1	4.0
	More than 20	1	4.0
	Total	25	100.0
years of Experience in psychiatric field	1 - 5	19	76.0
	6 - 10	3	12.0
	11 - 15	3	12.0
	More than 16	0	0.0
	Total	25	100.0

Table 2. Distribution in levels of Knowledge according to Study Sample for three Phases.

Knowledge											
Phases	No.	Levels of Knowledge								Total	
		Extremely Low		Low		Intermediate		Good			
		f	%	f	%	f	%	f	%	f	%
One	25	20	80.0%	5	20.0%	0	0.0%	0	0.0%	25	100.0%
Two		0	0.0%	5	20.0%	11	44.0%	9	36.0%	25	100.0%
Three		0	0.0%	3	12.0%	13	52.0%	9	36.0%	25	100.0%

Table 3. Association between demographic characteristics and Knowledge about Restraint and Seclusion for Study Sample

Correlation coefficient		
Variables	Knowledge about restraint and seclusion	
	R	sig.
Demographics		
Gender	-0.16	0.42
Age	0.11	0.58
Level of Education	0.23	0.25
Years of Experience	-0.11	0.59
Years of Experience in Psychiatric Field	-0.28	0.17

Table 4. Repeated Measures ANOVA Tests for nurses’ knowledge about Restraint and Seclusion.

Knowledge	Repeated Measures ANOVA Tests			
	F	P	size effect (d)	Observed power
Main time effect	131.493	0.00	0.9	1.00
Between groups effect	83.168	0.00	0.7	1.00
Groups Interaction overtime	164.349	0.00	0.8	1.00

F= F- statistics, p= probability value

Table 5. Differences within the Three Phases regarding nurses’ knowledge about Restraint and Seclusion (Total Knowledge) by using Post hoc tests.

Pair-wise Comparisons (multiple comparisons: Bonferroni)				
(I) Knowledge	(J) Knowledge	Mean Difference (I-J)	Std. Error	Sig.
1	2	-1.96	0.16	0.00
	3	-2.05	0.16	0.00
2	1	1.96	0.16	0.00
	3	-0.09	0.21	1.00
3	1	2.05	0.16	0.00
	2	0.09	0.21	1.00

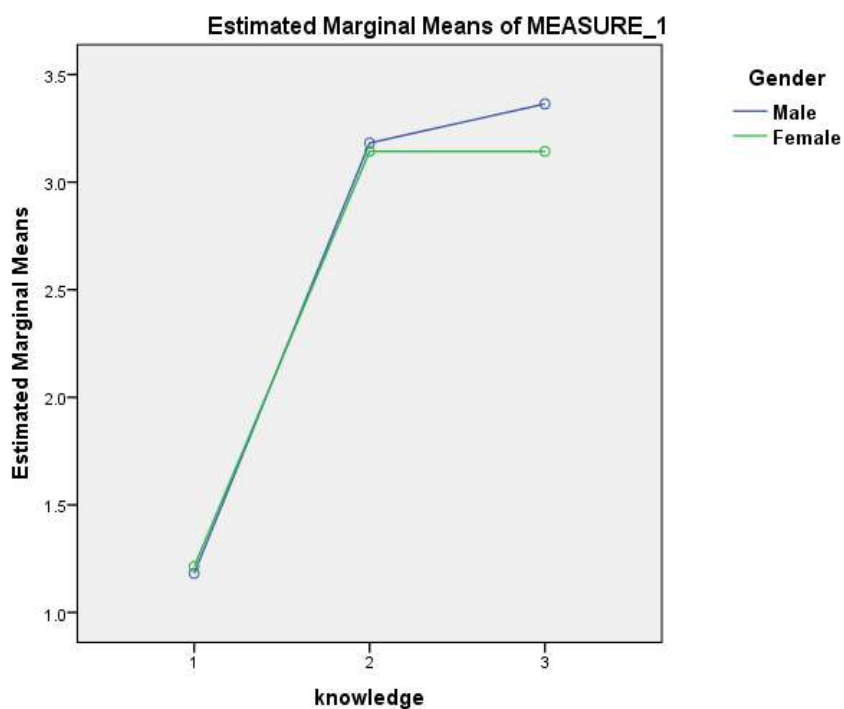


Figure 1. Changes in the levels of the nurses’ knowledge about restraint and seclusion in the males group and females group throughout the three phases.

CONCLUSION

The nurses had little training about how to deal with agitated patients in psychiatric wards. Most of the nurses who participated in the study have preparative school graduates, and they have an extremely low level of knowledge more than others. The participants who spent (1- 5) years of experience in psychiatric field have an extremely low level of knowledge more than those who have more 5 years of experience in psychiatric field. The studied nurses confirmed that the study group have improve and increase in their awareness and level of knowledge about restraint and seclusion in phase two, and three. The educational program is effective to increase awareness and knowledge of the studied nurses about restraint and seclusion after its implementation.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Psychiatric and mental Health Nursing Department, College of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effect of Rainfall on the Ratio of Atmospheric Carbon Dioxide Drift for the 2015-2016 Season

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ABSTRACT

Carbon dioxide is one of the most important greenhouse gases that is increased in atmosphere by effect of human. These rates increase in the winter season while less when the plant began to grow, where withdraws this gas by photosynthesis. CO₂ is closely related to several elements of climate. CO₂ meter device was used at Mustansiriya station for the purpose to measure concentration of gas during the winter season for the period (14/12/2015 to 27/ 3/2016), before rain fell by observing the weather situation, 14 rain cases were recorded during this period. Rainfall data is measured use the automatic weather station located in the Department of Atmospheric Sciences, Collage of Science. The result shows that increasing in concentrations of gas that has been measured about the natural gas, where the concentration of CO₂ initial at the beginning of the rainy season is up to 450_{ppm} at the end of the winter, while it was about 350_{ppm}. External gas ratios by washing was high whenever the rainstorm is strong. The intensity of the gas flux is also increased by increasing the rain intensity I, so the rainy winter of Baghdad reduced the percentage of CO₂ in the atmosphere.

Keyword: Washout, Wet deposition, Intensity of rain.

INTRODUCTION

Atmosphere composed of several gases, nitrogen and oxygen occupy 98%, Argon occupy 1% and all other gases place small quantities usually they are not mentioned as percentage, but as units of part of a million (ppm) to describe gases with simple ratios in the atmosphere, including CO₂ and water vapor. Although the percentage of CO₂ does not exceed in some sources 0.035%, but these percentages in case of increasing the result of human activities, involve the use of fossil fuels as a source of energy and cement industry, which caused a large increase in gas rates. That is not less important than the increase caused by energy production and transportation, the danger of this increase in temperature rise as one of the most important greenhouse gases, causing global warming. Any increase in the proportions of this gas has great damage to the environment and human. Thus, there is a relationship between weather

variables and percentage of increase or decrease of this gas and these most important variables rain. This study was to indicate whether there is a rain effect on the rates of presence of gas CO₂ or not affected by the rain using the method of wet deposition of gases based on equations¹. Drifting chemicals from the atmosphere either operations physical or methods of chemical transformations, If these substances are present in the atmosphere in large molecules or large droplets, the Physiological deposition to soils and vegetation and the sea may occur due to the deposition of gravity. Either small particles that have quicken deposition Neglected; it may be deposited into these surfaces with dispersion. Either Gas deposition occurs by adsorption to surfaces directly. These gaseous substances interact with other materials to form substances that are subsequently drifted. There are two kinds of deposition: The first type is dry deposition, which means that any physical drift process does not include precipitation. The second type is wet deposition, which refers to the processes in which atmospheric chemicals accumulate in the rain and snow and fog droplets. Wet deposition is drifting many chemicals from the atmosphere even gases. When these substances are combined with the droplets of water present in the cloud, this process is called deposition

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polluted rain (Rainout), but if the merger occurs under any cloud accompanied rain through the air toward the ground called this process deposition Washout ¹. The aim of this study is to find the effect of rain on the percentage of carbon dioxide in the atmosphere in the area of waziriya in Baghdad, depend on the idea of wet deposition of gases and calculate the proportion of gas after the rain and these ratios are strongly affected by the rainstorm.

MATERIALS AND METHODS

Drifting gases in the atmosphere, including carbon dioxide, are dissolution inside the rain drops that do not return to land. When equilibrium occurs, the chemical composition in the rain drops is given by Henry’s law [2]

$$C_{\text{water}} = C_{\text{(air)}} / H \dots 1$$

Where, $C_{\text{(water)}}$: is the concentration of the dissolved chemical in the rain droplets , $C_{\text{(air)}}$: concentration of the gases in the air, H: Henry law constant has no units which equal a ratio ($C_{\text{water}} / C_{\text{air}}$).

The density of flux resulting from the gas dissolved coupled with rain falling given by equation [3]

$$F = C_{\text{(water)}} \times I = C_{\text{(air)}} \times I/H = C_{\text{(air)}} \times w_r \times I \dots 2$$

Where, F: density of flux is the density of any variable on the unit area, but here the intensity of the flood we mean the ratio of the dissolved gas concentration in the amount of rain.

I : rainfall rate in mm / hr, w_r is the external washing ratio and equal 1 for co2 gas, The outside washing coefficient λ for carbon dioxide is calculated by relation⁴.

$$\lambda = (10^{-4}) (I^{0.53}) \dots\dots\dots 3$$

Where λ units S^{-1} It should be noted that the value of the observed range from λ

$0.4 \times 10^{-3} S^{-1}$ to 6×10^{-5} can guess the concentration of air after the end of each rainstorm, the drifting process of the first rank so dissolution equation

$$C_{\text{(air)}} = (C_{\text{air}_0}) e^{-t\lambda} \dots\dots\dots 4$$

Where t is the time per second so the amount of CO₂ externally washed and deposited on water complexes

$$C_{\text{(airo)}} - C_{\text{(air)}} = C_{\text{(CO2)}} \dots\dots\dots 5$$

Dataset

It is known that CO₂ concentration depends on two factor, location and time such as day and night, summer and winter and agricultural and residential area. A device was used to measure carbon dioxide concentration before rain that is named CO₂ meter. It is a digital device has a ppm (part per million) range from (0 - 4000 units) and temperature range from 0 to 50 (C) or (F) at height varies from (0 - 9000 m) . Monitor the weather situation through the website of the General Authority for Aerial and Seismic Monitoring .The measurement of gas concentrations of co2 before the rain for the period 2015-2016. The station in the Department of Atmospheric Sciences Recorded 14 rain storms ranging from heavy to medium and weak. This station is located at a height of 50 meters above sea level, where the wazirya area in Baghdad is located 32 meters above sea level and the height of the building science faculty 18 meters to avoid any natural impact of industrial buildings such as trees or high buildings, which may affect the data of weather variables. This station was installed in 2007 and is considered one of the first stations in Iraq to measure and collection of weather variables, including temperature, humidity, rain, speed and direction of wind, atmospheric pressure, solar radiation and other variables. The use of rainfall data measured at the station for a period of one season from 2015-12 to 2016-3 the wazirya area of Baghdad.

RESULTS AND DISCUSSION

Carbon dioxide is a rare atmospheric gas, accounting for 0.04% of the atmosphere, according to NOAA measurements on the island of Monalo, Hawaii [6]. The concentration of this gas varies according to different factors, including areas close to the surface of the earth and remote areas, the city and the countryside, as well as the industrial cities for non-industrial as it varies by month, In the northern hemisphere the concentration of gas is highest in spring and less in the autumn [7]. Thus, its concentration varies with time and place. Co₂ affected by the high population density and the rate of increase as the population in the region, for example, found that the rate in the New Baghdad area higher than the rate in the Mansour area [5], Percentage of change with time as increasing at night and less during the day Because effect of the plant where the process of photosynthesis at night, the proportion of gas in the atmosphere increases. In addition to the above mentioned, CO₂ gas is also

affected by different weather factors of temperature, rain, etc. In this study we will show the effect of rain on the percentage of the presence of this gas in the atmosphere, through measurements of the percentage of the existence of this gas using the device described above for severe rain cases And medium intensity and weak, and these assignments can be divided by the amount of rain as follows:

- Light (0.3mm-3.9mm)
- Medium (4mm-10.9mm)
- Heavy (11mm-20.9mm)
- Very heavy higher than 21mm.

Using equations (1-5) the following results were obtained that will be explained in the tables below. Rain intensity depends on the amount of rainfall and the number of hours of rain, the highest intensity was on 30/12/2016 as table 1, while the highest amount rain was on 22/2/2016 and 27/3/2016, but different rain falling period In the first case, it was approximately 6 hours and in the last two cases (9-12) hours (which was caused by the sinking of most of the residential areas of Baghdad). These cases are classified as heavy rain, so the wash rate of CO₂ is greater than the other cases as tables 2, Figure 1. Where the proportion of gas remaining in the atmosphere after the rain is very little compared to what exists before the rain and so there is positive relationship between them, where the greater the intensity of the rain increased the rates of washing carbon dioxide in the atmosphere as figure 2, i.e proportion of this gas in the atmosphere is decrease, The Correlation coefficient between them (strong correlation, r²=0.811) and this enhances the above. In the case of light rain recorded in the days 14/12/2015, 6/2 / 2016, 14 / 3/2016 as table 2, show The proportion of gas remaining in the atmosphere

after the rain is greater than the state of heavy rain. when the amount of rain is equal, the carbon dioxide gas ratios vary depending on the concentration of the gas before the rain, and this is what happened 31\12, 1\1 where I equal, but the gas ratios varied according to the initial concentration and the time also affects the proportions of gas On 31 / 12/2016 rain occurs at night and 1/1/2016 rain occurs during the day, as shown in table 2. the density of flux F(the ratio of the dissolved gas concentration in the amount of rain) has been shown that the intensity increases with intensity rain as the flux density varies depending on the intensity I, When are The intensity of light rain is F = 131 , when I is severe, F = 1374 and when I medium F = 735, so there is a positive relation between them as shown in Figure 3.

Measurements were shown for concentrations of carbon dioxide for the city of Baghdad, the high rates of this gas significantly despite the multiplicity of causes that lead to increase in the atmosphere and its impact on the environment on the one hand and human on the other, The concentration of this gas begins to decline at the end of the winter, where the presence of this gas at the beginning of the season is equal to 435ppm at the end of the season is about 350ppm as shown in Figure 1. In figure 4 the amount of gas out washing or so-called (washout), this ratio increases with increased rain intensity, the greater the intensity of heavy rain was a large washout ratio and thus reduce the concentration of carbon dioxide in the atmosphere . at the end of rain period the concentration of gas Washout less than The measured concentration (initial). This shows that the increase of concentrations of carbon dioxide to the city of Baghdad in a large amount, the more rainy winter in Baghdad helps to reduce the concentration of carbon dioxide in the atmosphere.

Table 1. The rainfall intensity I is shown in unit mm / hr and the outside washing coefficient a

The series of cases of rain	Data of rain	Number of hours of rain	The amount of rain unit mm	Rain intensity mm / hr	10×a
1	14/12/2015	2	1.27 (light)	0.635	0.786
2	24/12/2015	3	4.32 (medium)	1.44	1.2
3	30/12/2015	6	16.76 (Heavy)	2.795	1.7

Cont... Table 1. The rainfall intensity I is shown in unit mm / hr and the outside washing coefficient α

4	31/12/2015	5	1.25 (Light)	0.25	0.4
5	1/1/2016	3	0.75 (Light)	0.25	0.4
6	22/1/2016	3	1.26 (Light)	0.42	0.63
7	23/1/2016	6	10.66 (Medium)	1.77	1.35
8	6/2/2016	2	2.03 (Light)	1.01	1.005
9	7/2/2016	2	3.29 (Light)	1.645	1.3
10	11/2/2016	2	0.75 (Light)	0.375	0.594
11	22/2/2016	12	22.79 (very heavy)	1.899	1.404
12	23/2/2016	7	6.78 (medium)	0.966	0.982
13	14/3/2016	1	1.27 (light)	1.27	1.13
14	27/3/2016	9	22.73 (very heavy)	2.5	1.633

Table 2. Shows the concentration of carbon dioxide before and after the rain and the intensity of the flow F.

Sequence	Data of rain	initial concentration of gas co2 before one hour of rain unit PPM	Outside concentration of washing after rain stops with PPM unit	Density flux (F)
1	14/12/2015	435	188	131.3
2	24/12/2015	463	337	656
3	30/12/2015	460	448	1374
4	31/12/2015	435	252	69.3
5	1/1/2016	380	154	42.35
6	22/1/2016	440	141	65
7	23/1/2016	400	378	735.9
8	6/2/2016	360	185	491
9	7/2/2016	360	218	394
10	11/2/2016	340	118	48.6
11	22/2/2016	320	319	636
12	23/2/2016	350	320	341
13	14/3/2016	310	206	290
14	27/3/2016	305	368	1012

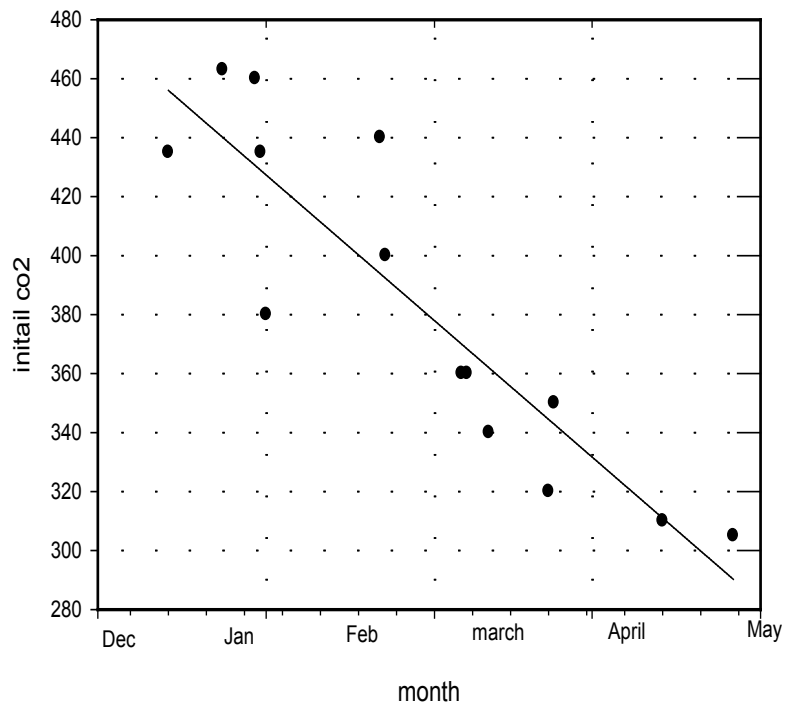


Figure 1. Concentration of CO₂ through study period

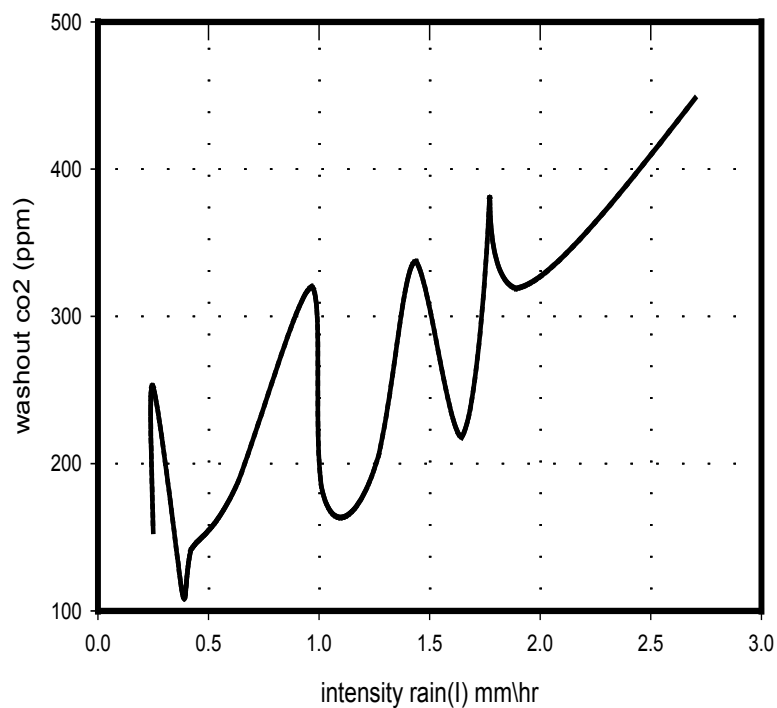


Figure 2. Relation between washout CO₂ and intensity rain.

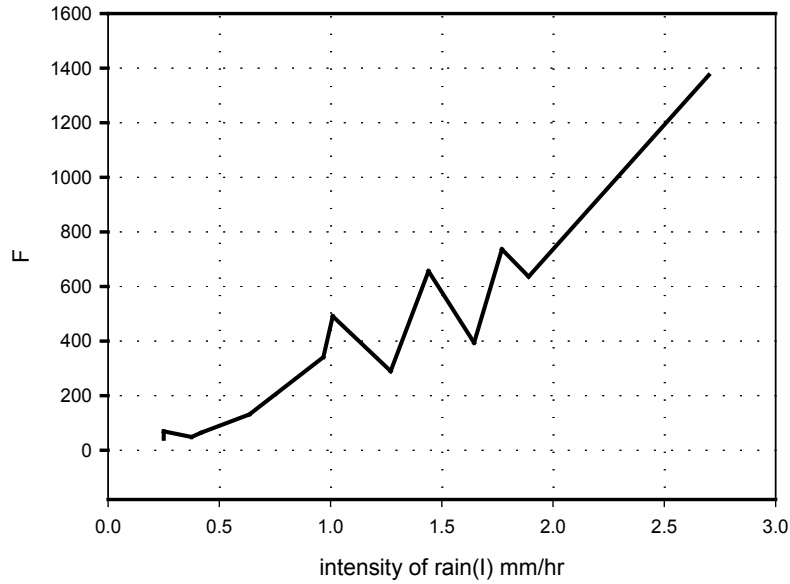


Figure 3. Relation between F and I.

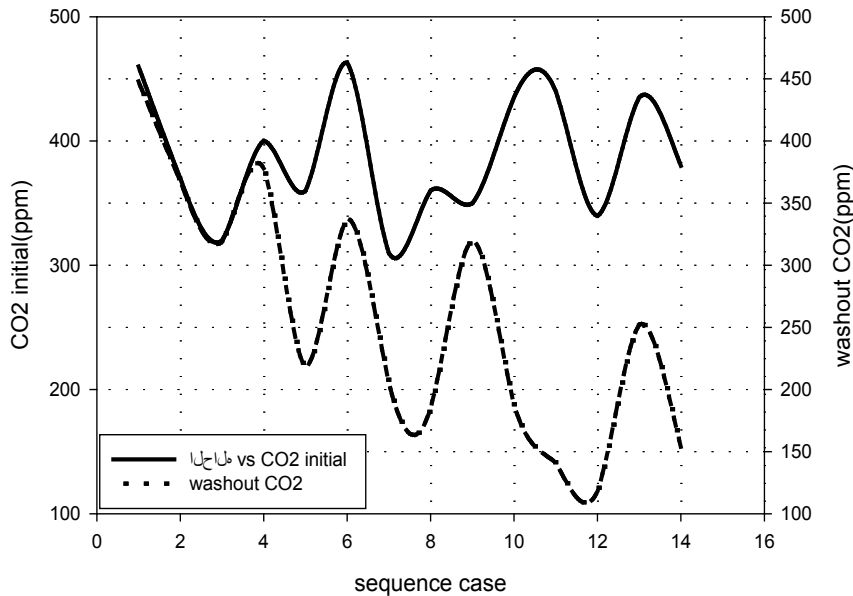


Figure 4. Concentration of CO2 initial and washout CO2 through study

CONCLUSION

Concentration of CO₂ decreases at the end of the winter season as the measurements show that the concentration of gas at the beginning of the season is about 450ppm and at the end of the season 350ppm. The percentage of gas out washing (washout) increases with increasing rain intensity, the greater the amount of rain, the lower the proportion of the presence of carbon dioxide. The flux density of dissolved gas in the rain

increases with increasing rain intensity, where when I = 0.25mm, F = 69 and when I = 2.7mm, F = 101.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Atmospheric Sciences Department,

Collage of Sciences, AL-Mustansiriyah University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Histopathological Study of Infection with Helminthic Parasites Intestinal of some Tigris River Fish passing Through Tikrit City, Iraq

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ABSTRACT

A total of 100 fish samples were collected from Tigris river at Tikrit city, during the period from September 2017 to March 2018. These fishes were belonging to ten species which were *Alburnus sellal*, *Arabibarbus grypus*, *Carasobarbus luteus*, *Coptodon zillii*, *Cyprinus carpio*, *Cyprinus kais*, *Leuciscus vorax*, *Luciobarbus Xanthopteru*, *Mystus pelusius* and *Silurus triostegus*. The results revealed infection with four species of worms including three cestoda *Eubotherium salvelini*, *Schyzocotyle acheiognathi* in *cyprinus carpio* with percentage of infection (5.2, 10)% respectively and *Ligula intestinalis* in *Coptodon zillii* with percentage of infection (9)%. One specie acanthocephala (*Neoechinorhynchus zabensis*) in *Arabibarbus grypus* and *Carasobarbus luteus* with percentage of infection (20, 5.8)% respectively. In this study also recorded two new hosts including *Eubotherium salvelini* and *Ligula intestinalis* were recorded the first in Iraq. The present study included the histopathological changes on the intestine which infected with parasitic worms (acanthocephalan, cestoda). It has been differentiated the intestinal villi appeared with epithelial degeneration and cellular debris in the lumen of intestinal, also the basement membrane of this epithelium was displaced from the core of villus, cavitation in muscular layer, complete sloughing of epithelium in intestinal cavity and white blood cells infiltration especially in lymphocyte cells.

Keywords: Tiger fish, Worms, histopathology, cestoda.

INTRODUCTION

Fish are infected with a wide spectrum of parasites, some of them are pathogenic for other kinds of fish or the vertebrates such carnivorous including the human being¹. It became important to study the causes and life cycles to be diagnosed and finding the way to control it². Some parasites cause a mechanic damages for the fish when they move throughout their tissues, and they cause over growth in the connecting tissues that obstacles the processes of reproduction and growth. Some of fish parasites or their larvic stages transfer in to the human being by eating fish uncooked or bad cooked such as nematode worm *Gnathostoma*, liver worm *Clonorchis sinensis* and cestoda worm *Diphyllobothrium latum*³. Because of few studies in the country that deal with tissue changes resulted from intestinal infections by parasitic worms in Tigris river fish, so this study aims at isolating parasitic worms and studying the tissue pathogenic changes of intestinal tissue infected by

parasites.

MATERIALS AND METHOD

A total of 100 fish specimen were collected during the period from September 2017 to March 2018 from different local shops in Tikrit City. Samples transferred to our parasite laboratory in College of Science according mentioned method to⁴ the method is that splitting linear at media ventral line from head to anus then opened from first splitting to cover gills on length line side of fish. After that this piece was removed to appear internal parts to examine the body cavity by eyes in order to notice worms. The gastrointestinal tract was dissected out from the rectum to the esophagus, opened longitudinally and examined carefully. worms have been preserved in 70% alcohol, they were stained with following method to⁵, dehydrated in an ethanol series (70%, 80%, 90%, 100%), cleared in Xylene mounted with Canada balsam. As tissue sections were fixed in

10% neutral formalin, prepared them were passed by Histokinate then embedding of paraffin, were cut thickness five microns, stained with hematoxylin and eosin (H&E) and examined under microscope^{6,7}.

RESULTS AND DISCUSSION

Through the current study is collected and examined 100 fish, involved ten species of fish. They have taken from Tigris river at Tikrit city. The results revealed that infection with four species of worms involving three cestoda *Eubothrium salvelini*, *Schyzocotyle acheiognathi* in *Cyprinus carpio* with percentage of infection (5.2, 10)% respectively and *Ligula intestinalis* in *Coptodon zillii* with percentage of infection (9)%. One specie acanthocephala (*Neoechinorhynchus zabensis*) in *Arabibarbus grypus* and *Carasobarbus luteus* with percentage of infection (20, 5.8)% respectively as shown in table (1). This study also includes the effects pathogenic tissue are caused by parasite worms as following:

cestoda: *Eubothrium salvelini*

Differentiated tissue sections to intestinal in *Cyprinus carpio* that the intestinal villi were containing great vacuoles in between epithelial cell which were also appeared mostly degenerated with presence sloughed cells in the lumen of intestinal (fig. 1).

Schyzocotyle acheiognathi

Pathogenic tissue changes to intestinal in *Cyprinus carpio* show that the lamina propria and sub mucosa was infiltrated with lymphocytes and other white blood cells, also these cells are aggregated in the form of local patten around the suspected parasites and empty blood vessel (fig. 2). It also displays the intestinal mucosa was formed low great villi, but its epithelium which are lining appeared completely sloughed from the surface which appeared like the core of villi with different regions infiltrated by white blood cells (fig. 3).

Acanthocephala: *Neoechinorhynchus zabensis*

It indicates through examined tissue sections to intestinal in *Arabibarbus grypus* there are certain areas in the epithelium was lost its continuation with others, also other areas were lost its epithelium completely and these areas were invaded by white blood cell and lymphocytic aggregation, the blood vessels in the lamina propria had thick wall with great number of

white blood cell and red blood cell in its lumen (fig. 4). Distinguished tissue sections in *Carasobarbus luteus* that the intestinal villi appeared with epithelial degeneration and cellular debris in the lumen of intestine, also the basement membrane of this epithelium was displaced from the core of villus. Which this core was greatly infiltrated with lymphocytic and other white blood cell aggregation (fig.5). The current study is recorded that pathogenic tissue changes resulted from infection with intestinal worms included:

1. Cestoda : *Eubothrium salvelini*

The current study indicates that damages are caused by this worm in *Cyprinus carpio*, degenerated epithelium of intestinal villi and appeared vacuoles, sloughing cells in sub mucosa layer. perhaps, it has been caused these damages to be secreted by worm that toxin effects on tissue cause defect in organisms function⁸. Generally, damages are mechanical in the area of connecting worm, it has been obtained cause of inflammation peritonitis or causes of internal hemorrhage^{9,10}.

Schyzocotyle acheiognathi

This study shows that mechanical damages of intestinal *Cyprinus carpio* caused by parasitic worms. it also results from parasitic infiltration of intestinal layers especially mucoid and submucoid layer of inflammatory cells of lymphocytes types. this infiltration is represented as reaction of parasitic process¹¹. principally, inflammatory cells focus were got in the never layers of parasitic worms when it tried to stick intestine walls by use bothria. According to the size of worm, it may be led to the pressure is resulted from sticking worm intestine walls to lose far of intestine. In view of bigness worm perhaps leads the resulted pressure to stick worm of intestinal wall to lose from epithelial layer. this agreed with¹².

Acanthocephala : *N. zabensis* in *Arabibarbus grypus*

This study displays that pathogenic intestinal changes to fishes are infected by parasite, there closed in cavity intestinal of parasite section are caused damaging epithelial desquamation strongly with reducing villus because of being fixed probosis parasite in epithelial layer and makes irritation, parasite makes acute response inflammatory locally because the presence of worms parasite, these finding are agreed with^{12,13}.

Most of pathogenic effects of acanthocephalus resulted from sticking adult worm and larves in tissue , however , pathogenic effects of infection are resulted from sticking adult worm deep areas in tissue devastation has been arrived at more deeper than sticking areas proboscis parasite, parasite usually tends to stick of epthela layer and perhaps extend sticking to muscular layer of intestinal ^{13,16}.

N. zabensis in Carasobabus luteus

the current study shows that worm cause damage

variously in intestinal of *Carasobabus luteus* infected , appears that tissue sections degeneration epithal , absement membrane and core of villus greatly infiltrated with lymphocytic and other white blood cell aggregation, is represented as reaction of host towards sticking worm. It has been known that acanthocephalus penetrate some or all wall layers of intestinal fish infected especially if it was long proboscis parasite ¹⁷. These damages causes to close cavity intestinal especially when these worms in the bigger size and lot of numbers, this agreed with ¹⁸.

Table 1. Recorded worms species in fish, Prevalence and Average of violence infection

Worms species	Hosts	Number of fishes		Number of isolated worms	Prevalence (%)	Mean intensity of infection
		Examined	Infected			
<i>Eubotherium salvelini</i>	<i>Cyprinus* carpio</i>	21	1	2	5.2	2
<i>Schyzocotyle acheilognathi</i>	<i>Cprinus carpio</i>	21	2	6	10	3
<i>Ligula intestinelis</i>	<i>Coptodon* zillii</i>	11	1	5	9	5
<i>Neoechinorhynchus zabensis</i>	<i>Arabibarbus grypus</i>	5	1	1	20	1
	<i>Carasobabus luteus</i>	17	1	3	5.8	3

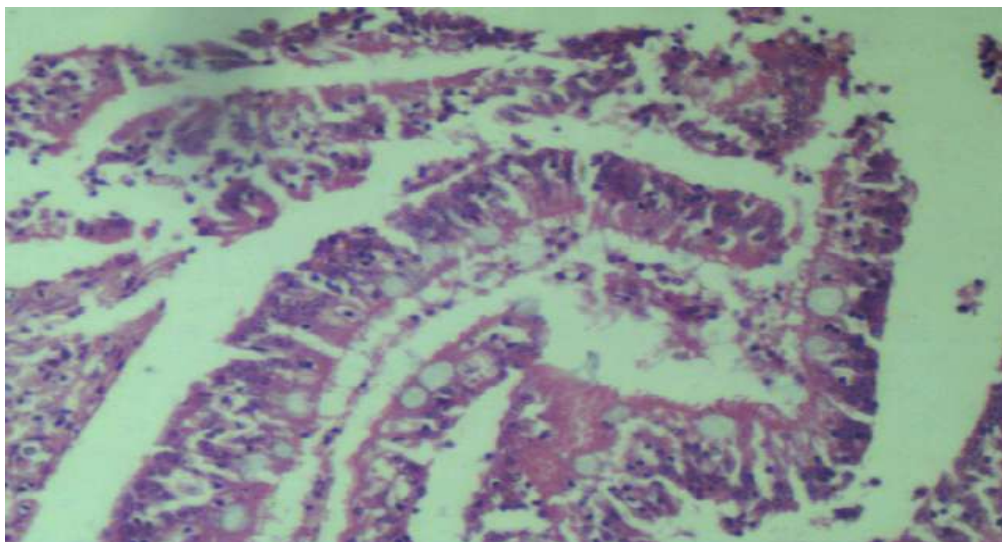


Figure 1. Tissue sections to intestinal in *Cyprinus carpio* infected *Eubotherium salvelini* explain degenerated epithelium of the intestinal villi , vacuoles in the epithelium (H&E X40)

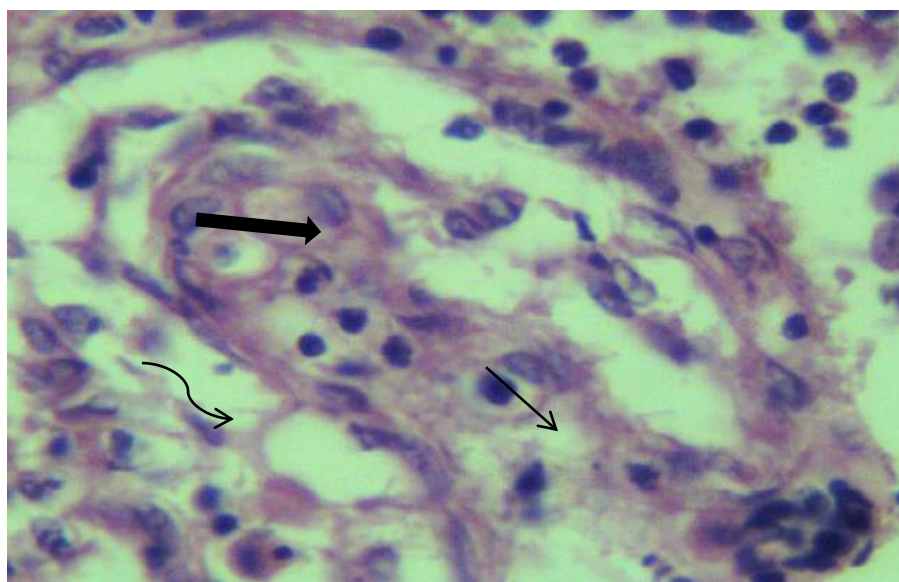


Figure 2. Tissue sections to intestinal in *Cyprinus carpio* infected *Schyzocotyle acheiognathi* explain lymphocytic diffusion (**→**) in the lamina propria and submucosa (**→**), suspected parasite (**→**) (H&E X40)

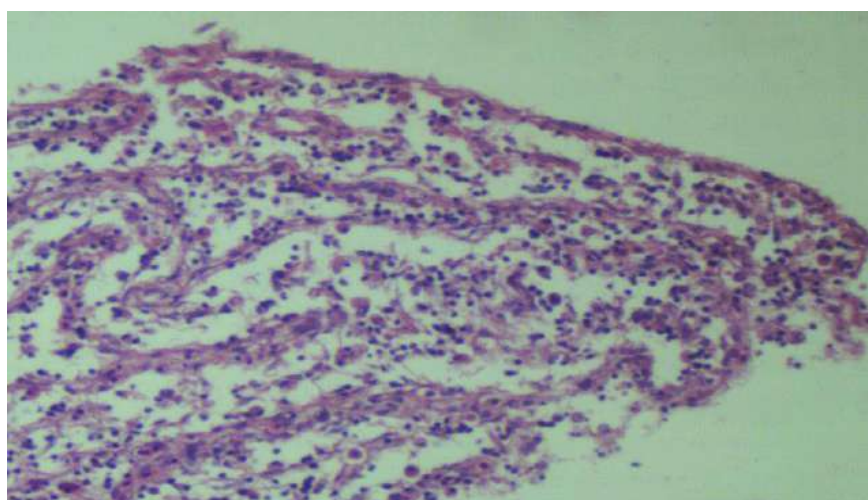


Figure 3.: Tissue sections to intestinal in *Cyprinus carpio* infected *Schyzocotyle acheiognathi* explain complete sloughing of epithelium (**→**), core of villus with lymphocytes (**→**) (H&E X40)

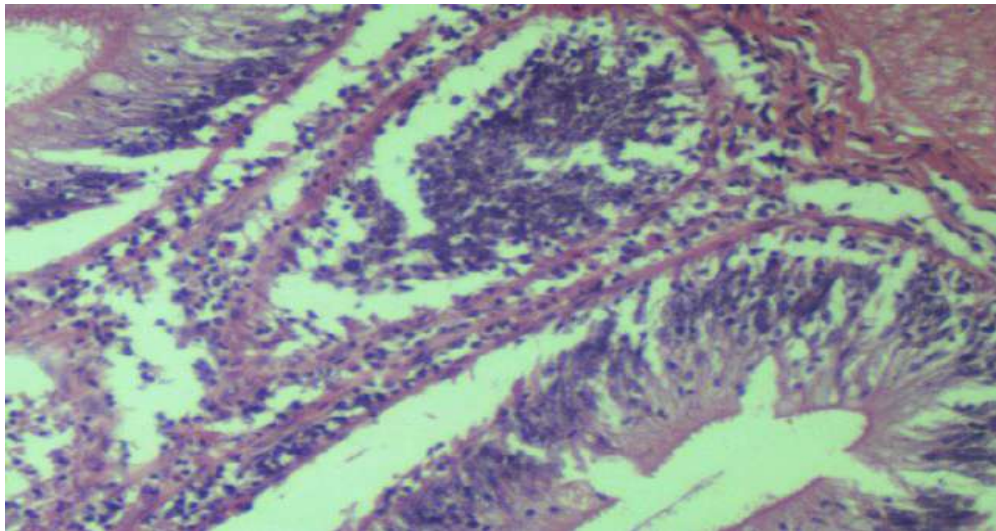


Figure 4. Tissue section to intestinal in *Arabibarbus grypus* infected *Neoechinorhynchus zabensis* explain discontinuation of epithelium (**→**), with invasion the epithelium by lymphocytes (**→**),lymphocytic aggregation in lamina propria(**↪**) (H&E X40).

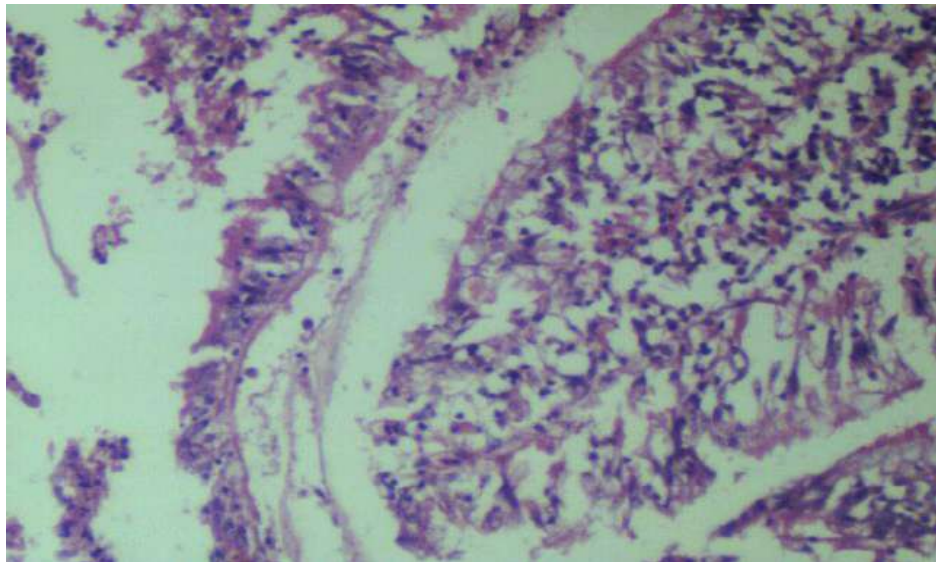


Figure 5. Tissue section to intestinal in *Carasobabus luteus* infected *Neoechinorhynchus zabensis* explain epithelial degeneration (**→**), basement memberen (**→**), core of villus (**↪**).

CONCLUSION

The present study included the histopathological changes on the intestine which infected with parasitic worms (acanthocephalan, cestoda). It has been differentiated the intestinal villi appeared with epithelial

degeneration and cellular debris in the luman of intestinal, also the basement membrane of this epithelium was displaced from the core of villus, cavitation in muscular layer, complete sloughing of epithelium in intestinal cavity and white blood cells infiltration especially in lymphocyte cells.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science, University of Tikrit, Iraq and all experiments were carried out in accordance with approved guidelines.

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Leukemia Detection Using Image Processing

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ABSTRACT

Digital image processing for medical images has advanced so much in a very short period of time, but we still have to figure out very narrow issues which can be very important sometimes. One such problem is to successfully differentiate between a normal bone marrow slides images with an abnormal one. This needs to be done with high accuracy because these classification results will be going for classification of different types of Leukemia. In order to work through the process, a number of features will be extracted from each image. A set of images will be used to get the features and another set will be used to test out the features extracted from the training dataset. This classification technique is done at a high accuracy rate to identify a malicious Leukemia image.

Keywords: Leukemia, image processing

INTRODUCTION

From multiple types of cancers, Leukemia is one type of blood cancer. As per ¹, about 4.5% cases of cancer in Malaysia are for Leukemia. This type of cancer starts in bone marrow. The main cause of Leukemia is extra formation of malignant white blood cells (WBCs) which are also immature in nature ². Unfortunately, children are more likely to have Leukemia as compared to adults. There are four types of this cancer:

- AML - Acute Myelogenous Leukemia
- ALL - Acute Lymphocytic Leukemia
- CML - Chronic Myelogenous Leukemia
- CLL - Chronic Lymphocytic Leukemia

Types of WBCs which can be affected by Leukemia are neutrophils, basophils, along with eosinophils, monocytes and lymphocytes. The progression speed of acute Leukemia (AML and ALL) is more than chronic

Leukemia (CML and CLL). If caught at early stages of the disease, Leukemia is very much curable and treatable. A hematologist recommends a complete blood count (CBC) test to check for the disease. A detailed study of morphological marrow of bone smear analysis needs to be conducted if there are found any form of abnormal counts of the cell from the test. This is finalized to ensure the presence and detection of leukemic cells in the blood ³. There are instances where the counts of platelets and RBCs becomes very low in leukemia. Based on the current scenario in medical industry, the presence of leukemia is observed by taking a look at the nucleus and the cytoplasm via a microscope ⁴. The only problem is that this task of looking under the microscope is a very tedious task to accomplish, and that goes even for an expert too. Because of this process's extensive nature of diagnose, the final results might lead to misdiagnosis.

Classification of leukemia is a long and complicated process with multiple steps. The first step is to separate the images of bone marrow into normal and abnormal category. Again, this classification is also a multistep process. These processes are as follows:

- Image enhancement
- Image segmentation
- Features extraction
- Classification

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In medical imagery, the first step which is image enhancement plays a very important and crucial role. Reason being this step improves and enhances the quality of the image and it becomes easy and efficient for human viewing. But medical images comes with their own issues and weaknesses. This issue is missing contrast from the image which is due to the bad lighting at the time of image acquisition. Hence, image enhancement steps are taken so that this problem can be overcome with. The steps which leads into image analysis and image interpretation is none other than image segmentation, in this step the medical image is separated into regions ⁵. The tasks which follows this one, such as feature extraction and image classification relies heavily on the quality and efficiency of image segmentation ⁶. In Leukemia, WBCs holds very important information about the diagnosis of leukemia. Hence, during the segmentation process the RBCs and background will be segmented and we are left with the WBC only which will go further into the analysis. The next step is to extract the features out of the image having only WBCs. These are the features holding vital information about the classification and diagnosis. A hematologist observes the WBCs from the image on various parameters ⁷:

- Size
- Shape
- Nucleus chromatin structure and its characteristics
- Nucleoli's size and color
- Cytoplasm's color
- Characteristics of granules and their presence/absence

These are some of the features which are extracted in order to classify efficiently. Color based features are extracted in this paper, which are as follows:

- Standard deviation
- Mean
- Variance

These features are extracted for red, blue and green channel separately. These features and then used to classify the faulty and non-faulty leukemic cells. We can categorize the whole implementation is broadly divided

into two parts:

This would be our base dataset, which we will use to create a baseline for comparison with other images.

We then need to process the other half of raw data i.e. we process the remaining images to as to make a decision for test images. This decision will be in regards to whether the test images belong to cancerous or non-cancerous category.

The whole project will be divided into 2 parts. Part 1 involves extracting features from a set of sample images, part 2 is about comparing the extracted features with images to mark them as cancerous or not. We have employed 35 distinct sample images to create a baseline data as well as comparison with the test images. This data size can obviously be increased or decreased as per the user's requirements. But as per the author's guidelines, the bigger the training dataset images, the better. More number of input images will yield better baseline and hence better results to compare with. Once the extraction process is complete, we define the optimal range for each feature. This range for every feature will be used in the next step in order to classify the images into cancerous and non-cancerous category. Part 2 takes a test image as input and extracted feature range from part 1 as well is taken as input. Features are extracted for the test image. These new features will be compared with the feature database and baseline. This is how the new image is classifies into cancerous and non-cancerous categories.

METHODOLOGY

In the given paper, the author has used the following methodology for the implementation of a generic system to classify leukemic cells in the blood samples. The process is automated so that manual interventions like looking under a microscope could be dealt with and an efficient result could be obtained. Because a misdiagnosis in this case could be a heavy mistake from the medical perspective.

- Input all the images (cancerous only) into the system
 - Extract the following parameters from these images, one by one
 - o Mean value of red channel pixels
 - o Mean value of blue channel pixels

- o Mean value of green channel pixels
- o Standard deviation of red channel pixels
- o Standard deviation of blue channel pixels
- o Standard deviation of green channel pixels
- o Variance of red channel pixels
- o Variance of blue channel pixels
- o Variance of green channel pixels

- In this code, we are using a total of 35 images (we can increase this number by including more images)

- Hence, we will get a total of 35 sets of parameters for all the cancerous images

- After getting all the values, we will decide a range for maximas and minimas for all the parameters used.

- After this, we will have a range for each parameter.

- To test an image, again calculate all the above parameters for that test image

- Now, if any of the parameter of test image comes under the range of our dataset, the image comes closer to be a cancerous image

- But, if even 1 of the parameter is out of range, then test image is declared not cancerous.

- To test, a set of random images is also given.

RESULTS AND DISCUSSION

Following are the images which passes the test and are termed as healthy cells based on the classification criteria.

Based on the above experiment, it is evident to say that the implementation based on feature extraction specifically on the color features of these images works really well and efficiently.

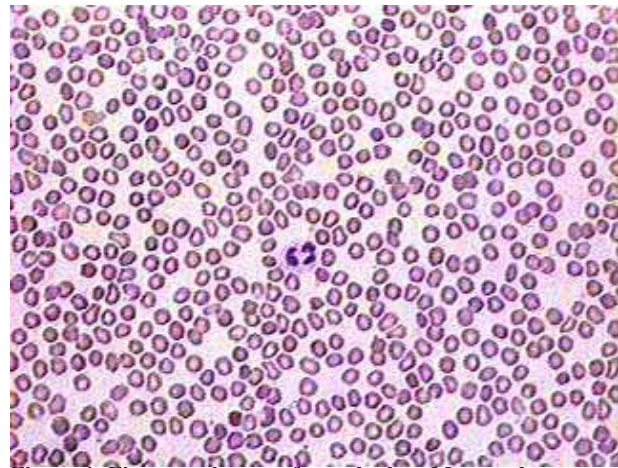


Figure 1. First case image after calculate Mean value

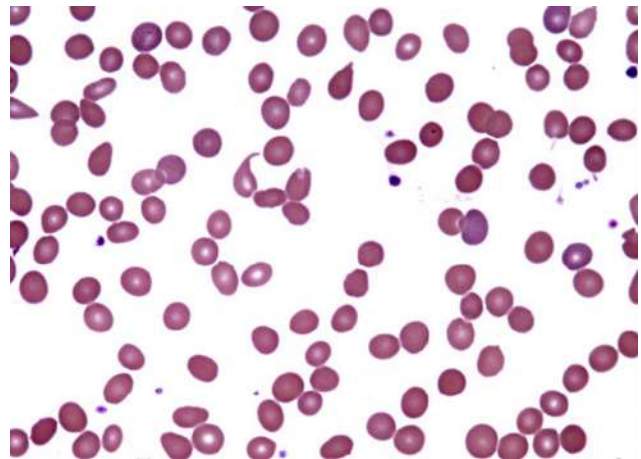


Figure 2. First case image after calculate Standard deviation value

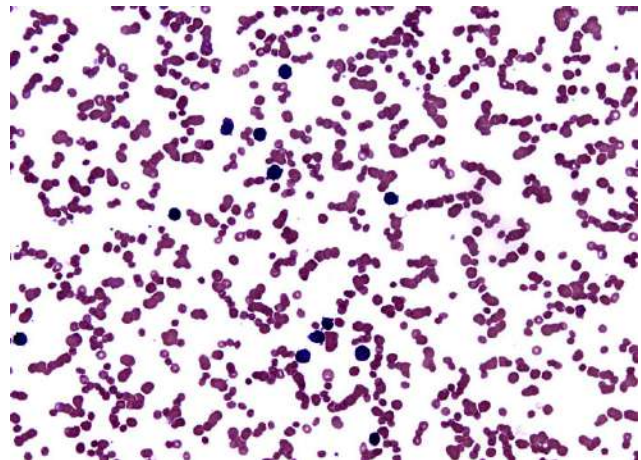


Figure 3. First case image after calculate Variance value

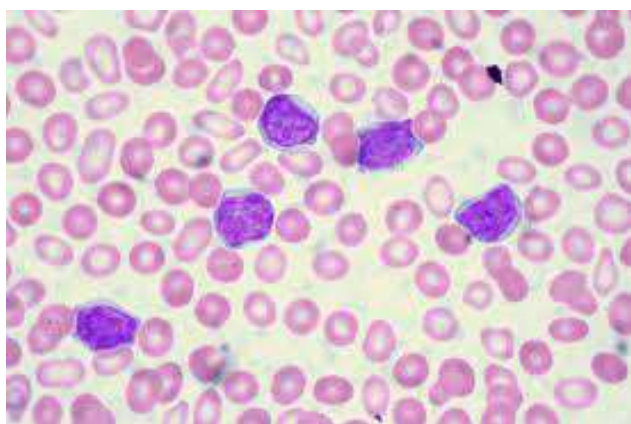


Figure 4. Second case image after calculate Mean value

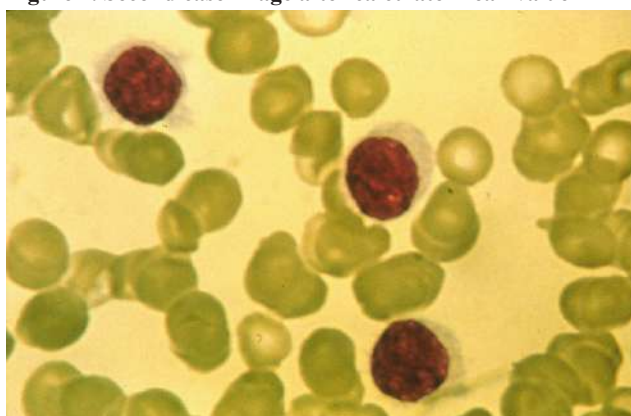


Figure 5. Second case image after calculate Standard deviation value

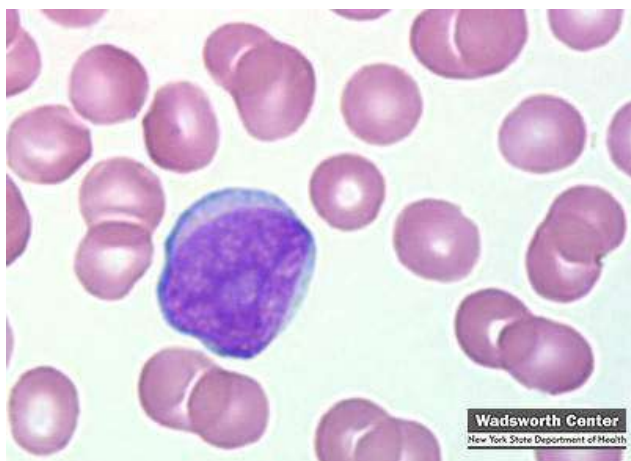


Figure 6. Second case image after calculate Variance value

CONCLUSION

This paper study involves classification of leukemic affected cells from the general lot of healthy cells. This is done using the microscopic blood sample images. The proposed system uses the microscopic images and extract the features in terms of standard deviation, mean and variance of red, green and blue channel of the microscopic blood sample images. The algorithm used in the above discussion is able to identify the infected cells in RBCs when used for an infected individual.

The system showed efficiency, reliability, was able to perform calculations in a considerable less amount of time and with much less error, high accuracy, cheaper computation cost and a robustness in finding the exact solution. This way, it'll become easier to identify the diseased patient.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance

All experimental protocols were approved under the College of education for pure science, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Relation Level between Physics Nature and Science Teaching Methods for Preparatory Grade Physics Teachers

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ABSTRACT

this research aims to identify the relation level between understanding nature of physics and science teaching methods, the descriptive approach has been used to verify the two research tools and testing first tool which is the nature of physics by its aspects (aims, nature, ethics and the interaction between physics and technology) in addition to choosing science teaching methods. The results indicate that there is a poor relation between nature of physics and science teaching methods; many recommendations have been reached in this matter.

Keywords: *testing nature of physics, testing science teaching methods.*

INTRODUCTION

Physics plays an important role in most scientific and practical fields as well as it is regarded as one of the main domains in technical development and other theoretical sciences such as: chemistry, biology, mathematics and applicative sciences such as: medicine, engineering and agriculture ¹. We can say that it covers a large field since it studies the phenomena of the universe and the particles of the material, through this importance comes the importance of paying attention to it and its methods of teaching.

Teaching the nature of a science is considered a massive challenge in the field of science teaching and this matter calls for developing teachers teaching guides which depend on educational science curriculums standards that contribute in the method of learning the nature of science in a manner that positively reflects on the teachers educational practices and their students' performance to deeply understand the nature of that science, scientific knowledge and educational contemplating, therefore, this research is considered one of the supplemental researches as it links between theoretical and applicative aspects in the fields of science

philosophy and teaching methods. A lot of new trends emerged in teaching science and physics depending on modern teaching methods that show the relation between science and technology since it forms a proper introduction to science teaching through transforming the theoretical fact of aspects into practical fact in a manner that facilitates the student's improvement of scientific output since these methods are the result of steps and stages followed by the teacher to achieve certain goals as well as modern and various teaching methods. The following studies tackle the nature of science: ¹ study about the extent of Oman teachers' understanding of science nature in the light of (gender, experience) variables, ² study on (the effectiveness of negotiation approach on science nature development), the study of ³ on the opinions physics, chemistry and astronomy teachers about science nature, ⁵ study on the (aspects of analysis of science nature in science curriculums in Portugal's intermediate schools) and ⁴ study on investigating teaching committees opinions at the colleges of educational sciences - Jordanian universities about the scientific knowledge and its impact on the educational behavior and beliefs of students. Also the following studies discuss teaching methods and their skills: ⁶ study on (the actual situation of teaching methods used at the College of Education – Oman and the reason behind their usage) since this study aims to identify the utilized methods (lecturing & discussion and asking questions along with lecturing), ⁷ study on (*physics teacher beliefs about physics and learning physics*), ⁸

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study on (assessing the performance of natural sciences in the intermediate stage in the light of general standards of general education) and ⁹ study on (*Jordanian physics teacher* beliefs about teaching strategies and assessment included in science curriculums).

METHODOLOGY

The researcher followed the descriptive method since it is the proper one for the aim of the research which can be summed up in identifying the relation level between the understanding nature of physics and science teaching methods for preparatory grades physics teachers. The research sample includes (140 physics teachers of both genders) of preparatory stages; sample method has been used for the random layer which represents a proportion of (32%) of research population. Preparing this research requires the preparation of the two research tools that must include standards by which the relation level between physics and science teaching methods is identified and therefore, the researcher has followed the following steps to develop these tools: reviewing previous studies and seeking the views of experts and specialists in the fields of psychology and science teaching methods; in the light of these steps, the two research tools have been developed and the first tool which is the nature of physics by the aspects of (aims, characteristics, processes, ethics and the interaction between physics and technology) has been tested. First tool test is a multiple choice question that consists of (20) items and testing teaching methods in the fields of scientific knowledge levels, teaching methods and assessment is also a multiple choice question that consists of (20) items. The statistical means used in the research are percentage, arithmetic average, Pearson correlation coefficient and (T-test) for one sample and two independent samples.

RESULTS AND DISCUSSION

The results show that applying physics nature test on teachers sample indicates that the arithmetic average has reached (18.87) which is equal to (60.04%); percentage method has been adopted in order to explain the results since (80%) represents very high understanding level, (79.70%) represents high understanding level, (69.60%) represents medium understanding level and less than (60%) represents low understanding level. We notice from table (4) that percentage of choices for three aspects is (60.04%) and this percentage indicates a

medium level of understanding of physics nature; this result complies with (Hussam Al-Deen & Schwartz, 2008) research results. The results in table (5) have been reached by using (T-test) method in testing physics nature understanding according to (gender) variable. We notice from table (5) that the calculated significance level reached (0.79%) which is more than significance level amounting to (0.5%) that conforms with null hypothesis which provides that there are no differences in understanding physics nature according to gender variable and this can be attributed to the mutual interest in searching for different references whether within the specialty, modern or classic. Arithmetic averages and standard deviations for teachers according to (years of experience variable) have been calculated as in table (6). We notice from table (6) that teachers with experience years less than (5) have an arithmetic average of (38.73) and a standard deviation of (7.03), teachers with experience 5-10 years have an arithmetic average of (34.8) and a standard deviation of (9.89); teachers with more than 10 years of experience have an arithmetic average of (37.76) and a standard deviation of (7.78). Table (7) shows the results of teaching methods test which has been applied on the same sample of teachers. We notice from table (7) that the total arithmetic average is (9.223) which is equal to (28.197%) and this does not rise to the educational acceptance level of (60%). Table (8) shows the results of teaching methods test which has been applied on physics teachers according to years of experience variable. Arithmetic averages and standard deviations for physics teachers' grades in teaching methods test according to teaching experience have been extracted as teachers with less than 5 years of experience have an arithmetic average of (28.66), teachers with 5-10 years of experience have an arithmetic average of (28.76) and teachers with more than 10 years of experience have an arithmetic average of (28.12). As for the range of relation between physics nature test and methods of teaching test, teachers' answers on both tests show that correlation coefficient between the tests' grades has reached (0.38) which is considered to be poor and indicates a poor correlation. In the light of the results presented by the researcher, she reached the following conclusions: the necessity to assess physics books in order to check on the inclusion of the physics nature fields since they have an impact on teachers' educational practices through using teaching methods, certain questions patterns and students education assessment in manner that achieves scientific progress; the necessity to

activate the role of teachers by training them before and during service through including plans which aim to make them qualified to link between physics and science teaching methods.

Table 1. Shows some of the items for choosing teaching methods

No.	Item	A	B	C
1	A Scientific output that proves its validity in certain times and conditions is considered a:	Scientific fact	Scientific concept	Scientific theory
2	one the reasons that call for using different methods and means in teaching science is:	Increase in number of students	Scientific variety	There are no specific reasons
3	Teacher’s movements, students responses and teaching aims of study subject represent:	Teaching method	Teaching style	Teaching strategy
4	Using certain skills to identify problems such as explanation or prediction is called:	Social skill	Motor skill	Scientific thinking
5	The skills that science teaching is trying provide for students are:	Academic personal skills such as thinking and manual skills	Student appreciating the importance of science in his daily life	Discussing scientific topics and their effects

Table 2. Shows preparatory stage physics teachers’ understanding level of physics nature

Aspect	Grade	Arithmetic average	Standard deviation	%
Aims and characteristics	12	8.14	1.48	68
Nature and ethics of science	13	6.48	1.44	72
Interaction between technology and physics and the society	18	4.25	1.25	75
Aspects together	37	18.78	4.17	60.04

Table 3. Shows the arithmetic averages and standard deviations of teachers understanding of physics nature test according to years of experience variable

Field	Gender	Number	Arithmetic average	Standard deviation	(T-test)	Significance
Total grade	Males	70	37.77	6.36	0.22	0.79
	Females	70	36.65	6.77		

Table 4. Arithmetic averages and standard deviations for teachers according to (years of experience variable)

Field	Years of experience	Number	Arithmetic average	Standard deviation
Total grade	Less than (5) years	30	38.73	7.03
	5-10 years	36	34.8	9.89
	More than 10 years	74	37.76	7.78

Table 5. Arithmetic averages and standard deviations of teaching methods test for physics teachers according to gender variable

Gender	Members of sample	Arithmetic average	Standard deviation	Percentage of mediums %
Males	70	8.871	2.539	27.722
Females	70	9.107	2.227	2,459
Total	140	9.223	2.362	28.197

Table 6. Arithmetic averages and standard deviations according to teaching experience

Experience	Members of sample	Arithmetic average	Standard deviation	Percentage of mediums %
Less than 5 years	30	9.1	2.310	28.66
5-10 years	36	8.94	2.42	28.76
More than 10 years	74	7.55	2.01	28.12

CONCLUSION

It is clear from the presented results that the percentage of physics nature test has reached (60.40%) which indicates a medium level for physics teachers; the researcher attributed this matter to their lack of employing intellectual fields through different scientific processes in their teaching methods, since it would deviate them from their main teaching task, and focusing only on the curriculum in addition to the reason of failure of developing their trends and beliefs to search for everything new in the different education stages. The results showed that teaching methods test has reached (28.197%) and this percentage does not rise to the acceptance level due to the teachers' unfamiliarity with science teaching methods and their only concern is to

complete the curriculum whatever the teaching methods. The results also show that the relation between physics nature test and methods of teaching test is poor according the teachers grades in both tests and this matter refers to the poor correlation between them and the importance of variety in employing teaching methods to understand the nature of physics.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effectiveness of a Proposed Teaching Method to Develop the Productive Thinking Skills of Primary School Students in Reading

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ABSTRACT

The study was conducted with the aim of building a proposed teaching method for developing the productive thinking skills of primary school pupils in Iraq. The sample was selected from the center of Babylon Governorate, and the use of the relevant skills, such as percentages and t-test, and the search results in a list of the skills of thinking and the building of the method. The results of the study showed that the proposed educational method has an impact on the development of productive thinking skills among primary school students.

Keywords: *Effectiveness, Instructional Method, Productive Thinking Skills, Reading*

INTRODUCTION

The educational and educational process in Iraq suffers from multiple problems, especially its components, which are represented by students, teachers and curriculum. The curriculum is prepared according to the old educational philosophy which believes in the frequent receiving of the knowledge and the efficient teacher according to this philosophy is able to transfer the great amount of information to the learners. Which guarantees the teacher the abundance of information transmitted to the learners regardless of whether this information is practical or not and does the literacy skills of learners improve and refine their talents? If the teaching methods used by teachers are limited to Providing the learners with knowledge is not enough to prepare the successful learner because the teaching profession has sufficient knowledge and performance^{1,2}. If there is a defect in the performance competencies, the teacher cannot achieve the educational goals no matter what his cognitive competencies. This is confirmed by the recent trends in the preparation of teachers, Education

is not enough to influence the learner for the purpose of learning, but the teacher to have the necessary skill to perform educational tasks in educational situations to ensure the development of thinking skills of learners, and therefore can be said that what results from the educational effort in the field Education is a natural reaction to the problems experienced by various educational institutions revealed by experience and practice, and that the problems of reading education vary according to the stage of study and that the observed weakness in the achievement of learners for the primary stage may be due to weakness in the performance of teachers at the primary stage. The research problem can be summed up in the following question: Does the proposed educational method have an impact on the development of productive thinking skills among primary school students in reading^{3,4}. The question of thinking occupies a major place in the educational sciences, in other sciences and in life in general, because the task of thinking is to find suitable solutions to the urgent theoretical and practical problems faced by man in nature and society. These problems are constantly renewed, which always prompts him to seek new methods and methods to help him find solutions. And thus enables him to overcome difficulties, so thinking - as a cognitive process - is an essential element in the mental construction of knowledge possessed by man, and Hoing believes that creative thinking is a complex

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thinking that involves breaking or reconstructing old or old ideas. The researcher believes that the development of ideas produced by learners depends to a great extent on the teaching methods they receive from teachers, as Philip's study The study aimed to evaluate the content of the teaching programs and teaching methods used in Turin, Italy, and used in this study the personal interviews and the questionnaire restricted in data collection. One of the most important conclusions was that the content of the programs was varied but did not take into account the individual differences, despite its diversity, with the need to involve teachers in the development of programs and propose methods of teaching to create the productive learner, Phillips 1999: 69. Bradley asserts that there is no ideal way to impose on the teacher Affect his idea and innovation but he must be aware of the goals and the nature of learners and the possibilities available as well as his potential as a leader of the educational process is the decision maker ^{6,7}. The method of teaching consists of most components of the educational process as well as the objectives, content and sources of learning and emphasizes the transfer of ideas, skills and activities to bring about the desired change in the behavior of the learner Fawal, 2005: 258), and the researcher believes that the importance of teaching method comes from how the teacher achieve the objectives of his lesson The method that depends on positive change, and the active teacher who pays his students to the thinking of the product is continuous and can be a reading material to achieve this, Berlson stressed the need for careful reading and accurate text that is intended to analyze the content and this distinguishes it from normal reading, reading includes a thorough understanding of the vocabulary and the extraction of meanings as well as understanding the sentences and identify relationships and knowledge of the rules of language and recognize the links between the paragraphs of the text and awareness of patterns of knowledge and organization and order so that the learner can understand the text accurately Durkin and Dolores, 1995: 122), And the reading in terms of education in the present age an important way to fruitful learning, and an essential component of the educational process is based on it to provide students with information and skills and applied positively, to give that process fruit and achieve its objectives. The objective of the study was to identify the effectiveness of teaching in the Karen model in the achievement and thinking produced by the second grade students in physics. To achieve this goal, the researcher

formulated the following hypotheses: "There is no statistically significant difference at the level of (0.05) The experimental group studying physics using the Karen model and the mean scores of control group students who study the same material in the normal way with the post-test "and" there is no statistically significant difference at the level of significance (0.05) between the average grade of the experimental group students who study the The study sample consisted of (54) students who were randomly assigned to the experimental group (27) students and the control group (27) students who were equal In the following variables (age, parental achievement, intelligence, first course grades for physics, previous information, and productive thinking), the researcher prepared two tests, the first of which consists of (40) test paragraphs of the type of multiple choice and the other, Wen (26) position, has been confirmed Alsekoumtrah characteristics of the two tests, and the results of the study showed the superiority of the experimental group students on the control group students in the collection and thinking about the product. Study of the painter: The objective of the study is to identify the impact of a training program based on the dimensions of learning in the development of some of the thinking skills produced by students in Kuwait. The sample of the study (89) students from sixth grade students in Kuwait. Six sub-tests are (interpretation, analysis, evaluation, fluency, flexibility, originality) and the overall score of the test. This confirms the parity of the experimental and control groups before applying the learning program based on learning dimensions. Study of Ramadan: The study aimed to design a training program to develop the motivation of achievement among students of secondary education who are late in school and to discover the effect of training using this proposed program on the development of educational achievement and on the development of creative thinking. (108) students from the first grade of high school in Petra secondary school, and used the measure of achievement motivation and the Tawarenz test of creative thinking verbal (Picture A) and the Tournes test of innovative thinking using images (Picture B) Naya Critical Thinking 2000 and a training program for the development of motivation achievement. The results showed that there were statistically significant differences between the average scores of the experimental group and the control group in the post-measurement of the variable achievement of the first semester marks (creative thinking - critical thinking) and

the motivation of achievement for the experimental group. Statistical significance between the average of the students of the experimental group in the tribal and remote measurements for the variable achievement of the first semester marks (creative thinking - critical thinking) and motivation for achievement in favor of the group Therapies.

METHODOLOGY

Procedural definition: A set of reading texts included in the curriculum prepared by the Iraqi Ministry of Education for the students of the fifth primary for the year 2017. **Research objective and hypothesis:** This research aims to: Building a proposed teaching style according to the skills of productive thinking and Learn the effect of the proposed method in developing the productive thinking skills of primary school students in reading. **The hypothesis of the research:** "There is no difference in statistical significance at the level of significance 0.05 between the average grade of students in the fifth grade of primary in the applications of tribal and post-test skills of thinking product» Table 1. **Determination of the educational material:** The researcher identified the article in agreement with the teacher of the Arabic language and also comes (education and mothers, the caliph and the world, and visit the city, and Hamolabi and Bilbly). **Building the proposed learning method:** Use the researcher after reading and reading the literature and websites steps of the educational method as follows:

Raise the motivation of students towards new learning.

Reading the text of the teacher and pupils.

Inferring: Thinking beyond the information available to fill gaps

Predicting: Using previous knowledge to add meaning to new information and linking it to existing knowledge structures. **Elaborating and Resenting:** Developing basic ideas and information given in important detail and additions that may lead to new products, and adding new meaning to the information by changing its image (represented by symbols, diagrams or diagrams). **Summarizing, Restructuring:** Shortening the subject and abstracting it from the main ideas in an effective and practical way, and modifying existing knowledge structures to incorporate new information. **Scheduling the experiment in time for execution and**

evaluation: Specify the time required to perform the experiment as shown in the table 2. The evaluation included the evaluation of experts and arbitrators: The researcher presented the proposed educational method to a number of experts and arbitrators to validate it, and tried the proposed method on a number of students. The researcher tried the proposed program on (55) students - without the research sample - to verify their ability to interact Positive with the curriculum followed in the proposed teaching style.

Search Tool (Test Product Thinking Skills)

The researcher proceeded to build the research tool according to the following procedures and steps:

1. Review previous studies and research that dealt with language skills in general and thinking skills and thinking in particular.
2. Prepare a list of the thinking skills required by the research sample.
3. Selection of a set of texts to build the test paragraphs.
4. Preparation of the test paragraphs and presented to the arbitrators.
5. Choose the search group randomly.
6. Coordinating with the school administration to implement the necessary procedures and apply the tests.
7. Selection of a group of students sample exploratory, in order to know the appropriate time for the test and measuring the stability and honesty and the strength of discriminatory paragraphs and the level of difficulty and effectiveness of the alternatives wrong.
8. Apply the test on the sample of the study and monitor the results and analysis

Statistical Methods: The researcher used the following statistical methods: (one test for one sample, Pearson correlation coefficient, coefficient of difficulty and ease, effectiveness of the wrong alternatives, paragraph discrimination coefficient, and square.

RESULTS AND DISCUSSION

The researcher reached the following results as

in Tables (3) and (4): Table (3) shows that there are statistically significant differences in productive thinking skills, because the calculated value of (4.77) is smaller than the scale value of (1.96) at the level of significance (0,05) A decrease in sample performance in the test of product thinking skills. Table (4) shows that the average scores of pupils in the tribal application (11.5) and the difference (32.83), while the mean of the same group in the post application (31) degree, the variance (43.9) (T-test) for one sample found that the calculated T value was (5.46), which is greater than the tabular value of (2.02) at the level of significance (0.05), which means rejecting the null hypothesis and accept the alternative hypothesis “There are statistically significant differences between students in the two applications Tribal and remote testing and in favor of post-test application “and thus can be said:

1. the weakness of students thinking skills product.
2. Despite the importance of thinking skills, but it has not been assigned a curriculum or lesson that students can practice.
3. Lack of interest in interactive teaching in the teaching of the Arabic language led to the low level of students in the skill of productive thinking.

4. The proposed educational method has a positive impact on the development of skills among primary school students.
5. the possibility of developing the skills of thinking product using the integrated method and the ability, and the physical potential, and the conditions for its application.

Interpretation of the results: The researcher believes that the proposed educational method provided the students who studied in light of a better opportunity in terms of conservation, memory, understanding, attention, application and analysis of the main skills and sub-thinking produced through the creation of learning as well as the analysis of the proposed educational content and organization cumulatively from simple to complex; In the use of the above learned mainly in the most complex learning, especially when directed to the transition to the effectiveness or new information without prior mastery, as well as the proposed method of education was given sufficient opportunity for feedback (feed_back), which provided the student with The success of this step-by-step process has led to the reinforcement and encouragement to continue learning. The student feels that he has learned something successfully and this increases his motivation to continue studying.

Table 1. Shows the training needs of the sample students

Lesson	Title
The first	is to think beyond the information available to fill the gaps in it
The second	is to use the previous knowledge to add meaning to the new information and to link it to existing knowledge structures
The third	is to develop the basic ideas and the information given and to enrich them with important details and additions that may lead to new products
Fourth	add a new meaning to the information by changing its image (represented by symbols, diagrams or graphs
Fifth	Shortening the subject and stripping it of the main ideas in an effective and practical way. To modify existing knowledge structures to integrate new information

Table 2. Shows the times of implementation of the training program

n	Themes	Time
1	Education and mothers	40 minutes
2	Caliph and the world	40 minutes
3	City visit with two lessons	80 minutes
4	The Hammurabi obelisk is	40 minutes
5	Balbly	35 minutes

Table 3. The mean, the mean, the standard deviation, the degree of freedom, the two values, and the statistical significance of the sample of the research in the test of the tribal product

N	mean	The mean medium	standard deviation	df	t		Statistical significance level (0.05)
					Calculated	Table	
140	5.11	8	2.55	139	4.77	1.96	Statistical function

Table 4. Shows the arithmetical mean, variance, and T calculated and tabular value of students in pre and post-test applications

The experimental group	mean	variance	t	
			Calculated	Table
Tribal	5.11	32.83	5.46	2.02
after	31	43.9		

CONCLUSION

The sample was selected from the center of Babylon Governorate, and the use of the relevant skills, such as percentages and t-test, and the search results in a list of the skills of thinking and the building of the method. The results of the study showed that the proposed educational method has an impact on the development of productive thinking skills among primary school students.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Basic Education,

University of Babylon, Hillah city, IRAQ and all experiments were carried out in accordance with approved guidelines.

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The Effectiveness of the Token Reinforcement in Reducing The Aggressive Behaviour Among Pupils With Learning Difficulties

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ABSTRACT

The study aims to identify The Effectiveness of The Token Reinforcement in Reducing The Aggressive Behaviour Among Pupils With Learning Difficulties, the researcher adopted the experimental approach with one group with pre- and post- test, the research sample consisted of (8) pupils with learning disabilities and before apply the program, the researcher applied the measure of The aggressive behaviour in order to identify their behavior problems before apply the program, then the program was applied that made up of a group of activities , games and videos that be a suitable for the problem of The Aggressive Behaviour that they suffer from, so the program made up of (15) sessions, whereas the aggressive behaviour is reduced, after the program was completed , the researcher applied the measure of The aggressive behaviour phenomenon on the research sample in order to identify the variables that happened before and after applying the program, then the data have been statistically processed by Wilcoxon Test, the results have presented the effectiveness of the token reinforcement that led to reducing the level of the aggressive behaviour among pupils in the research sample.

Keyword: Reinforcement, Pupils, Effectiveness.

INTRODUCTION

It's undeniable that, care of children and attention to them is considered the bedrock of building a strong family with drops and well-establishment, in order to create a good and successful children , it's necessary to pay attention and upbringing of them in the correct way, but upbringing of normal children in general and special needs children requires attention and care of them, and provide them with psychological and educational programmes of their own, that's for the negative effect of disability on the individual level (Disabled Child), at the family level and society as well, as is known, the disabled child has a special building and psychological creation, as a result of his/her disability and his/her sense of difference from other children, disability leads child to disturb his/her image of him/herself, this results in a lack of harmony with him/herself and others, therefore there are some behavioral problems such as : aggression, hyperactivity, introversion, withdraw and other forms of turbulent behavior. Kaval and Mostert (2004) ¹ refers to that several of researchers believe that a lot of researchers believe that academic difficulties can't be dealt with, in isolation from the effective and social aspects which

in turn overcome these difficulties, then pupils with learning difficulties are the most pupils who cause behavioral problems based on the teachers' viewpoint inside The class room whereas these pupils appear behaviors and obstructing manners for the progress of the classroom creating an chaotic environment within the classroom, this leads to the formation of a serious obstacle to all pupils of what the pupils with learning difficulties and teachers by frustration and discomfort as a result to chaos and didn't achieve the educational task. The majority of pupils with learning difficulties who face problems in keeping pace with others, making friends and keeping them positive emotions about themselves. At the same time, some are aggressive toward others, including partners, while others are shy and withdrawn in social situations and interactions.⁷ Pupils with violent behavior described as they don't have the ability to have friendships with the persons around them, as there are elements that lead to keeping others away from these troubled children, as they hurry towards violent behavior, abuse and irresponsibility, and the tendency to control and impulsive and excessive activity that leads to overheating Movement and distraction. On the

other hand, part of the responsibility be on the adults, whereas they don't spend time with these children, and if they spend part of their time and any of them makes a behavior of turbulent, they punished him! So it isn't shocking that these children become confused, trying to spoil everything that surrounds them with anyone close to them. Thus, the problem be not only in the behavior of the child or in the surrounding environment, but branches from its importance in terms of lack of an appropriate interactive relationship between the child and his/her environment⁶. Aggression is one of the most serious social problems in the modern time, as it's a huge problem because it combines between the psychological, social and economic impact on the person and society. It's not easy, not only because of the pain caused by violence, wherever there is any action of violence can produce more of violence actions, so violence creates violence.³ As a result of the increasing interest of those who are interested in the category of children with learning difficulties and don't suffer from any other disabilities of hearing, eyesight, emotion or physical, environmental deprivation, cultural deprivation or unusual circumstances, and those normal persons with learning difficulties or abnormal in of their intelligence and level of adaptation Have intermediate or above average IQs and adaptive behavior standards. However, they have difficulties in learning academic skills such as reading, algebraic and writing, and they fail in attention skills, reinforcement and awareness⁴. There is no doubt that the teacher play an important role in the educational process of learning and his role in influencing the behavior of students is known, for example, it's need to find ways to lead the attention of pupils and their energy towards the achievement of school, so it work to control class, reduce aggressive behavior, and respect the class system⁷. The Token reinforcement is considered a type of positive reinforcement that has verified to be effective in the behavior modification process. It's called the Token reinforcement with the replaceable reinforcement, which is the physical things that the individual gets when performing the acceptable behavior, which is to be strengthened and replaced it later by many different reinforcements¹³. Token reinforcement programs are considered one of the most behavior modification methods used, which is an exchange system where individuals whose behavior is modified are fed instant feedback, in how appropriate their behavior¹². It must be emphasized that it's necessary that children be given token reinforcements every day and have full freedom

to delay or replace the reward immediately⁸. The use of methods that include physical reinforcement in the classroom has been developed by token reinforcement, depending on the degree of coupling of the material reinforcement by providing a desirable event, reduces the time between aggressive behavior and reinforcement whereas it can be presented immediately after aggressive behavior occurs. In additional to that the token reinforcement is an indication of providing variable reinforcement thus it guarantees the effectiveness of reinforcement with different people at different times, token reinforcement doesn't work on disrupt the series of behavioral responses that undertaken by the pupils⁹

METHODOLOGY

Include a presentation of the procedures that have been done to achieve the research aims, starting with the research methodology and the experimental design and identify the community and the sample of the research, preparing the requirements and instruments of the research, and presentation of statistical methods used, the nature of the research require an experimental approach, which means the method that the researcher stitches all variables that impact in any phenomenon, except the variable independent experimental in order to measure its effect on the phenomenon (dependent variable).

The Experimental Design for The Research

It includes one independent variable which is (token reinforcement), and dependent variable (The Aggressive Behaviour), so the researcher used the experimental design with one group with the pre- and post-test.

The community and Sample of the Research

The community of the research represents pupils with learning difficulties in the fourth class of primary, all of them belong to the primary school which belongs to Directorate General of Education in Babylon (city center), for the academic year (2017-2018), while the researcher selected the research sample of (Al-Jazraah Primary School) in Babylon , intentionally to make her research, after choosing (Al-Jazraah School) the researcher found out that the school consists of (131) pupils, aged between (9-11) years, the researcher applied the aggressive behaviour scale to determine the children who have aggressive behaviors, after applied it , the researcher found that (8) pupils got the highest scores on the measure of aggressive behaviour, so the research

sample consisted of (8) pupils, who will apply (The token reinforcement) on them.

The Instrument of the Research

An instrument was prepared to measure the aggressive behaviour among the pupils (the research sample), preparing the instrument requires the following steps:

Prepare the measure items

Through the knowledge of the researcher on literatures that related to research variables and scales of the aggressive behaviour, the researcher used items of measure aggressive behaviour that are (16) items represent the aggressive behaviour, multiple choice questions are given (Always , often , sometimes , rarely and no applicable), the scores are given respectively (1,2,3,4,5), thus the highest score of measurement is (80), the minimum for measurement is (16) and the mean hypothesis is (48) scores.

Prepare the measure instructions

The aim of the instructions is to explain the idea of the scale in its simplest form to facilitate the application of the scale because the clear and understandable instructions contribute to raising the coefficients of the validity, stability and objectivity of the scale, In order to rely on the scale, it's necessary to extract its cyko-metric properties:

The measurement validity

The results showed that the apparent validity achieved 80% of the agreement by the arbitrators and specialists. As for the validity of the construction, the results showed that all the items of the scale are statistically significant, so the measure is true in measuring aggressive behavior.

The Pilot Application for Measurement, includes

The First Pilot Application

The level of aggressive behavior in the first pilot phase was applied to a group of fourth-class pupils of primary with learning disabilities without a research sample. The number of children was (30) pupils. The aim was to know the clarity of the test instructions, the understanding and clarity of the test items for pupils and according to the time required for the test.

The Second Pilot Application

The test was applied to a sample of (100) pupils in the fourth class of primary without a research sample, and its purpose is to analyze the items of the measurement statistically.

Discrimination of the Item

One of the most important characteristics that must be provided in the items of the scale is the distinguishing feature and the possibility of items or items in the detection of pupils who have the measured and the pupils who don't own them. The value of the coefficient of discrimination between the scales ranged from (2,010-4,587), thus considered all the measurement items with discrimination and suitable factor.

The Measurement Stability

Estimation of the stability is considered one of the characteristics of the good measure, although validity is more important than it, because the validity measure is stable and may not be a stable measure is validity because it may be homogeneous in items, but may measure a property other than that prepared for measuring, and to achieve the stability of the scale was found Stability in a retest method. The Retest Method : The retest method is a direct method to determine the stability of the test, that is depended on the applying of the test two consecutive times on the same homogeneous group representing the original community of persons. If the test is completely stable, the score of each individual in the first application will be fully predicted by its score in the second applying of the test, the researcher re-applied the scale on the first pilot sample, and the researcher calculated the Pearson correlation coefficient between the first and second applications of the scale, which is (0,79), that is a good stability coefficient.

Statistical Methods Used

The researcher used Wilcoxon Test to compare between the marks of pre- and post-test in order to measure the aggressive behaviour.

RESULTS AND DISCUSSION

When the researcher selected the research sample and applied the measure of aggressive behavior, the program was then applied to the selected sample. The aggressive behavior measure was applied to the sample

before applying the token reinforcement. After the token reinforcement applying, the researcher used the Wilcoxon Test to identify the differences between the pre-test and post-test as in the table 1. According to the table above, the results showed that the calculated value is (-W=zero, the least repetitive value), which is less than the ruler value of (4) at the level of significance (0.05), which refers to the differences between the marks of pupils with learning difficulties, before and after apply the program, for the favour of the post-test, so thus decline the null-hypothesis and accept the alternative hypothesis, figure (1). Moreover, the researcher used (Mac-Jojian) equalization to derive the effect size of the program's effectiveness between the pre- and post-test for violent behavior, table 2. The table above explain the value of the effect size of the program effectiveness, which was (0,768), which is a suitable value to interpret the effect size, Roebuck (1973) refers to that the effectiveness of effect size must increasing

more than (0,60) in order to the program being active.⁽¹¹⁾ The current results refer to the effectiveness of the program that is used in reduce the aggressive behaviour among pupils with learning difficulties in the fourth class of primary, so the results showed that the pupils who have been subjected to the program have been reduce the aggressive behaviour among them in comparison with what were they before apply the program. The researcher attributes that reason to (the effectiveness of the token reinforcement) which is used in the research, that was able to reduce the aggressive behaviour among the pupils with learning difficulties (the research sample), so this refers to that the program has a positive effect in reducing the aggressive behaviour which is represented in increasing the suitable responses in the classroom, and appearance of the attention situations, don't disturb the teacher, don't transfer from one place to another in the classroom, don't quarrel with pupils and joining in the class activities significantly.

Table 1. The comparison between the marks of pre-test and post-test on the measure of aggressive behavior

No.	The Pre-Test	The Post-Test	Distinctions	Absolute Distinctions	Grades of Distinctions	Sign of Distinctions Grades
1	64	30	+34	34	3	+3
2	64	20	+44	44	8	+8
3	60	30	+30	30	2	+2
4	63	20	+43	43	6,5	+6,5
5	54	28	+26	26	1	+1
6	63	21	+42	42	5	+5
7	62	23	+39	39	4	+4
8	62	19	+43	43	6,5	+6,5
						+W = 36 -W = Zero

Table 2. The effect size of the program effectiveness

Situation	The Sample N	The mean marks of pre-test	The mean marks of post-test	The highest mark on the criterion	the effect size of the program effectiveness
The Aggressive Behaviour	8	61,5	8	80	0,768

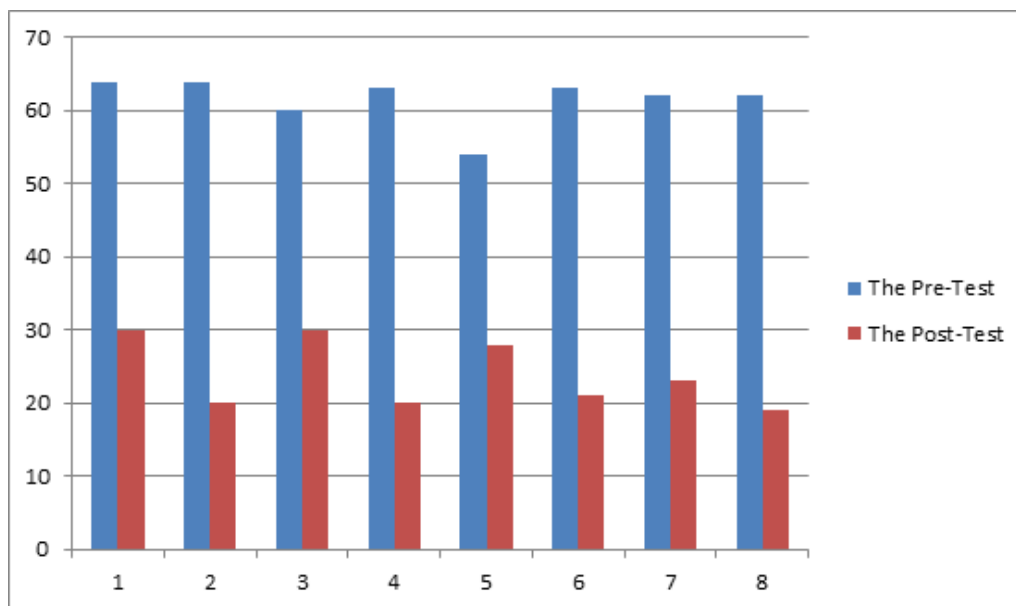


Figure 1. The Differences Between The Pre-test and Post-Test Marks (The Aggressive Behaviour)

CONCLUSION

researcher applied the measure of the aggressive behaviour phenomenon on the research sample in order to identify the variables that happened before and after applying the program, then the data have been statistically processed by Wilcoxon Test, the results have presented the effectiveness of the token reinforcement that led to reducing the level of the aggressive behaviour among pupils in the research sample.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effects of Silver Nanoparticles on Biofilms of *Streptococcus* Spps

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ABSTRACT

Today technology using nanoparticle when treatment pathogenic microorganism and we focused on this here. It was found that the species of streptococcus used in present study were sensitive to erythromycin. In present study focusing biofilm formation by *Streptococcus* spp was evaluated. Species *S. mutans* was found that highest amount of biofilm compare with the other species. The aim of report effect (SNPs) on ability of biofilm form different species of streptococcus. The anti-biofilm effect of SNPs was in concentration dependent manner. The highest effect of SNP against biofilm formation was found the concentration 160 µg/ml, while the lowest effect was found the lowest used concentration (80 µg/ml) of SNPs. In vivo study revealed that silver nanoparticles treatment of *Streptococcus pyogenes* contaminated injured skin showed good prognosis and good healing process include complete regeneration of the epithelial cells of the epidermis and increase of cellularity of the dermal content compared with untreated group. In conclusion, treatment of skin infected with *S. pyogenes* using silver nanoparticles concentration (160 µg/ml) may limited the skin damage, localized the lesion to the incision site and enhance the healing process.

Key words: Biofilm, Silver nanoparticle, *Streptococcus*.

INTRODUCTION

Streptococcus mutans has dental caries with helping some host factors gave evidence that this species related with teeth infection. There is an accumulation of dental plaque on the surfaces of teeth. Secondary caries occurs under the restorations is increasing the risk of dental plaque. Increase of plaques on resin is related to the surface (such as roughness of surface), which is depended to filler size, resin type and the percentage of filler composite) *in vitro* resins to increase number of bacteria or plaques¹. *Streptococcus pneumoniae* (pneumococcus) shown that colonize the as biofilms (nasopharynx) and we have this biofilm phenotype *in vitro* using nasopharyngeal environment². In Gram positive bacteria (Quorum sensing) has been found to regulate a number of physiological activities, including

in *Streptococcus gordonii*, *S. pneumoniae*, and *S. mutans*³. Periodontal diseases forming in Dental plaque is causes a biofilm in the human body such as (periodontitis, gingivitis and dental caries). Many researches inhibit the formation of dental biofilms and to remove mature biofilms. The major (inhibit or remove dental plaque) is susceptibility to irritation in oral mucosa⁴ Most serotype 2 (SS2) of *Streptococcus suis* clinical isolates can form biofilm, which contribute to persistent infection, transmission and difficulties to eradicate infection⁵. *In vitro* Particularly the biofilm phenotype was evaluated with isolate collections and for many of the clinically relevant under static and flow conditions⁶

MATERIALS AND METHOD

Indicator isolates

The major identified tests (morphological and biochemical) these isolates were by according to⁷ were obtained from College of Science for Women/ Department of Biology /University of Baghdad.

Confirmation of *Streptococcus spp*s and Antibiotic

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Resistance testing:

All isolates *Streptococcus spp* the cultures were grown on (MHA) plates at 37 °C for 18 hrs. The zone of inhibitor (mm) disk around compared with a documented standard the zone of inhibition in (mm) around each disk Clinical and Laboratory Standards Institute. The antibiotic susceptibility against using Ampicillin, Ciprofloxacin, Erythromycin, Azithromycin and Chloramphenicol⁸.

Preparation of nanosilver suspension: Silver nitrate in the beginning put under low effects of polyaldehyde. Effect of surface activator decreased silver particles affinity to attach a solution with silver particles in nanometer size. To ensure the particle size, intensity test was made in the solution. Average size of silver particles was from 2 to 6 nanometers that measured by dynamic light scattering method. In microbiology laboratory a pilot experiment was done to find out the antimicrobial effects of silver nanoparticles against *Streptococcus spp*, the standard method of Clinical and Laboratory Standard Institute was followed⁹.

Determining the MIC of Silver nanoparticle

Two grades of silver nanoparticles; first, suspended in normal saline exposed to ultrasonication for 20 min. Two-fold dilutions were gained (80 and 160 µg/ml) used in present study. Two hundred of the bacterial suspensions of stock solution were inoculated into the corresponding test tubes containing different concentrations of Muller Hinton broth (MH)¹⁰.

Biofilm assay

Method described by¹¹ was followed to achieve biofilm formation: To study the ability of adherence *Streptococcus* isolates, were grown in Trypticase soya broth containing 1% glucose in 96-well polystyrene tissue culture plates and incubated at 37°C for 24 h under aerobic conditions. The planktonic cells after incubation were washed 3 times with deionized water, and fixed with 200 µl of absolute methanol for 20 min the adhering cells in well and left to dry overnight. Were stained the adhering cells with crystal violet for 15min. The plates were washed with D.W and air-dried overnight. The crystal violet dye bound to the adherent cells was dissolved with 200 µl of 96% ethanol per well, and the plates were read at 490 nm using a spectrophotometer. The experiment was performed in triplicates, and the

absorbance of wells containing sterile TSB was used as the negative control the result calculated as in table 1.

Detection Antibiofilm Activity of silver nanoparticles on pre-formed biofilm of *Streptococcus spp*

According to¹² Method followed for the inhibition of biofilm the isolates of *Streptococcus spp.*, were selected to be assayed according to inhibition activity of nanoparticles against planktonic cells of it on plate agar. Same protocol was added to each well produce a biofilm but (100 µl of Ag NPs). The plate was incubated for 24hr at 37 °C. Wells were washed and stained after incubation period all, then absorbance was determined at (490) nm in an ELISA reader. With crystal violet binding to the wells exposed only to the culture medium with bacteria controls were performed. The following equation was used to calculate biofilm inhibition percentage¹³.

$$\text{Biofilm inhibition (\%)} = \left(\frac{\text{Control OD} - \text{Test OD}}{\text{Control OD}} \right) \times 100$$

Experimental design

Twenty mice were divided into 4 groups, the mice in the first three groups (n=15 for each group) were anesthetized with an intraperitoneal injection of a mixture of xylazine (5 mg/kg) and ketamine (75 mg/kg), then the hair of the right flank was shaved (3×2 cm) using electrical shaver and the remaining hair was shaved using disposable hand shaver. The shaved area was cleaned by soap and sterile D.W., after drying wound in the skin was induced using sterile lancet in which 3 parallel line of superficial skin wound was made. The 4th group (n=5) considered as control negative group. The mice in the 1st group were considered as control positive group and the injured skin did not receive any treatment, while the injured skin of mice in the 2nd and 3rd group was contaminated by *Streptococcus pyogenes* using one drop from the bacterial suspension 1×10⁶ cfu/ml (14). The injured skin of mice in the 3rd group was treated locally with silver nanoparticles concentration (160 µg/ml) by swab after 2 hr post infection and treatment repeated every 12 hr.

Histopathological Study

All mice were euthanized after 72 hr post infection and samples (1×2 cm) of injured skin were taken and fixed immediately in 10% formalin solution for 48 hrs,

then the samples were processed routinely and sectioned by microtome (thickness 4-6 micron) and the slides stained by Hematoxyline and Eosin stain ¹⁵.

RESULTS AND DISCUSSION

Isolation and identification of *Streptococcus* spp: a species of Gram-positive bacteria. These bacteria are aero tolerant and an extracellular bacterium, made up of non-motile and non-sporing cocci. It is clinically important in human illness as expected with a streptococci, but usually pathogenic, part of the skin microbiota. Figure (1) shown group A streptococci when grown on blood agar produces zones of beta-hemolysis, a complete destruction of red blood cells. It is thus also called group A (beta-hemolytic) streptococcus ¹⁶. Antibioqram profile results for *Streptococcus* spp isolated from clinical samples the isolates showed multi-resistant to Ampicillin, Erythromycin, Chloamphinicol. These results agreed with All the isolates were sensitive to Ciprofloxacin and least resistance was observed towards Azithromycin. The result agree with (17) shows a high frequency of resistance to erythromycin particularly in countries where antibiotics are overused. Of all throat isolates, 95.0% were predominantly resistant to erythromycin, 70.0% to clindamycin and 24.0% to clarithroycin. To evaluate the in vitro antibacterial effects of SNPs against *S. viridans*, *S. pneumoniae*, *S. mutans* and *S. pyogenes* at (40,80 and 160) µg/ml concentrations of SNPs were added to Petri dishes before pouring plates with (MHA). Uniform agar plugs with a diameter between (9-13) mm Table (1) and Figure (1). The small particles have large surface area as compare with same amount of big particles. Silver nanoparticles in diameter 5-32 nm improve antibacterial effect of different antibiotics ¹⁸. Silver nanoparticles attach and make a way into Gram-negative bacteria ¹⁹.

Biofilm formation

The results of current study showed that all *Streptococcus* spp., were strong biofilm producer when detected them by microtiter plate method, and compare it with control (broth medium only without bacteria), see table (3). *S. pyogenes* has high ability to produce biofilm as compared with other species of *Streptococcus* in oral cavity ^{20,21}. This species in biofilm form has some proteins in comparison to planktonic cultures that increase exopolyphosphatase expression

and decrease lactate dehydrogenase or pyruvate kinase expression ²². Biofilm is clinically important because this phenomenon interfere with susceptibility of bacteria to antimicrobials²³.

Antibiofilm activity of silver nanoparticles:

The antibiofilm activity of Ag NPs was carried out by using microtiter plate method, the results showed that all concentration of Ag NPs were affected against bacterial biofilm of *Streptococcus* spp., but in different percentage depending on the species of bacteria and the concentration that was used. The concentration one gave highly effect against *S. pneumoniae* and *S. pyogenes* in percentage of inhibition (87%), but effect on *S. mutans* and *S. viridans* in percentage (65% and 51%) respectively. The second concentration show highly effect against *S. pyogenes* in percentage (92%), but other strain reached in percentage (79%) respectively, the last concentration show approximately the same results of second concentration on *Streptococcus* spp in the percentage of inhibition (92%, 82%, 79% and 77%), see table (2). This result agrees with present study Pérez-Díaz *et al.* (2015) showed that nanoparticle inhibited effective the growth of a planktonic *S. mutans* clinical isolate and killed established *S. mutans* biofilms, which suggests that could be used for treatment of dental caries. The anti-biofilm effect of AgNPs was observed less effective against G+ve bacteria than on that of G-ve bacteria, this remark happened because the structural difference in the cell wall of G+ve and G-ve bacteria. Other study revealed that AgNPs have antibiofilm ability against G+ve and G-ve bacteria when catheters coated with AgNPs were tested in vitro observed almost complete prevention of biofilm formation by *E. coli*, *S. aureus* and *C. albicans*. AgNPs show the anti-biofilm activity that is why; used in coating of catheter to reduce biofilm formation of several species of bacteria such as *Pseudomonas aeruginosa*. Similar applications of using of AgNPs were used in the dental applications. The histopathological changes in group 1 (positave control) showed incomplete regeneration of the epidermal layer in the incision site under cellular debries and neutophils aggregation, also the mild neutrophils infiltratin in the dermis and subcutaneous tissue. The 3rd group (treated group) showed complete regeneration of the epithelial cell of the epidermis with mild degeneration and increase cellulartiy of the connective tissue of the derims, other section showed mild hyperplasia of epithelial cells of the epidermis. *In vivo* study showed that, histological

changes in mice skin of the first group characterized by infiltration of inflammatory cells (mainly neutrophils) during 48 hr of injury, and this indicated the first phase of normal wound healing process, while the present of fibrin plug and infiltration of fibrous connective tissue in the dermis are a normal responses represents a part of the normal healing process of the skin in immune component

animal. *S. pyogenes* cause infection of skin and soft tissues with diverse clinical entities, so histopathological changes in the skin of mice in the second group showed severe damage in epidermis, dermis and subcutaneous tissue and this may be contributed to the exotoxine streptolysin O (SLO) which is produced by all strains of *S. pyogenes* and it is toxic to many cell types such as leukocytes, endothelial cells and fibroblasts.

Table 1. Classification of bacterial adherence by tissue culture plate method

OD values	Adherence	Biofilm formation
< OD _c	Non	Non
OD < OD ≤ 2*OD _c	Weakly	Weak
2*OD _c < OD ≤ 2*OD _c	Moderately	Moderate
4OD _c <OD _t	Strong	High

Table 2. Antibacterial effects of Silver nanoparticle against different species of Streptococcus.

Nanosilver dilutions	Zone of growth inhibition In millimeters			
	<i>S. pneumoniae</i>	<i>S. pyogenes</i>	<i>S. viridans</i>	<i>S. mutans</i>
1	13	9	9.4	9.5
2	12.2	10	8	9
3	11.5	10.8	7	8

Table 3. Biofilm producing by *Streptococcus spp.* before treatment, using microtiter plate assay

Isolates	<i>S.mutan</i>	<i>S.viridans pyogenes</i>	<i>S. pyogenes gonorrhoeae</i>	<i>S.pneumoniae mutans</i>
O.D	1.160	1.221	2.604	0.875
Biofilm producing	Strong	Strong	Strong	Strong

Table 4. The effect of silver nanoparticles against first step of biofilm formation in *Streptococcus spp.*

Bacteria	<i>S. viridans viridans</i>	<i>S.pneumoniae</i>	<i>S. pyogenes</i>	<i>S. mutans</i>
Control	1.160	1.221	2.604	0.875
Concentration 1	0.561	0.206	0.330	0.303
Percentage of inhibition	51%	87%	87%	65%
Concentration 2	0.240	0.152	0.194	0.222
Percentage of inhibition	79%	87%	92%	74%
Concentration 3	0.243	0.212	0.19	0.197
Percentage of inhibition	79%	82%	92%	77%



Figure 1. *S. pyogenes* on A) Brucella Agar B) Blood agar at 37°C for 24 hrs

CONCLUSION

In conclusion, treatment of skin infected with *S. pyogenes* using silver nanoparticles concentration (160 µg/ml) may limited the skin damage, localized the lesion to the incision site and enhance the healing process. Biofilm experiment revealed that all tested streptococcus species produced strong biofilm. On the other hand the results of antibiofilm study showed that silver nanoparticles gave highly effect against all *streptococcus* species biofilm in different concentration and with different percentages of inhibition.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Dep. of Biology / College of Science / University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Activity Measurement of Airborne Alpha and Beta Particles in Destroyed Radiochemical Laboratories, at Al-Tuwaitha-Iraq

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ABSTRACT

Radiochemistry laboratories are one of the most destructive nuclear facilities in Iraq. It is contaminated by many isotopes that emit alpha or beta particles. The indoor air of radiochemistry laboratories was monitored to determine alpha and beta concentrations by used the alpha/beta intelligent Continuous Air Monitor (iCAM) device. Alpha airborne particulates come from radon/ thoron, whereas beta comes from background compensation. The concentration of R-222 and Rn-220 was found to be high in most samples measured inside the radiochemistry building, ranging from 12 to 52, and 0.08 to 0.41 respectively. The annual effective dose of exposure to radon and thoron ranged from 0.03 to 0.188. The concentration of radon and annual effective dose for workers are close to anxiety levels, especially in laboratories C1 and C2, since there is no guaranteed of good air exchange.

Keywords: Radon, Thoron, airborne, activity, annual effective dose, radiochemistry

INTRODUCTION

The primary risk associated with airborne radioactivity is through inhalation. The assessment of this risk is normally determined from measurements of activity concentrations of radionuclides in the various workplaces, combined with dosimetric calculations of the radiation dose arising from inhalation of tense atmospheres. These calculations are dependent upon the physical and chemical properties of each radionuclide, the nature of the suspended particles and on biological parameters. The liberation of radioactive particles into the atmosphere of the working areas is an accidental output of all activities involving radioactive materials. Even with a high degree of sophistication and safety in the working facilities. In accidents, the amounts of radioactive releases may vary depending on the types of operations and the amounts of radioactive materials involved³. The main source of internal dose comes from Inhalation of radioactive particles. Airborne radioactivity measurements are necessary to ensure that the control

measures continue to be effective. Airborne radioactive particulate in nuclear facilities and during shut down the nuclear facility, as well as the contaminated area, will have a strong impact on the public dose if they are freed into the environment and especially into the dose received by workers. Airborne particles that occur from natural radioactive materials are radon and its daughters. Radon is a noble gas, colorless, odorless and tasteless, and an alpha emitter. The main naturally occurring isotopes of radon are Rn-222 (the daughter of Ra-226 in U-238 chain), Rn-220 (the daughter of Ra-224 in Th-232 chain), and Rn-219 (the daughter of Ra-223 in U-235 chain)^{1,2}. Radon, thoron and their decaying products represent the largest contributors to the annual effectiveness from natural background sources of radiation. In a closed area where Rn-222 and Rn-220 can exist and where ventilation is limited, the levels of these radionuclides and their decaying products can accumulate to high levels. In order to provide adequate protection for workers, it is necessary to properly assess and control these contaminants. Therefore, the objective of this study is to measure the activity of airborne radioactive particles in the atmosphere of the radiochemistry building and to assess the risks to workers.

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Studied Area

Air samples were collected from the Radio Chemistry laboratory (RCL). RCL is a chemical research building at Al-Tuwaita nuclear centre in Iraq (20km southeast of Baghdad, GPS Coordinates are North= 33°12'18.3", East= 44°30'58.9"). RCL was built in 1978 by SNIA TECHINT Italian Company. RCL was used to extract radionuclides and reprocess the irradiated fuel for the extracting of plutonium for research purposes; it was destroyed in the 1991 war. This building consists of laboratories, offices, health physics control rooms, air - conditioning room, underground storage tanks (SLA) for high level liquid radioactive wastes, as well as many types of equipment such as hot - cells, glove boxes, fume hoods and ventilation trap filters. Some areas the RCL building and all equipment are heavily contaminated. Some parts of the building are very destructive especially the ventilation system.

MATERIALS AND METHOD

Air Measuring

The Alpha/Beta intelligent Continuous Air Monitor (iCAM) was used to monitor the activity of airborne alpha and beta particles in the workplace. iCAM has a Passivated Implanted Planar Silicon (PIPS) detector to detect both alpha and beta activity, with 24% alpha efficiency up to 5.7MeV and beta detection for ³⁶Cl or ⁹⁰Sr. The activity measurement was calibrated using two standard point sources, Am-241 and Sr-90 instead of the filter card. The air is withdrawn to the device at an average rate of 15–60 l/min and the particulate matter is deposited on a removable filter card 25mm (1inch) of glass fibre filter (Canberra, 2013). Each sample of air was taken within one hour and the average air flow was (40l/min).

Determine Concentrations of Radionuclide in the Air Filters

In order to determine radionuclide concentrations in air filters, the high-performance digital signal processor was used for gamma-ray spectrometer (DSPEC LF ORTEC) at a low background. The gamma-ray spectrometry system consists of a high-purity germanium (HPGe) detector of P-type with a diameter of 65mm × 50mm length with passive shielding (ORTEC). The energy calibration of the gamma spectroscopy system was performed using a mixed standard source,

550ml Marinelli beaker, containing Am241, Cd-109, Co-57, Co-60, Sn-113, Hg-203, Y-88, and Cs-137. The efficiency calibration was performed using point sources (Am-241, Cs137, Eu-152 and Na-22) with a diameter 25mm (1inch) to maintain the continuous counting geometry of the air filter card.

Dose Calculation

To assess the risk of an effective dose of radon and thoron, the effective dose can be evaluated as follows (UNSCEAR, 2006; Chege et al., 2015; Yamada et al., 2006):

Where C is the concentration of radon or thoron in Bq.l^{-1} , K is the dose conversion factor taken ($9\text{nSv}(\text{Bq.h.m}^{-3})$ for radon and $40\text{nSv}(\text{Bq.h.m}^{-3})$ for thoron), F is the indoor equivalent factor of 0.4 for radon and 0.1 for thoron, t is the number of exposure hours per year.

RESULTS AND DISCUSSION

The concentration of airborne radioactive particles varies from place to place in the same laboratory because of the laboratory environment that contains floors and equipment (hot cells, crates and foam hoods) contaminated with different concentrations and isotopes. Airborne radioactive particles (iCAM) have been measured at different locations within the radiochemistry laboratory building. Figure 2 shows the locations of air samples in the block diagram of the radiochemistry laboratories. Table 1 and 2 summarizes the data obtained from iCAM as well as the effective dose calculated from one-hour exposure to radon and thoron. Table 3 shows the measurement of the filter in a gamma-ray spectrometry system. Figure 1 shows the radon and thoron concentrations in all samples. The highest concentration of radon and thoron was found in C2 laboratories with average values of 41.7 and 0.34 respectively, as well as in C1 laboratories with an average values 31.3 and 0.16 respectively. The high concentrations of radon and thoron can be explained by the presence of highly contaminated areas and equipment in C1 and C2 laboratories, which are larger than the rest of the sites. For the same reason, it was observed that the concentration of integrated alpha and beta airborne activities was higher in the same samples as shown in figure 2. The concentration of alpha integrated airborne activity within the radiochemistry building was 0.150–1.78, also the concentration of integrated beta airborne activity was 9.9 – 55.8. Air filters were measured in

gamma-ray spectroscopy system, where some samples contained Cs-137 isotope, especially in laboratories C1 and C2 near the equipment from which samples were taken. Table 3 shows that the presence of Cs-137 in the air filter is due to the fact that the polluted dust that covers the equipment can volatilize into the air. The effective dose was calculated for 1 hour from exposure to radon and thoron using equation 1. Table 1 shows that the annual effective dose is based on the number of work

hours per year. The workers stop the operation in the decommissioning of nuclear facilities at the rate of 1000 hours per year, i.e. 4 hours a day in this work. Figure 5 shows the annual effective dose inside radiochemistry laboratories. The annual effective dose of exposure to radon and thoron inside the radiochemistry laboratories ranged from 0.03 to 0.188 while the annual effective dose inside laboratories C1 and C2 was 0.11 and 0.15, respectively.

Table 1. Indoor Rn-220, Rn-222, α β integrated airborne activity concentration and Effective dose inside radiochemistry laboratories.

Sample No.	α β integrated airborne activity concentration		Rn-222	Rn-220	Effective dose		Location
	α	β			R-222	R-220	
1	0.500	22.3	28.5	0.12	102.6	0.48	C1
2	0.625	25.5	30.4	0.18	109.44	0.72	
3	0.690	35.4	34.0	0.21	122.4	0.84	
4	0.740	33.0	32.3	0.13	116.28	0.52	
5	0.290	16.0	20.1	0.17	72.36	0.68	Corridor
6	0.315	19.3	20.4	0.19	73.44	0.76	
7	0.380	9.9	15.1	0.09	54.36	0.36	B5
8	0.203	11.7	12.0	0.08	43.20	0.32	B6
9	0.319	15.4	12.9	0.08	46.44	0.32	B7
10	0.150	13.0	8.5	0.09	30.60	0.36	B9
11	0.450	12.6	15.7	0.10	56.52	0.40	B10
12	1.780	55.8	52.0	0.41	187.2	1.64	C2
13	0.806	30.5	31.9	0.34	114.8	1.36	
14	1.010	50.0	48.0	0.32	172.8	1.28	
15	0.800	29	35	0.30	126	1.2	C3
16	0.310	19	20	0.1	72	0.4	
17	0.400	23	24	0.23	86.4	0.93	SLA
18	0.380	19	20	0.09	72	0.36	

Table 2. Outdoor Rn-220, Rn-222 and α β integrated airborne activity concentration.

Sample No.	α β integrated airborne activity concentration ()		Rn-220 ()	Rn-222 ()	Location
	α	β			
19	0.09	4.5	3.7	0.040	Outside building
20	0.16	3.6	3.7	0.038	
21	0.05	3.1	3.2	0.037	Al-Tuwaitha site
22	0.04	4.9	3.7	0.044	
23	1.033	44.6	20.1	0.170	Ventilation system

Table 3. Measuring samples filters in gamma-ray spectroscopy system.

Sample No.	Cs-137 ()	Bi-214 ()	Sample No.	Cs-137 ()	Bi-214 ()
1	-	3.15±0.9	13	-	7.51±0.8
2	0.3±0.1	3.71±0.5	14	0.80±0.1	9.10±0.9
3		5.60±0.7	15	-	8.07±1
4	1.08±0.2	4.50±0.9	16	-	3.5±0.4
5	-	4.04±1	17	-	2.1±0.2
6	-	3.87±0.8	18	-	1.89±0.2
7	-	-	19	-	-
8	-	-	20	-	-
9	-	-	21	-	-
10	-	-	22	-	-
11	-	-	23	0.55±0.2	8.7±0.9
12	0.60±0.2	9.53±1.3			

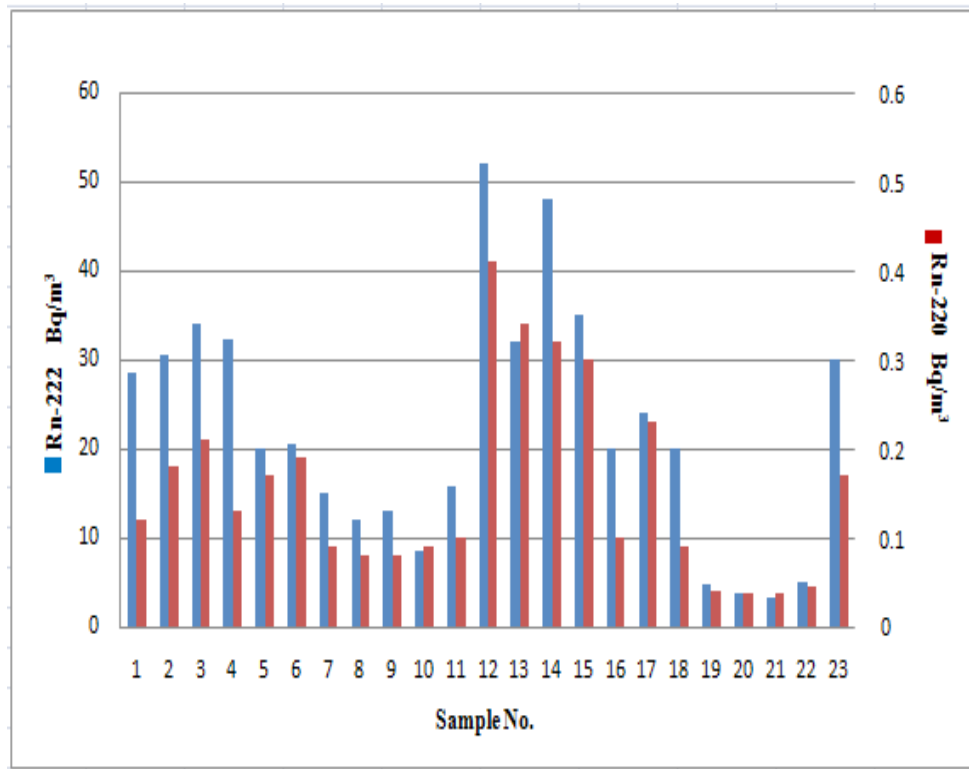


Figure 1. Radon and Thoron Activity Concentrations.

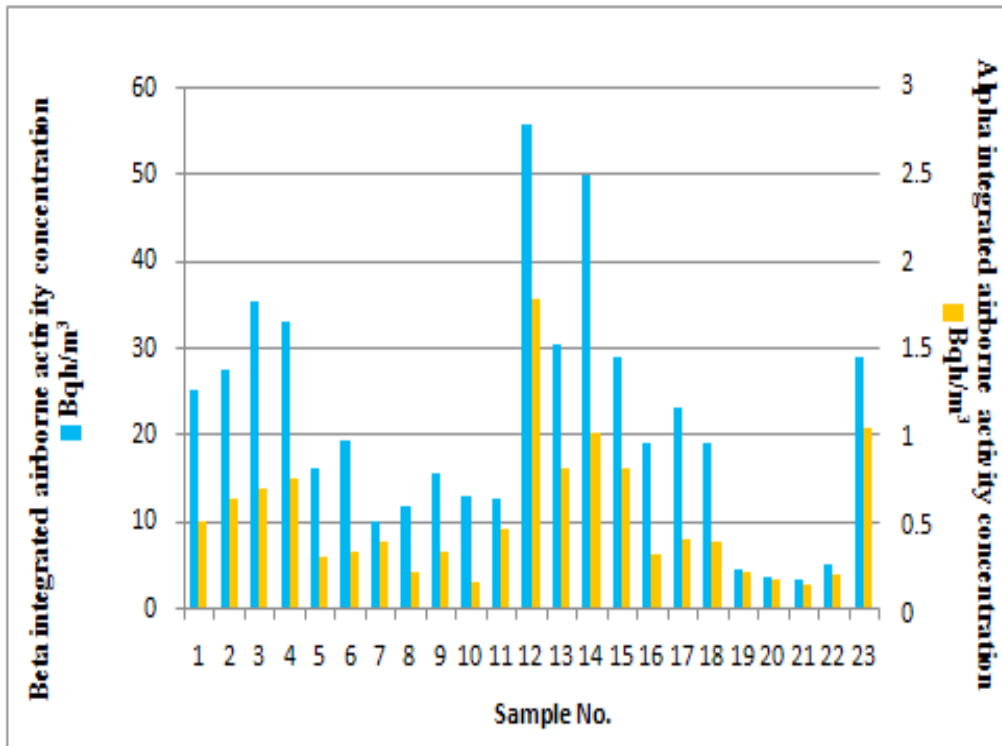


Figure 2. Alpha and Beta integrated airborne activity concentrations.

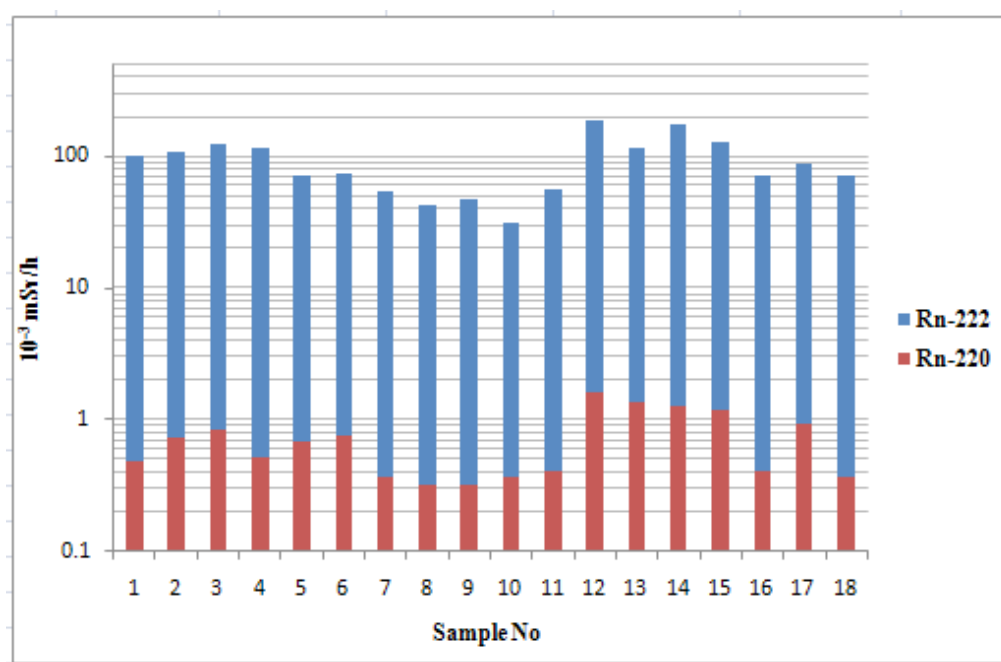


Figure 3. Annual effective dose of exposure to radon and thoron.

CONCLUSION

The results show that radon concentrations are high inside the radiochemistry laboratories building, especially in C1 and C2 laboratories, because they contain highly contaminated areas and equipment. Also due to the closure of the building and very bad ventilation system, this contributed to the increased concentration of radon. Airborne radioactive particulate was measured via *i*CAM inside radiochemistry laboratories where the concentration of radon activity (12-52) and thoron activity concentration (0.08-0.4) were found. The annual effective dose of workers was calculated at the decommissioning of the nuclear facilities, where they were found to range from 0.03 to 0.188

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Physics, College of Science, Al-Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Antibacterial and Anti virulence Factors activity of ZnO nanoparticles Biosynthesized by *Lactococcus lactis* ssp. *Lactis*

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ABSTRACT

In the present we are used a probiotic bacteria *Lactococcus lactis* ssp. *lactis* which is isolated from fish intestine to produce ZnO nanoparticles. Then we conformation the synthesized of nanoparticles using different techniques such as atomic force Microscopy (AFM) X-ray diffraction (XRD): technique, Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopic (SEM) and Energy-dispersive X-ray analysis (EDX) spectra. The results of characterization showed that the nanoparticles are hexagonal ZnO crystal structure, spherically shaped with a diameter of about (31-36)nm. The biosynthesized ZnO nanoparticles were tested against pathogenic bacteria isolated from skin infections included *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, *Klebsiella pneumonia*, and *Staphylococcus aureus*. The activity of ZnO nanoparticles as antimicrobial agent was measured via the investigation of the minimum inhibition concentration (MIC). The ZnO nanoparticles had antibacterial activity, the MIC ranged between (25 -100) mg/ml. The anti-virulence factors also determined against tested bacteria. Results showed that the ZnO nanoparticles had ability to inhibit virulence factors the ability of β -hemolysin, urease and pyocyanin production were decreased after treatment with biosynthesized ZnO nanoparticles, also the best effect has been shown in biofilm formation after 72 h for all isolates, with high inhibition 62.18% against *K.pneumoniae* (K6).

Keywords: Biosynthesis, ZnO nanoparticles, *Lactococcus*, Inhibitory effect, Skin infection causative bacteria, virulence factors.

INTRODUCTION

Bacteria of lactic acid are an important microorganism in industrial microbiology; they are used in fermentation process, and in nutrition benefits. It is able to produce antimicrobial substances that used as foods preservatives. LAB has ability to produce chemicals materials such as hydrogen peroxide, organic materials, and CO₂. In addition to produces low MW antibacterial substances, and bacteriocin which is used widely in biomedical applications¹. *Lactococcus lactis* is a Gram positive, and it is used widely in industry as a food preserver and in fermentation as well as other biological activity. This bacterial strain is interestingly

used in almost modern biotechnological applications². It is used by a lot of people in industry for production and fermented dairy products. This bacterial strain could be used in extensive research like metabolic pathway to increase its efficiency for dairy production³. Recently, many studies are demonstrated the important role of this bacteria in biomedical applications such as oral vaccine, production of foreign protein, and in genetic engineering and metabolic pathway⁴. *Lactococcus lactis* have come could used in economy in industry as well as food preservatives, and widely used in medical field⁵. The role of Zinc oxide nanoparticles in medical applications have been demonstrated by several studies. Recent study provided ZnO nanoparticles as non-toxic agent to mammalian and human cells, other study refer to used these nanoparticles as antibacterial agents, and noxious to microorganisms. In addition to a good biocompatibility to human cells⁶. There are many methods are used to synthesis of ZnO nanoparticles such as chemical, physical, and biological methods. The

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current study described a simple and eco-friendly way for production of zinc oxide nanoparticles using Iraqi *L. lactis* ssp. *lactis* isolate and evaluation of its antibacterial activity and Anti virulence factors against pathogenic bacteria isolated from skin infections.

MATERIALS AND METHOD

Microorganisms

Lactococcus lactis ssp. *lactis*

Lactococcus lactis ssp. *lactis* was isolated from fish intestine. Bacterial isolate was identified using many techniques such as cultural methods, and microscopical as well as chemicals method according to the protocol describe by Liu *et al.* (2014)³ then identified through Vitek2 system.

Pathogenic Bacteria

Eight isolates of pathogenic bacteria isolated from skin infections included two isolates for each of *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, *Klebsiella pneumonia* and *Staphylococcus aureus* were selected as virulence factors producer isolates. These isolates were identified throughout many techniques such as cultural methods, and microscopical as well as chemicals method according to Forbes (2007)⁷ and Vitek2 system.

Detection of virulence factors:

Urease production

Urea agar is used to determine the ability of the pathogenic bacterial isolates to produce urease enzyme pathogenic. After incubation at 37° C for 24 h the change of color from yellow to pink indicated positive result⁸.

Hemolysin production

This test is used to detect production of hemolysin enzyme. Blood agar cultured with tested bacteria, then was incubated at 37°C for 24 h, a hemolysis around the colony indicated positive result⁹.

Pyocyanin production

Pseudomonas aeruginosa isolates were cultured in nutrient broth and incubated at 37°C for 24 h and observed for color change, by visually observing culture supernatants. So, the pyocyanin production was performed¹⁰.

Biofilm formation of bacteria

Bacterial isolates were screened for their ability to biofilm formation using Microtiter plate method according to the procedure described by Mathur *et al.* (2006)¹¹. 96 flat bottom well microtiter plate were filled with one hundred eighty µl of brain heart infusion broth with 4% sucrose then inoculated with 20µl of diluted bacterial suspensions. Control wells contained two hundred µl of media which is BHI broth with two % of sucrose, then the samples were sealed with parafilm then incubated at 37°C for 24 h, the rest of bacterial cells were discarded by three times washing with PBS (pH 7.2), drying at room temperature for 15 min, then 200 µl of crystal violet (0.1%) was added to the wells; for 20 min. After removing the crystal violet solution, wells were washed three times with PBS (pH 7.2) to remove unbound dye, leave the plates at room temperature to dry, then added 200µl of 95% ethanol. After that read the absorbance at 630 nm by ELISA reader¹². The O.D value for control well was deducted from all the test O.D value.

Biosynthesis of ZnO Nanoparticles

A pure culture of *L.lactis* ssp. *lactis* (9×10^8 CFU/ml) was used for biosynthesis of ZnO particles using sterile flask contains (MRS) broth culture media, then incubated at 30 °C for 24h. After this time the pH of the MRS culture media was adjusted to 6 by 1 M NaOH to stop transformation process. Zinc Chloride ($ZnCl_2$) was used as analytical reagent grade during for preparation of 0.25 Moller strength solution at room temperature. After that, the prepared solution was added to flask containing culture media and the mixture is heated using water bath up to 80°C for 5-10 min¹³. The presence of white precipitate at the bottom of flask is refer to the transformation process then, the flasks was discarded from water bath, incubated at 37 °C for 12 h¹⁴. The final product was filtered and DW was added to ZnO nanoparticles.

Antibacterial activity of synthesized ZnO nanoparticles

The antibacterial activity of the synthesized ZnO nanoparticles by *L.lactis* ssp. *lactis* was measured via determine the, minimum inhibitory/ concentration (MIC) using micro dilution technique in the culture broth media.

Effect of biosynthesized ZnO nanoparticles on bacterial virulence factors production.

Effect on urease production

The effect of ZnO nanoparticles biosynthesized by probiotics bacteria *L.lactis* ssp.*lactis* against urease production by bacterial isolates from skin infections were studied. Briefly, 0.1 ml of sub MIC ZnO nanoparticles was added on urea agar, then left at room temperature to dry after that the samples were inoculated with bacterial isolates and incubated for 24 h at 37 °C, the ability of bacterial strains to urease production was noted by formed of pink colonies whereas urease non-producers remained yellow in color ¹⁵.

Effect on hemolysin production

The effect of ZnO nanoparticles biosynthesized by probiotics bacteria *L.lactis* ssp.*lactis* against hemolysin production of bacterial isolates from skin infections were studied by using of blood agar method as described by (Bajelan, 2014) ¹⁵.

Effect on pyocyanin production by *Pseudomonas aeruginosa*

The effect of ZnO nanoparticles biosynthesized by probiotics bacteria *L.lactis* ssp.*lactis* against pyocyanin production of *P.aeruginosa* isolates from skin infections. Overnight culture of *P.aeruginosa* isolates were diluted 1:100 in nutrient broth and then treated with subMIC of biosynthesized ZnO nanoparticles (1:1) (ZnO nanoparticles: cultures), control included culture broth only. After growth for 16 h, culture supernatants were collected by centrifugation at 6000 rpm for 15 min, then transferred into cuvettes and photographed ¹⁶.

Effect on biofilm formation

The antibiofilm activity of biosynthesized ZnO nanoparticles against bacterial isolates from skin infections has been done using procedure used by Ali (2012). Each of bacterial suspensions in brain heart infusion broth with 2% sucrose (100 µl) was added to 96- well flat-bottomed microtiter plate together with (100 µl) subMIC of ZnO nanoparticles. The control group wells contained 180 µl of brain heart infusion broth with 2% sucrose and 20 µl of bacterial suspensions, The covered microtiter plate was sealed with Parafilm during incubation at 37°C for 24 h. The suspended bacterial strains were discarded by washing

the plates more than three times with PBS (pH 7.2). After that leave the samples to dry at room temperature, then two hundred µl of crystal violet stain (0.1%) was added to the samples for 25 min. The stained attached bacterial cells were rinsed using PBS (pH 7.2) three times, then left the samples to dry at room temperature then extracted twice with 200 µl of 95% ethanol and the absorbance of each well was measured at 630 nm using ELISA Reader. The inhibition of biofilm formation for each pathogenic bacteria was measured as equation used by (Qayyum and Khan, 2016)

$$\text{Inhibition of biofilm formation \%} = \frac{\text{Control} - \text{Sample}}{\text{Control}} \times 100$$

Antibiofilm assay measures the % reduction of bacterial biofilm related to the control wells, which were set at 100% to indicate the absence of ZnO nanoparticles.

RESULTS AND DISCUSSION

Characterization of synthesized ZnO Nanoparticles

Atomic Force Microscope (AFM), is one of important test which is used to view the nanomaterials both in surface and three Dimensional view, our results found that the average size of ZnO nanoparticles between (80-89) nm. The structure and lattice parameters of ZnO nanostructure were studied by X-ray diffraction. This technique gives an indication about the grain size, formation material type, strain and dislocation density. XRD pattern of ZnO nanoparticles biosynthesized by probiotic ↑ bacteria *L.lactis* ssp.*lactis* as show in figure (1A) Mostly the XRD peak were observed between (30°-40°). Fourier transformation-Infrared spectroscopic results give information about phase composition and the way in which oxygen is bound to metal ions. The following figures show the FTIR spectra for ZnO nanoparticles synthesized by probiotic bacteria *L.lactis* ssp.*lactis* (Figure 1B) shows that the absorption peak is around (400–800) cm⁻¹ broken spectra which is related to the zinc oxide powder nanoparticles prepared. The presence of a broad absorption peak in FTIR indicates the synthesis of ZnO nanoparticles of varying sizes. The energy-dispersive X-ray analysis (EDX) spectra of the ZnO nanoparticle powder synthesized by probiotic ↑ bacteria *L.lactis* ssp.*lactis* which confirm that all the films contain the elements (Zn, O) (Figure 2A, B). The components of the growth media which are used in bacterial culture, therefore; play an important role in the production process of metallic and/or oxide nanoparticles

which is done in the current study. Energy- yielding material – suitable carbohydrate (which responsible of the rH_2 control), the ionic status of the medium pH and overall oxidation-reduction potential (Eh) of the culture medium, all these factors cumulatively negotiate the synthesis of ZnO nanoparticles in the presence of *Lactobacillus* strain. Previous studies on biosynthesis of silver nanoparticles using fungal cell-free filtrate also showed the presence of proteins on the surface of individual nanoparticles which conferred their stability¹⁶.

Antibacterial activity of synthesized ZnO nanoparticles

The antibacterial activity of ZnO-NPS isolated from *L.lactis ssp.lactis* was determined by measuring the growth obtained for some bacteria causing skin infection. From those results, the MIC for each bacteria was determined. Results showed that the MIC of ZnO nanoparticles synthesized by *L.lactis ssp.lactis* isolate was effective against all the tested pathogenic bacteria, the MIC ranged between (25 -100) mg/ml. The best effect of ZnO nanoparticles was effective against *A.baumannii* and *S.aureus* found to be 25mg/ml but the lowest effect has been recorded on *P.aeruginosa* (50 -100mg/ml).

Effect of biosynthesized ZnO nanoparticles on bacterial virulence factors

The present study has made an attempt to find out the effect of bioynthesized ZnO nanoparticles by probiotic bacteria *L.lactis ssp.lactis* on urease production by pathogenic bacteria causing skin infection. Results showed that the biosynthesized ZnO nanoparticles had effect on urease production against isolates of *S.aureus*

,*P.aeruginosa* and *A.baumannii* while do not effect against the isolates *K.pneumoniae* (K6) and *P.aeruginosa* (p9) (Table 1). One of the most enzyme inhibitors are heavy metal ions which controls rate of urea hydrolysis. These chemical materials could be damage of enzyme structure results in loss of their function. The combination between copper (II) and zinc (II) play an important role as inhibitors of jack bean urease (Wang *et al.*, 2017). The results of present study has been demonstrated that the biosynthesized ZnO nanoparticles using *L.lactis ssp.lactis* showed antibacterial activity against all bacterial strains which produce hemolysin enzyme except two bacterial isolates of *K.pneumoniae* and *P.aeruginosa* (p6) (Table 1). This study is the first to examine the inhibitory effects of ZnO nanoparticles biosynthesized by *L. Lactis ssp.lactis* against pyocyanin production of (*P.aeruginosa* 6, *P.aeruginosa* 9) isolated from skin infection. pyocyanin inhibition by the plain Solid lipid nanoparticles (SLNs) was not due to killing of the bacteria, an effect that is often associated with nanoparticles.

Effect on biofilm formation

Zinc Oxide nanoparticles synthesized by probiotic bacteria *L. lactis ssp. lactis* were studied to inhibit biofilm formation by bacterial isolates from skin infection. Results showed that biosynthesized ZnO nanoparticles recorded maximum biofilm inhibition against gram negative bacteria after incubated for 72 h reached to (59.46, 62.18)% against (*A.baumannii* A1 and *A. baumannii* A6) respectively and (51.79, 41.71) % against gram positive bacteria (*S. aureus*3, *S. aureus* 9) respectively (Table 2).

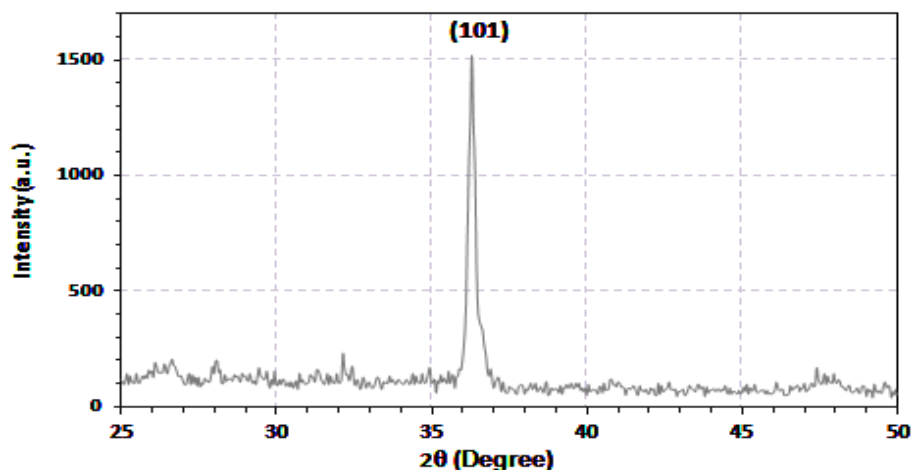


Figure 1. XRD pattern of ZnO nanoparticles synthesized by probiotic [*Lactococcus lactis ssp.lactis*]

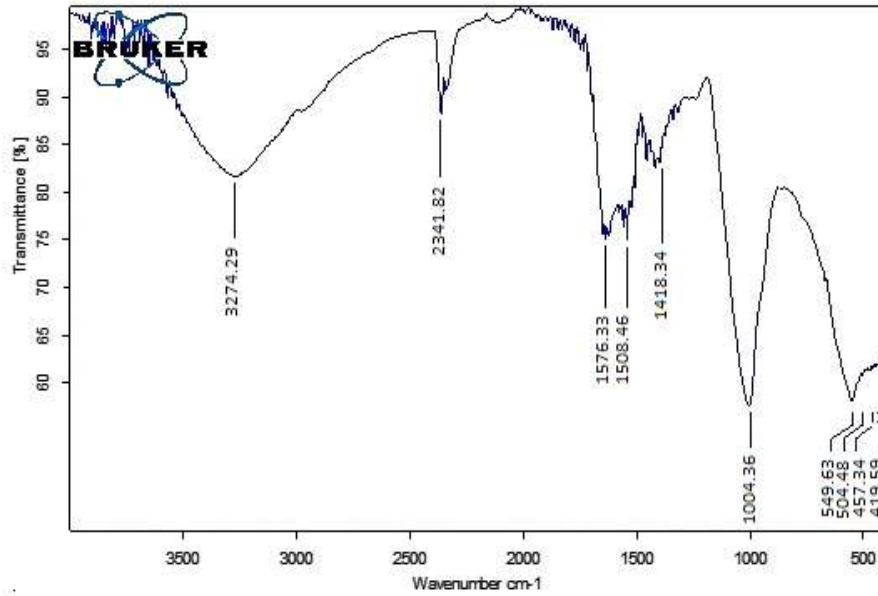


Figure 2. FTIR results of ZnO nanoparticles synthesized by probiotic bacteria *Lactococcus lactis ssp.lactis*

Table 1. Effect of (ZnO NPs) synthesized by *L.lactis ssp.lactis* on hemolysin and Urease production of bacterial isolates from skin infections

Bacterial isolates	hemolysin Before treatment	hemolysin After treatment	Urease Before treatment	Urease After treatment
<i>P.aeruginosa</i> (P6)	+	+	+	-
<i>P.aeruginosa</i> (P9)	+	-	+	+
<i>K.pneumoniae</i> (K5)	+	+	+	-
<i>K.pneumoniae</i> (K6)	+	+	+	+
<i>A.baumannii</i> (A1)	+	-	+	-
<i>A.baumannii</i> (A6)	+	-	+	-
<i>S.aureus</i> (S3)	+	-	+	-
<i>S.aureus</i> (S9)	+	-	+	-

Table 2. Antibiofilm effect of (ZnO NPs) synthesized by *Lactococcus lactis ssp.lactis* against bacterial isolates from skin infections

Bacterial isolates	Biofilm inhibition %		
	Incubation time(hour)		
	24	48	72
<i>P.aeruginosa</i> (P6)	-16.67	18.75	46.73
<i>P.aeruginosa</i> (P9)	-10.45	17.22	26.53
<i>K.pneumoniae</i> (K5)	2.564	12.4	59.46
<i>K.pneumoniae</i> (K6)	20.71	22.76	62.18
<i>A.baumannii</i> (A1)	9.375	13.56	38.27
<i>A.baumannii</i> (A6)	11.71	21.24	32.14
<i>S.aureus</i> (S3)	26.4	46.31	51.79
<i>S.aureus</i> (S9)	13.16	24.79	41.71

CONCLUSION

In conclusion, in this study a save and non-expensive biological, and ecofriendly method was used for production of zinc oxide nanoparticles by using *Lactococcus lactis* ssp. *lactis*. Biosynthesized ZnO nanoparticles had antibacterial and anti-virulence factors against skin infections causative bacteria.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science, Mustansiriyah University, Baghdad city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Calculation of Optimum time Exposure of Ultraviolet Radiation for Different Seasons at Baghdad City

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ABSTRACT

Aims this study is focused to calculate exposure times which cause to skin damage (one minimum erythema dose) and the optimal time for exposure to sunlight that is needed to receive adequate UV for vitamin D production, without inducing erythema at Baghdad city. In this study calculated the annual and seasonal optimal time for exposure of Ultraviolet radiation and Maximum exposure time for causes skin burns in Baghdad depending on the Fitzberk classification assuming normal ozone conditions throughout the year by using Ultraviolet radiation data received from French site for Solar radiation data(SODA) in the period 1/1/2005 to 31/12/2017. The greatest time for exposure to solar radiation to create vitamin D without skin burns was 16 min in winter, 6 min in spring, 5 min in summer and 9 min in autumn, While the greatest exposure time to solar radiation that causes burns is 80 min in winter, 32 min in spring, 22 min in summer, and 46min in autumn. It was find the number of days per UV Index level was found in one year (2015) were low level 8 days, Medium level 74 days, High level 68 days, Very High level 93 days.

Keywords: Ultraviolet Radiation, Ozone, pigmentary changes, Skin Cancer, Skin Burns, Vitamin D, Solar radiation.

INTRODUCTION

The Ultraviolet radiation waveband is traditionally included in the nonionizing radiation although the UV band has enough energy to break the bond of macromolecules^{1,2}. It is divided into three bands although the exact wavelength at which the divisions are made differ in accordance with different disciplines. The Second International Congress on Light in Copenhagen in 1932 defined three regions: UVA 400-315nm, UVB 315-280nm, UVC 280-100nm. However, in photobiology the boundaries for these regions are slightly different and associated with the biological effects: UVA 400-320nm, UVB 320-290nm, and UVC 290-200nm³. Solar Ultraviolet radiation is responsible of a variety of different effects on biological systems

prolonged human exposure to solar UV radiation may result in acute and chronic health effects on skin, eyes and immune system. Sunburn and tanning are the best known acute response to excessive UV radiation exposure¹; chronic and lifetime sun exposure induce degenerative changes in cells, fibrous tissue and blood vessels and lead to premature skin ageing. Ultraviolet radiation likely to cause inflammatory reactions of the eye, such as keratitis and It can cause cutaneous malignant melanoma, non-melanoma skin cancers are squamous cell carcinomas are basal cell carcinomas in fair-skinned populations the most common⁴. The effect of excessive Ultraviolet radiation exposure is erythema, the familiar skin reddening termed sunburn, estimated at 24 h after exposure, It is considered a large dose. The erythema response depends not only on the UV dose but also on skin type. Sensitivity to sunburn is usually determined by the minimal erythema dose (MED) is the minimum dose that will make a just perceptible erythema 8-24 hours after irradiation⁵. While UV in solar radiation is needed to synthesize previtamin D in the epidermis. UV radiation very important in maintaining our health, especially in the protection of diseases caused by

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deficiencies in serum vitamin D ^{6,7}. Therefore, it is important to know the convenient UV exposure time to obtain the amount of vitamin D ^{8,10}. The ultraviolet Index adopted worldwide as a standard scale to UV radiation intensity at the Earth's surface ¹¹ and serves to inform the public about the intensity of the Sun's UV radiation and the adequate sun protection actions recommended to avoid excessive exposure to UV radiation ^{12,13}. The erythemal action spectrum is a weighting function which simulates the damage process occurring in the epidermis. It is used to determine the UV index ¹⁴⁻¹⁶. The UV index is calculated dividing a summer erythemal dose rates at mid-day under cloud free conditions, which becomes a scale of 1 to 11 (or more) indicating the potential sun burning of the solar radiation[17].

becomes a scale of 1 to 11 (or more) indicating the potential sun burning of the solar radiation[17].

$$UVI = \frac{1}{25mWm^{-2}} \int_{280nm}^{400nm} I(\lambda)E_{\lambda} d\lambda \quad \dots\dots\dots 1$$

I(λ) is the solar irradiance at the surface (mW/m²/nm) and E_λ is the erythemal action spectrum:

$$\begin{aligned} E_{\lambda} &= 1 && \text{for } \lambda \leq 298 \text{ nm} \\ E_{\lambda} &= 10^{0.094(298-\lambda/nm)} && \text{for } 298 \text{ nm} < \lambda \leq 328 \text{ nm} \\ E_{\lambda} &= 10^{0.015(139-\lambda/nm)} && \text{for } 328 \text{ nm} < \lambda \leq 400 \text{ nm} \\ E_{\lambda} &= 0 && \text{for } 400 \text{ nm} < \lambda \end{aligned} \quad \dots\dots\dots 2$$

The time needed (t_E in minutes) to induce skin damage was calculated as follows:[17]

$$t_E = \frac{4000}{60} \frac{MEDF.SP.F}{UVI} \dots\dots\dots 3$$

Where: 4000/60 accounts for the conversions from UV_{Ery} to UVI and seconds to minutes; UVI is the UV Index; MEDF (Minimum Erythemal Dose Factor) is a factor to take into account the differences in skin color and SPF is the sun protection according to the Fitzpatrick skin classification (Table 1) . The optimal time for exposure to sunlight that is needed to receive adequate UV for vitamin D production, but without inducing erythema, depends strongly on season and latitude. The exposure time for sufficient vitamin D was calculated taking into account the area of exposed skin expressed as percentage of total body area (A)[19]:

$$t_D = 8 \cdot \frac{MEDF.SP.F}{UVI.R.A} \quad \dots\dots\dots 4$$

Where: R is the ratio of UV_{VitD} /UV_{Ery} ; A is the uncovered body area expressed in %

RESULTS AND DISCUSSION

For determining UV radiation exposure time for vitamin D Synthesis in the Skin without risk to health. Assuming body area exposed and no sunscreens (face and the backs of both hands) about A=0.27. The number of days of the levels of the ultraviolet radiation index was determined and shown in Table (2).

The number of days for Extreme high and very high levels for UVI constitute about 59% Where the level of Extreme(34%) and very high(25%) for

(Mar, Apr, May, Jun, Jul, Aug and Sep). Time needed for effective exposure for vitamin D synthesis has been calculated in Figure (1a) shows optimal times of exposure for skin types (II, III, IV), and these skin types have been selected because they are the most available in Baghdad. The time needed to induce skin damage for skin type II needs 14 minutes in summer While the skin type IV need of about 35 minutes. In winter it takes more time for damage, Where the skin type 11 needs 35 minutes and the type of skin in need of 88 minutes as shown in Fig (1a). In the summer skin type II (represents

light skin) needs 4 minutes to generate vitamin D While the skin type IV (represents dark skin) need of about 10 minutes to be generated vitamin D due to high levels of ultraviolet radiation as shown in Fig (1b). In winter, it takes more time for vitamin D to be produced Where the skin type II needs 11 minutes and the skin type IV need of 22 minutes to generate vitamin D.

Table 1. Skin type classifications according to the Fitzpatrick scale [18].

Skin type	Description	SED
I	Celtic (always burn)	2 - 3
II	Pale (burns easily)	2.5 - 3
III	Caucasian (may burn)	3 - 5
IV	Mediterranean (burns rarely)	4.5 - 6
V	S. American (rarely burns)	6 - 20
VI	Negroid (rarely burns)	6 - 20

Table 2. Number of days for levels of UVI

UV Index	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Low ^{1,2}	2	-	-	-	-	-	-	-	-	1	4	1
Medium ^{3,4,5}	18	6	-	1	-	-	-	-	1	7	12	29
High ^{6,7}	11	17	6	-	3	-	-	-	1	16	14	-
Very High ^{8,9,10}	-	5	25	11	6	2		9	28	7	-	-
Extreme ¹¹⁺	-	-	6	18	22	28	31	22	-		-	-

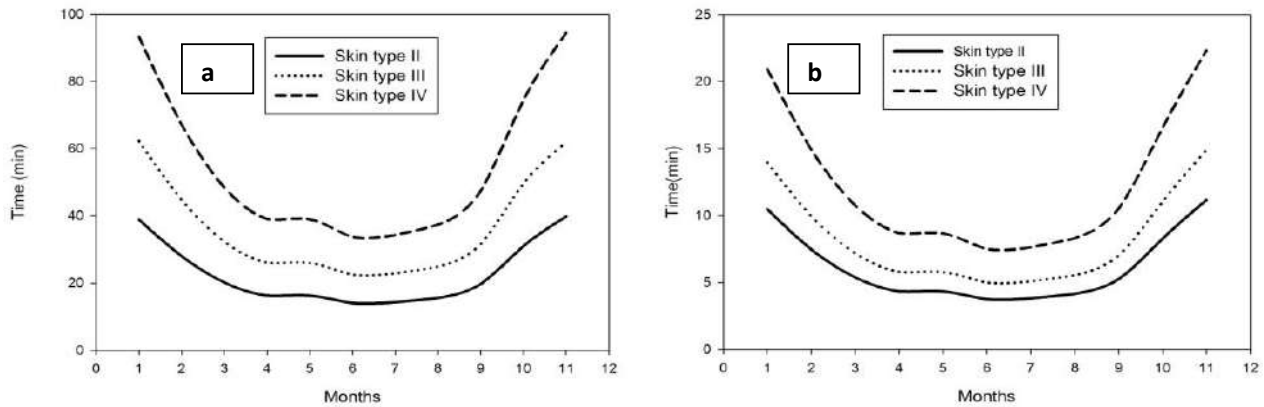


Figure 1. (a) the time taken to receive an erythema for different skin types.(b) shows the Optimum time for ultraviolet exposure to generate vitamin D for different skin type.

CONCLUSION

The number of days of levels of ultraviolet (UV) index was 127 days and about 34% from the days of the year. Therefore, UV protection should be applied regardless of the color of skin, since this high ratio is distributed over five months, from March to September. This requires the use of means and methods of protection from solar radiation during these months, especially during the hours of 11 am and 14 pm in the summer, sufficient vitamin D can be produced from a few minutes of sun exposure to the face and hands. But the exposure

time should be limited to less than approximately 10 minutes to avoid sunburn. The area of skin exposed to solar radiation (A) must be more than 27% as most people expose the face and hands only, especially for women for social reasons, which leads to a decrease in the generation of vitamin D and this vitamin is very important to the absorption of calcium in the body. It is preferable to expose a larger area, such as the shoulders and some parts of the arms or legs, rather than just the face and hands.

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Cell–Cell Communication (Quorum Sensing) in Gram-Negative and Gram-Positive Bacteria: A Review

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ABSTRACT

Quorum sensing indicates to the capability of a bacterium to sense information from other members in the population when they compass a critical concentration and connect with them. The mode used for this intercellular connection is depend on small, self-generated signal molecules called as autoinducers. Quorum sensing is reflection to endure pathogenic bacteria mechanism to reduce host immune responses by retardant the forming of tissue-destroying virulence factors until adequate bacteria have accumulated and are destined to crush host defense mechanisms and set infection. Among these pathogenic bacteria, Gram negative bacteria such as *Pseudomonas aeruginosa*, *Vibrio* spp., and *Escherichia coli* as well as Gram positive bacteria; *S. aureus* and *Clostridium perfringens* are probably the best understood in terms of the virulence factors regulated by the Quorum sensing that plays a role in the pathogenicity. In conclusion bacteria do not live separated, but rather they communicate using varied chemical languages.

Keywords: Quorum sensing, Gram positive bacteria, Gram negative bacteria, Virulence factors.

INTRODUCTION

Bacterial cell-cell communication systems also called quorum sensing (QS) is a mechanism that regulates gene expression according to cellular density that are based on the release of signal molecules known as autoinducers(AIs), so called because they can act on the same cell that releases them, and are able to trigger gene expression throughout the population, causing a global response¹. The concentration of the autoinducer is decisive in starting the QS, the higher the population density (greater number of individuals), the higher the autoinducer's concentration in the external environment that stimulating the changes in their cell numbers and collectively alter gene expression². QS controls genes that direct activities that are beneficial when performed by groups of bacteria acting in synchrony. Different forms of QS have been discovered in various bacterial genera. The difference between them lies in the type

of autoinducer molecule used and the global response triggered in the bacteria.

Quorum sensing History

Bacterial activity involving quorum sensing was first observed in the mid-1960s by the microbiologist Alexander Tomasz in his studies of the ability *Streptococcus pneumoniae* to take up free DNA from its environment. In 1970, the first QS in bacteria *Vibrio fischeri* were observed. The researchers found that the Gram-negative bacterium that lives in a free-living in the seas and oceans. The low number does not produce luciferase but when the luminous organs of fish or marine bacteria holes cephalopods (*Euprymna scolopes*) into the holes where the organs of reproduction is and then increase the number of bacteria, QS active and causes the activation of luciferase gene and luminance phenomenon occurs³⁻⁵.

Quorum sensing in Gram positive bacteria and gram negative bacteria

Gram-positive and Gram-negative bacteria use different types of QS systems. AI molecules produced by Gram-negative bacteria diffuse passively into and out of cells, whereas AIs synthesized by Gram-positive bacteria

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are actively transported ⁶. Gram-positive bacteria use peptides, called autoinducing peptides (AIPs), as signaling molecules. Once produced in the cell, AIPs are processed and secreted. When the extracellular concentration of the AIP is high, which occurs at HCD, it binds to a cognate membrane-bound two-component histidine kinase receptor. Usually, binding activates the receptor's kinase activity, it autophosphorylates, and passes phosphate to a cognate cytoplasmic response regulator. The phosphorylated response regulator activates transcription of the genes in the QS regulon. In some cases of Gram-positive bacterial QS, AIPs are transported back into the cell cytoplasm where they interact with transcription factors to modulate the transcription factor's activity and, in turn, modulate gene expression changes ³.

QS Control of virulence factors in Gram positive bacteria

In Gram-positive bacteria such as gram-negative bacteria, QS has role triggering of infection, antibiotic production, biofilm, and so is the role and structure of QS molecules in Gram-positive bacteria differ from gram-negative bacteria [6]. In Gram positive bacteria more molecules of peptide Octa or Hepta who called pheromone involved in transmitting messages. These molecules that are hydrophobic low molecular weight ($5 \times 10^{-11}m$) and at least two molecules per cell of these peptides with biological activity there. Receptor agonist study suggests that these molecules messaging system similar to cytokine signaling in eukaryotic ^{6,7}. QS Controls virulence factor production in various Gram-positive human pathogens including *S. aureus*, *Listeria monocytogenes*, *Bacillus cereus*, *Enterococcus faecalis*, and *Clostridium perfringens* ^{3,8,9}.

Staphylococcus aureus Quorum Sensing

Staphylococcus aureus is a gram-positive, round-shaped bacterium that is a member of the Firmicutes, and it is found among the normal human skin flora. If the epithelial barrier is compromised, *S. aureus* can cause minor skin infections. These infections can lead to pneumonia, bacteremia, and sepsis ¹⁰. Its ability to cause disease depends on expression of an array of adhesion molecules, toxins, and compounds that affect the immune system. QS Regulates expression of genes encoding these virulence factors ³. The quorum sensing system in *S. aureus* occurs through the accessory gene

regulator (*agr*) ¹¹. It is a complex molecular mechanism and though the pathway is elucidated, the response of QS itself is not well understood. *Agr* functions to increase the expression of certain virulence factors secreted by *S. aureus* and decrease certain cell surface proteins ¹¹. There is evidence that *agr* contributes to *S. aureus* pathogenicity in several infection types, including subcutaneous abscesses, endocarditis, and arthritis. On a molecular level, the *agr* locus contains promoters P2 and P3 that encodes transcripts for RNAII and RNAIII, respectively ¹¹. The P2 and P3 operons code for different proteins that have individual roles in *agr*-sensing. P2 operon encodes the RNAII transcript that produces gene products *agrB*, *agr D*, *agrC*, and *agrA* ¹¹. These four products comprise the actual signaling system. The P3 operon encodes the RNAIII transcript that produces only one gene product—a toxin called delta-hemolysin—but that increases transcription of several virulence factors. However, it has been noted that the *agr* system is not necessary for the expression of virulence factors like toxins. *AgrD* and *AgrB* work together to produce an auto-inducing peptide (AIP). *AgrD* encodes for pro-AIP and transmembrane protein *AgrB* processes the pro-AIP to AIP, transporting it to the external cellular space. AIP will continue to accumulate in the external environment beyond the cell membrane, eventually binding to *AgrC*, a kinase embedded within the membrane. The *AgrC* kinase phosphorylates regulator *AgrA*, which then is responsible for the autoinduction of the *agr* locus by binding to the P2 and P3 promoters and initiating the cycle again. The *agr*-sensing system is a circuit that is auto-activating ^{11,12}.

Clostridium perfringens Quorum Sensing

Clostridium perfringens is a Gram-positive, spore-forming, anaerobic bacterium that is widely distributed in soil, feces, and foods as well as the normal intestinal microbiota of both humans and animals ¹³. *C. perfringens* produces various exotoxins and enzymes that cause food poisoning and gas gangrene. The genes involved in virulence are regulated by the *agr*-like quorum sensing (QS) system, which consists of a QS signal synthesis system and a *VirSR* two-component regulatory system (*VirSR* TCS) which is a global regulatory system composed of signal sensor kinase (*VirS*) and response regulator (*VirR*) ¹⁴. Both similarities and differences exist between the *Agr*-like QS system of *C. perfringens* and the well-characterized, paradigm *Agr* system of *S. aureus* ^{12,14,15}. For example,

the *C. perfringens* Agr-like QS system includes an operon encoding *AgrD* and *AgrB*, where *AgrD* is the precursor peptide for the autoinducing peptide (AIP) that mediates Agr QS signaling and *AgrB* is the integral membrane endopeptidase that is involved in processing *AgrD* to the active AIP. However, *C. perfringens* lacks the *AgrA/AgrC* two-component system that responds to the AIP in *S. aureus*¹⁵⁻¹⁷.

QS Control of virulence factors in Gram negative bacteria

The vast majority of gram-negative quorum-sensing systems that have been studied thus far utilize *N*-acyl homoserine lactones (AHL) as signaling molecules. When in high enough concentration, these molecules can bind to and activate a transcriptional activator, or R protein, which in turn induces expression of target genes²¹.

LuxI/LuxR Quorum Sensing

Gram-negative bacterial systems employ the autoinducer Homoserine Lactones synthesized by a *LuxI* homologue and a *LuxR* homologue. The *LuxR* homologue encodes a transcriptional activator protein which detects the cognate HSL inducing the appropriate phenotype. It has been established that such cell dependent phenomenon is exhibited by over 30 species of Gram-negative bacteria. Though *LuxI/LuxR* systems are used by a variety of bacteria for quorum sensing, there exists a layer of complexity in the *LuxI/LuxR* systems³. *LuxI/LuxR* homologs have been identified in more than 100 Gram-negative bacterial species²¹. AHLs produced by different bacteria possess different length side chains and side-chain decorations. Acyl chains ranging from C4 to C18 have been identified with modifications such as carbonyl and hydroxy moieties at the C3 position^{22,23}.

Vibrio cholerae Quorum sensing

Vibrio cholerae, the causative agent of the diarrheal disease cholera, exists primarily in marine environments, and infection of humans usually occurs through ingestion of contaminated water²⁶. After traversing the stomach, *V. cholerae* expresses an array of virulence factors that enable colonization of the host intestinal epithelium. The major colonization factor, toxin coregulated pilus, promotes adherence to the intestinal lining, and the subsequent secretion of cholera toxin leads to severe diarrhea and release of the bacterium into

the environment²⁷. Critical to its infection cycle is *V. cholerae*'s ability to alternate between expression of virulence traits essential for survival inside the host and expression of traits such as biofilm formation that are necessary for survival in its ex vivo marine environment²⁸. Quorum sensing in *V. cholerae* controls the expression of virulence factors including cholera toxin and biofilm formation. *V. cholerae* is regulated by two parallel QS pathways, the CAI-1 pathway, specific to *V. cholerae*, and the AI-2 pathway which is relayed between multiple species of bacteria^{29,30}. The use of two external signaling molecules allows the bacteria to accurately monitor the composition and developmental stages of its surrounding community and vary gene expression accordingly.

Pseudomonas aeruginosa Quorum Sensing

Pseudomonas aeruginosa is a Gram-negative organism that is commonly found in soil and water. Although *P. aeruginosa* can survive under multiple harsh conditions, it is an opportunistic pathogen and is only able to infect hosts with defective immune system function, such as that observed in individuals with cystic fibrosis, burns, and HIV. To facilitate the establishment of infection, *P. aeruginosa* produces an impressive array of both cell-associated and extracellular virulence factors. Several of these virulence factors have been demonstrated to be regulated by (QS)³. A second QS system in *P. aeruginosa* consists of the *RhlI* and *RhlR* proteins. The *RhlI* synthase produces the AHL *N*-butyryl-L-homoserine lactone (C₄-HSL), and *RhlR* is the transcriptional regulator³.

Escherichia coli Quorum sensing

Escherichia coli also known as *E. coli* is a Gram-negative, facultative anaerobic, rod-shaped, coliform bacterium of the genus *Escherichia* that is commonly found in the environment, foods, and intestines of people and animals. *E. coli* are a large and diverse group of bacteria. Although most strains of *E. coli* are harmless, others can make you sick. Some kinds of *E. coli* can cause diarrhea, while others cause urinary tract infections, respiratory illness and pneumonia, and other illnesses. In the bacterium *Escherichia coli*, cell division may be partially regulated by AI-2-mediated quorum sensing. This species uses AI-2, which is produced and processed by the *lsr* operon. Part of it encodes an ABC transporter, which imports AI-2 into the cells during the early stationary (latent) phase of growth. AI-2 is

then phosphorylated by the *LsrK* kinase, and the newly produced phospho-AI-2 can be either internalized or used to suppress *LsrR*, a repressor of the *lsr* operon (thereby activating the operon). Transcription of the *lsr* operon is also thought to be inhibited by dihydroxyacetone phosphate (DHAP) through its competitive binding to *LsrR*. Glyceraldehyde 3-phosphate has also been shown to inhibit the *lsr* operon through cAMP-CAPK-mediated inhibition. This explains why, when grown with glucose, *E. coli* will lose the ability to internalize AI-2 (because of catabolite repression). When grown normally, AI-2 presence is transient.

CONCLUSION

The ability to assortment behavior in a cell-density-dependent style has several apparent benefits. In the state of pathogenic microorganisms, the regulation of virulence determinants during the infection process is thought to play an important role in pathogenicity. Evading host defenses is a major aim of pathogens, and Quorum sensing provides these bacteria the appropriate time to express the immune evading machinery. Using Quorum sensing, bacteria can collect a high cell density before virulence determinants are expressed, and in doing so, the bacteria are capable to make a planned attack and produce vast virulence factors to smash the host defenses. In the future, it will be remarkable to see whether additional human pathogens utilize Quorum sensing as portion of their pathogenic lifestyle and, if so, whether production of the signal molecules, AHL or otherwise, can be utilized to control infections.

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Closed Loop System Synchronization of Quantum Dot Semiconductor Lasers with Optical Feedback

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ABSTRACT

In this work a systematic study on Close - Loop System occurring in the rout to chaos observing in integrated of quantum dot semiconductor lasers with optical feedback .The time delay of the feedback has been chosen in order to provide suitable condition for intermittent dynamics. The effect of long and short external cavity of QDSL on synchronization in a closed –loop system are studied under an enhancement factor of ($\alpha = 3.5$) value by solving the set of 6-rate equation.

Keywords: Close-loop system, Quantum dot, semiconductor laser, optical feedback, line width enhancement factor.

INTRODUCTION

Control of Chaotic synchronization in different dynamical systems has more interest attracted with potential applications on private communication ¹. Synchronization phenomena in Quantum Dot (QD) semiconductor laser chaotic has a good Subject of interesting by sensitive with optical feedback, and discrete energy for materials and low linewidth enhancement factor. This has motivated many studies, with expected benefits including elimination of lasers ². Transmitter and Receiver systems have optical feedback loops and this configuration is called a closed-loop system. on other word, two time delay on receiver laser. When another Transmitter and Receiver systems, receiver system does not have a feedback loop, transmitter laser have time delay coupling with receiver laser ,this asymmetric system is called an open-loop system. Two above system must have output a chaotic signal ³. Very small semiconductor particles with (2-10 nm) are called Quantum Dots (QDs), by confined electron and holes in all spatial dimensions ⁴. The idea of chaos synchronization between two nonlinear systems was proposed by (Pecora and Carroll), They used a Lorenz

system with three variables for the demonstration ⁵. Low threshold current density, high characteristic temperature and small linewidth enhancement factor (LEF) is the characteristic of quantum dot semiconductor laser (QDSL)⁶. Therefore, the synchronization scheme is called complete chaos synchronization and it is distinguished from generalized synchronization of chaotic oscillations ⁷. quantum dot (QD) nano structures used on telecommunication applications due to the carrier confinement in three dimensions ^{9,8}. Optical feedback is the carrier dynamics to be affects the output of QD laser ¹⁰ also optical injection ¹¹. When used with optoelectronic feedback circuits, QDSLs are more sensitive to time delay changes than other SLs ¹². Two different origins of synchronization in nonlinear delay differential systems, complete and generalized chaos synchronization. When receiver outputs a synchronized wave form immediately after it receives the transmitter signal, therefore there is a time lag between the two outputs, this system called generalized synchronization. Another type of chaos synchronization accrue when time lag is less than the signal transmission between the transmitter and receiver systems ¹³.

Rate equation of Quantum Dot Laser

In QD semiconductor devices, the carriers are first injected into a wetting layer before being captured into a dot at a capture rate that depends strongly on the dot population. The rate equations

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method, includes a set of at least three coupled equations; carrier density (N), photon density (E) and the other for the occupation probability (ρ). They are given in equations (1-3) shown below^{14,15}. Thus, rate equations that commonly describe carrier dynamics of QD materials read¹⁶

$$\frac{dE_{(T,R)}}{dt} = E_{(T,R)} \left(-\frac{1}{2t_s} + \frac{g_o v}{2} (2\rho_{(T,R)} - 1) \right) + \frac{\gamma}{2} E_{(T,R)} (t - \tau_{(T,R)}) + R_{sp} \quad (1)$$

$$\frac{d\rho_{(T,R)}}{dt} = -t_n \rho_{(T,R)} - g_o (2\rho_{(T,R)} - 1) |E_{(T,R)}|^2 + CN_{(T,R)}^2 (1 - \rho_{(T,R)}) \quad (2)$$

$$\frac{dN_{(T,R)}}{dt} = J_{(T,R)} - \frac{N_{(T,R)}}{t_d} - 2n_d CN_{(T,R)}^2 (1 - \rho_{(T,R)}) \quad (3)$$

where $N_{(T,R)}$ is the carrier density in the well for transmitter and receiver lasers, $E_{(T,R)}$ is the complex amplitude of the electric field for transmitter and receiver lasers, $\rho_{(T,R)}$ is the occupation probability in a dot for transmitter and receiver lasers, t_s is the photon lifetime; t_n and t_d are the carrier lifetime in the well and the dot, respectively; N_d is the two-dimensional density of dots; and $J_{(T,R)}$ is the pump. γ and τ describe the feedback level and delay time, where $\tau = 2L/c$ is the round trip time of light within the external cavity (L) and c velocity of light [15]. C is Auger carrier capture rate¹⁶. In this work we analyze theoretically, closed-loop system consist of two type of synchronization as complete and general for transmitter and receiver quantum dot semiconductor lasers with optical feedback. Same two laser on linewidth enhancement factor (equal to 4), current, time delay, and different on time delay between two lasers τ_c .

RESULTS AND DISCUSSION

the account both photon density, occupation probability, carrier number and attractor using the fourth-order Runge-Kutta numerical method and Matlab. Photon density of (QDSL) as a function of time when $\alpha = 3.5$, ($\tau = 14.7 ns$), photon density reach to ($2.8 \times 10^{20} m^{-2}$) and reduced to a chaotic behavior at steady state. Not periodic behavior for transmitter and receiver of (QDSL) and attractor between photon density of receiver laser and transmitter laser is clearly not periodic with general synchronization time series for photon density of transmitter and receiver (QDSL) laser

when $\alpha = 3.5$, ($\tau = 15 ns$), double quasiperiodic and chaotic quasiperiodic respectively. Attractor chaotic behavior double quasiperiodic and chaotic quasiperiodic respectively when $\alpha = 3.5$, ($\tau = 14.7 ns$), ($\tau = 15 ns$) respectively. For table (2) when time delay ($\tau_{T,R} = 19.5, 20, 26 ps$), irregular quasi periodic relation between photon density of quantum dot semiconductor lasers (transmitter and receiver), and quasi general synchronization. A different on time delay equal to (0.5 ps), after (6 ps) photon density is stable with periodic behavior, and good general synchronization. For long external cavity length, when time delay ($\tau_{T,R} = 300, 310, 320, 350 ps$) for transmitter and receiver QD lasers. a chaotic behavior on all values time delay with no synchronization except when ($\tau_{T,R} = 350 ps$), we obtained good complete synchronization. that is good results for application communication

CONCLUSION

The effect of time delay on Quantum Dot Semiconductor lasers with Optical Feedback dynamics are studied in this search with one value of Linewidth enhancement factor (3.5), critical behaviour of chaotic when short external cavity and crisis general synchronization. long external cavity determine critical behaviour of chaotic and good complete synchronization at ($\tau_{T,R} = 350 ps$).

Table 1. Parameters used in the calculation for QDSEL.

Definition	Symbol	Value	Units
Photon life time	ts	3.4	ps
Carrier life time well	t_n	1	ns
Electronic charge	q	1.6×10^{-19}	C
Carrier life time dot	t_d	1	ns
Linewidth enhancement factor	α	2 , 4	-
Velocity of light	c	3×10^8	m/sec
Spontaneous recombination factor		3×10^{-5}	-
Group velocity		7.14×10^9	cm/s
Confinement factor	Γ	0.03	-
Photon decay rate		5×10^{11}	Sec ⁻¹
Number of carrier at transparency		1.8×10^{18}	cm ⁻³
Effective gain factor	g_0	0.414×10^{-16}	
Density of Quantum Dot	N_d	2×10^{14}	cm ⁻³

Table 2. Time delay and stets of Synchronization.

Time delay (ps)	$ E_T ^2, E_R ^2$ with Time	Type of synchronization
19.5	Double periodic	Quasi general synchronization
20	Chaos	No synchronization
26	periodic	General synchronization
300	Chaos	No synchronization
310	Chaos	No synchronization
320	Chaos	No synchronization
350	Chaos	Complete synchronization

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Ethical Clearance: All experimental protocols were approved under the Laser Physics Department, Science College for Women, Babylon University, Hilla, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effectiveness of Tablets in Developing Teaching Skills at the University

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ABSTRACT

The study aimed to identify the effectiveness of tablets in the development of skills in the university teaching. The sample was selected in a descriptive way, from the University College of Imam al-Azam, and the number of the sample (23) teaching staff, trained and developed their teaching skills through tablets, was used to describe the phenomenon accurately and express it as a qualitative or quantitative expression and description of the devices tablet, display and identification of skills, a one-set experimental curriculum for the theme of the study, measuring the effectiveness of tablets in the development of skills, and used to collect data two tools: The first: The Test of tribal and post skills, of the type of choice of multiple and have been sure to believe The test and stability as well as the statistical analysis of its paragraphs, the second instrument of observation card and after legalization has been calculated its sincerity and consistency and applied to the sample. The statistical Packaging program for Social Sciences (SPSS) was used to conduct the appropriate statistical processes for research, including the equation: (kr-20), test (Wilcoxon) and test (v) for two mean-bound, and others.

Keywords: *Efficiency, Tablets, Teaching Skills.*

INTRODUCTION

The educational field of the present era has witnessed a clear progress in the field of technology coincided with the knowledge explosion and transformed the world into a small village, so the educational and educational techniques developed, to achieve the educational goals effectively according to the Standards and educational foundations ¹. During the current decade, there has been a major shift in technology in the classroom. Students now a day live in a world surrounded by laptops and mobile devices, today's generation of students is living in an age that requires digital literacy skills (Literacy Skills) which assists them in searching for information, testing and evaluating data with their fingertips. So, integrating technology into the classroom is not just a popular obsession, but also becoming a need for today's Society ²⁻⁴. In this sense, those interested in technological science and education have begun to devise ways to help both the teacher and the teaching staff in the planning,

implementation and evaluation of attitudes. Educational, and from these means interactive whiteboard ⁵ which is a hand-held device. Therefore, it is imperative that the teaching staff be actively trained in technological concepts and skills, so that they can play their critical role and have sufficient skills to provide their lectures electronically and using tablets effectively. To save time and effort, and organize lectures in an interactive electronic way that can be displayed in a variety of ways and at multiple times through tablets that encourage self-learning as well, and collaborate in making the educational environment more effective and give students a greater opportunity to interact with lectures and motivate them to participate actively and others. The main objective is how to manage and use information and harness it to raise the learner's efficiency in the face of present and future problems, enable him to face the challenge of mystery and surprises, and increase his ability to adapt the environment and the surroundings he lives in ⁶. According to the study ⁷: Previous studies lacked education based on the use of smart cellular applications, mobile devices and tablets carried by many learners, which can become the best way to teach students

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to be better used⁸. The rapid development of educational technologies and software has become effective tools and devices that provide ample opportunities for the university teaching staff in particular, the teacher and the instructor in general, to develop their teaching and training skills, and to strengthen the educational and educational process with the educational developments that can be employed And the investment of tablets to benefit from them.

METHODOLOGY

Includes Review of some of the previous symposia, conferences and studies related to the subject and dimensions of the study and the current study variables where the independent variable represents: tablets, and the dependent variable: developing skills in the university teaching. From what was called for to achieve the goal of the study, a series of actions were carried out in sequential steps: First the Experimental design: The choice of the experimental design suitable for the experimental study is necessary to arrive at answers to the hypotheses of the study, and has a prominent role in the experimental setting of the study, and serves as a broad lines for the implementation of the experiment and the planning of the circumstances and factors surrounding the problem closely and observation It follows closely⁹, adopting a descriptive approach to accurately describe the phenomenon and express it qualitatively or quantitatively, as well as the one-group experimental approach. Second The research community and its sample: The study community consists of all individuals, persons or objects who are the subject of the research problem¹⁰. The current research community is from the holistic Society of the Faculty of the Imam al-Azam University for the academic year (2017/2018) and the Human Resources section of the college was visited to obtain the number of teaching staff of both sexes (349). The sample of the research was made up of a random sample (23) of the total number of teaching staff for the academic year (2017/2018) and over three weeks. Third identification and preparation of research tools: (Cognitive testing, notes card). And presented to the specialized authorities. The first tool: building cognitive testing: The researcher prepared a test to measure the cognitive aspect of the effectiveness of tablets in the development of skills, and chose from the types of objective tests the type of choice of multiple. The number of paragraphs (50) Paragraph aimed at measuring skills in the university teaching and using

tablets, the test was presented to a group of experts and specialists in the curriculum and methods of teaching, measurement, evaluation and educational techniques, to benefit from their opinions and observations about it, and the amendments were made required by their guidance and observations. Eighty percent and more were adopted as criteria for the validity of the paragraphs, thus achieving virtual honesty. Internal consistency: The test was applied to the sample for calculating internal consistency, and then the degree of correlation of each test paragraph was calculated in the overall degree of the test, and table (1) shows the results obtained. Table (1) refers to the correlation coefficient values for the entire test paragraphs and is statistically significant; therefore, all paragraphs are appropriate to measure what they are developed for; the test is validated. The content of the course material trained by the teaching staff was analyzed when applying the experiment to its components, specifying the goal of the test to be achieved at the end of the course and determined the behavioral procedural objectives according to all levels of the Blum classification in the cognitive field, and then prepared the table of specifications according to the calculation The importance and relative weight of each level of cognitive objectives, so as to build the identified cognitive test of the type of multiple choice of the four alternatives, and formulas according to the objectives previously identified, the rules of preparation of the multiple choice test were taken into account when formulating test questions, and formulated The test instructions are briefly and clearly placed on the front of the test, then the content is validated. Table 2 shows the value of the stability coefficient and the overall average of the field. Table (2) shows the value of the stability factor for the five areas, and the overall stability factor of the instrument by finding the correlation coefficient between the observed performance scores, where the researcher used the card to evaluate the performance of the teaching staff in the initial lectures until they reached the final evaluation, and the coefficient was calculated The correlation between the grades observed with the initial observation and the final observation, the total value of the reliability coefficient of the note card (0.9063), and is a high persistence value. The general arithmetic mean of the domains is (2.23).

RESULTS AND DISCUSSION

Explains the results of the statistical operations showed the effectiveness of tablets where their use

has the positive effect in the development of skills in the university teaching, which may be due to: The tablets allow the teacher to rely on his skills in terms of interacting with them positively to benefit from them on the professional side which was born have fun at work made the lecture more dynamic. The difference between the before and after testing in favor of the dimensional test in the university teaching is more receptive and inclined to modern methods in the teaching process, born have more motivation to be able to skills related to tablets that have increased their eagerness to be able to have many skills. To answer the query question, how effective are tablets in developing the skills of the university teaching staff? This question was answered by testing the following two hypotheses: To verify the first hypothesis and states: there is a difference of D statistic at the level of statistical significance (0.05) between the mid-grades of the teaching staff in the experimental group in the tribal and postgraduate measurement to test the development of skills in the university teaching using tablets, in favor of dimensional measurement. It is therefore found that there is a statistically significant difference at the level of statistical significance (0.05) between the mid-grades of the teaching staff in the experimental group in the tribal and postgraduate measurements to test the skills development of the university teaching staff using tablets, for the benefit of dimensional measurement. To test the validity of this hypothesis, a statistical treatment was carried out using the Wilcoxon test (Wilcoxon) for two related samples to compare the degree of application of tribal and other tests in the development of teaching skills using tablet devices. The value of (z) calculated (8.79-) in the measurement of skills is less than the (z) tabular value of (17) at an indication level (0.05), one-party indication, and a sample (23), which shows that the teaching staff benefited greatly from the course

lectures. This may be because the lectures for the course concerned have helped to develop and improve skills and have enabled teaching staff to acquire new skills. This confirms the effectiveness of tablets in the development of skills and the development of educational process and this corresponds to many previous studies as in the study ¹¹⁻¹⁴: To verify the second hypothesis, it states: there is a difference of d at the statistical significance level (0.05) between the middle grades of the teaching staff in the experimental group in the tribal measurement and the follow-up of the note card including the development of skills in the university teaching using tablets for the benefit Dimensional measurement. To test the validity of this imposition, the value of (v) is calculated to denote the difference between the mid-grades of the teaching sample in the tribal and secondary measurements, using a two-intermediate test for the research sample, for the tribal and other applications for the results of the observation card where the value (t) calculated Reached (26.860) and is statistically function at (0.05) level and degree of freedom (34) This indicates the existence of statistically significant differences between the average grades of teachers in the results of the observation card, which indicates the development and high level of skills among university teaching staff in the use of tablets. The ultimate objective in the development of the educational and educational process. It resulted in: the course management skills of the tablets were well received by the study sample, with an average general arithmetic for the first field (2.33), and the second area: the skills of content management in tablets (1.98), and the third area: the skills of using hardware calendar tools The tablet got (2.47), and got the fourth area: the skills of using communication tools on tablets (2.25), and finally got the fifth area: the skills of using student management on tablets (2.13), while the overall average of the entire fields was good (2.23).

Table 1. Shows the results obtained, * * Function at level (0.05) * function at level (0.01)

Correlation coefficient	Paragraph	Correlation coefficient	Paragraph	Correlation coefficient	Paragraph	Correlation coefficient	Paragraph	Correlation coefficient	Paragraph
0.378**	41	0.377**	31	0.481**	21	0.294*	11	0.374**	1
0.295*	42	0.4**	32	0.291*	22	0.397**	12	0.391**	2
0.421**	43	0.374**	33	0.289*	23	0.402**	13	0.421**	3
0.291*	44	0.385**	34	0.39**	24	0.378**	14	0.388**	4
0.374**	45	0.375**	35	0.415**	25	0.291*	15	0.401**	5
0.378**	46	0.402**	36	0.294*	26	0.388**	16	0.415**	6
0.402**	47	0.378**	37	0.401**	27	0.385**	17	0.272*	7
0.291*	48	0.401**	38	0.388**	28	0.392**	19	0.279*	8
0.294*	49	0.413**	39	0.413**	29	0.29*	20	0.374**	9
0.397**	50	0.375**	40	0.391**	30	0.381**	18	0.288*	10

Table 2. Shows the value of the stability coefficient and the overall average of the field

Overall average	Stability Factor value	Areas	
2.33	0.9158	First area: Course management skills in tablets	1
1.98	0.8788	Second area: Content management skills in tablets	2
2.47	0.9379	Third area: skills of using calendar tools in tablets	3
2.25	0.9017	Forth area: Skills of using communication tools in devices	4
2.13	0.8977	Area 5: Skills of using student management in tablets	5
2.23	0.9063		The total stability coefficient value of the note card, and the overall average

CONCLUSION

The use of tablets to develop the skills of the university teaching staff has proven its effectiveness. The introduction of tablets is an effective way of does his rule the right to the education of an educated in cooperation, by raising the education of the learner in the subject matter and in a way that is not and his report the traditional pattern that He used it.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Basic Education/University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Using the Constructs of the Health Belief Model in Changing the Health Beliefs of Male Nurses about Testicular Self-Examinations

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ABSTRACT

A randomized controlled trial was used in this study, which was conducted at Al Hussein Medical City in Karbala. A random sample consisting of (80) nursing staff and males was selected. This sample was divided into two groups: the study group consisted of (40) nurses and a control group consisting of (40) nurses. A self-administration questionnaire was used for data collection and consisted of four parts: (a) demographic and social characteristics, (B) general health information; (c) identification of smoking behavior; and (d) measure of self-examination of test scores. The results of this study showed that there were significant differences between all concepts of the model of health beliefs related to tests of testicles (perceived readiness, perceived risk, perceived benefits, perceived obstacles, signs of doing work and self-efficacy) in all tests. In addition, there was a significant correlation between the perceived risk of testicular cancer and the perceived risk of testicular cancer in all tests. This study concluded that health education based on the model of health beliefs was effective in improving all the key concepts of the model of health beliefs.

Keywords: Health Belief Model, Testicular Self-Examination

INTRODUCTION

Cancer is a generic term for a wide range of diseases. Cancer is characterized by the growth from unnatural cells out of outlines that can then Piercing adjacent parts of the body or injuring the other (World Health Organization¹. Cancer causes one in eight deaths worldwide and is rapidly becoming a global pandemic (American Cancer Society [ACS], 2018). Because of the development and elderly in humans, the worldwide the burden is likely to grow to 21.7 million cancers new stats and 13 million death in cancer simply². 70% and more of all which deaths in cancer usually happened in low- and middle-income nation. This cities from expect have two-thirds new cases of carcinoma in the world. By 2050, approximately 14 million new cases will emerge compared to that in 2012 (Union for International Cancer Control [UICC], n.d.; World Health Organization³.

There are about 200 known types of cancer (UICC, n.d.), one of these is testicular cancer (TC). TC is the most common cancer and mainly affects in men 15-45 years of age. Without a identified way to avoid the illness, care giver specialists must encourage awareness and primary finding of TC⁴. Testicular tumors falls into two main types; seminoma which is a form of testicular cancer containing only one type of cancer cell. It is normally found in men between the ages of 30 and 60 years, but can happen at other ages. Whereas, non-seminoma germ cell tumor (NSGCT, often known as a non-seminoma) is made up of many different types of cancer cells grouped together. It is more common in younger men, most often between late teens and early 40⁵⁻⁷. Non-seminomas tend to grow and spread more quickly than seminomas⁵. One of the highest fears to well-being and wellness is TC among 15- 45-year-old in men. To encouraging awareness need to a intensive exertion in the literature, risk factors, and blocking procedures is warranted⁶. The lack of material distribution about the illness's occurrence, commonness, etiology, handling, and prevention procedures within the overall population

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contributes to a knowledge shortage concerning awareness and preventive behavior execution⁸. A hard lump in either testis is the usual symptom of testicular cancer. The lump is usually painless but in about one in 10 men, it is painful or tender. In a few men, constant backache, coughing or breathlessness, and enlarged or tender nipples may signal that the cancer has spread⁹. Early diagnosis is considered crucial in the successful treatment of TC. Testicular self-exam (TSE) is an important method to overcome the late-stage diagnosis of TC^{10,11}. TSE is a painless self-screening process, which is considered easy to learn and perform, and encourages males to take responsibility for their own health. TSE is vital in identifying early symptoms of testicular cancer when conducted properly by men in the high-risk group (15-44 years-old)¹². For men, monthly TSE, starting at puberty, is also an effective way of detecting testicular cancer at an early, and potentially curable, stage. TSE is not just a method to detect early stages of TC, but should be used to increase bodily self-awareness and raise informed decision-making (IDM) among men. By increasing IDM among men and making them further self-aware of their bodies, they may in turn feel more comfortable discussing men's health issues with others. This study aims to (1) determine the efficacy of the HBM-based health education in changing participants' health beliefs about performing testicular self-examination, (2) identify the association between participants' age and perceived susceptibility, perceived severity of developing testicular cancer, perceived benefits, barriers, cues to action, and self-efficacy of performing TSE.

MATERIALS AND METHOD

A Randomized Controlled Trial design was used to guide this study. In this study, a number of variables were examined to determine each subject's predisposition to adopt and commit to TS examinations including age, marital status, educational qualification and how many time doing TSE. The study population included male nurses who age 20–45-years who were recruited from The Imam Al-Hussein Medical City in Karbala City, Midwestern to Iraq. Sample and sampling. The Imam Al-Hussein Medical City hospital; a 400-beds hospital, was selected randomly through a simple random sampling procedure. All hospitals of the Karbala City were written in identical pieces of paper and put into a flask. These pieces were stirred well and then one of the colleagues drawn one piece. A probability systematic

random sampling method was used for selecting the study sample. The total number of nurses in this hospital is 780; of which, 260 male nurses. Of these 250, there are 225 who age between 20-45-years-old. The number of elements in the population $N = 80$ male nurses. Based on an effect size of 0.6, α error probability of 0.05, and a power of 0.80, the minimum required sample size for each group would be 36. The researcher distributed (100) copies of the study questionnaire to the accessible male nurses' with age between 20-45 years old. The returned questionnaires were 96 with a response rate of (96.0%). The number of incomplete copies was 14 which were later excluded. Thus, the final sample size $n = 40$ for each group. The list of all male nurses' aged between 22-45-years and holders of an associate and bachelor's degrees in nursing were selected. The first name was chosen randomly. This name was assigned into the study group and the next name was assigned into the control group. By dividing the population size by the desired sample size $225/40$, the result is 5.6 which means that every 6th nurse on the list would be included in one of the two groups. One of the researchers brought the nurses' names list and with a blinded eyes, the researcher put his finger on this list. The start point name was an odd on this list was assigned into the study group and next even name assigned into the control group. Every next 6th nurse; both odd and even, would be assigned into the corresponding group till getting the desired sample size. Study procedure. RCT was used in the present study with the use of pretest, posttest I, and posttest II. Both groups were pretested on February 1st, 2018. The intervention was implemented by introducing the health education materials (PowerPoint presentation and a booklet) that focused on all constructs of the HBM (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy) for the study group only on February 7th-8th, 2018. The posttest I was conducted on March 20th, 2018. The posttest II was conducted on April 30th, 2018.

Perceived susceptibility scale. The first construct is perceived susceptibility was used to measure the likelihood of getting TC. This scale is a 7-point Likert type scale that is composed of six items. These items were measured on a 7-point Likert scale. Responses on this scale range from 1 (Strongly Disagree) to 7 (Strongly Agree). The total scores range from 6 to 42 with a higher score indicating higher perceived susceptibility of developing TSE. This scale showed good internal

consistency (Cronbach's alpha is 85).

The perceived severity "seriousness" scale. The perceived severity "seriousness" scale was used to measure one's belief about the seriousness of contracting TC. This scale is a 7-point Likert type scale that is composed of 12 items. These items were measured on a 7-point Likert scale. Responses on this scale range from 1 (Strongly Disagree) to 7 (Strongly Agree). The total scores range from 12 to 84, with a higher score indicating higher perceived severity of the TC. This scale showed good internal consistency (Cronbach's alpha is 85).

The perceived benefits scale. The perceived benefits scale was used to measure one's an individual's assessment of the value or efficacy of taking TC screening. This scale is a 7-point Likert type scale that is composed of three items. These items were measured on a 7-point Likert scale. Responses on this scale range from 1 (Strongly Disagree) to 7 (Strongly Agree). The total scores range from 3 to 21, with a higher score indicating higher perceived value of performing the TSE. This scale showed good internal consistency (Cronbach's alpha is 75).

The perceived barriers scale. The perceived barriers scale was used to measure one's possible obstacles to taking TSE. This scale is a 7-point Likert type scale that is composed of eight items. These items were measured on a 7-point Likert scale. Responses on this scale range from 1 (Strongly Disagree) to 7 (Strongly Agree). The total scores range from 8 to 56, with a higher score indicating higher perceived barriers to performing the TSE. This scale showed good internal consistency (Cronbach's alpha is 85). A self-report questionnaire was used for data collection. Distributing questionnaires in person enables the SR to demonstrate the instructions before the participants start answering the questions. The estimated time range for each participant to complete the study questionnaire ranged between 15-30 minutes, to be reaffirmed by the pilot study. The data were represented by levels of measurement at the nominal

level for some of the demographic variables such as the marital status, smoking status, and performing TSE. While the ordinal level data will be collected to measure participants' educational qualification. Data collection was performed through the use of the study instrument and the application of health education materials. The age mean for participants in the study group is 31.2 ± 7.1 ; more than two-third were within the age group of (22-28) years-old ($n = 17$; 42.5%), followed by those who were within the age group of (36-42) years-old ($n = 14$; 35.0%), and those who were within the age group of (29-35) years-old ($n = 7$; 17.5%). For the control group, the age mean is 33.4 ± 6.1 ; two-fifth were within the age group of age group of (22-28) years-old ($n = 16$; 40.0%), followed by those who were within the age group of (29-35) years-old ($n = 15$; 37.5%), and those who were within the age group of (36-42) years-old ($n = 9$; 22.5%). Concerning the marital status, most in the study group were married ($n = 26$; 65.0%) compared to those who not married ($n = 14$; 35.0%). For the majority are married ($n = 32$; 80.0%) compared to those who are not married ($n = 8$; 20.0%). Regarding the educational qualification, more than a half in the study group hold an associate degree ($n = 22$; 55.0%) compared to those who hold a bachelor's degree ($n = 18$; 45.0%). For the control group, most hold an associate degree ($n = 24$; 60.0%) compared to those who hold a bachelor's degree ($n = 16$; 40.0%). There is statistically inverse correlation between participants' age and their Self-Efficacy of performing TSE ($r = -.500$; at $p\text{-value} < 0.01$). The values of the Perceived Susceptibility of contracting testicular cancer for the study group noticeably decrease by time (Pretest = 14.23, Posttest I = 51.47, Posttest II = 59.04). For the control group, such values slightly decrease by time (Pretest = 22.550, Posttest I = 22509, Posttest II = 22.15). The values of the Perceived Severity of testicular cancer for the study group noticeably decrease by time (Pretest = 39.37, Posttest I = 21.10, Posttest II = 9.88). For the control group, such values slightly decrease by time (Pretest = 33.85, Posttest I = 34.75, Posttest II = 35.65).

Table 1. Participants' Sociodemographic Characteristics

	Study (N = 40)		Control (N = 40)	
	Frequency	Percent	Frequency	Percent
Age: Mean (SD) (Study G.): 31.2 ± 7.1 Mean (SD) (Control G.): 33.4 ± 6.1				
22-28	17	42.5	16	40.0
29-35	7	17.5	15	37.5
36-42	14	35.0	9	22.5
Marital Status Upper lower class				
Not married	14	35.0	8	20.0
Married	26	65.0	32	80.0
Educational Qualification				
Associate degree (Diploma)	22	55.0	24	60.0
Bachelor's degree	18	45.0	16	40.0

Table 2. Correlations between Participants' Age and Study Variables in the Pretest Time

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Age	-											
2. Intention	.169	-										
3. Attitudes	.193	-.029	-									
4. Subjective Norms	-.133	.004	-.016	-								
5. Perceived Behavioral Control	.026	-.052	-.034	.224	-							
6. Perceived Susceptibility	.309	-.149	.048	-.026	-.059	-						
7. Perceived Severity	-.113	-.014	-.099	-.109	-.316*	-.170	-					
8. Perceived Benefits	-.138	-.334*	.111	.068	-.013	.047	.178	-				
9. Perceived Barriers	-.243	-.105	.208	-.084	-.031	.016	-.197	-.013	-			
10. Health Motivation	-.037	-.083	.084	.126	.022	-.226	.147	.141	.234	-		
11. Cues to Action	.028	-.125	.316*	-.174	.046	-.030	.022	-.058	-.009	-.195	-	
12. Self-Efficacy	-.500**	-.395*	-.265	-.029	-.128	-.169	.285	.292	.163	.135	.090	-

Table 3. Descriptive Statistics for the Values of the Perceived Susceptibility over Time

Self-Efficacy	Mean	Std. Deviation	N
Study Pretest	14.23	11.245	70
Study Posttest I	8.20	12.527	70
Study Posttest II	7.10	14.514	70
Control Pretest	22.550	6.530	69
Control Posttest I	22.50	8.105	69
Control Posttest II	22.15	7.337	69

Table 4. Descriptive Statistics for the Values of the Perceived Severity over Time

Perceived Severity	Mean	Std. Deviation	N
Study Pretest	39.73	11.245	70
Study Posttest I	21.10	12.527	70
Study Posttest II	9.88	14.514	70
Control Pretest	33.85	6.530	69
Control Posttest I	34.75	8.105	69
Control Posttest II	35.65	7.337	69

CONCLUSION

The HBM-based health education positively influenced participants' perceived susceptibility of contracting TC, the perceived severity of TC, the perceived Benefits of performing TSE, and the Perceived Barriers to perform TSE.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Karbala Health Directorate, High Vocational Health Institute, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of Polytechnic (Applied) Theory in the Development of Information Processing Methods among Secondary School Students

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ABSTRACT

The objective of the research is to identify the effectiveness of the Polytechnic theory in the development of the information processing methods of the secondary students. To achieve the goal, the zero hypothesis was established. That assumes there is no statistically significant difference at significance level (0.05) between the average scores of the experimental group who will study according to the strategies of the Polytechnic Theory And the average score of the control group who will study according to the usual method in the scale of information processing methods, and to verify them, the experiment was implemented in the second semester of the academic year (2017-2018), The study sample consisted of (64) fourth grade students in the Al-Jihad preparatory school. The two groups were equalized in the following variables: The chronological age, IQ test scores, the scale of information processing methods built by Badran (2000) was used and the experiment lasted 8 weeks. At the end of the experiment, a scale was applied to the two groups. The results were then analyzed and showed that the students of the experimental group were superior to the control group who studied in the usual way.

Keywords: *Polytechnic theory, information processing methods, secondary stage.*

INTRODUCTION

The human mind is a distinctive and important creature of man and without it, man can't follow his life properly and make the right decisions. As the mind works and thinks in orderly steps. The mind first observes the information, when specific information is mentioned, then the brain notice it, the observation may be by voice or image, after observation, the brain preserves the observation and it is concentrated in the brain in short-term memory. Then the brain begins to analyze the observation, and the brain may produce certain information through this observation then stores it in the long-term memory. The subconscious mind affects the behavior of the brain, and subconsciously stores information and transmits it to habits and behaviors over time, which leads to the human

acquisition of new actions without notice. In the case of human exposure to the problem, man identifies the problem and then analyzes it to determine its results, then looking for suitable solutions, possible and fast-acting, and if appropriate solutions are found, it is implemented immediately to resolve the problem, this is called information processing ¹. The interest in learning methods is a form of information processing that has appeared in many research and studies under multiple names such as learning how to learn, knowing how to identify, knowing how to remember, mental skills training, memory enhancement strategies, and strategies for cognitive preference ². These concepts all refer to the individual's way of thinking and his way of understanding, remembering and cognition, which is based on formulas of information classification, composition, analysis, storage and retrieval when necessary, these processes are practiced by the individual in his daily dealings with the information and the study material and contribute to the development of the individual's perception and skills and achieve excellence and high achievement ³. It is considered that the individual is capable of handling,

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processing, storing and retrieving the information and the processes used in this are processes that take place within the mind before the response is issued, in the form of cognition, thinking and solving the problems of individual processing of information⁴. The present research aims to identify the effectiveness of the applied polytechnic theory in the development of information processing methods among secondary school students.

METHODOLOGY

It includes an overview of the procedures that have been carried out to achieve the research objectives, starting with the research methodology, experimental design, defining the research population and its sample, and the equivalence of the research groups (experimental and control), preparation of research materials and tools, procedures for applying the experiment and presentation of the statistical means used, and will be presented as follows: The researcher followed the experimental method to know: (The effectiveness of the Polytechnic theory in the development of information processing methods among secondary school students) because it is the appropriate approach to the nature of research, and represents one of the scientific research methods used in educational and psychological research.

The Experimental Design:

The researcher chose the partial control experimental design, because it is more suitable for his research procedures.

Research Population

The current research population represents fifth-grade students in the secondary day school for boys in the center of Babil province for the academic year (2017 - 2018). To choose the sample of schools, the researcher visited the General Directorate of education for Babil province under the book issued by the University of Babylon – Appendix No. (1), to identify the names of preparatory and secondary schools for boys only affiliated to them, which lies within the boundaries of the center of the province of Babylon.

Research Sample

The preparatory school for boys was selected in the center of Babil province in order to conduct the research. It was found that it consists of four divisions of the fourth scientific grade (A and B). A random sampling method

(The lottery method) was used to choose the class (A) which have (32) students to represent the experimental group, and they will study according to (Polytechnic theory strategies), and in the same way was randomly chosen class (B) to represent the control group which have (32) students who will study according to (the usual method).

Research Group Parity

The researcher conducted a statistical equivalence between the experimental and control groups in some variables that affect the results of the experiment. Despite that the researcher chose the two groups in the random lottery method, although the students of the research sample are from a very similar social and economic community and study in one school, the equivalence of the following variables was done: (the time age calculated by months, the first semester grades, and the IQ test). The researcher performed the equivalence between the two research groups in the variables mentioned above. And the results are shown in Table (1).

Preparing Research Requirements

The research requirements are the basic elements upon which the research is carried out, according to which the research procedures are continued. These requirements are as follows: (The scientific material (content): The scientific material that the researcher should teach to the students of the two research groups during the period of the experiment (second semester) for the academic year (2017-2018) was selected. The scientific material included chapters (4th, 5th, 6th) The researcher has prepared 16 plans for the experimental group that is taught according to the strategies of the Polytechnic Theory and the same for the control group which is taught according to the usual method.

Statistical Analysis of Scale Paragraphs

The analysis of paragraphs is defined as a study of evaluating their effectiveness through the students' response to each of the scales. The aim of this procedure is to keep the good paragraphs in the scale⁵. In order to verify the analysis of the paragraphs statistically, the scale was applied to the survey sample. After applying the scale, the researcher extracted the following:

Distinction strength of paragraphs

The primary objective of calculating the distinction

strength of paragraphs is to exclude paragraphs that do not distinguish between the examinees and to retain those that distinguish them. Therefore, the researcher marked the answer of the students and determined the total score obtained by each student in the scale, and then arranged grades from the highest to lowest grade, and chose (27%) of the highest grades and (27%) of the lower grades to represent the two extreme groups and to calculate the coefficient of discrimination between the groups paragraphs scores (upper and lower), the T-test was then used for two independent samples to extract the difference between the mean of the upper and lower groups in each paragraph of the scale, the results showed that all calculated (t) values were higher than the tabulated value of (2,000) at the significance level (0,05) and the degree of freedom (52).

The paragraph relating to the total degree of the scale

Since the discriminatory strength of paragraphs does not determine their homogeneity in the measurement of the phenomenon need to be measured, there may be similar paragraphs in their discriminatory strength but they measure different behavioral dimensions⁶. Therefore, the researcher found the relationship of each scale paragraph to the total degree and found that all Pearson correlation coefficient values were higher than the tabulated correlation coefficients which were (0,113) at statistical significance level (0,05) and degree of freedom (99).

Psychometric Characteristics

All the psychometric characteristics of the scale (honesty, stability) were extracted, as follows:

The structural honesty of the scale: Honesty is one of the psychometric characteristics that reveal the extent to which the scale achieved the purpose for which it was prepared. Anastasi believes that honesty is positional because it is calculated from the grades when applied to the sample of students, which is relative rather than absolute (Anastasi & Urbina, 2010: 115). This kind of honesty has been achieved by extracting two indicators: the distinction strength and the relationship of the paragraph to the overall degree.

Stability refers to the accuracy and consistency of an individual's performance, and also to the stability of results over time (Anastasi & Urbina, 2010: 142). By

calculating the stability coefficient of the scale using the general equation of Vaccronbach, the stability coefficient was (0.73), thus the test became ready for implementation.

Extracting test paragraphs

The paragraphs of the achievement test were formulated in its preliminary form in the light of the test map, the researcher chose the type of test (multiple choice) which is one of the best objective tests. The test consisted of (40) test paragraphs, which were distributed on the Blooms cognitive levels (knowledge, understanding, application, analysis, composition, rectification) from the Physics book.

Test instructions

Specific instructions and guidance were written on how to answer (choosing one correct alternative to the paragraph, answering all paragraphs, answer time, typing full name, grade, and class in the assigned space).

The honesty of the test

The honesty of the test has been verified and content certified, the results showed that the apparent honesty obtained the proportion of agreement (80%) by the arbitrators and specialists, as for the validity of the content, the results showed that all the items of the achievement test are statistically significant, so the achievement test is honest in measuring the comprehension of the fourth grade students in physics.

Statistical Methods

The researcher used the t-test for two independent samples to make the parity between the experimental and control groups. The Pearson correlation equation was used to correct the correlation coefficient between the test segments (even and odd scores) after the Pearson correlation coefficient was calculated.

RESULTS AND DISCUSSION

The search results are presented according to the sequence of its hypotheses as follows: To identify the significant difference between the instantaneous achievement scores of the experimental and control groups. The t-test was used for two independent samples, and the difference was statistically significant at significance level (0.05) with a degree of freedom (58). The calculated t-value was (6.09) which is

greater than the tabulated t value (2) as illustrated in table (2). Thus the first zero-hypothesis was rejected. To determine the significant difference between the mean scores of the information processing methods for the experimental and control groups, the t-test was used for two independent samples. The difference was statistically significant at (0.05) with a degree of freedom (58), where the calculated (T-value) was greater than the tabular value (2), as illustrated in Table (3). Thus the second zero-hypothesis was rejected. It can be said with 95% confidence that there is an ability to solve problems in the experimental group compared to students of the control group. This indicates that there is a clear effect of the Polytechnic theory strategies in teaching students of the experimental group the scientific thinking skills compared to students of the control group. The researcher found that these results were due to effectiveness of the Polytechnic theory, as it turned out that he contributed in teaching the students of the experimental group the skills of scientific thinking, and contributed in raising the level of their academic achievement as the achievement of the experimental group was better than the achievement of control group with a statistical difference. It is clear from the results of this research that the students of the

experimental group used the higher thinking processes during the analysis, synthesis and evaluation of Bloom classification and interpretation and experimentation as well as stimulate their motivation and eager to learn the skills of scientific thinking through diversity in the use of teaching methods appropriate to the teaching plans and the use of activities and teaching aids with feedback and enhancement. As well as the clarity of behavioral purposes at the beginning of the educational material as the students of the experimental group have studied the material in an unusual way they have been subjected to several positions included in the strategies of the of Polytechnic theory, For example, when teaching predictive skill to students, the researcher gives students a number of questions that measure their ability to predict after learning this skill. This leads to the organization of students' efforts towards completing the educational tasks and makes the educational process more effective and successful, and easier for both the researcher and the student. All these are positive indicators to reach the objectives of the strategies of Polytechnic theory in raising the level of achievement of students and enhance the educational - learning process.

Table 1. The equivalence between the two research groups

Variable	Group	Sample Number	Arithmetic Mean	S.D.	D.F.	T-Value		Sig. level
						Calculated	Tabulated	
Age in months	Experimental	32	171.486	12.258	68	0.997	2	Not statistically significant
	Control	32	174.943	16.451				
First Semester Grades	Experimental	32	54.657	16.916				
	Control	32	53.885	15.657				
IQ Test	Experimental	32	27.771	7.814		0.758		
	Control	32	29.143	7.277				

Table 2. T-value of the achievement test for the experimental and control groups in physics.

Group	Number of individuals	Arithmetic Mean	Variance	D.F.	T-Value		Sig.
					Calculated	Tabulated	
Experimental	32	81.6	45.15	58	6.09	2	Sig. at level 0.05
Control	32	68,2	102,61				

Table 3. T-value of the problem-solving test for the experimental and control groups (for two independent samples).

Group	Number of individuals	Arithmetic Mean	Variance	D.F	T-Value		Sig.
					Calculated	Tabulated	
Experimental	32	51.86	28.30	58	7.98	2	Sig. at level 0.05
Control	32	39.56	44.35				

CONCLUSION

Teaching using the strategies of Polytechnic theory created in students the skills of critical thinking rather than the use of traditional questions in physics. Teaching using the strategies of Polytechnic theory has increased the development of students' abilities to understand, criticism, analyze and interpret. Teaching using polytechnic theory strategies helps students to make the right decisions.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Cloud Platform Specification based on Bioinformatics Application

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ABSTRACT

Cloud computing technologies are evolving as a good solutions to bioinformatics problems, There are today many applications within the field of Cloud-based services in bioinformatics such as: DaaS, SaaS, PaaS and IaaS referring to Data, Software, Platform and Infrastructure as a Service respectively These services were developed based on cloud platform by the big enterprises ,. This paper, will provide the specification and field of application of the such platforms as : (google genomics), Cloud Genomics, Genomics API, and Map Reduce with correlated software such as hadoop and presents a number of existing software solutions in bioinformatics domain that use the Map Reduce programming mode to enable their application and incorporation as a graphical workflow engine. Such engine allows these results to be easily grouped together and eases the advance of open-ended analyses and encourages its. The researchers `` in Cloud genomics application like Cancer and Autism, then, present new recommendations for developing the performance of bioinformatics filed.

Keywords: Cloud Computing, bioinformatics, Google genomics, Genomics API, Cloud Services, CloudGene.

INTRODUCTION

Bioinformatics tools are becoming much easier to use. Research have been done dealing with large sequencing of data without time delay ¹. On-demand and pay-as-go Cloud computing model has been used to provide dynamic computing resources for construction of physical systems without commitment or upfront costs. Cloud computing are generally used for data analysis with parallel processing tools, such as Apache Hadoop and MapReduce (a programming model consisting of map and reduce. functions that is applied in Apache Hadoop to process large data sets in parallel¹³. Bioinformatics applications have broadly implemented cloud computing with Hadoop to manage large genomic data and to perform data analysis, one of the challenges in such research is how to

understand and share the analysis processes results with others⁴. The following sections show some interesting applications of bioinformatics in cloud computing and parallel applications, (i.e. Google Cloud Platform (Google genomics), Cloud Genomics API, Map Reduce framework,) and give a case study of each application with real examples. In 1970 the term bioinformatics was invented by P. Hogeweg and B. Hesber to designate investigation of data and information processing in biotic frameworks ⁵. Bioinformatics is new discipline to collect, store, break down, analyze and incorporate natural biological and hereditary genetics data by using computer science concepts ⁶. Bioinformatics studies biology in the form of atoms or molecules and utilizes “informatics methods” used in computer science, mathematics, and statistics. The aim is to understand and sort out the related information ⁷. The objective of bioinformatics is to build an understanding of the natural biological procedures and explores the integration of subatomic science or molecular biology with computer technology. Simply put, one can say that Understanding the relationship between genetics and disease is essential

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in biomedical research. Empowered by progressively economical next-generation sequencing technologies, many projects have tried to describe variations within and across populations and disease cohorts. Cloud computing represents a drive away from applications installed on local computer towards applications hosted online. The “cloud” refers to the Internet, the name was inspired by flow charts and diagrams that use often a cloud symbol to represent the Internet.) . Large comparative genomics studies and tools are becoming more compute-expensive as the number of available genome sequences rise. This reflects on the capacity and cost of local computing infrastructures which are likely to become unaffordable with the increase, especially as the breadth of questions increases ^{10,11}. Cloud computing environments relief this pressure and support fast, broad, and economical comparative genomics strategies.

MATERIALS AND METHOD

Bioinformatics Google genomics Applications

Google cloud platform is part of google infrastructure, it supports YouTube that can handle three hundreds 300 hrs. of video every minute and Google search which returns search results in quarter of a second with search index that is over a hundred petabytes 100pb in sites. To translate that on genomics It means data from 6 whole genome sequencing uploaded to Google servers every minute where google can both index and search the evolving of a million-whole genomic on sequences ^{14,15}. There is increasing acknowledgement on the importance of cloud computing for genomics data analysis. It allows the use of public cloud resources for storing, accessing, sharing and analysis of genomic data. Parallely there is evidence at the life scientist’s community that cloud based genomic data analysis is the future. Recent articles showing features that are cheaper faster and more flexible on the cloud computing resources compared to local data sets ¹⁵. Google cloud platform resources are even sited as key public cloud computing resource and are lately used by publicly

Case study: Google genomics in Google Cloud Platform

This case study explains how Google Genomics can help store, process, explore, and share genomic data either own or massive shared datasets, like TCGA or Autism project. It discusses why Google is interested in genome data, how Cloud Platform works, the GATK

pipeline, and other examples of how the service is being used. The volume of genomics information is increasing rapidly, the magnitude of genomic data will double every year to reach a billion genomes by 2025 ¹⁶. All this Huge data magnitude will not be useful unless scientists can manage to extract clinical meaning from it .One will need to study row data using right analytical reading methods from data mining ,novel algorithms to the virtualization and machine learning As scientist scale up their studies and begin question thousands and soon millions of genomes , they will need to have a scalable technologies to manipulate ,analyze and interpret enormous data sets without the time and cost for moving that data from place to place . Google genomics that is built on Google cloud platform intends to help organize the world genomic information and make it available and useful Google cloud platform offers both infrastructures services and platform as a service. It also builds a unique genomics API that controls many genomics specific features. One can choose which service (infrastructure or platforms) One wants and genomics specific features as content - aware storage and access via web API that implement the GA4G (global alliance of genomics and health specifications.

Bioinformatics MapReduce Applications

MapReduce designates a programming framework that supports distributed and parallel processing on large data sets. MapReduce involves two distinct tasks – Map and Reduce ^{17,18}. The reducer phase takes place after the mapper phase, where a block of data is read and processed has been completed. To produce key-value pairs as intermediate outputs. The Mapper’s (key-value pairs) output is the Reducer’s input [19]. After the reducer gets the key-value pair from numerous map jobs. it aggregates those into a smaller set of tuples or key-value pairs that constitutes the final output.

Case study: MapReduce Bioinformatics using CloudGene and Cloudman

In Spite of the clear potential of the MapReduce model and the existence of bioinformatic algorithms and applications, they are yet not widely implemented in the bioinformatics data analysis. The Hadoop MapReduce model represents a simple framework for data parallelism. This is done by providing an automated runtime retrieval (both for failures in task runtime and hardware) and implicit scalability (automatic running of parallel batch

mode tasks). Two prior conditions for wider adoption and higher utilization of MapReduce tools were found by us: Easing the technicalities composing multiple existing MapReduce tools. Providing easy access to the compute infrastructure and environment. Satisfying these requirements would allow bioinformatics experts to concentrate on the analysis while the required technical details are unseen. two platforms were presented:

CloudGene: a MapReduce tool execution platform leveraging Hadoop,

Cloudman: a cloud resource manager.

These two platforms have been combined and extended to provide an available accessible Hadoop based bioinformatics Cloud environment. CloudGene, other than integrating random MapReduce tools to perform an analysis, has been developed as a two dedicated services job execution engine: an imputation service developed jointly with the Center for Statistical Genetics, University of Michigan (can be found at mputationserver.sph.umich.edu) and a mtDNA analysis service (can be found at mtdnaserver.uibk.ac.at). Cloudman is a system generating the cluster in the cloud .and allows access to the cluster in the cloud by everyone. It is known for automatically setting Galaxy on the cloud infrastructure and supporting various cloud infrastructure such as Demonstrate web services OpenStack. Scientists using Cloudman can share instances for collaboration. A scalable processing and analyzing of large datasets is enabled by The MapReduce framework by distributing the computational load on connected computer nodes, referred to as a cluster this can store data and relaunch it later . Cloudman is Used in several infrastructures, it is used in the Amazon cloud AWS (since 2010) , also Australian cloud Necter(since 2012) and there is also a big project (2015) called The Jetstream and EGI engage H2020 project . The CloudGene objective is to establish a consistent graphical execution environment for the MapReduce programs, that can be integrated by using its plug-in interface. Users can upload own version of Galaxy on the cloud using the playbook + Packer and build images using different infrastructures.

RESULTS AND DISCUSSION

How to support scientists when using MapReduce programs by simplifying the execution of MapReduce programs including data management and simplifying access to a working MapReduce cluster and maintaining

data sensitivity. MapReduce: Simplified Data Processing on Large Clusters: CloudGene is a framework to build Software As A Service (SaaS) platforms for data analysis pipelines. By connecting command line programs, scripts or Hadoop applications to CloudGene, a powerful web application can be created within minutes. CloudGene supports the complete workflow including data transfer, program execution and data export. Finally we found that CloudGene + Cloudman have Similar ideas but different context.

Genome VIP: Genome Variant Investigation Platform (Genome VIP):

a system for performing variant discovery, annotation, and interpretation using cloud resources. Its intuitive, lightweight web interface enables users to detect genomic variants (single- and multinucleated variants, short insertions and deletions [indels], complex indels, and structural alterations that include translocations, inversions, and tandem duplications) in whole-genome or exome sequence alignment files (BAMs) ²¹. Genome VIP is a ,multiuser open-source and cloud-aware platform .It contains a web interface to perform; discovery, annotation, and interpretation of genomic variation, using cloud- or local high-performance computing infrastructure.

Genome VIP has been used for genomic analysis in large-data projects such as:

The Cancer Genome Atlas (TCGA) Pan Can Atlas :

- The International Cancer Genome Consortium (ICGC) Pilots:
- CPTAC
- ICGC-TCGA DREAM Challenges:
- the 1000 Genomes SV
- UK10K

Genome VIP Architecture

- The functionality of Genome VIP is provided through management of three central components:
- the user's web browser,
- the Genome VIP server

- a cloud-computing resource.

Genome VIP three components (web browser, server host, cloud) are coordinated by:

- Scripting languages (blue) and cloud toolkits (green).
- Interactive web pages, written in HTML (with CSS elements) and JavaScript, provide front-end functionality.
- jQuery is a JavaScript library providing methods to modify web page content with cross-browser compatibility.

Server-side PHP modules utilize Star Cluster and S3 Tools cloud toolkits to access.

Case Study: Genome VIP

EC2 Compute (gray) and storage resources (yellow) in the cloud. Genome VIP creates within EC2 a virtual cluster, based on a machine image with preinstalled variant detection tools and supports software (collectively, “Genomics Tools”) (red), that can access sequence data on S3 and EBS (Elastic Block Storage) resources (yellow). Secure channels using [HTTPS](#) and secure shell (SSH) protocols allow communication between various components.

Result of Genome VIP’s case study

Genome VIP’s provides high-confidence annotated somatic, germline, and de novo variants of possible biological implication using publicly available data sets. Users can direct Genome VIP to perform these tasks by selecting software from its palette of widely used bioinformatics tools and can specify provided best-practices discovery tool parameter sets or design a custom “execution profile” by adjusting the controls online or uploading parameters through the web interface. Genome VIP’s design brings powerful cloud resources to bear for task-specific bioinformatics analyses without any special cloud know-how required by the investigator. Genome VIP provides flexibility for use by computational biologist power users as well as by users having expert knowledge or research needs. Its design and operational aspects aim to promote the reproducibility, transparency, and uniformity of the processing of genomic data. Although we focused on Genome VIP’s cloud capability, it runs equivalently on

local high-performance computing clusters with local data with preinstalled versions of the named tools. The design and implementation of Genome VIP and its usage for modern, high sample count cancer genomics and human genetics research also serves as a starting point for integration of additional tools and capabilities and expansion to other cloud-computing platforms. The main analyzed in the paper concerns; privacy and security issues (e.g. integrity, confidentiality, authenticity, accountability, audit, on-repudiation, anonymity, unlikability), Economic opportunities, Legal aspects (e.g. the US Health Insurance Portability and Accountability Act (HIPAA) limits companies from disclosing personal health data to third parties , while the Canadian Personal Information Protection and Electronic Documents Act (PIPEDA) prohibits organizations to collect, use, or disclose personal information in commercial activities). Clouds services and Map Reduce flexibility promotes them to become the preferred approaches in the near future . MapReduce offers; higher level interface and less user’s explicit control of the parallelism, the ability to handle large data sets, the concept of computation to data moving, and cloud technologies better quality of service simplify the implementation compared to traditional systems.

CONCLUSION

Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet. Users need not have knowledge of, expertise in, or control over the technology infrastructure in the “cloud” that supports them. Cloud computing technologies are emerging as solid and economical solutions to high performance computing. To date, these technologies have had a partial impact on comparative genomics. In this paper; the deployment of a popular comparative genomics tools is discussed. We found that in spite of the confusion that exists regarding the definition of the cloud, IT managers are deploying cloud computing initiatives aggressively to achieve bioinformatics objectives.

Financial Disclosure: There is no financial disclosure.

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Effect of Strategy of “Plan” in Correcting Wrong Geographical Concepts and Commuting the Exam Concern of Literary 5th Level’s Student

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ABSTRACT

The term concern comes from Latin word “Anxietes” that means a turbulence in the mind which is a psychiatric condition known in the past as a worry and sadness that hurt the human psychologically and physically, concern is a kind of tense that attack the individual because interference of many factors that lead to inability of required performance for his works and duties beside reluctance in ensuring his necessary needs easily, concern may leads to worseness in efficiency of social activities of the patient in response to these requirements in his ambient and weakness of his ability in keep promises, theories were in contrast to explain concern, Freud sees that the reason of concern is the existed ideas in daily life, and expectation of penalty as a result to express prohibited desires or any banned motives also he sees that the roots of concern that hit the human are attributed to early childhood period of his life, the test’s concern or as it is sometimes called as fear from exam (it is a psychiatric condition that a category of students have suffered from in different level of educations , elementary, secondary and university).

Keyword: PLAN, STRATEGY, EFFECT

INTRODUCTION

Education is considered a an active social process that helps the community to preserve requirements of it’s existence and continuity that is via education’s active role which interprets philosophy of society into concepts and skills the individual can earn, it also strives toward achieving a balanced growth for individual in all mental, physical and sensual sides. So, countries, according to their development level, give tremendous importance for those who are in charge of education and breeding ¹. Education is the tool of teaching in achieving it’s aims through teaching the individual, developing him to be able to adapt and interact positively with environmental, natural and social influences and feel matching and durability. Since curriculum is a part of educational process, then it is a means to achieve education’s goals,

as it helps students on comprehensive growth in (trends, directions, needs, problems, capabilities and readiness) that lead to happening of changes in their behaviors positively, curriculum represents every study, activity or experience earned by learner under supervision and direction inside or outside the classroom ². While teacher plays important role building cultures, societies and inherited factors of educational process and interact with learner and earns this interactin (trends, skills, knowledge and values) , teachers in the prospects of developed communities is not mere an eradication eraser and a teacher of sciences, knowledge and values but a countries and nations maker to make a progress in all fields ³. Successful teacher is that one who has a wide knowledge in strategies of teaching methods and it’s different styles and he can use them and join between them easily and flexibility to achieve teaching goals and realize very well that real test to his success in teaching is not about what he knows but what students learn ⁴. Geography is considered one of the eldest branch of social branches and a major corner because it concerns studying relation between human and natural environment, styles of his interaction with land and

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environment and influences of that interaction, that is why geography collect between the two sides natural and human ⁵. In addition, most distinctive features of this word is the rapid advancement of technology that includes all life fields, notably the field of education, many direction have appeared that call for research and investigate of teaching styles that increase effectiveness of educational process and its ability, field of education has witnessed a vast concern over all levels of local, Arabian and international levels, also it witnessed continuous and fast development like scientific and technological revolution, cognitive explosion, emerging of modern educational techniques, methods of teaching, teaching tools, hence a big aspiration toward making curriculums matching to nature of era, and education is obliged to change it's classic and limited curriculums, develop and modify it's programs and it's plans and styles to be a proper preparing process and comprehensive for present and future. Education is considered an active social process that help community to preserve it's basic requirements of existence and continuity via it's active role in interpreting the philosophy of society into concepts and skills which any individual can get, also aspires toward achieving a balanced growth for him in all his mental, physical and sensual sides, that is why countries endeavor to give big importance to those who work in this field of education and teaching up to their level of development and technology. Education develops with development of human communities, it's heritage and extent of spreading, many fields and specializations have been emerged nowadays were not known in the past, so it is mandatory to catch the quality and quantity of development and humanitarian knowledge, education poses one of humanitarian appearances, it is a real practice of ideas and concepts have features , phenomena, reasons, results, origins and methods may be clear or not clear in another times, it's basis has humanitarian nature depends upon the ability of an instinctual ability of an individual for psychiatric and social adaptation. The current research aims to know (Effect Of Strategy Of "Plan" In Correcting Wrong Geographical Concepts And Commuting The Exam Concern Of Literary 5th Level's Student). There aren't differences with statistical evidences on level (0.05) between average marks of experimental group's students that study according to strategy of "PLAN" and controlling group's students who study up to the ordinary method.

METHODOLOGY

The researcher considered the experimental method, because it is the most accurate one where the researcher takes a neutral position against the phenomena, and adjusts all variables that he considers that they influence over his research's results but one research that is intended to study it's effect over the experiment ⁶. The researcher followed the procedures that ensure achieving the two aims of research, and verifying the two hypotheses that he applied, these procedures included two stages, first one was called diagnosing which the researcher tries to explore wrong geographical concepts for literary 5th grade's students. While the second stage was called therapeutically stage through which the researcher intends to use strategy of "Plan" to correct the wrong concept for the main research's sample in the geographical concepts in geography material for 5th literary stage's students. The researcher depends on experimental design of partial adjusting for the two equivalent group's experimental and controlling ones

RESULTS AND DISCUSSION

After finishing the experiment of research according to steps and procedures were mentioned in the 3rd chapter, in this chapter, researcher will show results that he came up with up to their target and hypothesis via balancing between grade averages of students of two groups of research in testing the outcomes (therapeutically) applied at the end of experiment to measure (correcting geographical wrong concepts) and discussing the results as follows: (There are no differences with statistical evidences on level (0.05) between average degrees of two groups (experimental and controlling groups in the after test) in correcting wrong geographical concepts). After correcting answers of two groups students of test items of correcting wrong concepts, results showed that mathematic average for total degrees done by experimental groups is (39,533) degree, criteria deviation was (5.4266), mathematic average of total degrees got by controlling group students (33,733) degree, criteria deviation (6,5214), to find out the mathematic difference evidence for these averages ,the researcher used (t-test) for two independent samples. From table (1) we can find the calculated "t" value which is (3,763) is more than tabulated "t" value that is (2,001) at evidence level of (0.005)and freedom degree of (58) which refers to a difference with a statistical evidence between degree average of the two group's students for

the behalf of experimental group, based on that, zero theory is neglected and accept the replacement theory that states on (there is a statistical evidence difference between average degree of experimental group's students who studied according to the pattern of Driver and average degree of controlling group's students who

study by the ordinary method in the after-test results for correcting the wrong concepts of geography. Result of current study comes similar to some previous studies that showed preceding of strategy of "Plan" over the ordinary method.

Table 1. Evidence of difference between average of degrees for correcting wrong concepts of geography for two groups (controlling and experimental).

	Average	Deviation	Contrast	Two (t) values		Temp.	The statistical evidence
				Calculated	Tabulated		
30	39.533	5.4266	29.448	3.763	2.001	58	
30	33.733	6.5214	42.528				

CONCLUSION

In the shed of research's results, the researcher has come up with some conclusions represented by the following: There are many wrong concepts for 5th grade students in geography.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon, College of Basic Education, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effect of Teaching the Reading and Texts by the Two Strategies of (Slap & CSR) On Expressional Performance of 2nd Intermediate Grade Students

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ABSTRACT

The research aims to know the effect of teaching the material of reading and texts by using the two strategies of (Slap & CSR) on the expressional performance of 2nd intermediate grade student, researcher has created a zero hypothesis compatible for research, and chooses a compatible experimental design, she compared between the two group of research, then specified subjects that she would discuss during time of experiment, she also created behavioral goals and prepared teaching plans appropriate for requirements of research, she chose Al-Rubaie criteria that consists of four spaces with extreme degree of (100) and made sure of it's credibility and truth, and applied the dimensional choice, and showed results of exceeding the two experimental groups of research against the controlling group in expressional performance.

Keywords: Reading and texts, strategies of (Slap, CSR), expressional performance, intermediate grade.

INTRODUCTION

Expression is considered a major problem for most of students, that they fail to express about any kind of subject either by writing or verbal, also teachers explore many mistakes in that expression looks like the student didn't read or brief his Arabic language nor benefit from it's main branches because Arabic language includes many sources that all pour in one main source which the expression of senses and feelings with an intact language free from mistakes ¹. One of the most reasons that led to the spreading of this weakness of expression is neglecting this material by student and teacher as there are no specified words the teacher can rely on, Muhsin Ateyah sees that "Expression's lessons rely on diligence and comprising ². Also, weak expression of student to arrange their words and terms to come up with a good expression that express what they feel may be attributed to lack of external reading, students tend to short readings and don't burden themselves to read long reading and less

writing in different subjects, in some case and for whole year they didn't write one or two subjects of expression, beside the spreading of slang language and wide spread of using it in many environments of educated people and reached to the teaching environment led to make the expression lesson a real problem because it requires talking with a formal language doesn't reside in their minds ³. Based on what is mentioned above, problem of research can emanate from the following question: What is the effect of teaching reading and texts by the two strategies of (CSR, Slap) on expressional performance of intermediate school students? Human lives a social life with a group of people connected with them by relations, neighborhood, hopes, pains, goals, ideas and emotions, so he is in need to understand them to let his life straight, human groups adopted movements, voices, symbols and means for this understanding and finalized with using the language, which is now the most important ways of understanding Language has a great social value, it is a human and conceptual behavior, has social and cultural context has it's evidence, symbols and contents, also it achieve communication between individuals, by which people get connected with each other, achieving their purposes, sharing ideas, feeling and ideas, and asking for achieving their benefits from each other, God grants

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human being with this grace exclusively, and it is the most important medium of communication, the means of first community to dye his members with social dye that has a vital role in merging the individual with his community plus to having it or well-adjusting for it influence the behavior of individual and his thinking and feeling⁴. Arabic language is one of the most ancient languages historically, culturally and structurally because it carried Islamic flag to the whole world, God blessed it when his almighty make it the language of holly Quran, language of science and knowledge for long centuries, science can't be done without it, knowledge doesn't transfer without it, starts from different religious sciences to many other sciences⁵. Arabic language has preserved it's vitality, purity and fruitfulness on the contrary of other language like Akadian, Aramic and Kinan languages and this attributed to Holly Quran, plus it's strength against any strange assault, to result in proving us with different expression styles, flexibility and diverse of terms and words and wide meaning in short words that we don't find in another languages⁶. Reading is main source of culture and human knowledge, through which human can brief all surrounding ambient and realize every life activities and then brief his nation's history buried in books and major sources, and knowing the heritage of other nations⁷, because it follows logic serial in dealing with written deed as an ideal factor and not a random one in withdrawing the text toward more shining places, in other words, reading with written text make an excavating work with a clear purpose, and specifying this purpose in forming the first vision of reading that represents an enrolling process includes exploring and interpretation together (8). Writing expression has a big importance because it all what have been written in students copybook, and is considered the medium of contact between the individual with whom is too far from him and need for such expression is so urgent in all occupations, it is not about communication but also feelings, senses opinions, needs and transforming information by a well-written speaking with all grammars rules and include good ideas⁸. Style of teacher and his behavior in teaching in front of students is so important and influences in forming their trends and growth them. Cultured teacher is that one who makes Arabic language is correlated with free reading in home or library, he would be successful when he make a tough relation between them and book by free and diverse reading beside out of curriculum materials. It is so important for the teacher to be aware of teaching

methods and diverse strategies of teaching, ability to use them, to help him to choose the most appropriate one for student's ability, how much it connected to their life, their trends and needs and their future aspiration⁹.

Strategy of (CSR) is considered one of the important strategies that helps student to understand the read material via preliminary show and specify difficult elements as they help students to understand and remember the read material that invest the old information in cognitive structures of learners in the new teaching via exploring relations between previous knowledge and new one that are not existed in between it and previous knowledge¹⁰. The strategy (Slap) represents one of the modern strategies in the process of teaching, it focused on reaching to best learning the learner can get, because it liberate the students from the classic styles in thinking and how to express themselves, and gives them the chance of expression freely and urge them for thinking, innovation and inventing. The researcher sees that the two strategies (Slap, CSR) are important strategies that depend upon the student to get information that growth their culture and increase their magnitude of language, beside they match with intermediate student's age. Researcher chose the intermediate grade to proceed the experiment of research and it represent the transitional period from childhood to early adolescence age, that enables students to practice mental processes to be able to increase their abilities of reading, understanding, thinking and reaching to solve problems that they may confront in daily life.

METHODOLOGY

The researcher used experimental method to achieve the research's goal, experimental method is considered the appropriate method for procedures of research.

Population of research and it's sample

Population

The researcher specified the research population by students of 2nd intermediate grade in intermediate and secondary schools (day time)for girls that include two classes or more in Al-Hashmiyah district that belongs to Babel province to chose a school to be the basic research sample.

A- School's sample: The researcher used the random method to chose the research's sample which the method that ensure no bias for any

specific school, after random withdrawing (Almanar Intermediate School) in Al-Hashimiyah district to be the center where experiment was implemented.

- B- Student's sample: students sample was (97) student as (35) female student in the 1st experimental group, (32) female students in 2nd experimental group, (30) female student in the controlling group.

Equivalent of two groups of research.

The researcher compensated between two groups in the following variables: age of student, education of their fathers, grades of Arabic language in first semester (2017-2018).

Specifying the scientific material.

the researcher specified the subject of study that will be studied during period of experiment, subjects were nine, from the curriculum material of reading and texts prepared for 2nd intermediate grade's students, these subjects are (will from dying man, which one is more loyal, spring, pioneer of chemistry: Jabir Bin Hayan, fresh of hope, Beauty of my country, Noor Mohammed, intact logic).

Behavioral goals and teaching plans: The researcher has created (102) behavioral goals according to Bloom classification for behavioral goals were offered to check by experts and referees to make sure of their validity, also she prepared eight teaching plans for each group of the research's groups according to the curriculum materials, she offered three of samples to specialist expert to check their validity.

RESULTS AND DISCUSSION

Main Zero Hypothesis To verify validity of zero hypothesis after correction of student's answers, she used analyzing uni-contrast (F) to make sure of evidence difference evidence between groups table 1. After statistical processing explained above and existence of differences with statistical evidence, value of (F) calculated (14,13) is bigger than tabular value of (3,07) in the after test of expressional performance.

Zero hypotheses and their types:

To verify the validity of zero sub-hypothesis, the researcher used Shiveh's method for diverse dimensional comparison as shown in the table 2. It is clear to see in the table above, results of differences among three groups of research, average of students' grades of 1st experimental group is (62,94) , average grade of controlling group is (52,00), that refers to existence of statistic evidence differences as the calculated value is (11,17) and it is higher than the critical value (2,48), also appears that average grade of 2nd experimental group is (62,78) , average grade of controlling group is (52,00), that refers to existence of differences with statistical evidences as calculated value was (10,39) and it is higher than critic value of (2,48), average grades of first experimental group is (62,94), average grade of second experimental group is (62,78), that means no existence of difference with statistic evidences as the calculated value is (0.003) and it is less than critic value of (4,48). Results above mentioned showed exceeding of 1st and 2nd experimental group over the controlling group, and no existence of difference between the two experimental groups, the researcher attribute this result to the effectiveness of (CSR) and (SLap) from the following: Training students on scientific discussion via strategy of (CSR) participates in increasing their concentration on important ideas, and neglecting unnecessary details in text, increases the ability of students on using pronunciation and meanings in new situations. Connecting between important ideas from others and increasing of their abilities to distinguish between main ideas from sub ideas via strategy of (SLap), determining the goal that subject targets and consequently this increases ability of student to understand and realize. The two strategies of (CSR) and (SLap) help the students to participate by their ideas, feelings and excitations led to creation of a favorite environment for them, hence increasing of attention and interaction and earning of experiences then improvement of their abilities. Effectiveness of teaching by two strategies of (CSR) and (SLap), the reason may be attributed to earning of students and developing of their motivation toward learning and earning of information, led to increase of their marks and developing their criticizing thinking , the right method is that one which leads to the intended goals with simplest effort and less time, and urges the motivation of students and their self-activity toward learning and positive work and active participation in lesson.

Table 1. Analyzing uni-contrast (F) to make sure of evidence difference evidence between groups

Source of contrast	Degree of freedom	Total of squares	Average of squares	F value		Level of evidence
				calculated	tabular	
Among groups	2	2446,89	1223,446	14,13		Function
Inside groups	94	8139,35	86,589		3,07	Statistically with a level of (0,005)
Total	96	10586,24	1310,035			

Table 2. Shiveh's method for diverse dimensional comparison

Balancing		First		Second		Third		
Groups		1 st Experimental	Controlling	2 nd experimental	Controlling	1 st experimental	2 nd experimental	
	Math. average		62,94	52,00	62,78	52,00	62,94	62,78
Two values of Shiveh	Calculated	11,17		10,39		0.003		
	Critical	2,48						
Evidence of (0,05)		Function					Not function	

CONCLUSION

The two strategies of (CSR) and (SLap) have the positive effect to increase the ability of students to written expression and speed of conception for a subject. Through the interaction of the researcher with student she finds that depending the two strategies of (CSR) and (SLap) enables students to be able to connect what they have of previous information with new ones that they get.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education/ University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Fabrication of a Solar Cells by Organic – Inorganic Hybrid Perovskites

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ABSTRACT

One of the important electronic applications in recent years is organic – inorganic hybrid perovskite materials because of their many useful characterizations particularly the low cost, tunable optical properties and high-efficiency. In this work we used varieties of lead halides, PbCl_2 and PbBr_2 to prepare two types of perovskites, MAPbBr_3 and MAPbBr_2Cl by one step method then study their properties; structural, morphological and optical properties, to fabricate solar cells from these perovskites with preparation of TiO_2 nanocrystal as electron transport material ETM by hydrothermal method. The power conversion efficiency PCE achieved is 1.2 % and fill factor $\text{FF}=0.26$ for MAPbBr_3 perovskite while the power conversion efficiency PCE for MAPbBr_2Cl perovskite reached up to 0.9 % and fill factor $\text{FF}= 0.25$.

Keywords: Perovskite, TiO_2 , Nanocrystals, solar cells, ETM.HTM

INTRODUCTION

The perovskite one of the most famous materials in researches electronic attention in the last ten years ago because of there are some important properties, which including long-ranged balanced electron and hole transport, tunable bandgap, facile deposition techniques, low cost and high-efficiency¹⁻³. The chemical structure formula of perovskite it is ABX_3 ^{4,5} where A is a bulky cation which occupies a cubo-octahedral site shared with 12X anions, usually it is represent methyl ammonium group CH_3NH_3^+ or formamidinium group $\text{FA}(\text{HC}(\text{NH}))^+$, and B is a smaller cation stabilized in an octahedral site shared with 6X anions e.g. Pb^{+2} , Sn^{+2} , Cu^{+2} , Ni^{+2} , Co^{+2} , Fe^{+2} , Mn^{+2} , Cr^{+2} , Pd^{+2} , Cd^{+2} , Ge^{+2} , Eu^{+2} or Yb^{+2} , and X is anion halogen e.g. halides chloride Cl, bromide Br and iodide I, respectively^{6,7}. The perovskite kind methyl ammonium lead halide perovskite (MAPbX_3 , MA = methyl ammonium) hybrid organic-inorganic attention has recently increased with these structure in particular

as photovoltaic devices, where it's have bandgap easily effectively adjusted by changing the cation, the metal or the halide in addition the power conversion efficiency (PCE) has skyrocketed from 3.8% to more than 20% in just 10 years^{2,8}. The optical properties of perovskites explain that $\text{CH}_3\text{NH}_3\text{PbX}_3$ have a direct bandgap and equal 1.55 eV, 2.2 eV and 3.0 eV for MAPbI_3 , MAPbBr_3 and MAPbCl_3 respectively, in addition the absorption edges for $\text{CH}_3\text{NH}_3\text{PbX}_3$ perovskites its different values where the MAPbI_3 have great value while the MAPbBr_3 and MAPbCl_3 less than, this effect at the highest occupied molecular orbital (HOMO) -5.23 eV -5.6 eV -5.82eV and the lowest unoccupied molecular orbital (LUMO) energy levels -3.66 eV -3.4 eV 2.94eV^{11,12}. When mixed more one halide element with methyl ammonium under controlled ratios, we get a perovskite have optical properties are different at the primary perovskites MAPbI_3 , MAPbBr_3 and MAPbCl_3 , which sometimes using as enhancement of perovskites properties¹³. In this study, we focused at the preparation of MAPbBr_3 , MAPbBr_2Cl perovskites to fabricated a solar cells benefiting from TiO_2 nanorod.

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MATERIALS AND METHOD

Materials

FTO glass, acetone, 2-propanol, Titanium(IV)

butoxide, TiCl_4 , Methylamine CH_3NH_2 (MA), Hydrobromic acid HBr, Hydrochloric acid HCl, Lead halogen PbBr_2 , PbCl_2 and dimethyl formamide DMF.

Preparation of TiO_2 Nanocrystal

TiO_2 Nanorod (TiO_2Nod) prepared by hydrothermal method, firstly we cleaned FTO glass by acetone, 2-propanol subsequently using the ultrasonic. Immersed FTO in the Teflon stainless steel autoclave contain the precursor of titanium perpend from adding 15 ml HCl, 15 ml deionized water and 0.25 ml titanium(IV) butoxide. The autoclave conducted for 7 hours at 170°C with a temperature controlled furnace¹⁴. After hydrothermal process, the samples were cleaned with in deionized water and annealing at 450°C for 45 min. The resulting of TiO_2Ncs treatment with TiCl_4 by immersed in TiCl_4 aqueous (0.57 ml TiCl_4 with 100 ml deionized water) at 80°C for 30 min then annealed at 450°C 30 min again^{15, 16}.

Preparation methyl ammonium salt MAX (X= Br, Cl) were synthesis similar report of described elsewhere¹⁷. Briefly reacting 20 ml from CH_3NH_2 with 30 ml from HBr to prepare MABr and 22 ml from HCl for MACl, in round-bottom flask beaker in the ice about 0°C for 2h with stirring. The precipitates were recovered by putting the solution on rotary vacuum to evaporated at 60°C for 1h to remove the solvents. The crystals were washed using diethyl ether and ethanol several times then dried by evaporated again for several hours to result crystal powder and stored it in dark dry place.

Perovskites preparation

MAPbBr_3 preparation mixing (0.25g) MABr, PbBr_2 (3.08 g) with 2 ml from DMF and stirring several hours at 60°C , by spin-coating we dropped the solution at TiO_2Nod for 1500 rpm/5 sec, 2500 rpm/45 sec at sequentially, then annealed at 60°C for 30min. MAPbBr_2Cl preparation by mixing equal molar ratio from MACl (0.27 g) and PbBr_2 (1.5g) dissolved in 2ml from DMF at room temperature with stirring several hours, then dropped the solution at TiO_2Ncs substrate with spin-coating for 1500 rpm/5 sec then 2500 rpm/45 sec, finally the film annealed at 120°C for 30 min.

RESULTS AND DISCUSSION

The perovskites MAPbBr_3 and MAPbBr_2Cl was

fabricated to design a solar cells, first we distinguish the crystallization of perovskites by XRD were there are peaks for MAPbBr_3 , the most important at 15, 21, 30, 33.5, 43 and 46 peaks and the indexed (100), (110), (200), (210), (220) and (300) respectively and the MAPbBr_2Cl have same peaks at 15, 21, 30, 43 and 46 for same indexed (100), (110), (200), (210), (220) and (300) respectively. The phase of the MAPbBr_2Cl it was single phase, the space group ($pm3m$) and unit cell $a=5.95$ see Figure 1^{18,19}. Figure 2a shows the absorption spectrum of the perovskites, we found the absorption edge for the MAPbBr_3 equal 520 nm and nearly 518 nm for MAPbBr_2Cl which have absorbance value higher than of MAPbBr_3 and this is due to the large grain size of MAPbBr_3 perovskite which appear in the SEM images¹⁸⁻²¹. The band gaps were calculated by using Kubelka–Munk method which dependent at reflectivity spectrum of perovskites for this perovskites, where the direct band gap about 2.28 eV for MAPbBr_3 and for MAPbBr_2Cl Figure 2b, and here, it turns out that the energy gap can be tuning by controlling the component ratios of the halogens, where the energy gap approaching the values of the main compositions (MAPbI_3 , MAPbBr_3 and MAPbBr_2Cl) depending at the I, Br and Cl. The morphology of surface devices were determine by Field Emission Scanning Electron Microscope FESEM show in the Figure 5a for the MAPbBr_3 and Figure 5b for the MAPbBr_2Cl perovskite, we can see the crystal size of MAPbBr_3 biggest than MAPbBr_2Cl perovskite. The schematic diagram of the perovskite device structure shows in the figure 3, its consist of FTO/ TiO_2Ncs / MAPbX_3 /Ag, the $\text{TiO}_2\text{Ncs}/\text{MAPbX}_3$ act as n-type and the MAPbX_3/Ag act as p-type when the light incident through the FTO glass substrate. Figure 4 shows J-V and intensity characteristic, the parameters of solar cell for MAPbBr_3 perovskite after illumination light equal 1.5 AM (100 mWcm^{-2}). The maximum values for voltage and current $V_{max} = 0.22 \text{ V}$, $J_{max} = 5.5 \text{ mA.cm}^{-2}$ when the $V_{oc} = 0.43 \text{ V}$, $J_{sc} = 10.7 \text{ mA.cm}^{-2}$ and $\text{FF} = 0.26$ which resulted 1.23 % of $PCE = \frac{V_{max} I_{max}}{P_{in}} \times 100\%$

While the MAPbBr_2Cl perovskite solar cell parameters of the perovskite which were 0.9 % for the PCE at $V_{max} = 0.21 \text{ V}$, $J_{max} = 4.3 \text{ mA.cm}^{-2}$ when the $V_{oc} = 0.42 \text{ V}$, $J_{sc} = 8.3 \text{ mA.cm}^{-2}$ and $\text{FF} = 0.25$. When compared the results in both solar cells the PCE of MAPbBr_2Cl decreased than MAPbBr_3 . This due to of

decreasing the values of V_{max} and J_{max} than the MAPbBr₃ perovskite and this because of the difference in the crystal size for these perovskites²². The J-V curve appeared near ohmic behavior which due to differ the work function between Ag and perovskites which can be enhancement by addition materials as hole transport materials like spiro-OMeTAD, and the preparation of perovskites under environment controlling of humidity .

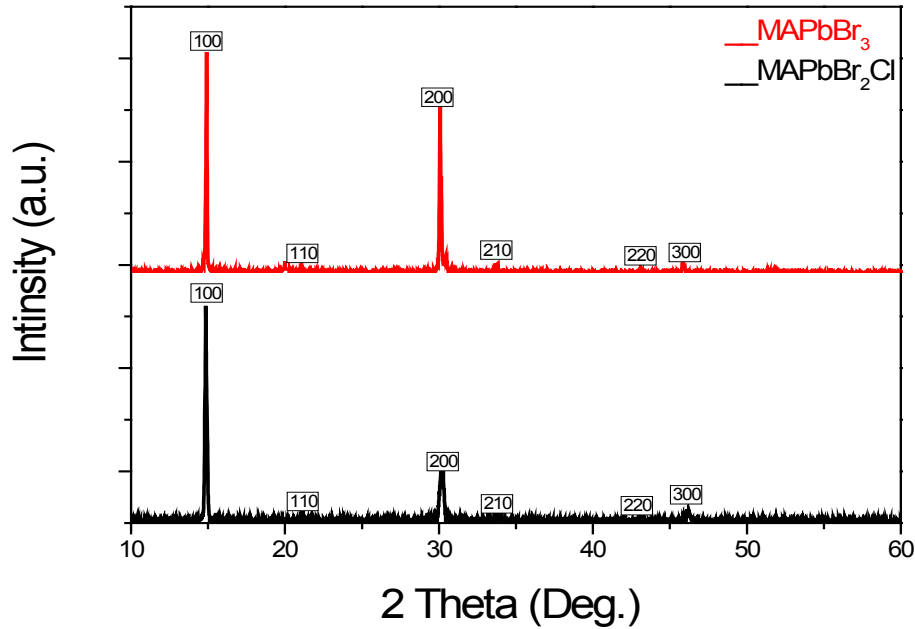


Figure 1. XRD pattern for the MAPbBr₃ and MAPbBr₂Cl perovskites

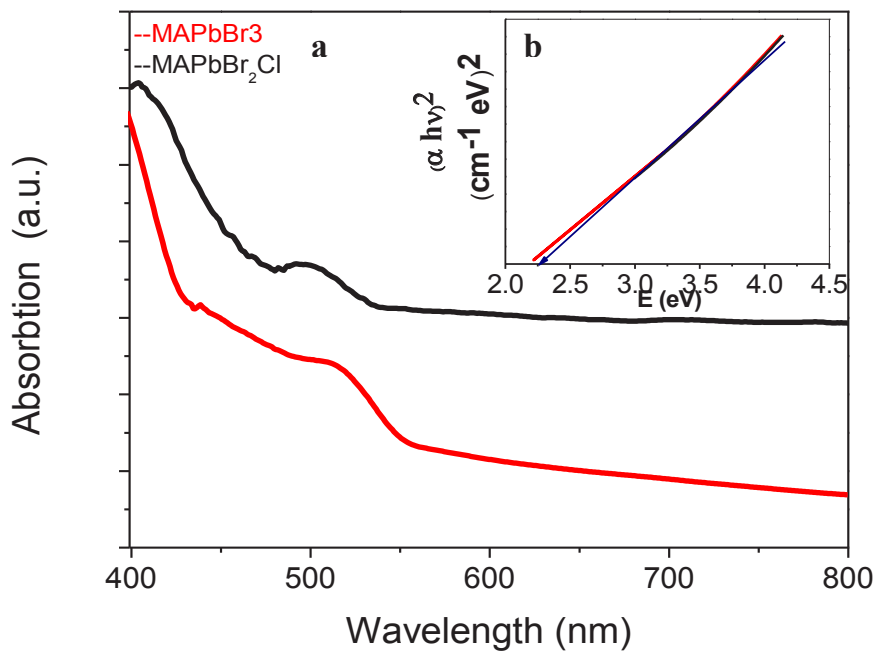


Figure 2(a). Absorbance spectrum to the MAPbBr₃ and MAPbBr₂Cl (b) The energy of bandgap.

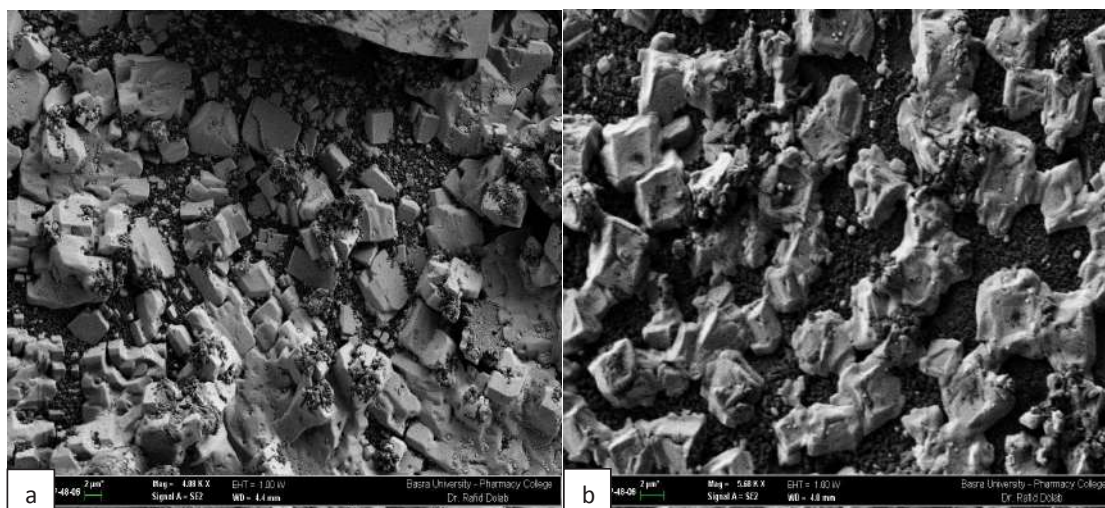


Figure 3. The images of FESEM (a) for MAPbBr₃ perovskite (b) MAPbBr₂Cl perovskite

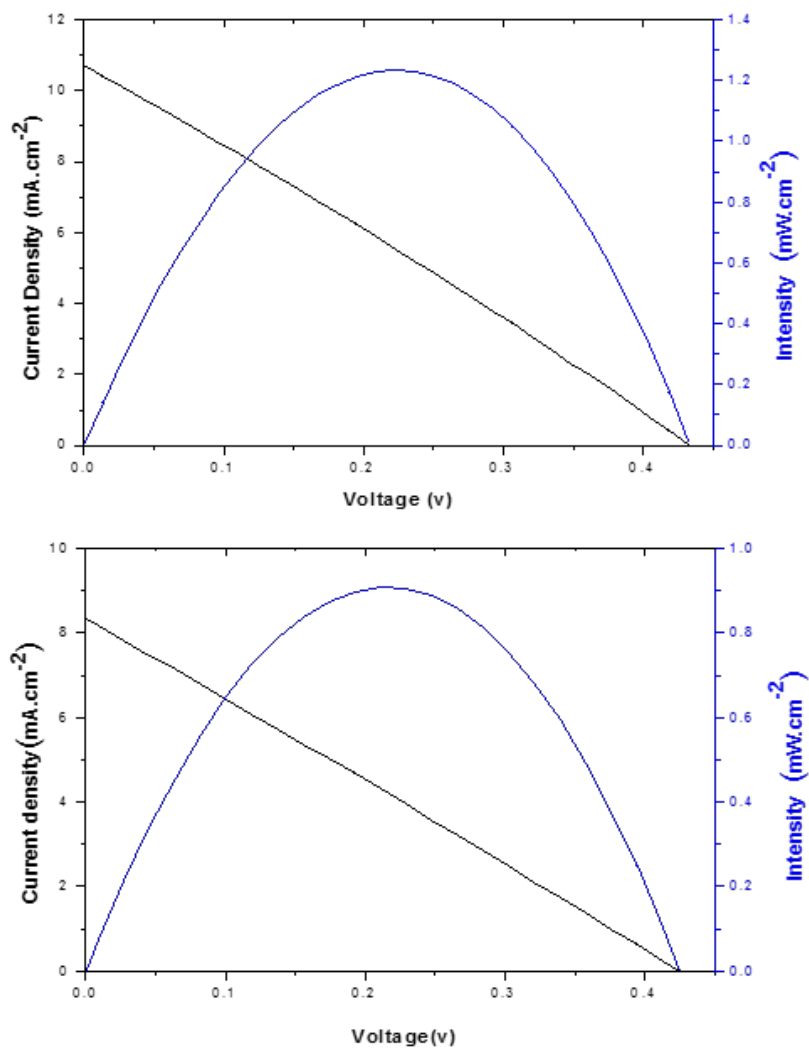


Figure 4. Shows J-V and intensity characteristic for MAPbBr₃ and MAPbBr₂Cl perovskite

CONCLUSION

The solar cells fabricated after prepared of two types organic-inorganic hybrid perovskites MAPbBr₃ and MAPbBr₂Cl. Changing in the ratio and kind of halogen Br and Cl, allowed to tuning the band gap of the perovskite. These solar cells have 1.23% and 0.9% power conversion efficiency *PCE* for MAPbBr₃ and MAPbBr₂Cl perovskite respectively after illumination light equal 1.5 AM (100 mWcm⁻²). The advantage of TiO₂ Nod as electron transport materials to increase the surface area of solar cell an addition it's used as a light harvesting.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Physics department, College of science, Basrah University, Basrah, Iraq and all experiments were carried out in accordance with approved guidelines.

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Improving an Illumination System in the Microscopic Imaging of Nuclear Tracks Using Light Emitting Diode

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ABSTRACT

In this study, images vision of nuclear tracks was increased using two methods. The first is to design a new light system based on Light-Emitting Diodes (LED) light instead of traditional fluorescent light used in the optical microscope. Due to the high dynamic range of the LED light, a high vision and an extra number of tracks were obtained during shooting. The second method is to establish a new scale depended on counting nuclear tracks. That is called No-Reference Image Quality Assessment Based on Wavelet Transform (NIQWT) scale. The quality of captured images was evaluated and no-reference scales like Entropy of First Derivative (EFD), Average Gradient (AG), the Measure of Enhancement by Entropy (EMEE), and (NIQWT) were calculated to be recommended. Then a good correlation coefficient was obtained for these scales. The best correlated coefficient 0.9032 was for (NIAWT) scale. Whereas, the statically results illustrated photography when using LED light much better than Florescent light in the optical microscopy. Therefore, these processes led to augment numbering of nuclear tracks discovered.

Keywords: *image quality assessment; nuclear tracks; CR-39 detector; LED light; wavelet domain.*

INTRODUCTION

Proper illumination is essential for optical microscope. Whereas in early years in candescent light was the only illumination. Today more specialized light sources, such as laser or arc lamp are being used. Due to the high efficiency and brightness of the LED, it has become a serious alternative to almost all types of illumination in the optical microscope. LED has high durability, no need for expensive electronics, and can be switched within a nanosecond. This makes them ideal sources of light when used instead of fluorescent in the optical microscope. The white color LED, which is between 2,600 and 5,000K, is an excellent choice for bright field illumination with the added advantage of simple brightness adjustments without changing the spectrum. This study discusses different types of LEDs, how they are used in fluorescence microscope, and how to use LED as specialized illumination source s for

transmitting resonance energy and fluorescent lifetime imaging microscopy ¹. No-reference quantitative evaluation of image quality is one of the most pressing and difficult problems in image processing. Generalized contrast is the most important quantitative characteristic which can determine the objective quality of the image. The objective of study is the process of no reference measurements to assess the image quality of the nuclear tracks. The purpose of the work is to increase the number of nuclear tracks detected at different levels of lightness in the optical microscope using a light emitting diode source. Actually, a new development on the quality of the reference image using the NIQWT scale for the accurate of nuclear tracks is an urgent need in nuclear studies because augmenting the analysis image has led to an increase in the number of nuclear tracks detected. This will also improve the accuracy of nuclear measurements better than conventional method of manual sorting of nuclear tracks. In fact, these methods are able to improve SSNTDs applications, particularly when by image processing techniques ³. In (2012), *Zylstra* et al. used analysis model to account the tracks in CR-39 detector ⁴. Hussain A. Al-Jobori et al. measured track parameters using MATLAB ⁵. A computer program named TRIAC

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I and TRIAC II was produced in MATLAB by Patiris et al. ⁶ to recognize the tracks and track parameters measurements from CR-39 solid state nuclear track detector images.

MATERIALS AND METHOD

This work has for the first time explored a new method of the enhancement of an illumination of optical microscopy in SSTNDs applications⁷. CR-39 track detector: Polyallyle diglycol carbonate - PADC which is generally referred as CR-39 is the most sensitive nuclear detector to record nuclear tracks. It was first discovered by Cartwright ⁸, and this detector consists of short polyallyle chains joined by links containing carbonate and die ethylene glycol groups into a dense three dimensional. The chemical form of CR-39 detector is . The properties of CR-39 detector⁹:

1. Amorphous polymer.
2. Optically clear.
3. Environmentally very stable.
4. Having non – solvent chemical etchant.
5. Highly cross – linked thermoset.
6. Sensitive to heavy ion damage.

Track formation mechanisms in dielectric media

When the cellulose nitrates can record α -particles (with certain energy depending on the etching condition) The CR-39 plastic can also exposed to thermal neutrons, which yield α -particles from the (n, α) reaction on the boron (or on the lithium)[10].The latent tracks can be etched with the help of a suitable etchant (often a simple alkali or acid, e.g. NaOH or FH), so that they become visible under an optical microscope,(with diameter of a (μ m) or more).

Alpha Particle (nuclear track)

The alpha particles were emitted by Americium decay; impinge on a target, producing neutrons over a broad range of energies with an average energy 4.2MeV and a maximum 10MeV ¹¹⁻¹³.

Light Source

Light is only one part of the various electromagnetic waves that fly through space. These waves contain frequency and length. Light values can be distinguished from other forms of energy on the electromagnetic

spectrum. Light is emitted from a body due to Incandescence, Electric Discharge, Electro luminescence and Photoluminescence ¹⁴. Images cannot be found without lighting.

Moreover, the general factors that effect on the light equality assessment have been determined.

Light Emitting Diode (LED)

The basic operating principle behind light emitting diodes LED is that inducing the conduction by negatively charged carriers (n-type) and some by positively charged carriers (p-type). When charged carriers of different types recombine, the released energy may be emitted as light [15]. LED lamps are the latest and newest addition to the list of energy efficient light sources. And that LED lamps emit visible light in a very narrow spectral band, they can produce “white light”. This is achieved either a by using a red-blue-green array or a phosphor-coated blue LED lamp, as well as its light decay is less than 10,000-hour testing. Although it is still in its infancy, the LED lighting techniques are rapidly and show promise for the future.

No- Reference Image Quality

The development of NR image quality measures is largely motivated by the fact that human beings can easily identify image quality without seeing a distortion-free image, and moreover, different individual observers tend to have similar image quality opinions. However, the HVS is enormously complex and current knowledge of the human visual perception is far from complete. In particular, there exists such factors like learning, visual context, and cognitive relevance in the human visual perception that can hardly be quantified. NR image quality assessment thus turns out to be an extremely difficult task. The field of NR image quality assessment has experienced fast advances in recent years and the number of new approaches that are being proposed is growing rapidly. At present, most existing NR image quality measures are designed with prior knowledge of the distortion. Fortunately, the distortion process is known in many applications, and the task of developing distortion-specific NR quality measures is of practical importance.

Image Quality Measurement (IQM)

Measuring image quality of image is a complex and difficult process because human opinion is influenced by

physical and psychological parameters. Many techniques are proposed to measure image quality but none are ideal for measuring quality. Hence, image quality assessment plays an important role in the field of image processing. Image quality metrics are divided in to two and objective types. Most IQMs are related to the difference between the two images (the original image and the distorted). This type is called reference IQM, while the other IQM

is not related to the difference between the two images, such as the reduce reference IQM and the no reference IQM. Three no-reference scales are in use:

RESULTS AND DISCUSSION

There are two methods to improve the lighting system to shoot the nuclear tracks in the optical microscope:

$$c(u, d, T) = \int_0^T u \cdot \frac{1}{(4\pi Dt)^{\frac{3}{2}}} \cdot \exp\left(\frac{-d^2}{4Dt}\right) \quad (1)$$

where D is the diffusion coefficient of the communication medium. If more than one nanomachine diffuses a unit u molecules, a receiver nanomachine j accumulates the sensed molecules through the summation of the values of $c(u, d, T)$ over diffusing nanomachines i , i.e., nanomachine j senses molecules in total during the interval $[t, t + T]$

$$\sum_i c(u_i, d_{(i,j)}, T_i) - c(u_i, d_{(i,j)}, [T_i - T]_+) \quad (2)$$

where, $d_{(i,j)}$ is the distance between nanomachines i and j , T_i is the time that passed from the diffusion of nanomachine i up to time $t + T$, i.e., nanomachine i diffused at time $(t + T - T_i)$, u_i is the unit of molecules by nanomachine i at that time, and $[T_i - T]_+$ equals to $\max\{T_i - T, 0\}$. In other words, the receiver nanomachine senses the total amount of molecules that have been in its nearest proximity in the time interval $[t, t + T]$ without being able to distinguish which molecules come from which transmitter. If the amount of sensed molecules is greater than or equal to threshold τ , it will be considered as 1, otherwise it is 0. The curve of the function. In Figure 1, $c(u, d, T)$ (the detected molecules) is computed, which represents the peak of molecular concentration sensed by receiver nanomachines at $d= 0.01, 0.5, \text{ and } 1$ from a transmitter nanomachine. The transmitter nanomachine is assumed to diffuse $u=1$ molecule, in a medium with diffusion coefficient $D=10 \text{ cm}^2/\text{sec}$, initial value of time $t=0$ (the parameters values are based on an experiment in ¹², the value of threshold is assumed to equal $\tau=0.5$, through the experiment t is incremented by 0.01. The peak of the sensed molecular concentration is inversely proportional to the distance between transmitter and receiver nanomachines.

Time Slots Length

All the nanomachines n in the network are assumed to be synchronized, and can communicate in a predefined time slot T_0 . Where T_0 is a system parameter and its length depends on the network's geometric properties, such that $T_0 = v \frac{d_{max}^2}{D}$, where v is a constant that can be equal 1; d_{max} is the transmission range distance of $node_c$, and D is the diffusion coefficient.

New Scale Called; No-Reference Image Quality-Assessment Based On Wavelet Transform (NIQWT)

Wavelet transforms are one of the most important and beneficial tools for image processing. It has been used in image processing, data Compression and signal processing. In MATLAB program worked on the histogram for HL component for the original images means that discrete wavelet transform, there are only a limited number of wavelet coefficients for each bounded rectangular region in the upper half plan. Then the HL transform image histogram have been created. Finally the calculation of WBH which represent the inverted of a maximum histogram. This method is called No-reference quantitative assessment of image quality (NQWIT) which is one of the most pressing and difficult problems of image processing. This feature can be the No-reference quality measure.

Microscopy Florescent Light changed by Light Emission Diode (LED)

Images with good lighting and contrast are of great importance in statistics and get a clear vision of the nuclear tracks. So image quality analysis is important for these tracks. This study determined the quality of the image that changes the light and contrast by controlling the level of light captured by the tracks images under the optical microscope. A new lighting system was used with the light emitting diode (LED) to generate

different levels of lightness from (93)Lux to (1255)Lux as needed. In this work, the CR-39 detector was selected with a thickness of 500mm² and an area of (1X1) cm². It was exposed to the radioactive source for a period of 3 minutes and it was placed at 3.5 cm far from the detector. The chemical etching was then performed for 180 minutes, after which the tracks were dried. Video images were then taken at different illumination levels using LED light rather than fluorescent light. The light levels were measured by Lux meter device, with (HDEC-50B) camera size (3)μpixel with and zoom (40x) under optical microscope, see Figure (1). The aim of this work was to answer the question: What is the best level of illumination to capture the picture under the optical microscope? The answer is to propose a non-reference scale of images based on the number of nuclear tracks, as tabulated in Table 1. Then calculate the correlation coefficient for all images for different levels of lighting and for different non-reference scales such as (EFD, AG, EME, and NIQWT). At the light level (949)Lux, the highest correlation coefficient using the (NIQWT) scale was found depending on the counting of the tracks, which means that the detected nuclear tracks will be increased in this area. These results are described in table (2). Thus, different levels of lighting were applied that make the image with high quality as shown in the figure ^{3,4} which show that the use of no-reference NIQWT scale of correlation coefficient is better than other scales.

Table 1. Accounting of nuclear tracks for nine sets of images captured at different levels of lightness under the optical microscope

Intensity (LUX)	a	b	c	D	E	F	g	h	I
93	56	59	66	70	81	96	129	46	42
112	53	56	63	67	78	93	126	43	39
215	51	54	61	65	76	91	124	41	37
334	46	49	56	60	71	86	139	36	32
410	50	53	60	64	75	90	143	40	36
673	52	55	62	66	77	92	145	42	38
949	59	62	69	73	84	99	152	49	45
1238	65	68	77	79	90	105	158	55	51
1255	57	60	58	71	83	97	150	38	43

Table 2. Correlation coefficients for different No-Reference scales comparing with intensity of light

Intensity (LUX)	EFD	AG	EMEE	NIQWT
93	0.4204	0.6807	0.2155	0.8789
112	0.5509	0.3981	0.1741	0.6149
215	0.3423	0.2859	0.4103	0.0926
334	0.2033	0.2025	0.2837	0.2736
410	0.5434	0.5591	0.2835	0.6328
678	-0.0648	0.4765	0.1046	0.2418
949	0.4367	0.3510	0.2894	0.9032
1238	0.5516	0.5967	0.4121	0.6067
1255	0.6433	0.8794	0.4885	0.7870

CONCLUSION

In this work the distribution of lighting for LED source was used. LEDs have gained popularity in our homes and started to migrate to researchers and laboratories, with their ease of use, long lifetimes, and low waste; they will continue to take over the role of the traditional mercury arc lamp. Nine sets of images with different luminance were captured. New Quality scale (NIQWT) was used to calculate quality factor as well as other well-known standards (Entropy, average gradient, and EME) and the extraction of correlation coefficient with comparison of manually account for nuclear tracks for different levels lightness (93,112, 215, 334, 410, 678, 949, 1238, and 1255) LUX with their histogram. The best correlation coefficient to specify the intensity level for CR-39 detector to detect alpha particles was with best resolution for the tracks. Therefore, increasing of nuclear tracks found was due to the increase in an illumination (lightness) in which images are captured. This does not mean the necessarily of increasing in image quality. Thus, there are lighting levels that make the image having high quality which is (949) Lux:

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Physics Department, Education College, Mustansiriyah University, Iraq and

all experiments were carried out in accordance with approved guidelines.

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Social Psychology, Political and Scientific Situation of the Eighth Century AH the era of the Pride Investigators (Fakhr Al-Muhakikin)

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ABSTRACT

Social psychology uses scientific methods to study how people relate to each other. As such, many of its most basic and classic findings are relevant to civil politics. Hilla, is the city of science and scientists, which emerged many scholars and scientists, the beginning of the journey of Islamic sciences started in that era since it was established in 495 AH / 1101 AD, especially in the era of Mohammed bin Ahmed bin Idris Al Aajali, 598 AH / 1202 AD, who criticized the views of Sheikh Tusi that has turned the attentions to Hilla for four centuries, Hilla embraced the scientific schools many centuries. He gave many scholars, whether from Hilla or outside Hilla Ijazats, and most notably Mohammed bin Makki, who turned publishing the science of the people of the prophet's household outside and inside Hilla. He wrote a lot of books in the fundamentals of jurisprudence, theology and other sciences. The social status which lived in by Al-Allamma played a prominent role in Hilla and his father's great love for him and his relation to the Mughal Sultan led him to his killing, in which many scholars differed.

Keyword: *Psychology, Social, Scientific situation, Political*

INTRODUCTION

Social psychology is increasingly asked to solve the problems that civil society is facing. Major societal issues prompt fierce debates and each side tries to bolster their position by reference to scientific evidence and expertise. Social psychologists will praise the usefulness and the relevance of their theories to meet the demand of those fields ¹. It sometimes results in the same research appearing in different specialized journals – modified only to suit the conventions of that publication. If some theories are robust and have been empirically tested with success in different fields, others are more specific and can be transferred to a different field only artificially. Most of those fields are classic (health, education, law, work, organizations, etc) and usually form handbooks of applied social psychology,

together with their methodological specifics. However, in addition to these traditional fields ²⁻³, there now appear more occasional fields, such as environment, economy and finance, media and new technologies, diversity, etc, which pertain to new social needs or preoccupations. This study shed light on the character of Mohammed bin Hassan al-Hilli (the pride of investigators), one of the flags of the eighth century AH, who was characterized and called (Zain Al-Mujtahideen) and knew his knowledge from his father. Mohammad Bin Al Hasan Al Hilli was a great man of high and high regard and raised in the house of his father (Allamma Al-Hilli), he was interested in teaching, completed his father's books in response to the commandment, he recommended and presided over his father's high school (Hilli school) after the death of his father. He was taught by his father and gave a lot of (Igeazats) ⁴, we shed lights on (Igazats of the pride of investigators) to scholars and jurists from home and abroad. This research is divided into an introduction and three topics ⁵. The first deals with Hilla, the center of science, and the role of Al Hilli in this great city, who had the significant role of making (Khadbanda Muhammad), the Sultan of Mughal one of Islamic shia doctrine.

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METHODOLOGY

The second topic deals with the Shikhs of his teaching times, his birth and his children, and the political and social situations of the Islamic eighth century AH. And the third topic is about the (Igazat), dealing with his death and his writings as well. Finally, we hope that God Almighty has helped us to show this great personality in the Islamic and social history of Iraq in general terms and in Hilla city in particular. Hilla is one of the Iraqi rich cities in science, which was characterized by scientific status and appeared in the Islamic scientific renaissance for several centuries and then increased the rise of thought by its founder Sadaqa Bin Maziad¹. It was known as (Two Mosques), which today is one of the areas of the city, compared to the two mosques in which the prince of the faithful (Ali bin Abi Talib) prayed during his return from his battles in Safin and Nahrawan 36, 377 AH / 656 AD, 657 AD, he stayed there for forty-five days waiting for one of his army commanders, Abdul Aziz Al-Saray², who was wounded, after his arrival. Imam Ali washed him and buried him and the grave was still there. Al-Hamwi⁽⁵⁾ said: Hilla is a large city located between Kufa and Baghdad and it was called (two mosques), the house of the sword of the state Sadaqah bin Dibis bin Ali bin Maysaid al-Asadi in Muharram (495 AH / 1101 AD) the first one who discovered and lived there, It was a refuge where the sepulchers were housed, He and his army were housed and built the beautiful and luxurious houses so it became a refuge for him and his people, because of that it became the most beautiful city, the merchants intended to come to the best city in the country of Iraq and the best life during (Saif Al Dawla) time. The first person who gave it the name so-called Hilla (Al saifya) is Al Imam Ali⁶ and also visited by many travelers, including what Yadge said during his visit to Hilla in 1307 AH / 1890 AD: Hilla is the most urban and educated for the past centuries⁽⁷⁾. The city of Hilla was rectangular, located on the right side of the Euphrates river, extending along the river¹, A problem was based on occurrence of a critical predicament (the divorce of his wife) that he was very angry with his wife and divorces her illegally so he gathered on the necessity of the analysts opinions, who were disagreed by the Sultan divorce of his wife thinking that the divorce was legally, one of his ministers suggested him to reference to the Shia doctrine, which says the invalidity of this divorce and brought the scholars of the doctrine of Hilla in Iraq and rely on their

options, they attended with the scholar Al Hilli expressing the invalidity of the divorce for the condition of the requirement of two witnesses, discussions were held between Al Hilli and scientists and other doctrines violently, At last, Sultan Mohammed Khadabandh believed in Al- Shia doctrine⁹, making the shia doctrine is the official one in the country. After the official declaration of Shiism by Khadbanda in all parts of the country, Hilli assigned the establishment of a "Moving school" equipped with all the equipment carried to the various regions in the Azerbaijan in summer and Baghdad in winter⁴. The activity of the intellectual movement in Hilla in the eighth century AH, and the role of scientists a prominent impact of the attention of scientists in the world to take from them sciences And they give them license, including the house of Al Alamma, which became the beacon of scientists and science, however, it was the exit of many scientists and scholars, including Alamma, which was intended to Hilla, Mr. Muhanna bin Sinan civil was the first who read his works in (717 AH) and Alamma Al Hilli praised in all his books and novels⁽²⁵⁾. Mohammad Bin Al Hasan Al Hilli was his father's partner not only at the Al- (Halayyah school) but in the house of Al-'Allamma also⁽²⁷⁾. Not only were the teaching houses, there were councils in Hilla, including the Council of Al-Hilli, the son of the Alamma, the teaching was issued after the death of the Allamma Al-Hilli his father and entered the council of a group of scientists (28). Ijazat It is an Arabic word means the permission that one person permits to another to narrate the speech, It has known as ((the words of the summary included the creation of permission in the narration of talk about him after telling him in general and the amounts of common and commonly known in his book this permission includes the mention of books and works. And to mention to the religious sheikhs of the authorized authority in the speech as well as mentioning the sheikhs opinions of each of these sheikhs in social and religious classes after another until the basic ending to the infallible people. His Ijazat (Sheikh Izz al-Din al-Hilli) Hassan bin Ahmed bin Muzaher Al-Hilli who has Ijazat from Muhamad Bin Alhasn Al Hilli in 741 AH, put him Sheikh Faqih Izz al-Din bin Muzaher and the first written on the copy (rules) and dated in (714 AH) (happy jurisprudence, Abi Abd Allah (Ahmad Bin Balko) bin Abi Talib bin Ali Sheikh Abu Abul Fotouh Al Owi for the Ijazat of the Allamma Al Hilli and about his son Muhammad 705 AH, Hassan bin Mohammed bin Ibrahim bin Sheikh Ezz

al - Din ibn Shams al - Din al - Damascene who has Ijazat of Mohammad Al Hilli 753 on the back of the rules, Imad al-Din al-Kashi, Hussein bin Mohammed bin Ahmed, the father of Sheikh Abi Saeed has three Ijazat from Mohammed Al Hilli (759 AH), Hamza bin Hamza bin Mohammed Nasser Al-Din Al-Alawi Al-Husseini is one of his students has Ijazat in the year 736 AH, Haidar bin Ali bin Haidar Al - Amali Hussein Al - Obaidly Sufi has two Ijazat of him in 759 AH and 761 AH, Abu Sa'id ibn al-Husayn ibn Muhammad ibn Ahmad al-Sheikh Taj al-Din al-Kashi has three Ijazat all in the year 759 AH, Abdul Karim Mohammed bin Ali bin Mohammed Al - Aaraj Al - Hussein Ghayath al - Din a student of Mohammed Al Hilli has it in the year 736 AH, Abdullah bin Muhammad bin Ali al-A'raj, who is Zia al-Din ibn Abd al-Din Muhi al-Din (Majd al-Din) Abi al-Fawares Muhammad ibn Ali al-Husseini, the younger brother of Amid al-Din (745 AH), and they were the sons of Al Allamma sister, Ali bin Hassan bin Ahmed bin Muzaher Zain al-Din AlHilli, the owner of the issues of demonstration and has two Ijazat in 741 AH and 755 AH, Mohammed bin Sadaqah Shams al-Din was one of the students of Mohammad Al Hilli his Ijazat in year 758 AH, Shams al-Din (Muhammad ibn Abi Talib) has Ijazat in 750 AH, Nizam al-Din Muhammad ibn 'Ala ibn al-Hasan and his Ijazat from Mohammad Al Hilli in 757 AH, Muhammad bin Hilal al-Owi is Shams al-Din Abu Yusuf Muhammad bin Hilal ibn Abi Talib bin Haj Muhammad ibn al-Hasan ibn Muhammad al-Owe has Ijazat in 705 AH of Mohammad Al Hilli, Mahmoud bin Mohammed bin Ali bin Yusuf al-Tabari, which is Mohammed al-Akbar Badr al-Din Abu al-Mahasin a student of Al Allamma and the Mohammad AlHilli in the year 708 AH, Makki bin Mohammed bin Hamed bin Ahmed Jamal al-Din Abu Muhammad al-Amli, the father of Mohammed bin Makki (734-786) and had Ijazat by Mohammad Al Hilli in the year 751 AH, Muhanna bin Sinan bin Abdul Wahab has Ijazat from Him, Al Sayedf Amin Eddin Abu Talib Ahmed bin Zahra al-Husseini has Ijazat from Mohammed Al Hilli in 756 AH, Jamal al-Din al-Istrabadi: Shaykh Jamal al-Din was a full-fledged figure. He was referred by Sheikh Abdul Muttalib bin Fakhr Abdul-Muttalib al-Khuzai as a student by Mohammad Al Hilli and his father (Alamma), and had given Ijazat, he has studied Sheikh Al-Ahli global Ijazat with (khat al fakhr), Jamal al-Din al-Istrabadi: Shaykh Jamal al-Din was a complete fad. He was referred to by Sheikh Abdul Muttalib bin Fakhr Abdul-Muttalib al-Khuzai as a student by Al Allamma

and his son, Sheikh Mohammed bin Mohammed Al-Esfandiari Amaly: Mohammad Al Hilli gave Sheikh Mohammed al-Esfandiari approved a copy of the book of Al-Murad in the explanation of the disqualification of the belief of Al-Alamma in 745 AH and then read on to His son Mohammad, Sheikh Abu al-Muzaffar Yahya bin Sheikh Fakhr Al Muhakikin (Mohammed Al Hilli): Abu al-Muzaffar Yahya bin al-Sheikh wrote a variety of classifications of his grandfather Al-Hilli, including a summary of words written by his father and his father gave him Ijazat and other Ijazats, Izz al-Din Hassan bin Qasim bin Bulbul (alive 730 AH) : The student of Mohammad Al Hilli and authorized him by saying (I have given Sheikh Faqih virtuous religious Hassan Bin Qasim bin Bulbul bin Kuttab editorial full Ijazat), Ibrahim bin Ali bin al-Hussein al-Turaihi 724 AH: one of his students, he had Ijazat in 717 AH, Ali bin Hassan Al-Sarabashnawi Al Hilli: He had Ijazat from Mohammad in (751 AH). His Works: The works of Mohammed bin Hassan al-Hilli (Fakhr Al muhakikin): Some of his work has not written yet, so next we will present most of his works: Tahseel Al Najat, Izah Al Foa'd fi Sharh Mushkilat Al Quaed =Izah Al Quaed, Jamie Alfawayid Fi Sharah Khutbat Alqawaed, Iirshad Almustarshidin Wahidayat Altaalibayn = Wajib Alaietiqad, Haashiat 'Iirshad Al'adhhan, Alhashiat Ealaa 'Anwar Almalkut Fi Sharah Alyaqut, Thlatht Wa'arbaeun Hdythana Nbwyana, Mueraj Alyaqin Fi Sharah Nahj Almustrshdin, Alfkhrya Fi Maerifat Alnya, Ghayat Alsuwawl Fi Sharah Tahdhib Alwusul 'Iilaa Eilm Al'usul, Aleaqayid Alfkhryt = Eaqayid Fakhar Aldiyn = Alaietiqadat, Sharah Alfusul Alnsyrya, Alnakt Alaetqadyt = Alrisalat Aljwabya = Almasayil Waljawabat = Alfkhrya Fi Aleaqayd, Alkhilasat Fi 'Usul Aldiyn Waleaqayid, Al Hag, Alkafiya Alwafiya Fi Alkalam, Nihayat Almamul Fi Sharah Mabadi Alwasul, Nihayat Alhal Fi 'Usul Alfaqih, Dawazidh 'Iimama, Wajibat Alslaat, Almasayil Alamlyat = Alhydrt = Al'asyilat Alamly, Almasayil Alnasryat, Almasayil Almazhryat = Alhawashiu Alfkhrya = Jawab Masayil Abn Mazahir, Almasayil Alfqhy, Almasayil Wal'ajuba, Masayil Suyl Eanha Fi Eilm Alkalam, Almasayil Alfkhrya, Wlellha Bieiniha Almasayil Almhnnya, Ujubat Almasayil Almhnnya = Almdnya, Ujubat Almasayil Alfqhy, Ujubat Masayil Fqhyat Libaed Alajila, Iijabat Masayil Alsyid Eala' Aldiyn Ely Bin Zahrt. Al-Qami said that the first person who had visited the grave of him said ((The owner of this grave must transfer, it was quoted by his father and then he mentioned the story of the one who visited the grave of his faithful

brother. Abdullah al-Mumqani said otherwise: "I did not stand on the spot of his burial place, which was transmitted by the sheikhs. His body has become unsafe for the cause of mobility, which is not advisable to transfer"⁽⁹⁰⁾. It had been known about father's love for him which his father called him the pride of investigators (Fakhr Al muhakikin) and the pride of religion (Fakhr Al dien). As well as his closeness to the Mughal Sultan and his knowledge and sciences. He was killed on Friday the fifteenth of Jumadi al-Akhra in 771 AH at the age of 89 years.

CONCLUSION

Political psychology applies what is known about human psychology to the study of political behavior, focusing on individuals within a specific political system. Topics such as terrorism, public support for fascism, and ethnocentrism are commonly studied within political psychology to gain better traction on the perennial question of how well citizens are equipped to handle their democratic responsibilities. The scholars of Hilla, especially the family of (Al-Mutaher) AL Allamma AL Hilli and his son, Fakhr Al Muhakikin (the pride of investigators) has a prominent influence in the social and political life of the rule of the Mongols, especially in the era of Muhammad (Khadbanda). Al-Hali and his son who accompanied his father Al-Hasan bin Yusuf bin al-Mutahar in his travels has founded the school in publishing the sciences of the prophet's household people. Muhammad ibn al-Hasan al-Hilli was headed in 771 AH after the death of his father the leadership of science teaching after his father. He completed and wrote his father's books, who recommended that to complete them according to his father's will. He gave many scholars, whether from Hilla or outside Hilla Ijazats, and most notably Mohammed bin Makki, who turned publishing the science of the people of the prophet's household outside and inside Hilla. He wrote a lot of books in the fundamentals of jurisprudence,

theology and other sciences. The social status which lived in by Al-Allamma played a prominent role in Hilla and his father's great love for him and his relation to the Mughal Sultan led him to his killing, in which many scholars differed. The family of Al Mutahr presented to the city of Hilla and the Islamic cities many scholars and scientists with a lot of sciences.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Education for Human Sciences, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effectiveness of the Theory of Expansion in the Development of Mental Skills among Students

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ABSTRACT

The objectives of the current research are to identify the effectiveness of the expansionary theory in the development of mental skills among Fourth Grade students at the Faculty of Education for Human Sciences / Babylon University during the Academic Year 2017-2018. To achieve the research objectives, the researchers formulate the following hypotheses: The first hypothesis: There are no statistically significant differences at the level of significance (0.05) between the grades of the experimental and control groups in the performance of mental skills as a whole in the specified level of the questionnaire. The second hypothesis: There are no statistically significant differences at the level of significance (0.05) between the scores of the control group students in the pre-test and post-mental skills. The researchers adopted the experimental method, which has the ability to control the various factors affecting the phenomenon to be studied. The community of the study consists of (506) students, divided into (6) sections. The researchers conducted the pre-test of the sample and then their main experiment on the research sample, A curriculum based on the theory of expansion and then conducted the tests of dimension to be then processed statistically by (SPSS) program.

Keyword: *Development, Mental Skills, Effectiveness*

INTRODUCTION

The teacher preparation is one of the issues that has been and continues to occupy a large area of educational thought, and although it is one of the traditional issues, it is soon to put forward a new proposal with every development or change in dimension of the educational system, On the other hand, the success of development processes depends on the other hand. The teacher is the most important element in the educational process and its basic focus. It is the effective human element, which is the burden of the numbers and upbringing of the younger generations and giving them the basic qualities that are right and the direct responsibility for achieving the educational goals. , The efficiency of the educational system depends primarily on the efficiency and good preparation of the teacher ¹⁻³ . If the student can implement a mental skill successful implementation

of time, it means that he has the mental capacity to achieve this whenever he tried, but may be missed because his mind interferes improperly and spoils this mental and mental compatibility and reinforcement and can be demonstrated through the similarity of the process of developing the mental skill of students skills development process In technical development we show each one of them the most efficient techniques in the performance of special skill with advice on the use and with the improvement of students adapts this classical method commensurate with the body style and strength and length of the parties and the personality of the student. Al-Qatami (2011) confirms that the gradation of simple ideas to the most difficult described by the extended model helps to ensure that the learner is always aware of the educational context and the importance of different ideas being taught and allows him to learn the most appropriate level of difficulty, That ideas are not learned before their previous requirements are met and that it integrates the hierarchy with the overall structure of the extended sequence, as well as describing the use of parts of the strategies including learning sequential requirements at different points during the teaching

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process⁴. In the light of what is mentioned above, it has been found that teachers in the Faculty of Education of Human Sciences, to keep pace with the modern scientific development research found the of the theory of expansion effective of the (Rijloth) in the development of mental skills of the students identified the problem of research in the question: The Effectiveness of Raigloth's Expanding Theory on Developing Mental Skills in Students. Education occupies an important place in societies progress, because it aims at bringing about changes in human behavior, developing personality and directing people towards the service of their society. This process leads to a comprehensive change in the individual's intellectual, emotional and performance behavior from the very beginning of life till the end of it⁵⁻⁷. Through their curricula, faculties of Education are tackled in three basic aspects : the academic ,the professional and cultural aspect, including the academic specialization materials that the student will teach in the future in the primary , secondary schools, and the professional side which is composed of two elements: facts and information related to the teaching profession, scientific and practical skills that enable him to apply facts and information and to help his students to complete their growth. These two elements are inseparable. They overlap and each complements the master's skill in teaching methods and educational materials .It is natural for a teacher to be successful when mastering the specialization materials, and vice versa i.e., whatever mastered of the specialization materials will help the teacher to be able to connect fully to his students .He will not be able to play his role as education professional without mastering the skills and methods of teaching and other educational materials^{9,10}. Building a professional teacher is considered one of the most important basics of enabling his student to achieve the mastery and the desired goals that designed and planned by professionals in education to meet the challenges of comprehensive progress in light of the scientific, technological, social and economic changes of contemporary societies. Due to the importance of teacher preparation, there has been developed systems and teaching methods and programs in Colleges of Education locally and globally so as to raise the faculties outputs of the Faculties of Education and to cope with current scientific and technological developments¹¹. The expansionist theory is one of the modern theories that researchers in Education attempt to use to understand educational phenomena in their multiple overlapping dimensions. The systemic approach

relies on the so-called system, which essentially means a set of objects that have been grouped together in a field with their interacting relationships to achieve specific goals. Thus, the Education researchers feel there is an urgent need to adopt the systemic approach so that they can pursue the complex nature of the educational problems that are affected by an interactive set of different variables¹². The theory of expansion is one of the useful means in organizing the American curriculum: elementary, preparatory, secondary and university taking into account the level of difficulty at each stage. It is based on the logical sequence from general to specific and from abstract to the concrete, with details of the content of the curriculum to several stages followed by the summary, synthesis and conclusion stages. It was called the expansionist theory because it deals with the content of the teaching material at the extended level. It deals with the organization of a set of general concepts, principles or procedures that are included in a curriculum unit, or a course of study taught throughout a month, semester or year. The expansionist theory aims at finding a set of codified formulas that depict the content of the curriculum and organize it in a logical sequence that starts from the general to the specific and will help to construct a knowledge-based cognitive structure. This arrangement gives a general idea and then gradually separates it. The overall introduction is followed by a detailed description of the contents of this introduction horizontally or vertically in several stages, depending on the number of stages of detail on the size and level of difficulty of the content of the course material.

METHODOLOGY

In order to achieve the objectives of this research, the researchers adopted the experimental approach which is a control of the variables and their control in experimental situations. The experimental method is characterized by the ability to control the various factors affecting the phenomenon to be studied.

Research community and Samples

Research Community refers to all individuals or objects with certain observable characteristics. The only test of society is the existence of a common property among its members, and the characteristics of the society that can be observed are "milestones of society". The research community consists of the Fourth Grade students in the Faculty of Education for Human Sciences

/ Babel for the Academic Year (2017-2018). They are (506) students.

Research Sample

The sample is a subset of a community with common characteristics, the purpose of which is to generalize the results from a larger community (Abu Hwij, 2002: 45). Researchers choose the intentional method.

Research Communities Parity

The researchers statistically paired between the two groups of research (experimental and control) statistically before the start of the program in some variables that are believed to affect the safety of the experiment and the accuracy of results. These variables are:

- A) Pre-test scores (for mental skills).
- b) Mental capacity.
- C) The time period calculated in months.
- H. Test scores of mental skills.

The researchers obtained data on the dependent variable after applying a pretest prepared to measure the previous intelligence information.

Measuring Tool

To avoid the effect of this variable, the two researchers used the two sets of research (pre-post test) of the mental skills scale: the mental skills questionnaire is used to identify strengths and weaknesses and to follow their progress. The questionnaire is an adopted one which designed by two British psychologists - University of North Wales.

The questionnaire measures seven important aspects of the mental side:

- 1- The ability to imagine.
- 2 - Mental preparation.
- 3. Self-confidence.
- 4 - Dealing with anxiety.
- 5. Ability to focus.
- 6. The ability to relax.
- 7. Motivation.

The researchers have built an objective test according to the type of importance, since this type of test has many positives like its comprehensiveness and objectivity (truthfulness and consistency), as well as the ease of correction and lack of guessing effect. It is also more exciting and interesting for the student taking no long time to perform. The test paragraphs were derived by examining a number of literature in the curricula and teaching methods, writings related to mental skills, and extrapolating previous research and studies in the field of mental skills development.

Selection of Experimental Design

The experimental design means conducting a basic structure of an experiment, including the description of the groups that comprise the experiment members and the identification of the ways in which the sample is selected). Therefore, the researchers should choose an appropriate experimental design before conducting the experiment in order to test the validity of the results, noting that the educational experimental research did not arrive at a perfect experimental design of the control, and the control process remains partial because of the difficulty of controlling all the variables in the educational phenomenon. Since there are several experimental designs, the researchers chose a design suitable for the nature of the problem in their research. This is the pretest-posttest design. This design is illustrated in Table (1).

RESULTS AND DISCUSSION

Results related to the first main hypothesis

The first major hypothesis is that “there were no statistically significant differences at the level of significance (0.05) between the scores of the experimental and control groups in the performance of mental skills. In order to verify this hypothesis, researchers use the Mann-Whitney test. It appears that there is a statistically significant difference for the benefit of the experimental group. The calculated Mann-Whitney value is smaller than the tabular value at (0.05) Table (2).

Results related to the second hypothesis

The second main hypothesis is that “there were no statistically significant differences at the level of significance (0.05) between the scores of the control group students in the tribal and remote tests. To

investigate this hypothesis, the researchers use the Wilcoxon test. The calculated value of the appears to be greater than the tabular value at the significance level (0.05). Therefore, the null hypothesis is accepted. There is no statistically significant differences between the pre and posttests of the mental skills of the control group Table (3) .

Effectiveness Ratio

To determine the ratio of the effectiveness of the

independent variable (the training program) in the dependent variable (the mental skill scale, the theoretical aspect), the researchers applied the equation of MacGujian. The efficiency ratio appears to be 0.83. This indicates that the program is effective since scales denote that it should not exceed (0.60). To verify effectiveness, and if this is less, the program is ineffective (Roebuck, 1973-472-473).

Table 1. The number of the Fourth Grade students in the Faculty of Education for Human Sciences / Babel.

No.	Department	Male	Female	total
1	Mathematics	22	99	121
2	English	14	76	81
3	Physics	21	69	90
4	Biology	26	71	97
5	Chemistry	16	31	47
6	Computer Sciences	24	46	70
total		123	383	506

Table 2. Results of the Mann-Whitney test to determine the differences between the experimental and control groups In the overall performance of the skills as measured by the observation form.

Group	Number of community	Means of rank	Rank total	Mann Whitney Value		Statistical significance 0.05
				tabular	calculated	
Experimental	12	16.67	200.00	tabular	calculated	significant difference
control	12	8.33	100.00	37	22	

Table 3. Results of the Wilkinson test to find out the differences between pre and post application to measure the mental skills on the control group.

Group	tests	No.of community	Means of Rank	Wilcoxon Value		Statistical significance 0.05
				tabular	calculated	
Experimental	post	12	3.00	tabular	calculated	No significant difference
control	pre	12	4.75	14	19	

CONCLUSION

The interactive guide is effective in developing the mental skills of students / teachers. The highest level of mental skills was the ability to imagine first and then the other skills. They are (self-confidence - the ability to relax - motivation - the ability to focus and finally, the skill of dealing with anxiety) respectively.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon/ Faculty of Basic Education, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of the Clustering Strategy in the Acquisition of Students in Junior High in Grammar Arabic

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ABSTRACT

The aim of this study was to know the effect of the clustering strategy on achievement. The experimental method was adopted as a methodology for conducting research, which included an independent variable (the clustering strategy, the usual method) and a dependent variable. And the objective of the following variables (age of time calculated months, first grade grades in the rules, educational achievement of parents, test the previous parameters), the researcher to prepare the application requirements of plans, objectives and tests for the research groups, and after the violation After applying the experiment, the researcher applied the research tools to the two research groups. After correcting the students' answers, each student obtained data for the experimental group and the control. The data were statistically processed by the independent testing of two independent samples, and showed that the experimental group according to the clustering strategy exceeded the control group which were studied in the usual way in the variable scholastic achievement.

Keywords: *Clustering Strategy, Learning Achievement.*

INTRODUCTION

The development of the year of life, and the interaction with this development is required, and the world today is witnessing remarkable progress in all areas. The nations and societies are characterized by the knowledge, science and wealth of an educated human being capable of reviving themselves through their abilities to form their future, Therefore, the educational renaissance has to retreat from time to time and return to the fields of self-criticism in order to get what is most valuable in the development of the educational process. And the educational process tracker Found that there has been a remarkable shift in the last quarter of the twentieth century to studies on learning and education, after the psychologists and education focused on the principles of behavioral theory in their interpretation of the processes of learning and education became in

the early seventies focus on the principles of theories (constructivism cognitive) ¹ Behavioral theory interprets the process of learning as measurable observation responses, reinforced by practice and reinforcement, while cognitive constructivism views this process as internal mental processes expressed by the learner's ability to visualize, understand, absorb, retrieve, and use the information presented in similar situations ². that is, knowledge is driven in the mind by mental processes and that the structure of the total mind is constantly working to reorganize the cognitive pattern of the learner where the out put is permanently renewed subject to representation and adaptation influenced mainly by the positive Science and its effectiveness and experience and its unique characteristics, which make the learning process always dynamic process active does not stop at a particular moment and make the mind renew a member at every moment, changing the contents and structure of the time and place and environment elements surrounding the recipient that is the philosophy of constructive structure Antistatic stability, and integrative processes in return for dependence on the linear analytical mind, and positive by the learner. It is certain that the educational process can achieve its objectives in society only by means of communication through which scientific educational systems can be applied, namely,

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the language³. Therefore, each of the languages of the world must have rules and standards of language specific to their language, which will organize the language and make it understandable and easy to trade between their sons, without these controls and standards required by the nature of the Arabic language and the treatment of speakers is necessary was impossible to reach the meaning to the mind of the listener Or reader correctly and Understandable. Therefore, the grammars have an importance and a preference for the language, which is the balance of evaluating its validity, its pillars, the axis of its linguistic systems, and the wall that protects the Holy Quran and Sunnah from any attempt. The researcher believes that today we need to codify our science and ideas in Arabic language free of grammatical mistakes of the past and present in the future, and this will be achieved only by learning the rules of the Arabic language. Therefore, the researchers are interested in developing operational strategies followed by the teacher within the class, which is based on the theories of cognitive structure, which emphasizes the student's focus on the learning process without ignoring the role of the teacher as a key to the success of the educational process. Therefore, the educational system becomes more positive when concentrated on a group recent strategies such as self-learning strategy, problem-solving strategy, mental mapping, selective learning, exploratory learning, Active learning strategies, and clustering strategy are one of the Active learning strategies. A special structure is designed to influence the student interaction pattern and aims to improve the mastery of educational outcomes by engaging students in reviewing the covered materials for the lesson and achieving understanding of the content of the lesson. It is a sophisticated structure for students to help each other in small clusters, students seek to achieve a meaningful output for them and for members The students feel that each one of them has a specific responsibility and each one has a specific role to play in order to integrate the work of the whole group, so they become responsible for teaching each other as an alternative to traditional structures such as raising hands and then appointing a student teacher To answer the questions raised.

METHODOLOGY

It includes a presentation of the procedures followed to achieve the objectives of this research in terms of adoption of appropriate research methodology, design appropriate, the research community, the method of

sample selection and methods of equivalence of the two groups, and a description of the search requirements, tools and how to apply them and the statistical means used in data processing.

Experimental Design

Since the aim of the research was to identify the effect of teaching on the clustering strategy as an independent variable in the student achievement as a dependent variable, the researcher adopted the experimental design with partial control in two equal groups experimental study.

Research community

The current research community includes fourth grade students of all schools (secondary and preparatory) of the governmental day of the Directorate General of Education in the center of the province of Babylon for the academic year (2017-2018)

The research sample

The researcher chose the random sample of the study. It consisted of a school in the governorate center containing four divisions. Two random groups were also chosen to represent the experimental group and the control group. To achieve the objectives of the study, as in Table (1). The researcher ruled out students who failed because they had previous educational experience in the subjects that will be studied during the experiment. This affects the accuracy of the results of the experiment, although the researcher excluded them from the results only

Equal search groups before the actual teaching, the researcher carried out the equivalence of the students of the two research groups statistically in a number of variables that may affect the safety of the experiment and the accuracy of its results, as follows:

The age of the students calculated in months, the Educational achievement of the parents, the Educational achievement of the mothers, the grades of the students in the first semester of the Educational year 2017/2018 in the rule of the Arabic language

Control of the exotic variables Despite the parity procedures carried out by the researcher between the two research groups, Avoidance of the effect of some extraneous variables in the confidentiality of the

experiment, and then in the results. Here are some of these variables and how to control them. Before the actual teaching, the researcher carried out the equivalence of the students of the two research groups statistically in a number of variables that may affect the safety of the experiment and the accuracy of its results, as follows: The age of the students calculated in months, the Educational achievement of the parents, the Educational achievement of the mothers, the grades of the students in the first semester of the Educational year 2017/2018 in the rule of the Arabic language.

Control of the exotic variables Despite the parity procedures carried out by the researcher between the two research groups, Avoidance of the effect of some extraneous variables in the confidentiality of the experiment, and then in the results. Here are some of these variables and how to control them Experimental extinction: - There was no interruption of the students of the two groups of current research throughout the Experience period.

Conditions and associated accidents: Some experiments may be subjected to natural or abnormal events during the experiment, causing the experiment to be blocked and have an effect on the dependent variable next to the independent variable.

Sample Selection: Randomly selected and the two groups were checked.

The process of maturity: This factor had no significant effect in the current research, because the duration of the experiment was unified between the two research groups, as well as experimental design adopted by the researcher experimental design with partial adjustment, and on this basis, the resulting maturity and growth will return to students of my group search.

The impact of experimental procedures: The researcher worked to limit The impact of experimental procedures that can affect the dependent variable during the course of the experiment.

Preparation of research materials The research materials are basic and according to which the research procedures are carried out, which is: The educational material: The teaching material that the researcher is teaching has been determined for the students of the research groups during the period of the experiment (the second semester) of the academic year (2017-2018)

The first seven topics of grammar in the book of Arabic language (Part II) to be taught to students of the fourth.

Behavioral objectives the researcher formulated 68 goals in light of the general objectives and the content of the subject to be taught during the duration of the experiment. The researcher presented a list of behavioral objectives on the five levels of knowledge in the Bloom classification (recall, understanding, application, analysis, A selection of experts and specialists in the language and methods of teaching, and in the educational sciences to take their views and suggestions regarding the soundness of the formulation of the objectives and the extent to which the subjects of the content of the study covered by the experience,

Preparation of teaching plans: The researcher prepared a set of teaching plans for the experimental and control groups in the light of the topics of the book. The number of teaching plans (7) plans for the experimental group according to the clustering strategy and the same for the control group according to the usual method.

Research Tools: The current research requirements include the existence of a standardized tool to measure the achievement of intermediate second grade students in the Arabic Grammar for the experimental and control groups. Therefore, the researchers prepared a collection test consisting of (30)

The truth of the test: The researcher was keen to be a true instrument, and to achieve the objectives of the research so used two types of honesty: apparent honesty and trueness content The results showed that the apparent honesty obtained the percentage of agreement (80%) by the arbitrators and specialists. As for the validity of the content, the results showed that all the paragraphs of the test are statistically significant

Stability of the test: Midterm fragmentation: The researcher used the Pearson correlation coefficient to extract the coefficient of correlation between the individual and marital points of the test and was corrected by the Spearman-Brown formula. To calculate stability in this method, the researcher adopted the sample of the survey sample which reached (100) (0.86) and then corrected by Spearman-Brown equation (0.93).

Application of the achievement test before the end of the experiment a week, the researcher told the students of the research groups that there was a test for

them in the seven subjects that were studied for them. The researcher supervised with the Arabic language school the course of the test and the researcher explained how to answer the test paragraphs before the students began to answer

Statistical means

The researcher used the end-tailed(T-Test) for two independent samples: The researcher used the end-tit test for two independent samples in the equivalence between the experimental and control groups in the following variables: (the age of the students, the grades of Arabic grammar in the half year of the current year, and the final achievement test).

RESULTS AND DISCUSSION

The hypothesis of the research: “There is no statistically significant difference at the level of (0.05) between the average achievement of students of the experimental group who study the Arabic grammar using the clustering strategy, and the average score of students of the control group who study the same material in the usual way. To examine the hypothesis of the research, the statistical averages and the standard deviations of the scores of the two groups were extracted in the post-achievement test in the Arabic grammar, and the results of the T-Test were extracted to detect the significance of the differences between the averages, between the experimental and control groups on the post-achievement test in the Arabic grammar and by reference to the arithmetic averages, it is noted that these differences are in favor of the experimental group. In this way, we reject the null hypothesis and accept the alternative hypothesis, which means that the clustering strategy positively affects student achievement.

CONCLUSION

After correcting the students’ answers, each student obtained data for the experimental group and the control. The data were statistically processed by the independent testing of two independent samples, and showed that the experimental group according to the clustering strategy exceeded the control group which were studied in the usual way in the variable scholastic achievement.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Methods of Teaching Arabic Language, Faculty of Basic Education, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Training Effect on Listening Skills in the Pupils' Achievement with Learning Difficulties in Reading

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ABSTRACT

The research aims to identify the scope of that pupils have in learning difficulties for listening skills and improve these skills by training them on it , through an organized training program, the sample was chosen from the pupils of special education in the fourth class of primary, the sample of the research has made up of (12) pupils (masculine and feminine), the researcher used a questionnaire that was presented to the arbitrators to identify the listening skills which has required for the pupils in the research sample. The test of listening skills is used to identify the scope to which these pupils' possess of these skills. The researcher used the suitable statistical methods such as percentages and (w) test , the results of research reached to put a list contains all the listening skills required, the results of the research refers to a low level of the sample in all the listening skills required especially the organization of ideas skill as it presented in the audible text.

Keywords: *Training Effect, Skills, Pupils*

INTRODUCTION

Training is a modern and effective method to improve and develop any of the different life fields, whether in the personal , academic, financial, practical, family, health, or any other fields it takes a central position in the world as an important and effective method to achieve the aims by dividing it into tasks or small skills, then it refers to the achievement of knowledge and skill, proficiencies as a result of vocational education, or theoretical skills and knowledge that relate to specific useful proficiencies that forms the essence of apprenticeship, the training aims to change behavior and attitudes then develop skills and information especially the managerial behavioral skills in order to prepare pupils for the professional future and develop attitudes , understanding and the ability to solve problems , decision making, innovation, communication, listening art and negotiation , The listening skill needs training to develop in the individual , Economics and philosophies interested in the language, then there is no a doubt that the language form the minds of the nation and guide its thinking and build it, and prepare for the

linguistic activity what drives to and reduces the hard of life. ¹ Training and human development activity have increased significantly over the past few decades according to Volmer (1988) , more than 40 billion dollars a year is spent on human resources development ¹¹ , In education, teaching and learning requires Teachers turn the educational task into a reality, and as they admit (effective teachers and lecturers are usually responsible for introducing new learning concepts which demonstrate methods of thinking). ¹² Most of specialists and practitioners agree with each other that training is organized and planned process according to a specific methodology based on sound scientific foundations. Commitment is therefore necessary for this methodology if wanted to training programs to achieve the expected aims. The design of the training programs is represented a main stage in the methodology of training process, lots of researchers refer to that the design of effective training programs isn't done only in through a scientific assessment of the actual training needs of the participants in these programs. So preparing the training program aims, the determine its content, its subjects, its activities, effectives, diagnosed the suitable training methods, identification of other inputs required by the implementation process and dependent on the assessment of the training needs to.⁷ The importance of

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impact moving of training is that the training remains rigid and specific if it isn't move from one educational level to another. We learn to employ what we have learned in our applied life or use in facilitating learning of another kind, The concept of impact transmission is a behavioral phenomenon that's not occur spontaneously, but occurs according to objective and subjective terms. If these conditions be available, it will be easy to transform.⁶ Transition is the process that makes the use of previous education in new situations or the use of this learning to acquire another new learning, or it precedes future performance in a new situation, or the process of using something that a person has learned in another situation³. Listening is considered a linguistic art or main condition for the intellectual development, so this art is careless in our approaches especially in the Arabic countries, this is due to the lack of understanding of the listening process nature as well as its importance, the perception still that the skills development is limited to making the pupils read aloud of the open book in front of his/her classmates only to the limit that made the pupils lack of this skills and the clear lack of gotten it. So we spend most of our time listening even if there is a difference in the level of achievement and understanding. This is normal among individuals because of the individual differences, and it is a essential factor in the ability to talk, So that the learner can't pronounce the words correctly only if he/she listened well, as well as guiding between the listening skills and writing skills, because the writing mastery depends mainly on good listening that makes the learner able to distinguish between the letters and sounds, undoubtedly the good listener needs to increase the language and intellectual capital and cultural expression, that made his/her expression is more strength, although speaking expressive art and reading receptive art, but there is a great relationship between speaking and reading, each affects the other and influenced by, speaking weakness leads to the ability to read and to write, perhaps The importance of what has been revealed by some Studies that normal human takes in listening one third of what it takes in reading that is one of learning methods that helps to receive information, at the childhood level, the listening period is consider a period of custody for the rest linguistic skills of child, as the speaker reflects in the spoken language that he / she listens at home and the surroundings, so the speaker and his/her accent and fluent is effect on the listener and lead him/her to emulate what has he/she heard, Given the broadening of encouraging conditions for

listening art². The importance of language is reflected in the functions it performs. This aspect has attracted the attention of scholars, some of them have been viewed from a philosophical point of view, some of them have seen it from a social point of view and some of them have brought together the two sides, the listening is the origin of the language. But when the two languages were defined as one was audible and the other visual, so there are a lot of studies dealt with the listening skill, some Arabic studies and other foreign languages because of the importance of this skill in shaping the language of the individual, as well as its importance in developing its abilities⁴

METHODOLOGY

It includes a presentation of the procedures that were carried out to achieve the research aims, starting from research methodology, experimental design and identifying the research community and its sample, then prepared requirements and tools of research, as well as the presentation of the statistical methods used. The nature of the research requires an experimental approach that means the way that the researcher adjusts all the variables that effect of any phenomenon, Except for the (independent) experimental variable to measure its effect on the phenomenon (dependent variable).

The Experimental Design of the Research

It includes a particular independent variable (listening skills) and a dependent variable (learning difficulties). The experimental design is the search for a particular method for distributing the processors to the experimental parts so that we can obtain the least possible mistake, so the researcher used the experimental design with one group with pre-test and post- test.

Community and Sample of the Research

The community of the research made up of all pupils of fourth class in primary school of the General Directorate of Education in Babylon Governorate for the academic year (2017-2018), while the research sample, the researcher chose(Al- Al-Marifah Coeducation School) in the city center of Babylon intentionally in order to conduct her research, after choosing (Al- Al-Marifah School) the researcher found that the school made up of (100) pupils (male and female), who aged (10-13) years, the researcher applied the listening skills

test to identify pupils who had a low listening skill, After applying the test, the researcher found out that (12) pupils got the lowest marks on listening skills test. So the sample consisted of (12) Pupils, who will be trained on listening skills.

Research Instrument

The listening skills test was built to train pupils in the research sample as well as the instrument needs to require the following steps:

Preparation of the Test Items

Through the researcher's knowledge of some of the literature related to the research variables and listening skills tests, the researcher formulated the items of the listening skills test (30) items, then alternatives have given for answering (0,1) , that gives (0) for the wrong answer and (1) mark for the correct answer, so the highest mark be (30) while the lowest mark be (0).

Preparation of the Test Instructions

These instructions aim to explain the test idea in the simplest form to facilitate the process of the test applying, because the clear and understandable instructions contribute to increase the coefficients of the validity and consistency and objectivity of the test, in order to rely on the test, it is necessary to extract the psychometric properties:

The Test Validity

The validity of the test was verified and the validity of the structure was confirmed. The results showed that the apparent validity achieved the agreement percentage (80%) by the arbitrators. As for the validity of the structure, the results showed that all the test items were statistically significant, so the test considered validate.

The Exploratory Applying of the Test: that contains the following:

*** The First Test Applied:**

The listening skills test in the first test stage was applied to a group of fourth class pupils of primary without the research sample , that was (30) pupils , The purpose of it, is to know the clarity of the instructions and the test instructions, the comprehension and clarity of the test items for the pupils and calculate the time required for the test.

*** The Second Test Applied:**

The test was applied to a sample of (100) pupils in the fourth class of primary without research sample, that aims to analyze the test items statistically.

Discrimination Item:

Discrimination item is one of the most important things in test items that means the ability of items to find out about the pupils with the measured character, and the pupils who do not possess it. The value of the coefficient of distinguishing between the test items ranged from 0.32 to 0.60 that considered all the test items with a suitable and good factor.

The Test Stability

Estimation of the stability of the characteristics of the good test, although validity is more important than it, because the validity measure is constant and may not be a fixed measure is true because it may be homogeneous in its items, but measures a property other than that prepared for measuring, and to achieve the stability of the test was found to maintain the method Kyoder Richardson 20.

The Methods of Kyoder Richardson

Stability according to Kyoder Richardson 20, to determine the consistency of internal consistency, by determining how all test vocabulary is related to all other vocabulary and the test as a whole. Internal consistency results when all vocabulary or test tasks are linked. To estimate the stability coefficient, the researcher used the Kjoder Richardson equation 20 of the analysis sample The coefficient of stability of the test (0,75) was a good stability coefficient according to Ebel.

The Program Which Prepared to Train Pupils on Listening Skills:

The sessions of the program were prepared. The sessions of the program consisted of (28) sessions, and the time of each session (60) minutes in which the researcher used strategies (story strategy, summarization and taking roles) and video and recorded stories, the researcher used a variety of activities and each activity commensurate with the skill to be improved The activities and exercises have a great role in improving the listening skills of pupils, especially children, so these stories change in each session, whereas they discuss the

events of the story in the session.

The Statistical Methods Used

The researcher used Wilcoxon’s test to compare pre-test and post-test marks for test listening skills.

RESULTS AND DISCUSSION

After the researcher chose the research sample and applied the listening skills test, the program was also applied to the sample, the test was applied to the sample before and after applying the program, the researcher used the Wilcoxon’s test to identify the differences between the pre- and post-test, as in Table (1). Through the above table, the results showed that the calculated value was (292.4), which is less than the ruler value of (17) at the level of significance (0,05), indicating that there are differences between the pupils’ marks before and after the applied the program in favor of the post-test, so the null hypothesis disagreed, while the alternative hypothesis agreed. In addition, the researcher used the equation (Mac - Gujian) in the extraction of the impact size of the program effectiveness between the pre- and post-test , Table (2). The results of the this research refer to the effectiveness of the program that’s used to improve the listening skills of fourth class pupils in primary with educational difficulties. The results showed that the pupils who were exposed to the program improved their listening skills, so that the listening level increased significantly compared to listening before applying the program. The researcher attributed this positive result of the current research to that the training program was built according to the requirements of pupils with learning difficulties, and that the skills contained in the program commensurate with their abilities and potential and training to improve listening skills came in accordance with the structural theory that emphasizes the management of class discussion In addition, the researcher has used several different techniques in training to improve listening skills (verbal reinforcement, applause, praise, feedback). These methods increase the appearance of the desired response in the future and results in this Lib to strengthen its occurrence more and resurface again in other similar situations in the future. The results showed that there is no statistically significant difference between the male and female marks in the post-test within the experimental

group in listening skills as a whole. In essence, this process is successful by stimulating the pupils to the topic of the sessions so it can be said that the training programs based on scientific and objective basis may have a great role in helping pupils to face the problems they face.

Table 1. A comparison of pre-test and post-test marks shows the listening skills test

No.	The marks of the pupil in the pre-test	The marks of the pupil in the post-test	Differences
1-	23	24	1
2-	15	27	12
3-	12	25	13
4-	14	29	15
5-	18	19	1
6-	18	29	11
7-	19	29	10
8-	13	21	8
9-	17	19	2
10-	20	29	9
11-	14	29	15
12-	17	26	9

Table 2. The impact size of the program effectiveness

Average the pre-test marks	Average the post-test marks	Highest mark on the scale	Final sample size	Value of effect size
16.66	25.5	30	12	0.55

CONCLUSION

The test of listening skills is used to identify the scope to which these pupils’ possess of these skills. The researcher used the suitable statistical methods such as percentages and (w) test , the results of research reached to put a list contains all the listening skills required, the results of the research refers to a low level of the sample in all the listening skills required especially the organization of ideas skill as it presented in the audible text.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

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Theoretical Study of Extensive Air Shower Effects in Atmosphere by Simulating the Lateral structure of Several Cosmic Radiations

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ABSTRACT

Extensive air showers (EAS) are a cascade of electromagnetic radiation and ionized particles that produced in the atmosphere through the interaction of a primary cosmic ray with the atom's nucleus in the air producing a huge amount of secondary particles such as X-ray, electrons, neutrons, muons, alpha particles, etc. In this work, EAS effects were demonstrated by estimating the lateral distribution function (LDF) at ultrahigh energies of the various cosmic ray particles. The LDF of charged particles such as electron and positron pair production, gamma and muons particles was simulated at ultrahigh energies 10^{16} , 10^{18} and 10^{19} eV. The simulation was carried out using an air shower simulator called AIRES system version 2.6.0. The effect of the primary particles, energies and zenith angle (θ) on the LDF of charged particles produced in the EAS was taken into account. Comparison of LDF for charged particles and experimental results gave good agreement for electron and positron pair production and muons particles at 10^{19} eV for $\theta=0^\circ$ and 10° .

Keywords: AIRES system; lateral structure; extensive air shower; muons.

INTRODUCTION

High energy cosmic rays have been detected via the EAS that produced in the Earth's atmosphere¹. In 1930, Pierre Victor Auger, French physicist was discovered EAS through producing more and more particles in the atmosphere². A little part of the primary particle's kinetic energy has been converted into mass energy. Then, the residual kinetic energy can be distributed through the shower. The multiplication process is still continuing till the EAS particles energy still insufficient for producing more and more particles in sequential collisions. This stage of shower development can be called the maximum of shower^{2,3}. The LDF of charged particle in EAS is a requisite quantity for the observations of the Earth's cosmic radiation, which are mostly derived from the EAS observables⁴. The parameter that utilized for describing the shape of the

lateral structure density is the lateral shape parameter in the NKG function "Nishimura-Kamata-Greisen function"^{5,6}. The EAS develops in a convoluted way as a combination of electromagnetic and hadronic showers. It is important to fulfill a detailed numerical simulation of the EAS for inferring the primary cosmic radiation properties, which produce them. The number of charged particles in ultrahigh energy EAS may be enormous and may exceeding 10^{10} , therefore the simulations are an important way to challenge this situation⁷. Before the era of high-speed computing, Hitler presented a very simple model for the development of electromagnetic cascade⁸. At the time, Hitler, Rossi, and Gaisser developed more sophisticated analytical tools, which included more physical influences^{9,10}. In 2008, Cotzomi studied some observations about the LDF of charged particles at energy above 10^{17} Ev¹¹. In 2013, the age parameter of the lateral structure has been studied by Tapia by estimating the chemical composition of EAS particles¹². Recently, (in 2018), Ivanov was studied the distribution of the zenith angle of the cosmic ray showers measured with the Yakutsk array and its application to the analysis of arrival directions in equatorial coordinates¹³. The results of the current calculations show that the density

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of charged particles reaches the Earth's surface, such as the electron and positron pair production, gamma and muons particles, by simulating the LDF performed using the Monte Carlo AIRES system at ultrahigh energies 10^{16} , 10^{18} and 10^{19} eV. The comparison of the estimated LDF of the charged particles such as the electron and positron pair production and muons with the simulated results by Sciutto and Yakutsk EAS observatory gives good agreement at 10^{19} eV ^{14,15}.

METHODOLOGY

Hitler's model is the simplest conception of electromagnetic cascades and can extend it to the EAS. The purpose of using a very simple model is to show clearly the physics involved. Nevertheless, the most significant properties of the electromagnetic cascades has been predicted by Hitler's model ⁷. In the Figure 1a was shown a single photon that radiated by a single electron after transmitting splitting length ⁷:

$$d = \lambda_r \ln 2 \dots\dots (1)$$

Where, λ_r is the radiation length in the medium; d is the distance over which an electron loses, on average, half of its energy by radiation. After traveling the same distance, the photon is split into e^\pm pair. In either case, the particle's energy (electron or photon) is assumed to be evenly divided between two couple particles. After n splitting lengths, the distance x is given by:

$$x = n \lambda_r \ln 2 \dots\dots (2)$$

The total size of the shower for the electrons and photons is:

$$N = 2^n = e^{x/\lambda_r} \dots\dots (3)$$

When the particle energies become too low for pair production, the multiplication of EAS particles ceases. Therefore, Hitler takes this energy of electron as a critical energy that is given by the symbol (ξ_e^e) . The average energy lose of collision will exceed the radiative losses.

Through supposing a shower that initiated by a single primary photon with E_o primary energy, the cascade in this shower will reach its maximum size ($N = N_{max}$) when the produced particles have a critical energy ξ_e^e , therefor ⁷:

$$E_o = \xi_e^e N_{max} \dots\dots (4)$$

As shown in figure 1b, the air showers initiated by the hadrons were designed using a method similar to Hitler's method ⁷. Charged (π^\pm) and neutral (π^0) pions produced when hadron particles traversing one layer in atmosphere. Through this process, the π^0 pions directly will be decayed to photon particles and therefore the electromagnetic cascade initiated

⁷. Figure 1b demonstrates the electromagnetic showers through the decaying of the π^0 pions (dashed lines). While the π^\pm pions will continue interacting in the shower until their energy become below the critical pion energy (ξ_π^e) . Accordingly, the π^\pm pions will decay to muons that reach the earth ⁷.

Lateral Distribution Function

The LDF of charged particles in EAS is an important quantity of the ground surveillance for cosmic radiations, from which most cascade observables are deduced ¹². Studying of EAS may be performed experimentally on the surface of the ground, underground and at many mountain rising through determining some LDF quantities, i.e. the density of charged particles initiated in EAS as a function of the shower core distance or in another meaning, the LDF is the shower structure of the cascade at various depths in atmosphere ². The expression that used extensively for describing the LDF form is the NKG function that is given through the forum ⁵:

$$\rho(r) = \frac{N_e}{2 \cdot \pi \cdot R_M^2} * C(s) * \left(\frac{r}{R_M}\right)^{(s-2)} * \left(\frac{r}{R_M} + 1\right)^{(s-4.5)} \dots\dots (4)$$

Where $\rho(r)$ is the particle density on the distance r from the shower core, N_e is the total number of shower electrons, $R_M = 118$ m is Molier radii, s is the shower age parameter, and $C(s)$ is the normalizing factor which is equal $0.366 s^2 * (2.07 - s)^{1.25}$ ⁶.

RESULTS AND DISCUSSION

Simulating of LDF using AIRES system

AIRES is an acronym for AIR-shower Extended Simulations, which is defined as a set of programs and subroutines that used for simulating the EAS particle cascades, which initiated after interaction of the primary cosmic radiations with a high energies in the atmosphere and manage all the output associated data [14]. AIRES provides full space-time particle propagation in a true medium, where the features of the atmosphere, the geomagnetic field and Earth's curvature are taken into account adequately[14]. There are many particles are taken into account through the simulation using AIRES system such as: "electrons; positrons; gammas and muons". The incident primary particle in EAS may be primary proton or iron nuclei or other primaries that mentioned in the AIRES guide document with a very high primary energies that may exceeding 10^{21} eV [14]. Figure 2 shows the density of several secondary particles as a function of the distance from the shower axis that reaches the Earth's surface by AIRES simulation. The effect of the primary particles (proton) and energy (10^{19} eV) on the density of charged particles produced in the EAS was taken into consideration. As shown in figure 2, the density of several secondary particles decreases with increasing the distance from the shower axis. Finally, the primary energy is divided between muons and electromagnetic particles (electron and positron pair production and gamma particles) in sub-showers. Figure 3 displays the effect of the primary

particle energies on the density of secondary particles for zenith angle ($\theta = 10^\circ$) of the primary particles (iron) by AIRES simulation. Through this figure one can see that the lateral density of different secondary particles is directly proportion to the primary particle energy, i.e. the lateral density increases with increasing the primary energy.

Comparison with Sciutto experience and the Yakutsk Observatory

Figure 4 demonstrates the comparison between the present results of LDF that performed by AIRES simulation (solid lines) with the results simulated by Sciutto (triangle symbols)[14]. This figure displayed a good agreement of the secondary particles (electron and positron) that were initiated by primary proton at energy 10^{19} eV and vertical EAS showers. The Yakutsk EAS array studies the very high energy cosmic radiations, which occurs in the field of astrophysics, that is, an important area in the physics. There are two main goals for the construction of the Yakutsk EAS observatory; the 1st goal is the elementary particles investigating of the cascades that initiated by the primary particles in atmosphere. The 2nd goal is the astrophysical characteristics reconstruction of the primary particles such as: "mass composition, energy spectrum, intensity and the their origin" [15]. Figure 5 shows the comparison between the present results with the experimental data that obtained by Yakutsk Observatory [15]. The curves in this figure displayed a good agreement for (electron and positron) that initiated by primary proton at energy 10^{19} eV and slanted EAS showers with $\theta = 10^\circ$.

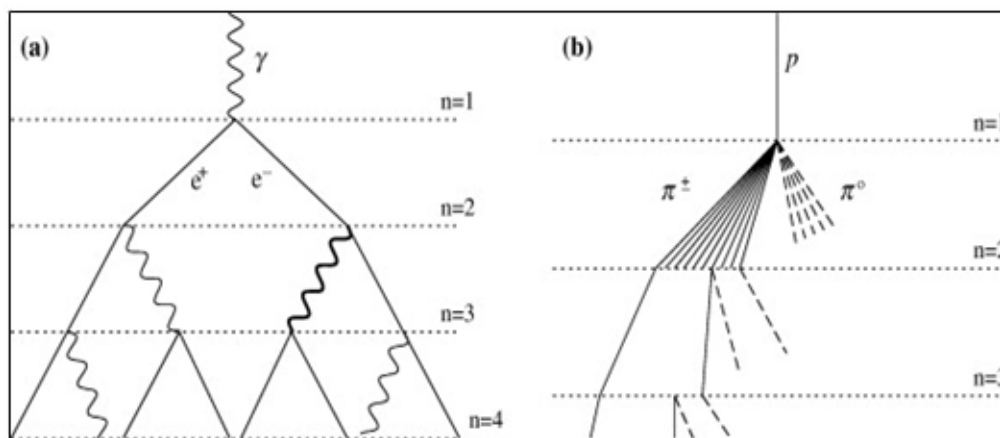


Figure 1. Schematic views of (a) Electromagnetic cascade and (b) Hadronic shower[7].

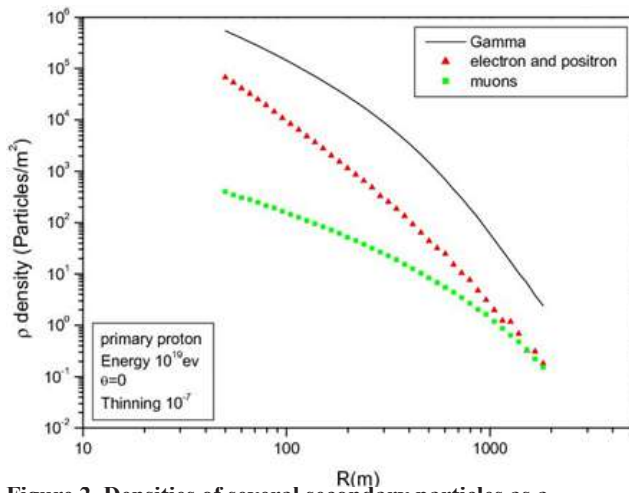


Figure 2. Densities of several secondary particles as a function of R that reaches the Earth's surface for vertical showers at energy (10^{19} eV) of proton.

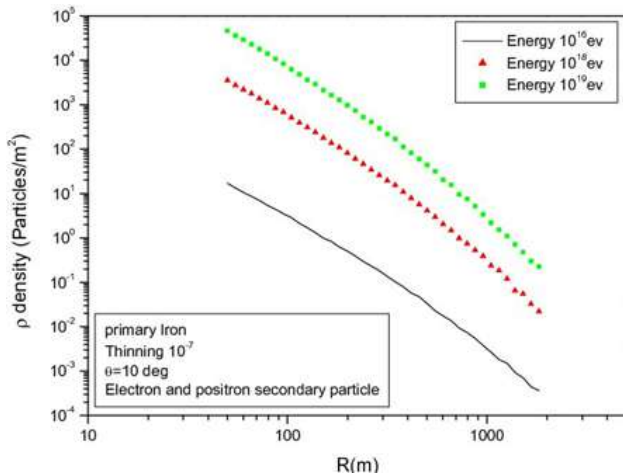


Figure 3. The primary energy effects on secondary particle densities for primary Fe at zenith angle ($\theta = 10$).

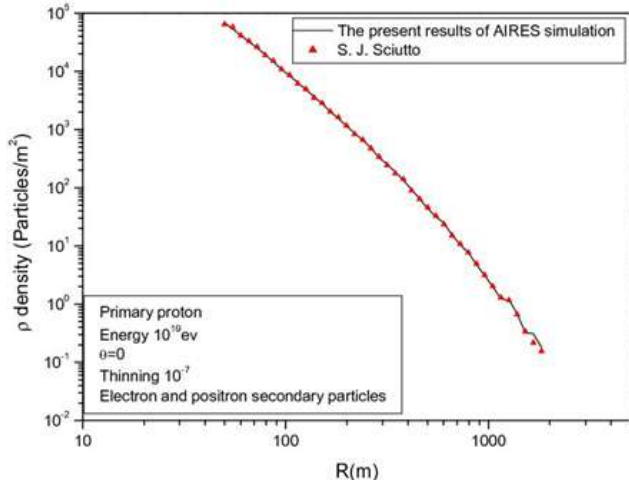


Figure 4: Comparison between the present results of simulated LDF by AIREs system with the results that simulated by Sciutto for primary p at energy 10^{19} eV for (electron and positron) secondary particles.

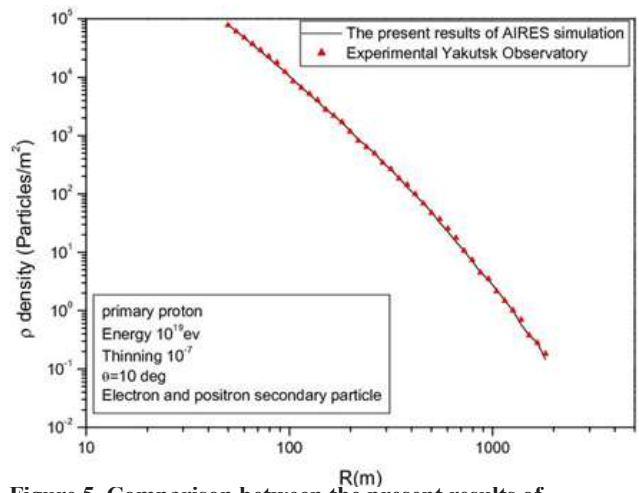


Figure 5. Comparison between the present results of simulated LDF by AIREs system with the experimental data obtained by Yakutsk Observatory for primary p at energy 10^{19} eV for (electron and positron) secondary particles.

CONCLUSIONS

In the present work, the lateral distribution function of charged particles using AIREs system for two primary particles such as (proton and iron nuclei) was simulated at different ultrahigh energies 10^{16} , 10^{18} and 10^{19} eV. The simulation of charged particle lateral structure demonstrates ability for identifying the primary cosmic ray particle and its energy. The important advantage of the present work is to make a library of Lateral structure samples that may utilized for analyzing real EAS events that detected and registered with an EAS arrays. The introduced results using AIREs system are identified with Yakutsk experimental data, proving that AIREs system provides an appropriate environment for the study of high-energy cosmic rays. Therefore, charged particles reaching the Earth's surface have many effects on weather, human health and other effects.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Physics, College of Science, Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Type II Toxin Antitoxin System in Imipenem Resistant *Klebsiella pneumoniae* in Baghdad, Iraq

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ABSTRACT

Toxin Antitoxin (TA) systems have recently received much attention as one of the most promising antimicrobial targets. This study was designed to evaluate the presence of type II toxin antitoxin system and biofilm formation among imipenem resistant *Klebsiella pneumoniae* isolates in Baghdad. A total of 39(22.94%) *Klebsiella pneumoniae* isolates were collected from patients. Antimicrobial susceptibility test was performed and the biofilm formation was assayed by micro titer plate, then PCR was performed for detection of Toxin Antitoxin -Type II, Biofilm and Quorum sensing genes. The results show that the imipenem resistance was seen in 23(58.97%) of *K.pneumoniae* isolates. Then, the isolates showed levels of resistance percentage to antibiotic, with a highest resistance rate reached to (100%) for ampicillin and recorded lowest resistance rate to ciprofloxacin and levofloxacin reached to (10.26%) and (7.69%), respectively. Among these isolates, 22(56.41%) were biofilm producers. All 39 *K.pneumoniae* isolates showed different results for *ompA* and *bap* genes when were found by 9(23.08%) isolates for *ompA*, while, all isolates didn't have *bap* gene. Further, TA system genes were found by 15(38.46%), 15(38.46%), three (7.69%) and five (12.82%) for *mazEF*, *ccdAB*, *relBE* and *mqsR*. On the contrary, all isolates didn't have QS system genes as *lasIR* and *rhlIR* genes.

Keywords: *Klebsiella pneumoniae*, imipenem resistance, persister cells, plasmid.

INTRODUCTION

A toxin-antitoxin (TA) system is a set of two or more closely linked genes that together encode both a protein "poison" and a corresponding "antidote" ¹. Accumulating knowledge about structure and function correlation of toxin-antitoxin systems from pathogenic microorganisms for develop antibiotic that target specific bacteria. Toxin antitoxin systems were initially discovered as plasmid in 1983 addition systems on plasmids with low number due to their ability to stabilize plasmids by post segregational killing ². Later on, they were also discovered in chromosome play the role in the stabilization of the chromosome and integrative conjugative plasmids ³. However, the definition of toxin-antitoxin modules is no longer restricted to entities that

provide control over genetic material, but expanded to a wide range of biological functions including defense against phages, growth control, persistence, biofilm formation programmed cell death (PCD), and general stress response ⁴. TA systems were classified to six types depending on the activity and nature of the antitoxins: antitoxins :type II, IV, V and VI toxin antitoxin systems ⁵. Type II TAs, the most prevalent type on prokaryotic genomes and plasmids, are bicistronic operons which code for a toxin protein and an antitoxin protein. Most of the type II TAs are typically less than 1 kb, encode endoribonuclease toxins ⁶ and propagate through horizontal gene transfer ⁷. Numerous toxins are mRNA interferases, either ribosome dependent (e.g. RelE, YoeB, YafQ and YafO) or ribosome-independent (e.g. YhaV, MqsR, ChpBK, MazF, HicA and PemK) ⁸.

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MATERIALS AND METHOD

Bacterial Isolates: A total of 343 different specimens were collected from patients in Baghdad hospitals between October 2015 and March 2016 for

isolation *Klebsiella pneumoniae* isolates, the isolates were diagnosis using and vitek 2 system.

Antibiotic sensitivity testing and MIC to imipenem

The sensitivity testing of all isolates to different antibiotics and the MIC to imipenem were testing by using Vitek-2 system using antibiotic sensitivity test number (AST-GN69) and (AST-N222) cards according to the manufacturer's instructions which included antimicrobial agents as follows: Ampicillin(AM), Amikacin(AK), Amoxicillin/clavulanic-acid(AUG), Ampicillin/sulbactam (SAM), Aztreonam(AZT), Cefazolin(CZ), Cefepime(CPM), Cefotaxime (CTX), Ceftazidime(CAZ), Ceftriaxone(CRO), Ciprofloxacin(CIP), Doxycycline(DXT), Gentamicin(GM), Imipenem(IMI), Levofloxacin (LEV), Meropenem (MEM), Nitrofurantoin(NIT), Piperacillin(PRL), Piperacillin/tazobactam(PTZ), Tetracycline(T) Ticarcillin/clavulanate (TIM), Tobramycin(TM) and Trimethoprim/sulphamethoxazole(TS).

Detection of Biofilm Formation

In the present study, we screened the isolates for their ability to form biofilm by micro titer plate according to the procedure described by Badmasti *et al.* (2015) ⁹. Briefly, *K. pneumoniae* isolates were grown overnight in LB broth+0.25 % glucose (LBG) prepared at 37 °C. On the next day, the culture diluted 1:50 in freshly prepared LBG pre-warmed to 37° C. Then, 200 ml suspension was used to inoculate sterile 96-well polystyrene microtitre plates, followed by incubation for 72 h. at 37 °C. After washes with PBS prepared any remaining biofilm was stained with crystal violet for 30 min after drying at room temperature for 15 min. Washed with PBS again. The dye bound to the adherent cells was resuspended with 200 ml ethanol/acetone (80:20, v/v) and OD570 quantified using an ELISA reader. The O.D value for control well was deducted from all the test O.D value.

Molecular Detection of Toxin Antitoxin -Type II, Biofilm and Quorum sensing genes

The imipenem-resistant *Klebsiella pneumoniae* isolates tested for Toxin-antitoxin (TA) (Type II) system genes, Biofilm genes and Quorum sensing (QS) system genes by using primers (Table 1). DNA genomes from isolates were extracted by using a commercial

purification system (Genomic DNA Purification Kit) and Plasmid DNA was extracted by PureYield™ plasmid Miniprep system, then PCR was used to amplify these genes in a total volume of 25 µl containing 1 µl PCR buffer, 2 mM MgCl₂, 2 mM dNTPs, 10 pmol of primers, 0.25U *Taq* DNA polymerase and 5 µl of template DNA. PCR products were analyzed by electrophoresis on 1% (w/v) agarose gel containing DNA safe. Agarose gels visualized by gel documentation (10).

RESULTS AND DISCUSSION

Bacterial Isolates

In this study, a total of 39 isolates (22.94 %) *Klebsiella pneumoniae* was isolated from 343 different clinical samples in Baghdad city. It was clear that it could be found as causative agent of RTI (sputum) 11(28.20%), also it is mainly associated with blood samples 9(23.08%); beside to 7(17.95%) from burns and 6(15.38%) from wound swabs; with low percentage from urine samples and ear infection which showed, 4(10.26%) and 2(5.13%), respectively.

Antimicrobial Susceptibility of *K. pneumoniae* isolates

In current study, isolates of *Klebsiella pneumoniae* showed a different levels of resistance rate to antibiotic (table 2), with a highest resistance percentage reached to (100%) for ampicillin, (89.74%) for piperacillin, (84.62%) for cefazolin, ceftazidime and cefepime, (82.05%) for ampicillin/sulbactam, ceftriaxone, aztreonam and cefotaxime, (76.92%) gentamicin, (71.8%) ticarcillin/clavulanic acid, (66.67%) amoxicillin /clavulanic acid and tobramycin, then moderate resistance percentage reached to (48.72%) for nitrofurantoin, (30.77%) for tetracycline and doxycycline, and recorded lowest resistance rate to ciprofloxacin and levofloxacin reached to (10.26%) and (7.69%), respectively. The numbers of *K. pneumoniae* isolates that gave MIC values more than break point for imipenem were 23 (58.97%) and these values assure resistance of studied *K. pneumoniae* isolates for this antibiotic.

Biofilm Formation

The results obtained that out of 39 *K. pneumoniae* isolates, 22(56.41%) were biofilm producers isolates by using micro titer plate. The current results recorded

that the highly percentage of biofilm production, and imipenem resistance for *K.pneumoniae* isolates was located within the weak and then moderate patterns. Therefore, these isolates may need this resistance but in this type of patterns of biofilm formation more than other patterns. From weak pattern of biofilm producers for *K.pneumoniae*, results showed that the highly number of biofilm producer's isolates and biofilm producers imipenem resistant isolates were isolated from sputum specimens. The results showed that the *ompA* gene was present in 9(23.08%) isolates of *K.pneumoniae*, while, all isolates didn't have *bap* gene.

Detection of Toxin-antitoxin (TA) (Type II) and QS systems genes

All *K.pneumoniae* isolates were tested for detection of toxin-antitoxin (TA) (Type II) and Quorum sensing (QS) systems genes by PCR technique. The PCR products have been confirmed by comparing its molecular weight with 100 bp DNA Ladder (table 3). The presence of *mazEF* system genes that which composed of *mazF* and *mazE* genes were in 15(38.46%) isolates (figure 1) and also *ccdAB* system genes that which composed of *ccdB* and *ccdA* genes were present in 15(38.46%) isolates of *K.pneumoniae* (figure 2). On the other hand, results showed that *relBE* system genes (*relE* toxin and *relB* antitoxin) were present in three (7.69%) isolates (figure 3). All isolates contained plasmids. Eight of isolates has just one mega-plasmid (more than 10kb). Seventeenth of isolates has just one large plasmid, their molecular size between 4kb-10kb. In addition, three of isolates has just one large plasmid their molecular size more than 2kb. While, six of these isolates pose more than one plasmids, their molecular size between (4kb-10kb). On the other hand, 4, 14 and 4 eluted plasmid DNA of *K.pneumoniae* were positive to *mazEF*, *ccdAB*, *mqsR* genes respectively, while 11, 1, 3 and one isolate were positive to *mazEF*, *ccdAB*, *relBE* and *mqsR* when we applied monoplex PCR on the chromosomal DNA of these isolates.

Relationship between biofilm formation and genes of biofilm, TA and QS systems for all imipenem resistant isolates under study

All of imipenem resistant isolates showed different results between them after tested for detection of some genes under study and their relationship with biofilm formation. From the detection results, 17 *K.pneumoniae* isolates which imipenem resistant and biofilm producers

showed positive results for *ompA* reached to seven (41.18%), while didn't have *bap* genes. Further, for TA and QS system genes, these isolates showed positive results reached to seven (41.18%), 10(58.82%) and three (17.65%) for *mazEF*, *ccdAB* and *relBE*, while didn't have other genes as *mqsR*, *lasIR* and *rhIR*. Therefore, the results revealed that no-relationship between biofilm production and these genes except *ccdAB* and it is interesting, for clarify the relationship between these parameters may be need to study gene expression for these genes to determine this relationship. DNA sequencing was performed on PCR products, sequenced PCR products revealed strong sequence identity (99 -100%) to the reference TA system sequence. Interestingly, results in present study showed approximately that all *K.pneumoniae* isolates were multidrug resistant isolates (MDR). Fouzia and Damle, (2015)¹¹ observed that $\geq 80\%$ isolates of *K.pneumoniae* were resistance to third generation cephalosporins and other antibiotics, making them multidrug resistant (MDR) isolates. The results of antimicrobial susceptibility test of *K.pneumoniae* in current study were consistent with other results as Al-Sehlawi (2012)¹² who showed that the resistance rate of *K.pneumoniae* isolates toward the antimicrobials was (92.2%) to piperacillin, followed by (59.2%) to nitrofurantoin, (50%) to gentamicin and (48.5%) to tobramycin. Recently, the study by Hussein and Hamed (2017)¹³ obtained the antimicrobial resistance patterns of isolates was (100%) resistance for ampicillin, (87.6%) for cefazolin, (85.71%) ceftazidime and trimethoprim/sulf., (83.92%) cefepime and ceftriaxone, (78.58%) ampicillin/sulbactam, (66.07%) gentamicin, (57.14%) tobramycin. Local study done by Al-Marjani and Khadam (2016) showed that 64.29% and 85.71% of isolates were resistant to ceftazidime and cefotaxime respectively and ciprofloxacin 37.5%. From weak pattern of biofilm producers for *K.pneumoniae*, results showed that the highly number of biofilm producers isolates and biofilm producers imipenem resistance isolates was isolated from sputum specimens. One of the present study objectives was to detect the existence and prevalence of common biofilm encoding genes among all clinical isolates. The results showed that the *ompA* gene was present in 9(23.08%) isolates of *K.pneumoniae*, while, all isolates didn't have *bap* gene. The antitoxin physically forms a toxin-antitoxin complex (TA complex), resulting in toxin sequestration from the cellular target. The antitoxins have a high turnover rate due to rapid degradation by proteases like

Lon, while toxins are relatively stable. The TA complex binds to the promoter/operator region of the TA operon, thus inducing transcriptional repression. This auto-regulatory mechanism prevails in most of the type II TAs characterized to date⁸. One of the powerful antibacterial strategies is an artificial activation of the toxin, which could be accomplished by using small compounds or peptides as inhibitors of the protein (toxin)-protein (antitoxin) interactions¹⁴. Then, from PCR analysis of

plasmid DNA did not yield any positive amplification, indicating that in *A.baumannii*, the screened TA systems were chromosomally mediated. Then, Yamaguchi *et al.*(2011)⁸, revealed to the presence of at least 33 TA systems in *E.coli* and more than 60 TA systems in *M. tuberculosis* suggests that the TA systems were involved not only in normal bacterial physiology but also in pathogenicity of bacteria.

Table 1. Primers used for detection of genes encoding TA, biofilm and QS genes in imipenem resistant *K.pneumoniae* isolates.

Primer name	Sequence (5'-----3')	Product size(bp)	Reference
<i>ompA</i>	F: GCTACTATGCTTGTTGCTGCT R: CGCTTCTTGACCAGGTTGAAC	1023	Badmasti <i>et al.</i> (2015)
<i>bap</i>	F: ATGCCTGAGATACAAATTAT R: GTCAATCGTAAAGGTAACG	1449	
<i>mazE</i>	F: ATGATCCACAGTAGCGTAAAGCGT R: TTACCAGACTTCCTTATCTTTCGG	249	Hematiet <i>al.</i> (2014); Karimiet <i>al.</i> (2015)
<i>mazF</i>	F: ATGGTAAGCCGATACGTACCC R: TGGGGCAACTGTTCCCTTT	288	
<i>ccdA</i>	F: GACAGTTGACAGCGACAGCT R: TCACCAGTCCCTGTTCTCGTC	199	
<i>ccdB</i>	F: GAGAGAGCCGTTATCGTCTGTT R: TCCCCAGAACATCAGGTTAATG	272	
<i>relB</i>	F: ATGGGTAGCATTAACCTGCGT R: TCAGAGTTCATCCAGCGT	240	
<i>relE</i>	F: GACGAGCGGGCACTAAAGGAAT R: TCAGAGAATGCGTTTGACCG	267	
<i>mqsR</i>	F: ACGCACACCACATACACGTT R: GCCTGGGTCTGTAAACATCCT	194	
<i>lasI</i>	F: GTGTTCAAGGAGCGCAAAGG R: AACGGCTGAGTTCCCAGATG	238	Hematiet <i>al.</i> (2014)
<i>lasR</i>	F: TCGAACATCCGGTCAGCAAA R: GTTCACATTGGCTTCCGAGC	128	
<i>rhlI</i>	F: CCGTTGCGAACGAAATAGCG R: CAGTTCGACCATCCGCAAAC	308	
<i>rhlR</i>	F: TCGCTCCAGACCACCATTC R: GACGGAGGCTTTTTGCTGTG	284	

Table 2. Antimicrobial sensitivity test results of imipenem-resistant *K.pneumoniae* isolates

Antimicrobial agents.	Resistance (%)	Antimicrobial agents.	Resistance (%)
Amikacin	24(61.54)	Gentamicin	30(76.92)
Amoxicillin/clavulanic-acid	26(66.67)	Imipenem	23(58.974)
Ampicillin	39(100)	Levofloxacin	3(7.69)
Aztreonam	32(82.05)	Meropenem	22(56.41)
Ampicillin/sulbactam	32(82.05)	Nitrofurantoin	19(48.72)
Cefazolin	33(84.62)	Piperacillin	35(89.74)
Cefepime	33(84.62)	Piperacillin/ tazobactam	24(61.54)
Cefotaxime	32(82.05)	Tetracycline	12(30.77)
Ceftazidime	33(84.62)	Ticarcillin/clavulanate	28(71.8)
Ceftriaxone.	32(82.05)	Tobramycin	26(66.67)
Ciprofloxacin	4(10.26)	Trimethoprim/sulphamethoxazole	24(61.54)
Doxycycline	12(30.77)		

Table 3. Number and percentage of TA Type II and QS genes for *K.pneumoniae* isolates.

No. of isolates	39 <i>K.pneumoniae</i>	
	No.(%) (+V)	No.(%) (-V)
<i>mazEF</i>	15(38.46)	24(61.54)
<i>ccdAB</i>	15(38.46)	24(61.54)
<i>relBE</i>	3(7.69)	36(92.31)
<i>mqsR</i>	5(12.82)	34(87.18)
<i>lasIR</i>	0	39(100)
<i>rhlIR</i>	0	39(100)

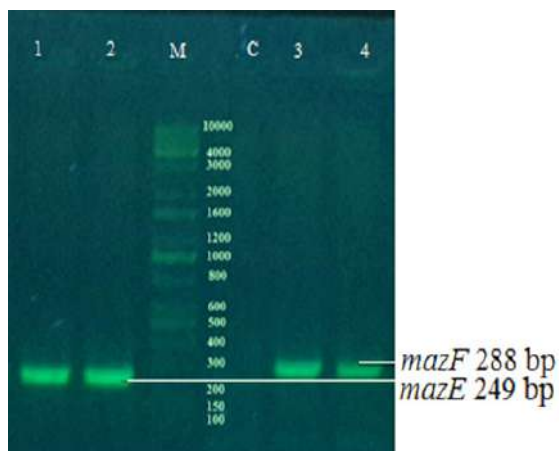


Figure 1. Detection of *mazEF* system genes by monoplex PCR. lanes 1-2, *mazE*; Lane M, 100 bp DNA ladder; Lane C, Negative control; lanes 3-4, *mazF*; was done on agarose gel (1%) at 5 V/cm for 1 h, stained with Red Safe dye and visualized on a UV transiluminator documentation system.

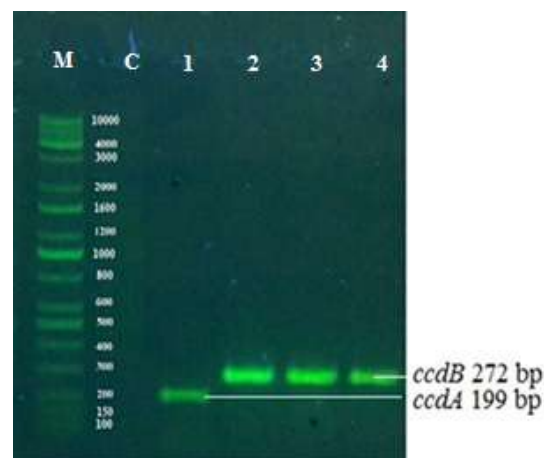


Figure 2. Detection of *ccdAB* system genes by monoplex PCR. Lane M, 100 bp DNA ladder.; Lane C, Negative control.; lane 1, *ccdA*; lanes 2-4 *ccdB*; was done on agarose gel (1%) at 5 V/cm for 1 h, stained with Red Safe dye and visualized on a UV transiluminator documentation system.

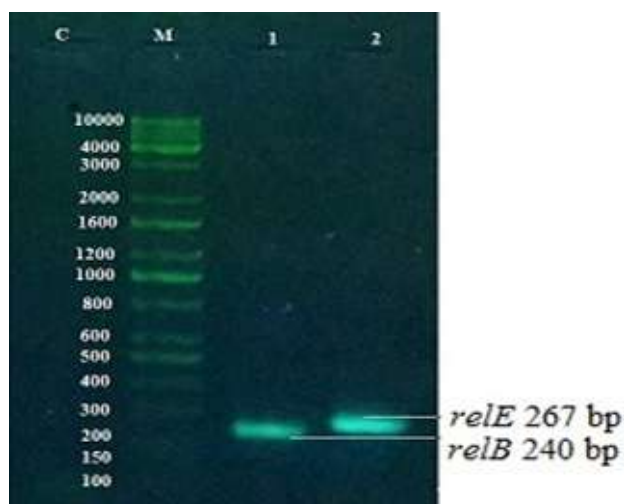


Figure 3. Detection of *relBE* system genes by monoplex PCR. Lane C, Negative control.; Lane M, 100 bp DNA ladder. Lane 1, *relB*, Lane 2, *relE*.; was done on agarose gel (1%) at 5 V/cm for 1 h, stained with RedSafe dye and visualized on a UV transilluminator documentation system

CONCLUSION

In conclusion, the *mazEF*, *ccdAB*, and *mqsR* are widespread in *Klebsiella pneumonia* clinical isolates in Baghdad.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Biology, College of Science, Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Fiber Content and Acceptability of Rice Bran Cookies for Young Women in Mamuju Regency

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ABSTRACT

Obesity is a detrimental overweight medical condition and it increases health problems. adolescentPrevalence (very fat) aged 13-18 years of West Sulawesi Province at 2.1%. Fiber is a substance that can prevent the occurrence of obesity. Rice Bran is a by-product of rice mills, with a total production of 4.8 million tons / year. Rice Bran contains high enough fiber, which can be processed into various products, one of them is cookies. The purpose of the study was to determine the fiber content of the substitution of rice bran cookies and acceptability. This research is a laboratory experiment to find out the absorption capacity, while the acceptability uses an organoleptic test that uses as many as 30 young women as panelists in Mamuju Regency. Fiber content was obtained from gravimetric tests and acceptability was obtained through organoleptic tests using a questionnaire. The results of this study indicate that the highest fiber content of rice bran cookies is 45% from bran substitution with an average of 5.65% with an acceptance test of 70% likes of taste, 70% likes of texture , 80% likes of color, and 60% likes of flavor. Rice bran cookies can be a rich in fiber snack for teenagers, especially for young women.

Keywords: *bran, cookies and fiber.*

INTRODUCTION

There are currently many health-labeled food products in accordance with the global trend. One message that emerges is fibrous food products. Pastries or cookies are food products that are requested by Indonesian people. Purchases, both home-made and factory-made, increase every holiday. The average consumption of cookies in Indonesia is 0.40 kg / capita / year¹. Food fiber is part of food that cannot be digested by human digestive enzymes. According to the Nutrition Adequacy Rate (AKG) in 2012, the amount of dietary fiber that must be consumed by adults is 20-35 grams / day.

Basic Health Research data in 2013 shows that prevalence of overnutrition nationally in adolescents aged 13-15 years in Indonesia amount to 10.8% consisting of 8.3% fat and 2.5% very fat (obesity). Prevalence of adolescents at the age of 16-18 years experienced a significant increase from 2007 of 1.4% to 7.3% in 2013. Prevalence of obesity in West Sulawesi Province aged 13-15 years was 1.5% and the age of 16-18 years was 0.6%.

Rice Bran contains fiber that is high enough, every 100 grams of bran contains 25.3 grams of fiber². Rice bran is the outermost part of the grain that is wrapped by chaff or is a byproduct of rice mills, with a number of production 4.8 million tons / year³. Besides containing fiber that is good for the body, rice bran also contains antioxidants, such as vitamin E which can prevent diabetes mellitus, coronary heart disease and slow aging. The use of rice bran is limited as animal feed so far, this condition causes the sale value of rice bran to be low.

This study aims to determine fiber content and acceptability (taste, texture, color, and flavor) substitution of bran flour in cookies.

RESEARCH METHOD

Materials and tools

The material used in this study consisted of ingredients for making cookies and determining fiber content. Flour, bran flour, butter, sugar flour, vanilla powder, eggs and corn starch were used. In making cookies, While chemicals were obtained from the Makassar Institute of Health Laboratory. the tools used are mixers, ovens, cookie cutters, containers, and scales.

Experimental design

This study uses a completely randomized design. The sample of this research is cookies with the substitution of rice bran flour 0%, 15%, 30%, and 45% with 3 times of each repetition. The fiber content analysis was carried out at the Makassar Institute of Health Laboratory and

the acceptance test which included taste, color texture and flavors with 30 panelists.

Rice bran- Cookies Making Process

Cookies that will be substituted for bran flour are 0%, 15%, 30%, and 45% as shown in the following Table 1.

Table 1. Formulation of the addition of bran flour to cookies

ingredients	Bran Flour Substitution (%)			
	0	15	30	45
Wheat flour (gr)	200	170	140	110
Rice bran flour (gr)	0	30	60	90
Butter (gr)	150	150	150	150
Sugar flour (gr)	75	75	75	75
Vanilla powder (tsp)	1	1	1	1
Egg yolks (grains)	15	15	15	15
Corn starch (gr)	25	25	25	25

RESULTS

Fiber Content

Determination of fiber content was carried out by the gravimetric method in which each sample was tested three times (triplo) and obtained results in Table 2.

Table 2. Test Results of cookies' fiber content

Sample code (%)	Testing	Fiber content (%) (%)	Average (%)	gr/100gr
0	1	3,69	3,29	3,29
	2	3,32		
	3	2,87		
15	1	4,23	3,95	3,95
	2	3,69		
	3	3,95		
30	1	5,09	4,90	4,90
	2	4,88		
	3	4,74		
45	1	5,92	5,65	5,65
	2	5,24		
	3	5,81		

Acceptability Test

Organoleptic tests of rice bran cookies were carried out to get the author’s response towards taste, color, texture and flavors of the rice bran cookies . Panelists responded to the taste of rice bran cookies in the substitution of 45% bran flour by 70% likes. Based on the texture of Rice Bran cookies, the average panelist (90%)likes the highest texture at 15% substitution. The color of rice bran cookies with the highest presentation at 45% substitution by 80% likes of the Panelists. And 90% of panelists like 15% of substituted bran cookies (Table 3).

Table 3. Distribution of the rice bran cookies acceptance test results

Bran Substitution (%)	Assessment criteria				total
	likes		dislikes		
	n	%	n	%	n
taste					
15	25	33,4	5	16,6	30
30	9	30,0	21	70,0	30
45	21	70,0	9	30,0	30
Texture					
15	27	90,0	3	10,0	30
30	21	70,0	9	30,0	30
45	21	70,0	9	30,0	30
color					
15	22	73,3	8	26,7	30
30	20	66,7	10	33,3	30
45	24	80,0	6	20,0	30
Flavor					
15	27	90,0	3	10,0	30
30	10	33,3	20	66,7	30
45	18	60,0	12	40,0	30

Table 4. Distribution of the rice bran cookies acceptance test results`

Substitution (%)	Fiber content (gr/100gr)	Acceptability Test			
		taste (%)	Texture (%)	Color (%)	Flavor (%)
15	3,95	83,4	90,0	73,3	90,0
30	4,90	30,0	70,0	66,7	33,3
45	5,65	70,0	70,0	80,0	60,0

The accuracy analysis of the fiber power test and the acceptance test (Table 4) found that the substitution of 15% of rice bran cookies had the best acceptability.

DISCUSSION

The latest definition of dietary fiber delivered by The American Association of Ceral Chemist is an edible part of a plant or an analogue carbohydrate that is resistant to digestion and absorption in the small intestine with complete or partial fermentation of the large intestine. According to the USDA, rice bran fiber content per 100

grams is 25.3 grams., rice bran can be used as a substitute with its high nutrition for nutritional enrichment of a processed food product⁴.

The test results in Table 2 can be concluded that the highest fiber content is found in the bran with the highest substitution, which is 45% with fiber content of 5.65 grams. The higher the substitution of rice bran

flour in cookies, the greater the fiber content produced. it is known that the fiber content is 1 gram⁵In the cookie products on the market, from the data it can be concluded that the fiber content found in cookies with bran substitution is 45% higher than the cookies on the market.

70%Panelists like the substitution of 45% rice bran flour. The more granting of rice bran flour in the process of making cookies gives a bitter taste. Rice Bran contains saponin compounds which can cause bitter taste. Saponins are glycosidic compounds which perfectly hydrolyzed produce sugar and non-sugar compounds called saponin⁶. The high concentration of rice bran flour that is used makes a rather bitter taste in fried bran noodles⁷.

Based on the texture, the panelists gave a good response for all samples of the substitution of rice bran flour. The process of making rice bran cookies uses eggs, where the use of eggs makes the bran become soft because it contains lecithin as a natural emulsifier which is useful as a softener so that it affects the texture of the bran product produced⁸. Starch flour will absorb water and will form a mixture with gluten, then it will be converted to gelatin by heat so that it makes the dough fused and smooth. Protein in wheat flour will bind water so it will expand and elastin. The elastin dough indicates gluten in flour works well⁹.

Panelists likes the colors produced even though the colors produced from each rice bran substitution are different. The brown color of the bran cookies is produced from the base color of creamy bran flour and the addition of bran flour which is growing in number. The greater the concentration of rice bran flour, the darker the color of the noodles produced^{10,11}. The higher addition of bran flour affects the color produced in cookies so that it affects the panelist's assessment of color.

The panelists' response to 45% substitution of flavor is they like the smell produced by bran products that comes from bran flour. The amount of rice bran concentration that is used makes the flavors even more pronounced. basically the substitution of bran in the manufacture of cookies can be a snack product for teenagers, especially for adolescent who are obese because these cookies contain high fiber content¹²⁻¹³.

CONCLUSION

The highest fiber content in 45% of rice bran flour substitution with fiber content of 5.65%. The results of the acceptance test for 45% of bran flour substitution is 70% panelists like the taste, 70% % panelists like the texture, 80% % panelists like the color, and 60%% panelists like the flavor.

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Conflict of Interest : None

Ethical Clearance: from Mamuju Health Ministry Polytechnic committee

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The Role of Religion and Spiritually in the Care of Patients in Family Medicine

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ABSTRACT

Religion and health care are two subjects that important to a patient suffering from any illness. However, the two concepts drifted apart at the start scientific revolution era although today the disciplines are closely connected. The study investigated the association of the two subjects by use of questionnaires which were mailed to 158 patients. The results were analyzed using various statistical methods and revealed that nearly 88 % of the respondents appreciated the role spirituality and religious beliefs played in medicine and healthcare. However, nearly 57 % percent of patients had a discussion on religion matters with their family doctors because of varied reasons such as time constraints and different religious background. The study revealed that spiritual and religious beliefs play an important role in the patients' medicine and healthcare.

Keywords; *spirituality, religious beliefs, medicine, health care.*

INTRODUCTION

People are confronted with life threatening diseases that leave them questioning the reasons for their existence or the purpose of their life. Thus they turn to their religious beliefs to strengthen their sense of control, support their hope or relieve their stress. Although the patient may seek medical help from specialists, they also turn to the creator in prayers and trust that the supernatural being will render a helping hand ¹. Thus for many centuries science and religion has always been closely interlinked. Actually, history indicates that medical and spirituality care was be conducted by the same individual. Christianity provides record of instances when God healed using similar remedies that were practiced in medicine. However, at the beginning of the Renaissance era, scientific revolution took place and faced rejection from the religious communities. Thus there occurred a drift between medicine and religion, because the earlier adopted the advanced scientific methods while the later served as a barrier to both knowledge and advancement. For instance, the Cartesian philosophy that was adopted by medicine viewed body and mind as two different items thus widening the gap between religion and spirituality ^{2,3}. At the start of 1900s the idea of importance of spirituality in medicine and psychological health was reintroduced by Carl Jung. He indicated

that in all his patients, the religious outlook in their life has always been their last resort ⁴. More so, Victor Frankl who survived the Nazi concentration suggested in his book named *Man's Search for meaning* that was published in 1946 stated that spirituality has a role to play in the mental health⁵. Religion and spirituality do not follow the scientific conventions and could thus be alienated further whenever its contribution to medicine is gauged using the scientific models. However, their main objective is to help an individual find the purpose of life and find their place in the world. Thus various prayers have been conducted to ailing persons as they continue with their conventional medication and positive outcome has been observed as indicated on this study. The duration between 1980 and 1990 witnessed the increased integration of religion and spirituality in medicine and healthcare. Popular press has published numerous articles that highlight the connection between of the two concepts in relation to both healing and comfort. Some of the practices that are applied are pastoral counseling, prayer in healing, evoking forgiveness or compassion. A survey was conducted by the National Center or Complementary and Alternative Medicine (NCCAM) in 2004 and discovered that prayer was preferred among the approaches that were listed in the survey. Thus the religious affiliation in addition to the patient's religious practices was related to their health and mortality ⁶. Lee-

Poy conducted an in-depth interview on patients as well as a survey on family physicians. The outcome showed that religious and spiritual beliefs were crucial in the patient care in family medicine. However, the barrier that was identified was the physician comfort level but could be enhanced through medical education on religion and spirituality⁷. There is evidence that indicate that the importance of spirituality in coping with illness because it offers protection against despair in patients with terminal illnesses⁷. Saliman attended to persons termed as challenging patients that were referred to him by physician-in-chief in his medical center. One of such patient was Tina who believed that she had multiple sclerosis which she felt was not being treated properly even with her monthly visit to the Emergency Department (ED) for magnetic resonance imaging. The results read normal and this made her really upset thus prompting her to write complaint letters after every visit. However, after she visited Saliman's office, her attitude changed because when he noticed she was wearing a golden cross on her neck, he requested they pray after every session. Tina was fighting to be given 1g of IV steroids but the physician reasoned with her that she cannot be given medication without evidence of what was being treated. The prayer session continued for nine months and she kept away from ED and instead of asking for steroids, visiting ED or writing complaint letters she wrote commendation letter to the hospital administration. The medical practitioner concluded that prayer is a crucial component in patient's lives and thus he welcomed any chance of saying a prayer at the end of office visits⁸. Analysis on various studies on how patients pray reveals that some individuals preferred conversational prayers while others relied on memorized prayers like the Lord's Prayer for Christians or seven tools for Muslims. Some patients did not have a specific time or place for prayer and some appreciated praying with others⁹⁻¹². A literature review conducted by Jors et al.,¹³ provided some of prayer items that patients include as well as the quotes they refers to in table 1. According to Ellen Barlow,¹⁸ potential effect of spirituality and religion on a person's health cannot be ignored. The Spirituality, Health and Health Disparities Symposium conducted in December 2014 by the Harvard Medical School indicated that religion offers patients an opportunity to share their pain thus becoming more bearable and gain an intense sense of power. A medical practitioner named White-Hammond highlighted the experience of a 5-year-old girl who was suffering from Leukemia and stated that

healing includes exercising compassion to ease pain and not necessarily save lives. Mindfulness techniques such as relaxation, meditation, yoga and prayers have both psychological and physiological changes.

MATERIALS AND METHOD

Various studies have been conducted regarding the importance of discussing with patients about their spiritual and religious beliefs. Some of the studies are directed towards the physicians' practices and opinions on asking their patients about their religious beliefs thus measuring their comfort levels when handling the topic^{7, 19, 20}. This study will follow the same procedure; however, it will focus on the role of religion and spirituality in patients' healthcare.

Design and sample

This was a cross-sectional study with self-administered questionnaire mailed to patients about the role of religion and spirituality in the healthcare. The sample frame was obtained from the general practitioners and physicians practicing between 2009 and 2018 in Kitchener and Waterloo, Ontario region. The list of family physicians was obtained from the Ontario Medical Association. The sample size was 158.

The development of questionnaire

The self-administered questionnaire was organized to assess how the patient's religious beliefs helped me in their recovery or coping with their illness. It also assessed how they felt when the family physicians discussed with them about their spiritual beliefs during their office visits. The questions were drafted based on the previously conducted studies' literature search although they did not indicate any authenticated questionnaire⁷.

Data collection

The self-administered questionnaires were distributed using a revised Dillman method thus increasing the response rates of the mailed questionnaires to the patients²¹. Together with the mailed questionnaires was a stamped return envelope and a reminder postcard was sent to non-responders two weeks later. Additionally, a second set of questionnaire and a stamped envelope was sent again five weeks later followed with final reminder postcard in the ninth week.

Variables and data analysis

The 5-point Likert scale consisting of variables such as never, rarely, sometimes, most of the time and always was used to measure the role of religion and spirituality in the medicine and healthcare of patients. The independent variables consisted of patients' demographic characteristics, their religious and spiritual beliefs, and their opinion on the role of religious beliefs on their healthcare as well as the frequency of discussing their beliefs with their family doctors. The 1-way ANOVA that analysis variance and *t* tests was used to carry out bivariate analyses as appropriate. The Multiple linear regressions were used to conduct multivariate analysis on the role of religious beliefs, frequency of their discussion with their physicians. In the bivariate analysis, the independent variables were statistically significant ($p \leq 0.05$).

RESULTS AND DISCUSSION

Out of the 158 questionnaires that were mailed to patients, 140 returned thus, a response rate of 88.6%. The patients responded differently to the five questions that were provided. For example, 140 provided their demographic details, 130 provided the number of years they have been sick while 115 indicated they were spiritually inclined and confirmed that religious and spiritual beliefs helped them to cope with their illness while 25 felt religious beliefs have no connection with health care and recovery. However, 80 indicated to have regular discussion with their family doctors regarding their religious beliefs or pray together their office visits. Additionally, the only similarity between the 18 non-respondents and respondents is that they were of the same gender but there was no other similarity in terms of variable was established. Approximately 51.4 percent of the respondents were female. Age ranged from 27 to

70 and their mean was 48.9 and standard deviation (SD) of 9.5 years. The patients had been sick between 2 to 42 years, thus a mean of 20.8 and SD of 10.3 years. 82.1% were spiritually focused and relied on their spiritual beliefs to cope and maintain a positive outlook. They participated in pastoral programs, attended seminars, yoga program or counseling programs. The patients were Christians, Muslims or Buddhists. 57.1% discussed with their family doctors their religious beliefs, prayed together or shared a scriptural thought together or received a recommendation of pastoral and counseling programs. However 42.9% did not discuss with their family doctors any religious matter because of varied reasons such as the perception that religious and spiritual beliefs were personal matter, they were not relevant to the healthcare, there was limited time for such discussions or the family doctors were either not religiously inclined or had a different religious background. Thus the patients and the physicians were reluctant to share their religious or spiritual beliefs. The multivariate analysis, 6 factors were statistically significant in the bivariate analyses and were thus included in the analysis of multiple linear regressions. The importance level of religion and spirituality ($p < 0.001$) and the patients opinion on the role of religion and spirituality in the health care of a person ($p = 0.01$). The study indicates that it is important for the patients to have religious and spirituality beliefs because it helps them in their recovery and to cope with their illness. There are some studies that support the discussion of the religious and spiritual beliefs with their patients²². This study confirms too that religious ad spirituality contribute significantly to the well-being of the patient. Thus the family doctors should take an interest in the discussion with their patients about their spiritual beliefs because it enhances their recovery and coping with terminal illnesses or any other form of diseases.

Table 1. Example of quotes.

Category	Example quote
Improvement in patient's health and wellbeing	"When in pains and aches or whatever, Pray to God and will He relieve it" ¹⁴
Disease management and decision-making	"Pray when scared, and ask God for wisdom, understanding and insight when making decisions." ¹⁵
Prayers for others	"Focus on praying for your family members, friends as well as other loved ones because they love and need you too." ¹⁶

Table 2. Demographic characteristics of the respondents: N=140

Gender	
Male (%)	Female (%)
48.6 (68)	51.4 (72)
Ages in years (percentage)	
< 40	20 (14.3%)
41- 50	40 (28.6%)
51-60	36 (25.7%)
≥ 60	44 (31.4%)
Number of years of being sick : N= 130	
< 10	22 (16.9%)
11 - 20	49 (37.7%)
21 - 30	31 (23.8%)
≥ 30	28 (21.6%)

Table 3. Factors statistically significant in the bivariate analysis.

Factors	B coefficient	P value
Demographic details		
Gender	0.023	0.761
Age	0.021	0.789
Opinion on having religious and spiritual beliefs		
Importance of spirituality	-0.116	0.138
Role of religious and spirituality beliefs o health care and medicine		
They help in recovery and coping	0.277	0.001
Importance of discussing with family health care		
importance to discuss	0.010	0.905

CONCLUSION

Religion and medicine was initially closely linked together and was offered by the same person. However during the Renaissance era the two subjects parted ways because of the widening gap in the understanding of body and mind. However, various studies indicate that spirituality and religion is important in the recovery of the patient because it helps them to find the purpose of their life. Many patients have been prayed for either knowingly and unknowingly and have positive outcome. Many popular presses have published articles that show the linkage between medicine and spirituality. Medical schools in America have also incorporated spirituality and faith related courses in their programs. The study on the 158 patients gathered 88.6 % responses and out of the 140 who responded 115 indicated that they possessed

some spirituality and religious beliefs opinion and were important in coping with their illnesses and maintenance of a positive outlook in life. On the other hand, 11.4 % felt spirituality is not linked to their recovery and medication was sufficient in their recovery. However, 57.1 % of the physicians have a regular discussion with their patients about their religious beliefs as well as pray together with them when they visit their offices. Therefore, spirituality and faith courses should be included in the medical curriculum to reinforce the practitioners comfort levels thus increase such interactions. This will enable them to engage patients on such topics because they play an important role in the patients' medicine and healthcare.

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Ethical Clearance: All experimental protocols were approved under the Ministry of Public Health, Maysan Health Department, Maysan governorate, Iraq and all experiments were carried out in accordance with approved guidelines.

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Analysis of the Association between Sebum Levels and Staphylococcus Epidermidis Infection Identified by PCR in Comedonal, Papular, and Nodular Acne Vulgaris

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ABSTRACT

Acne vulgaris is a common inflammatory disease of pilosebaceous follicles. This study aims to determine the relationship between sebum levels and Staphylococcus epidermidis infection in patients with acne vulgaris through PCR. The study was conducted in Dr. Wahidin Sudirohusodo Hospital, several network hospitals, and several high schools in Makassar City from May 2016 to June 2016. The study used cross sectional research design. The samples were patients aged 15 – 25 years, with mild, moderate, or severe type of acne vulgaris who came to the dermatovenereology clinic of Wahidin Sudirohusodo Hospital, other network hospital, and several high schools around Makassar City. A total of 45 subjects were identified and were divided into three equal groups each consisting of 15 subjects with mild, moderate, and severe acne, respectively. Samples from comedonal, papulopustular, and nodular lesions were taken followed by examination for Staphylococcus epidermidis infection. The results showed a quite high incidence of Staphylococcus epidermidis infection in acne vulgaris patients, with positive PCR results in 32 out of 45 samples, while 12 samples showed negative PCR results, suggesting Staphylococcus epidermidis as a dominant bacteria in such disease.

Keywords: *Acne Vulgaris, PCR, Staphylococcus epidermidis*

INTRODUCTION

Acne vulgaris is a chronic and multifactorial skin condition which predominates in patients aged 11 – 30 years. The characteristics of this disease include open and closed comedones, papules, nodules, and cysts which, in mild type are located on the face and around body in severe type. The condition may then be followed by post inflammatory pigmentation that may give rise to adverse psychosocial effect. Hence, acne vulgaris is one of the most common reasons to visit dermatologists.¹

Acne is formed in hair follicles of skin consisting dead cells. The accumulation of such cells together

with hyperkeratosis retention and an increase in sebum production lead to the formation of comedones (follicles blocked by sebum, keratin, and normal flora), which was then followed by inflammation. The normal bacteria inside the follicles is known as *Staphylococcus epidermidis*. It is not a pathogen but is involved in acne development. The gathered bacteria will release proinflammatory mediators that cause papules and pustules formation that may worsen the condition. These papules and pustules can develop into nodules and cysts which will be a concern for the dermatologists.² The classification is based on comedonal, papulopustular, and nodulocystic types. Pustules and cysts are considered inflammatory types.

A previous study conducted by Dhillon et al in India aimed to detect bacterial agents behind acne vulgaris through culture examination and followed by the evaluation of broad spectrum antibiotic sensitivity.³ The samples were collected from nodulocystic and pustular lesions of 50 subjects aged between 18 and 27 years. The

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microorganisms found from the lesions in both aerobic and anaerobic conditions included *Propionibacterium acne*, *Micrococcus spp*, *Staphylococcus epidermidis*, and *Staphylococcus aureus*. Different bacteria were discovered from different types of lesions that were cultured in different conditions in both males and females. In an aerobic condition, the incidence of *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Propionibacterium acne*, and *Micrococcus spp* infection were 45%, 49%, 0%, and 45% respectively. Meanwhile, the culture from anaerobic condition showed 41% *Staphylococcus aureus* infection, 20% *Staphylococcus epidermidis* infection, 32% *Propionibacterium acne* infection and none of *Micrococcus spp* infection. Regarding antibiotic sensitivity, it was found that *Propionibacterium acne*, *Staphylococcus epidermidis* and *Staphylococcus aureus* infection tended to be more sensitive to Rifampicin. It was revealed that the effect of the combination between Clindamycin and Benzoin Peroxide was not superior to Rifampicin alone. The study also showed different effects of antibiotics to isolated bacterial from pustular and nodulocystic types.

Another study in Brazil examined *Staphylococcus epidermidis* which carried biofilm-producing genes through multiplex PCR examination.⁴ The study used 18 reference strains and 149 clinical *Staphylococcus* strains and aimed to identify *Staphylococcus epidermidis* and its three gene sequence: *recN* for recombinant protein coding, *mecA* for methicillin resistance, and *icaAB* for biofilm formation. Amlicons from 219 bp (*S. epidermidis-recN* gen), 154 bp (*mecA* gen), and 546 bp (gen *icaAB*) were obtained. The result revealed that the multiplex PCR approach was beneficial for an accurate identification of methicillin-resistant *Staphylococcus epidermidis* which is capable of producing biofilm.

The objective of this study is to evaluate the association between sebum levels and *Staphylococcus epidermidis* infection using PCR method.

MATERIALS AND METHOD

Location and Time

The study was conducted in the dermatovenereology clinic at Wahidin Sudirohusodo Hospital, Hasanuddin University teaching hospital, several high schools around Makassar, South Sulawesi, Indonesia, and Hasanuddin University teaching hospital laboratory from May to June 2016.

Study Design and Variables

This study used a cross sectional research design. The variables examined consisted of independent variables (endogenous and exogenous factors), dependent variables (mild, moderate, and severe acne vulgaris), and intervening variables (sebum level and *Staphylococcus epidermidis* identification).

Population and Samples

The population of this study was female aged 15-20 years with mild, moderate, or severe acne vulgaris who came to the dermatovenereology clinic at Wahidin Sudirohusodo Hospital, Hasanuddin University teaching hospital, and several high schools around Makassar City. Subjects who did not receive retinoids, antibiotics or anti-inflammatory drugs in the last one month were assessed for acne severity with the Lehman Criteria and classified into mild, moderate, or severe acne vulgaris.⁵

Data Collection

Sebum level was measured using Sebumeter SM 815 (Courage & Khazaka Electronic Co, Cologne, Germany). The plastic film from the device was applied to the skin for 30 seconds to allow the sebum to be absorbed; which was then analyzed by the photometer inside the device. in $\mu\text{g}/\text{cm}^2$.

Specimens obtained from comedonal, papulopustular, and nodular lesions from patients with acne vulgaris were evaluated for the presence of *S. epidermidis* by using PCR (Biorad®, California, USA) examination the following primer sequence; forward (PR 264): 5-GCA GGC AGA GTT TGA CAT CC-3, reverse (PPA.R): 5-ATG TTG AGG GCG GTG ACG TT-3, and target ban 334 bp. Informed consent from each subject has been previously acquired.

Data Analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS) 18.0 for Windows (SPSS Inc. Chicago, IL, USA). All results were presented in tables and graphs. The Mann-Whitney test was used and significant results were denoted by a p-value of < 0.05 with 95% CI.

RESULTS

A cross sectional study was conducted to identify the association between sebum levels and *Staphylococcus*

epidermidis infection in acne vulgaris using PCR method. The study was done in the dermatovenereology clinic at Wahidin Sudirohusodo Hospital, Hasanuddin University teaching hospital, several high schools

around Makassar City, and the laboratory at Hasanuddin University teaching hospital from May to June 2016. There were 45 female participants with mild, moderate, and severe cases of acne vulgaris.

Table 1. Differences of PCR Results between the Mild, Moderate, and Severe Acne Group

Group	Positive	Negative	P-value
Severe Acne	5.122 ^a	8	0.744
Moderate Acne	5.476	8	0.706
Mild Acne	.381	1	0.537
Total	46		

Note: Chi-Square Test

There was no significant difference in *Staphylococcus epidermidis* infection between lesions from mild, moderate, and severe acne vulgaris lesions (Table 1). However, sebum levels between the three grades of acnes differed significantly ($p < 0.05$). P-values of those in mild-moderate group, mild-severe group, and moderate-severe group were < 0.001 , 0.005 , and 0.005 respectively (Table 2).

Table 2. Distribution of Association between Sebum Levels and *Staphylococcus epidermidis* Infection in Different Grade of Acne (Mild, Moderate, Severe)

(I) Acne	(J) Acne	Mean Difference (I-J)	Std. Error	Sig.
dimension3	Moderate	231,34167*	16,03518	,000
	Mild	279,20000*	16,29176	,000
dimension3	Severe	-231,34167*	16,03518	,000
	Mild	47,85833*	16,03518	,005
dimension3	Severe	-279,20000*	16,29176	,000
	Moderate	-47,85833*	16,03518	,005

*. The mean difference is significant at the 0.05 level.

It was found that the sebum levels were significantly associated with acne vulgaris grade (mild, moderate, severe) ($p < 0.001$). Meanwhile, *Staphylococcus epidermidis* infection was not associated with acne vulgaris grade ($p = 0.439$) Table 3.

Table 3. Distribution of Sebum Levels and *Staphylococcus epidermidis* Infection through PCR

			Acne	PCR	VAR00009
Spearman's rho	Acne	Correlation Coefficient	1,000	-,117	-,841**
		Sig. (2-tailed)	.	,439	,000
		N	46	46	46
	PCR	Correlation Coefficient	-,117	1,000	,020
		Sig. (2-tailed)	,439	.	,897
		N	46	46	46
	VAR00009	Correlation Coefficient	-,841**	,020	1,000
		Sig. (2-tailed)	,000	,897	.
		N	46	46	46

** . Correlation is significant at the 0.01 level (2-tailed).

Staphylococcal infection was found in 9 cases of severe acne vulgaris (28.1%), 12 cases of moderate acne vulgaris (37.5%), and 11 cases of mild acne vulgaris (34.4%) Table 4.

Table 4. Distribution of the Association between *Staphylococcus epidermidis* Infection and Acne Grading System (Mild, Moderate, Severe)

Positive Negative			PCR		Total
Acne	Severe	Count	9	6	15
		% within Acne	60,0%	40,0%	100,0%
	Moderate	Count	12	4	16
		% within Acne	75,0%	25,0%	100,0%
	Mild	Count	11	4	15
		% within Acne	73,3%	26,7%	100,0%
Total		Count	32	14	46
% within Acne			69,6%	30,4%	100,0%

DISCUSSION

This study showed that the incidence of *Staphylococcus epidermidis* infection in patients with acne vulgaris was quite high. There were 32 out of 45

samples with positive PCR results for *Staphylococcus epidermidis* and 12 out of 45 with negative results.

The data showed that there was no significant difference in PCR examination between the mild,

moderate, and severe acne vulgaris patients. This study aims to identify *Staphylococcus epidermidis* infection associated with three gene sequences: recN for recombinant protein coding, mecA (methicillin resistance) and icaAB for biofilm formation. Amplicons from 219 bp (S. Epidermidis-recN gene), 154 bp (mecA gene), and 546 bp (icaAB gene) were obtained. The results that achieved 100% of strain were then evaluated showing that the new multiplex PCR approach can benefit to accurately identify methicillin-resistant *Staphylococcus epidermidis* due to its potential for biofilm formation.⁴

The age distribution of subjects consisted of 33 patients aged 15-16 years and 12 patients aged 17-18 years. Based on this data, it was suggested that adolescents are more prone to have acne compared to the other age. The initial lesion starts to be visible at the age of 8-9 years and approximately in more than 50-60 % juveniles.⁶ The prevalence of acne vulgaris in adolescence is around 80-85% with its peak incidence is between the age of 15 and 18 years old, 12% in women aged more than 25 years and 3% in those who aged 35-44 years. 58% cases is affected those who aged 15-25 years. According to many studies, mostly the disease affects subjects who are 18-25 years old. Another also suggested the age of 12-39 years is the most common one.⁷

Meanwhile, the sebum levels of those with had mild, moderate, and severe acne vulgaris differed significantly. As we know, increased sebum level is one of the pathogenesis of acne formation. There are many ways to measure sebum level in skin such as gravimetric method using white film, cigarette paper method, photometric, and sebumetric. The parameter used to quantify sebum excretion is casual level (CL), defined as the amount of sebum per unit skin.^{8,9}

CONCLUSIONS AND SUGGESTIONS

The available data suggests that acne grading is associated with sebum concentration, both from the significance and empirical aspect. The incidence of *Staphylococcus epidermidis* infection was higher in the mild, moderate, and severe acne vulgaris compared to other bacteria such as *S.aureus*, *Bacillus*, *Bacillus,sp*, *Enterobacter*. However, it was not found to be significantly associated with acne vulgaris severity. Future related study is needed to compare the identification of *Staphylococcus epidermidis* between

PCR and microbiological culture.

Conflict of Interest : None

Source of Funding : Hasanuddin University

Ethical Clearance: Obtained from Medical faculty committee, Hasanuddin University

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The Influence of Diabetic Foot Gymnastic to Body Balance in Elderly Diabetes Mellitus Patients in Gatoel Mojokerto Hospital Diabetic Club

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ABSTRACT

Diabetes mellitus suffers from insulin deficiency which inhibited the transfer of glucose to cells in body tissues that cause starvation cells and in the increase in glucose in the blood that leads to muscle weakness thus disrupt the body's balance and increase the risk of falling. Diabetic foot exercises aim to improved blood circulation in the feet of people with diabetes mellitus, so that nutrient smoothly to the network. The purpose of this study to determine the effect of diabetic foot gymnastics on body balance elderly people with diabetes mellitus in Diabetic Club Gatoel Hospital Mojokerto in the 27 February – 25 March 2017. This research used a Quasy Experimental method with Pretest-Posttest with Control Group Design. The sampling technique used Simple Random Sampling with the sample of 17 respondents for the control group and 17 respondents for the intervention group. Wilcoxon Signed Rank Test obtained p-value $0,000 < 0,05$ concluded that there is an influence of diabetic foot exercises on body balance in elderly people with diabetes mellitus in Diabetic Club Gatoel Hospital Mojokerto. The study recommended that elderly people with diabetes mellitus is expected to take advantage of diabetic foot exercises as an effort to improve the balance of the body to reduce the incidence of fall.

Keywords : *diabetic foot exercises, body balance, diabetes mellitus*

INTRODUCTION

Elderly is a part of family members and communities that are increasing in number in line with increasing life expectancy. The older a person, he will experience a setback, especially in the field of physical ability, which can lead to a decrease in social roles that lead to dependence. In old age, a good balance is needed by someone in supporting their daily mobility.^{1,2}

The prevalence of diabetes mellitus based on physician diagnosis and symptoms increases with age, in East Java (2.5%) and increases in age 55-64 years (5.5%). In Mojokerto City the percentage of the elderly population was (9.94%), with the percentage of men (9.26%) and women (10.62%) and an estimated 20% of elderly people suffered from diabetes mellitus. (BPS East Java Province, 2015). Based on the results

of a preliminary study on December 6, 2016, at 11.00 WIB in the Diabetic Club of Gatoel Mojokerto Hospital, there were 50 elderly people with diabetes mellitus who received gymnastics. And there are 10 elderly diabetics who complain of foot tingling and numbness.

Diabetes mellitus is a major risk factor for impaired lower limb function, balance disorders, and mobility. Compared to other elderly people, the risk of physical limitations is 2-3 times that of elderly people with diabetes mellitus, and this risk is greater in women. The impact of all this is that more elderly women with diabetes mellitus experience falls and fractures. Balance in the elderly also experienced a setback. The existence of a balance disorder in the elderly will cause falls in the elderly^{3,4}. In addition, other researchers regarding the influence of elderly gymnastics on body balance in the elderly in the Dajan Bingin Sading environment showed

a significant change between the balance of the elderly body before and after being given gymnastics for 35 minutes in the afternoon for four weeks. This is evident from the improvement of the balance of the elderly body after being given gymnastics for the elderly^{5,6}. In addition, hatha yoga modification training and tai chi exercise can also improve balance.

Physical exercise of diabetic foot exercises keeps it moving because by moving indirectly it will keep the muscles and joints to regulate the balance of both legs and strengthen joint muscles in order to reduce the risk of falling in the elderly with diabetes. and the risk of other complications⁷. Diabetic foot exercises are carried out 2-3 times a week for 15 minutes to get effective results.^{8,9}

The research objective was to analyze the effect of diabetic foot gymnastics on the body balance of elderly people with diabetes mellitus in the Diabetic Club of Gatoel Hospital in Mojokerto.

MATERIALS AND METHOD

This research was conducted using the experimental Quasy design with Pre-Posttest design with Control Group Design. This research was conducted at the Diabetic Club of Gatoel Mojokerto Hospital on 27

February - 25 March 2017. The population in this study were 50 elderly people with diabetes mellitus in the Diabetic Club of Gatoel Mojokerto Hospital and sampling techniques with Simple Random Sampling as many as 17 samples respondents for the control group and 17 respondents for the intervention group.

Measurements were carried out in two ways, namely pretest and posttest, a pretest was before being given diabetic foot exercises using Berg Balance Scale (BBS) and posttest was given diabetic foot exercises using Berg Balance Scale (BBS) 2 times a week for 4 weeks.

RESULTS

Table 1. Distribution of Pretest Body Balance Frequency in Control Groups and Intervention Groups

Based on table 1. shows that the pre-test in the intervention group more than 50% of respondents have a good body balance that is 10 respondents (58.8%). Whereas in the pre-test control group, the majority of respondents had a good body balance as many as 11 respondents (64.7%). Based on the research data, the body balance of respondents with diabetes mellitus before intervention tends to be in the medium category.

Table 2. Distribution of Posttest Body Balance Frequency in Control Groups and Intervention Groups

Post Test	Group	Body Balance						Total	
		Good		Medium		High			
		F	%	f	%	F	%	F	%
	Control	10	58,8	6	35,2	1	6	17	100
	Intervention	15	88,2	2	11,8	0	0	17	100
	Total	25	73,5	8	23,5	1	3	34	100

Based on table 2. shows that in the intervention group almost all of the post-test respondents have a good body balance that is 15 respondents (88.2%). Whereas in the control group most of the respondents in the post-test had good body balance (58.8%). Based on research data it was found that respondents who did diabetic foot exercises 2 times a week experienced a significant increase in body balance compared to respondents who did not do diabetic foot exercises.

Table 3. Frequency Distribution of the Effects of Diabetic Foot Gymnastics on Body Balance in the Elderly Patients with Diabetes Mellitus in the Diabetic Club of the Gatoel Mojokerto Hospital on February 27 - March 25, 2017

No.	Body Balance	Control				Intervention			
		Pre Test		Post Test		Pre Test		Post Test	
		f	%	f	%	f	%	f	%
1.	Good	11	64,7	10	58,8	10	58,8	15	88,2
2.	Medium	4	23,5	6	35,2	6	35,2	2	11,8
3.	High	2	11,8	1	6	1	6	0	0
	Total	17	100	17	100	17	100	17	100
	p value	Uji Wilcoxon Signed Rank Test = 0,131				Uji Wilcoxon Signed Rank Test = 0,000			

Based on table 3. using the Wilcoxon Signed Rank Test test in the control group with a significance value of $0.131 > 0.05$ indicating that there is no effect of diabetic foot gymnastics on body balance in elderly diabetics in the Diabetic Club of Gatoel Hospital in Mojokerto. While the Wilcoxon Signed Rank Test test in the intervention group with a significance value of 0.000 or $p < 0.05$, which means that H_1 is accepted means that there is an effect of diabetic foot gymnastics on body balance in elderly people with diabetes mellitus in the Diabetic Club of Gatoel Hospital in Mojokerto.

DISCUSSION

1. Body Balance Before Given Diabetic Foot Gymnastics in the Control Group and Intervention Group

A speed of reaction time, relaxation and functional work. Furthermore, decreased function and muscle strength will result in a decrease or decline in the ability to maintain body balance. Obstacles in sitting motion to standing increased the risk of falls, changes in posture. Problems with the ability to move and function, are closely related to muscle strength that is individual in the elderly¹⁰. With sports such as jogging, running, lifting weights, badminton, tennis or other sports will maintain the bone density of the elderly. In addition, exercise can also strengthen the muscles of the elderly and help balance the posture so that the possibility of fracture (fracture) is smaller¹¹. Patients with diabetes mellitus have characteristics of hyperglycemia, high blood sugar

levels cause various disorders of the somatosensory system (visual, vestibular, proprioceptive) and motoric (musculoskeletal, muscle, soft tissue joints) which can interfere with the balance system thereby increasing the risk of falls. In addition, diabetics have insulin deficiency which inhibits the transfer of glucose to cells in body tissues which causes cells to starve and an increase in glucose in the blood. This creates obstacles in perfusion to muscle tissue which will result in muscle tissue getting less oxygen and nutrients which causes cells to lack the material for metabolism so that the energy produced decreases which result in the onset of weakness and can further result in muscle atrophy. Muscle weakness causes interference in static and dynamic body balance. These disorders will cause the body to falter and become unstable, increasing the risk of falls and fractures¹².

Physical activity can be done at leisure, the scope of work, and daily routine activities such as homework, gardening, hobbies, recreation, and sports¹³. This is reinforced by the opinion of Lord, et al which states that the average incidence of falls in elderly women is 40% while men 38% and will continue to increase at the age above 65 years. This event can be caused by reduced muscle strength in elderly women and lack of ability of elderly women to restore body stability. Elderly women also experience muscle weakness in the lower extremities so that they cannot support their weight.

The results of the analysis of the researcher, respondents who participated in this study were aged 60-74 years old who had entered the elderly but were

still active in gymnastics activities and the majority of respondents were mostly female. The risk of physical limitations in elderly people with diabetes mellitus is greater in women, the same effect is that more elderly women with diabetes mellitus experience falls and fractures.

2. Body Balance After Given Diabetic Foot Gymnastics in the Control Group and Intervention Group.

Based on the research data in table 2. it was found that almost all respondents in the treatment group experienced an increase in body balance to be good, namely 15 respondents (88.2%) while almost half of the respondents in the control group had a moderate body balance, namely 6 respondents (35.2%). This means that respondents who did diabetic foot exercises 2 times a week experienced a significant increase in body balance compared to respondents who did not do diabetic foot exercises.

The results of this study are in line with the research in Switzerland by Rocher cited by Wibisono in patients with diabetes mellitus with neuropathy, the results of irregular exercise research are at risk of developing diabetic ulcer 4 times higher than regular exercise¹⁴. The results of this study are consistent with a statement explaining that the physiological effects of foot exercises routinely will achieve simultaneous or separate effects. Therefore, diabetic foot exercises that are carried out regularly and in a balanced manner can have a positive impact on elderly people with diabetes mellitus, especially those who experience body balance disorders.

3. The Effect of Diabetic Foot Gymnastics on Body Balance in the Elderly Patients with Diabetes Mellitus in the Diabetic Club of Gatoel Hospital in Mojokerto.

The results of the analysis of the researchers, the increase in body balance from the medium to good after diabetic foot exercises in elderly people with diabetes mellitus in the intervention group in the Diabetic Club of Gatoel Hospital in Mojokerto was due to the respondents doing diabetic foot exercises correctly and regularly according to the movements determined by the frequency of exercise 2 times a week for less than 10-15 minutes in 8 weeks. Diabetic foot exercises physical exercise is able to keep it moving because by moving indirectly

it will maintain the muscles and joints to regulate the balance of both legs and strengthen joint muscles as a way to reduce the risk of falling in the elderly and the risk of other complications.

CONCLUSION

Based on the results of the discussion about the effect of diabetic foot gymnastics on the balance of the body between groups that apply diabetic foot exercises and not in elderly diabetes mellitus can be concluded that :

The balance of the body before being given diabetic foot exercises in the control group and the intervention group in the elderly with diabetes mellitus in the Diabetic Club of Gatoel Mojokerto Hospital tend to be in the medium category.

The balance of the body after being given diabetic foot exercises in the control group and the intervention group in the elderly with diabetes mellitus in the Diabetic Club Gatoel Mojokerto Hospital experienced an increase from the moderate to the good category in the intervention group.

There is an effect of diabetic foot exercises on body balance in elderly people with diabetes mellitus in the Diabetic Club of Gatoel Hospital in Mojokerto.

Source of Funding : STIKIP PGRI Pacitan

Conflict of Interest : None

Ethical Clearance : obtained from STIKIP PGRI Pacitan

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The Model of Supervision for Impermanent Food Sellers by Women Volunteer in Kendari City Indonesia

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ABSTRACT

Objectives: Many fast food sellers emerged in Kendari city of Southeast Sulawesi Province Indonesia. The number of staff in Environmental division in Primary Health Services was limit, so they could not supervise for all fast food sellers in that area. Therefore, involving of women volunteer in the villages of Kendari City was necessary. Therefore, this study aimed to find out the model of supervision for impermanent food sellers by the women volunteers in Kendari City, Southeast Sulawesi Province in Indonesia.

Methods: This study used Quasy Experiment with the One-Group Pre-test-Post-test Design. The study was conducted in 3 villages in Kendari City. This study recruited 17 women volunteers and 39 fast food sellers. The statistical analysis used linier regression.

Results: The model of supervision under the women volunteers could be found in this study. The characteristic of women volunteers which involved and be active to supervise were they who have be active in social activities in their village. They have also been involved in Primary Health Services in the village for more than 6 years, they were above 41 years old. They were married and had 3 children in average. Each village involve about 4-10 women. Each village was organized by 1 person as a village coordinator. The village coordinator had responsibility to communicate or mediate to primary health services, especiallay to environmental division. Every month the coordinator reports the results of women's supervision for the fast food sellers. The time of reaching the fast food sellers was found to be significant relation with the seller's behavioural change and fast quality improvement.

Conclusion: Women volunteers can supervise to the fast food sellers in kendari City in southeast Sulawesi Province, Indonesia. They have closed with the food sellers and with sanitation and environmental staff in primary health service.

Keywords: *Women volunteer, Fast food, Supervision, Food seller*

INTRODUCTION

Insecure food remains globally crucial issue, including in Kendari City of Southeast Sulawesi Province, Indonesia. As reported by Kendari City Health Department¹, there were about 176 food sellers

(20.21%) who were insecure in Kendari City in 2015. This number was the highest compared to other districts, such as South Buton (7.19%) and North Konawe (10,09%)¹. That condition has increased the incidence of diarrhoea and hypertension in Kendari City. In 2015, the incidence of diarrhoea in Kendari city was about 63,28%¹. This incidence was higher than North Konawe (6,64%) and Wakatobi (15,87%)¹. While the prevalence of hypertension were also higher (14,83%) compared to 7.15% of Bau-Bau city in 2015¹. To reduce the negative effect of hazardous food in the public places, so the government applies several strategies as

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described in the strategic planning in 2015-2019. The strategies include collaborated programs between the producers, governments, non-government organization and communities². Because the fast food sellers were huge, while there were a few health workers in Kendari City Health Department, so communities had big responsibilities to involve in controlling the fast food which were sold in the public places. However, the community involving model is unclear. Therefore, understanding the model of community involvement in the fast food control is necessary in Kendari city. Based on that phenomenon, the aim of this study is to find out the model of community involvement in controlling to fast food sellers in Kendari city to increase the quality of food hygiene and sanitation.

MATERIAL AND METHOD

Research Design

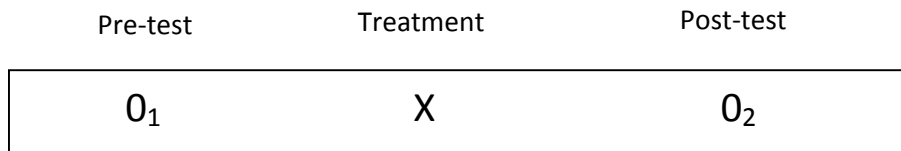
This study applied a Quasy Experiment method using The one-Group Pretest - posttest Design as described below.

notes:

O₁ : Pre-test

X : treatment from communities as controller and educator

O₂ : Post-test



notes:

O₁ : Pre-test

X : treatment from communities as controller and educator

O₂ : Post-test

Figure-1. The Quacy-Experiment method using The One-Group Pretest-posttest Design

The Study Site and Time

This study was conducted in Andonohu, Rahandauna and Wundumbatu villages in Kendari City. This study was conducted from February to July 2018.

The Population and Samples

a. Population

The population of this study were all of the fast food sellers in Kendari City namely 119 sellers.

b. Sample and sampling technique

This study recruited 39 fast food sellers in 3 villages in Kendari City with 5% of error tolerance. The samples were selected with using the purposive sampling. The

inclusive criteria of sampling technique included the sellers were included in 3 villages, the fast food sellers and there were civil communities who willing to control the fast food sellers.

Data collection

Data was collected through in-depth interview, observation and laboratorial test of food sample. The interview was purposed to the fast food sellers, women volunteer, health workers in Health Department of Kendari City and Poasia Primary Health Care Services.

Data analysis

The data was analysed through descriptive and inferential analysis. The descriptive analysis produced distribution of each variable such as the characteristic of

women volunteers, the model of the fast food supervision. The inferential analysis was proposed to understand the relationship between the time of supervision and the food seller's behavioural change to the quality improving of the food hygiene and sanitation. The statistical analysis used linier Regression.

RESULTS

Characteristic of Women volunteers

This study identified 17 women volunteers who could take supervision to the fast food sellers in Andonohu, Rahandauna and Wundumbatu Villages of Kendari City. The characteristic of women volunteers who actively involved in this study is presented in this below table.

Table-1. The Women volunteers' characteristic who involved in the Fast food control in Andonohu, Rahandauna and Wundumbatu Villages of Kendari City

characteristics	Number	Percentage
Education:		
Primary School	1	5.9
Junior High School	3	17.6
Senior High School	9	52.9
Diploma/ Bachelor/Post graduate	4	23.5
Age: (year): mean (±) 1 SD*	41.5 ±7.3	
30 - 34	2	11.8
- 39	5	29.4
40 – 44	7	41.2
45 – 49	2	11.8
> 50	1	5.9
Occupation:		
No working	12	70.6
Private/ trader	3	17.6
Teacher	1	5.9
Civil servant	1	5.9
Number of children: mean (±) 1 SD*	3 ± 1.3	
One	1	5.9
Two	7	41.2
Three	4	23.5
Four	1	5.9
Five	4	23.5

SD*= Standard Deviation

The time of reaching to the fast food sellers behaviour and the quality of fast food.

Table-2. The time of reaching to the Fast Food Sellers in 3 Village of Kendari City in 2018

	Number	Percentage (%)
The time to reaching to the food seller (minute): mean (±) 1 SD*	6.7 ±3.2	
< 4	4	23.5
5 – 9	8	47.1
10 – 14	3	17.6
15 – 19	1	5.9
20	1	5.9

SD*= Standard Deviation

Table.3. The Seller’s Behaviour and the Quality of fast food Hygiene and Sanitation between before and after women volunteer supervision for the Fast Food Sellers in Kendari City

Category	Before		After	
	n*	%	n*	%
Poor	0	0	0	0
Medium	10	25.6	3	7.7
Good	29	74.4	36	92.3
total	39	100.0	39	100.0

n* : Number of fast food sellers

Table 4. The relationship between the time of reaching to food seller be women volunteers and the food seller’s behavior and food quality improving

Model	Unstandardized coefficients		Standardized Coefficients	t	Sig	95% confidence Interval for B	
	B	Std.error	Beta			Lower Bound	Upper Bound
The time of reaching to food seller (minute)	2.947 -.175	.951 .128	-.219	3.097 -1.366	.004 .180	1.019 -.434	4.875 .084

Note: Linier Regression result

DISCUSSION

This study showed the women volunteer could supervise the fast food sellers in 3 villages in Kendari City. This can be explained that the women volunteers can help Poasia Primary Health Care Services especially for environmental division. As identified that the women volunteers who were active in social activities in their village. They have been trained by Poasia Primary health care services³. The women volunteers who involved in this study have been the health volunteer about 6.9 years in average. They have also gotten training or workshop about 9.2 times. They are given responsibility to do health planning and health promotion to the communities in their village³. This means they have had huge experiences, especially in community engagement towards better healthy life behaviour. Furthermore, they got support from their family member including from their husband because all of the cadres were women (94.1% of married and 5.9% of widow). Family support is reinforcing factor to determine the individual behaviour.

Thus, women volunteer have high motivation to take social responsibilities⁴. As mentioned in the above table that about 52.9%, they passed from senior high school. This means they could synthesize health information which they got⁵. Women Volunteer with more higher educational level tends to have awareness about science and information⁵. Some previous study also found that individual knowledge is determinant factor of successful cadres to take their responsibility in the comprehensive community health care services in the village⁶.

Furthermore, motivation is also the essential factor of successful for women volunteers. Motivation has significant relationship with human basic needs⁷. The human basic needs include physiological, safety, love, esteem and self-actualization needs⁷. This is true that women volunteer’s involvement in the fast food control in this study because they want to get new experiences and self-actualization. This is based on depth interview with women volunteers. Another thing, they hope to get an incentive from Poasia Primary Health Care Centre or from their village leader. Some of them (70.6%) do not

have job. They are wives who do domestic chores only. If they got incentive such as a few money, there will be increasing their family income. Additional household income will give significantly impact for their children nutrition because they will increase their purchasing power for food⁸. Increasing in the household income also can improve their household facilities such as water and latrine facilities. The housing condition also influence significantly to their under-five children's nutrition status⁹. Some of women volunteers have under-five years' old children. Also, they can buy gasoline for their motor cycle because there are about 82.4% of them used motor cycle when they supervise the fast food sellers. This means that incentive includes in intrinsic factor which motivate the human to involve in the activity like involving in the fast food control. Other previous study also argued that women volunteers' motivation was important factor for them to be active in the social activities in their village⁶.

Other important factor why they were effective to involve in the fast food control is they have lots of free time. As above mentioned that there were about 70.6% of cadres were no job. Thus, they had lots of time to involve in the fast food control. This activity took about 6.7 minutes only. Even some of cadres (29.4%) who had a job, they still could use their free time to involve in this activity. The distance between the women volunteers' home and the fast food seller is about 766 meters in average. They have 3 children in the average. Therefore, they do not have heavy burden between their responsibility in their home and in this fast food control. As we known, the wives in this culture have responsibility to child rearing including the domestic chores.

Furthermore, women volunteer have had some experiences in the previous activity could do the best approach and communication with the fast food seller. Thus, they could also give health promotion to the sellers during supervision. They were about 41.5 years old in the average. They included in the adult people who changed their interest and responsibility towards socialist people¹⁰. With the simple instrument of control the fast food quality, the women volunteers could show their ability to involve in the fast food control. The form includes several aspects such as about environment, the seller's behaviour towards the food hygiene and sanitation. Thus, they could give health education for the food sellers during supervision. The number of

assessment (0-10) of the quality of the food hygiene and sanitation is easier for them. The number of 5 becomes the basic to determine the good or poor because this number was agreed as a middle number.

The mechanism of reporting to the environmental staff in the Poasia primary health care services also could be done by the cadre because the coordinator only who reported to the environmental staff every month. The women volunteers have become familiar with all of health staff in this primary health care service. Every Saturday morning, they also take gymnastic in this primary health care. The gymnastic is purposed to increase fitness for people who are above of 40 years old and prevent for the chronic diseases such as hypertension, stroke and others. Therefore, their involvement in the fast food control was significant effective to increase the quality of the fast food.

CONCLUSIONS

This study has explained that the women volunteer can supervise the fast food traders in Kendari city, especially in Andonohu, Rahandauna and Wundumbatu villages. They are volunteers who have gotten lots of trainings and experiences in the health promotion program by primary health care services and others. Thus, they can influence the fast food traders to change their hygiene and sanitation to manage their fast food. The women volunteers can use their free time in the social activity because they have trained to manage their time effectively.

Conflict of Interest: The authors have no conflict of interest associated with the material presented in this paper.

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Ethical Clearance: Taken from Southeast Sulawesi Province Research and Development Committee, number 070/507/Balitbang/2018.

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Resistance Status in *Aedes Aegypti* Strain from North Toraja, Indonesia to Malathion and Temephos Insecticides

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ABSTRACT

Organophosphates is the main choice in controlling *Aedes aegypti* mosquito as the main vector of Dengue Hemorrhagic Fever. This study aims to determine resistance status of *Aedes aegypti* collected North Toraja District to malathion and temephos. This type of research is a quasi experiment. Assays to determine resistance status were conducted using WHO standard method. The samples were 600 *Aedes aegypti* F1 3rd and 4th instar larvae; and adult *Aedes aegypti* F1 female mosquitoes aged 3-7 days obtained from ovitrap survey at high dengue endemic area (Rantepao sub-district) and non endemic area (Sanggalangi sub-district) in North Toraja District. The adult samples were tested to Malathion 0.8% and 5%. The larva samples were tested to Temephos 1% concentration with 3 times replication, the number of each test was 20 mosquitoes. The statistical test used is univariate and probit analysis. The results showed that *Aedes aegypti* (high endemic strain) adults was resistance to Malathion 0.8% concentration, and that was tolerance to Malathion 5% concentration, whereas *Aedes aegypti* larvae was susceptible to Temephos 1%. *Aedes aegypti* (non endemic strain) were susceptible to Malathion 0.8%, Malathion 5% and Temephos 1%. There were a difference in lethal time (LT50, LT90, LT95, and LT99) between *Aedes aegypti* high endemic and none endemic strains to both malathion and temephos. The value of lethal time of *Aedes aegypti* high endemic strain were higher than those non endemic strain

Keywords: resistance test, malathion, temephos, *Aedes aegypti*

INTRODUCTION

Aedes aegypti is a major vector in the spread of dengue virus. DHF can occur throughout the year and can affect all age groups^{1,2}. According to WHO, it is estimated that the number of dengue fever cases amounts to 390 million per year, of which 96 million are serious cases. Southeast Asia, the United States and the Western Pacific are high dengue-endemic areas where 2.5 billion people or two-fifths of the world's population are at risk of contracting DHF. In Southeast Asia, Indonesia is one of the endemic countries of DHF. An estimated 500,000 people with DHF incidents require hospitalization each year and about 2.5% of them experience death³.

Vector control using insecticides is one of the strategies in eradicating mosquitoes that are considered more effective, fast and easy⁴. Resistance occurs when a vector cannot be killed by a standard dose or a vector successfully avoids contact with an insecticide⁵.

Continuous exposure to insecticides causes mosquitoes to adapt so that the number of resistant mosquitoes multiplies. The resistant mosquito can bring resistance to its offspring⁶.

Salim et al⁷ was found in Palembang city, that the adult stage of *Aedes aegypti* mosquitoes are still susceptible to malathion dose 5%. Suwito⁸ found in Surabaya, that in the location with high case of dengue fever already exist mosquito population that tolerant to insecticide malahion dose 5%. Research in three municipalities of DKI Jakarta shows that *Ae. aegypti* has been resistant to 1% temephos insecticide⁵. Research Handayani et al⁹ found in Semarang that *Ae. aegypti* larvae in the Tanjung Emas port in the perimeter region is already tolerant and in the buffer region has been resistant to temephos.

North Toraja is a dengue-endemic district in South Sulawesi Province. According to the North Toraja Health Office, there were 31 cases (IR = 13,84) in 2014,

increasing by 39 cases (17.29) in 2015 and increasing dramatically in 2016 with 96 cases¹⁰. These conditions allow the occurrence of resistance to *Aedes aegypti* due to the use of insecticides in fogging and abatezation in the eradication of DHF vectors. Until now, the North Toraja Health Office still uses 5% malathion insecticide in fogging and 1% temephos for abatezation.

This study aims to determine resistance status of *Aedes aegypti* collected from North Toraja District to malathion and temephos.

MATERIALS AND METHOD

Aedes aegypti was collected using ovitrap at locations representing different endemicity levels in North Toraja District, namely: high endemic (Rantepao sub-district) and non endemic (Sanggalangi sub-district). This type of research is quasi experiment.

The population in this study were all *Aedes aegypti* mosquitoes in high endemic areas and none endemic DHF in North Toraja District, while the samples of *Aedes aegypti* larvae F1 third and fourth instar amounted to 240 larvae and *Aedes aegypti* F1 3-5 days old was 360.

Assays to determine resistance status were conducted using WHO standard method. Testing of *Aedes aegypti* resistance status to the concentration of malathion and temephos refers to Bottle Bioassay test. Bioassay tests were conducted at the Entomology Laboratory of Faculty of Medicine Hasanuddin University. Primary data were obtained from observation of larvae and *Aedes aegypti* mosquito larvae during contact with insecticide for 1 hour observation, (as follows 5 minutes, 15 minutes, 30 minutes, 45 minutes, 60 minutes) and death within 24 hours. DHF incidence data as well as fogging and abatization program data were received from North Toraja Health Office.

Univariate analysis was done to know the frequency distribution and percentage of mosquito mortality test against malathion and temephos insecticides. Probit test was done to analyzed lethal time values (LT50, LT90, LT95, and LT99).

RESULTS

The results showed that *Aedes aegypti* resistance status in North Toraja *Aedes aegypti* high endemic area was resistant (mortality 55%) to malathion concentration 0.8%, and that was tolerance (mortality 93.5%) to

malathion 5% and that was vulnerable (mortality 100%) to 1% temephos; whereas *Aedes aegypti* non endemic area is still susceptible (mortality 100%) to insecticide malathion concentration 0.8%, 5% and temephos 1% (See Figure 1). Table 1 shows a significant difference in *Aedes aegypti* mortality in high endemic and none endemic strains to malathion exposure of 0.8%, 5% and 1% temephos. The result of chi-square test for malathion insecticide 0,8%, 5% and temephos 1% had significant p value = 0,000 <0,05.

Table. 1. Chi-Square test results difference in mortality of *Ae. aegypti* high endemic and none endemic strains to exposure to malathion and temephos insecticides.

Concentration of insecticide	Significance
Malathion 0,8%	0,000
Malathion 5%	0,000
Temephos 1%	0,000

The lowest (55%) average *Aedes aegypti* mosquito mortality of endemic strain against exposure to Malathion concentrations of 0.8%; and the highest mortality (100%) of none endemic strain to Malathion exposure concentrations of 0.8% and 5%. Figure 2 shows the difference in mean percentage mortality of *Aedes aegypti* larvae at each time observation of 1% temephos exposure in non endemic areas higher than endemic areas up to 60-minute interval. In 1440 the average number of *Aedes aegypti* larvae mortality was 100% in high endemic areas and not endemic. Figure 3 shows the values of LT50, LT90, LT95, and LT99 malathion insecticides concentrations of 0.8%, 5% and 1% temephos in high endemic areas higher than non endemic areas.

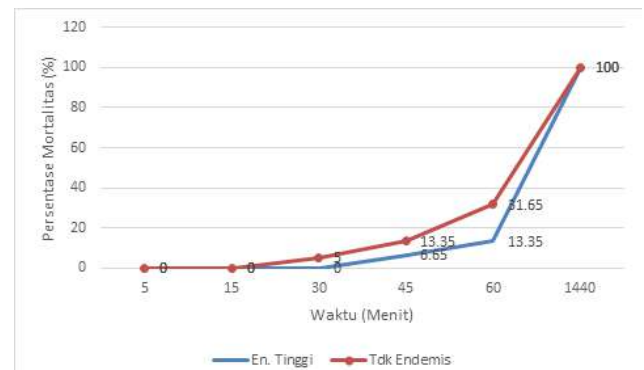


Figure 1. Average mortality of *Aedes aegypti* high endemic and non-endemic strains in North Toraja to Temephos 1%

DISCUSSION

This study shows that *Aedes aegypti* mosquitoes have been resistant to Malathion 0.8% in high endemic areas of North Toraja. The results of this study are similar with research conducted by Prasetyowati et al⁵, in East Jakarta, West Jakarta and South Jakarta found that the three regions of the *Aedes aegypti* mosquito were resistant to Malathion 0.8%. In line with the research of Widiarti et al (2011), conducted in Central Java and Yogyakarta that *Aedes aegypti* mosquitoes were resistant to Malathion insecticides in very low concentrations of 0.8%.

This study shows that *Aedes aegypti* is tolerant to Malathion concentration of 5%. This result is similar to that of Suwito⁸, finding that *Aedes aegypti* mosquito populations are already tolerant to 5% malathion. In line with Sing et al (2011) research, in Koderma, India it was found that *Aedes aegypti* mosquitoes had a mortality of 95.83% against malathion 5%, which means that *Aedes aegypti* mosquitoes at the site have been in tolerant or potential resistance category.

However, different conditions were found in several regions. Research conducted by Sundari & Orbayinah¹², in Yogyakarta found that *Ae. aegypti* from endemic research sites (Bogoran and Badegan) are still susceptible to malathion insecticides.

This study shows that *Aedes aegypti* is still susceptible to temephos 1% in high endemic areas and not endemic to North Toraja. This research is in line with research conducted by Salim et al⁷, in Palembang City found that *Ae. aegypti* larvae stage still tend to be susceptible to temefos dose 1%. Research by Sinaga et al (2016), found that larvae *Aedes aegypti* from Jatiasih Village, Bekasi City, is still vulnerable to temephos. In Buah Batu Subdistrict, Bandung City, it was also found that *Aedes aegypti* larvae were still susceptible to 1% temephos¹³.

Polson research in Phnom Penh (Cambodia) found that the difference in susceptibility of *Aedes aegypti* to insecticides between regions due to the different intensity and duration of insecticide use. The more frequent use of these insecticides, the faster resistance will occur¹⁴. This can be seen from the differences in *Aedes aegypti* mortality in high endemic areas and not endemic in North Toraja.

Another factor that influences the vulnerability of *Aedes aegypti* based on endemicity is population density. The denser an area of vector density is also increasing, the greater the potential for transmission of DHF, so the use of insecticides for vector control is also getting bigger¹⁵.

CONCLUSION

In this study, although the concentration of 5% is still tolerant of *Aedes aegypti* mosquitoes in high endemic areas, but the lethal time value shows a long time (LT99) 1827.26 minutes (30.45 hours) or 1 day 6 hours, when associated with biting characters which is multi-biter (repeatedly bites) then with the chance to live even if only 1 day 6 hours allows mosquitoes to still be able to play a role as transmitters of the dengue virus. These results indicate that a concentration of 5% is not effective for use in high endemic areas in North Toraja.

Conflict of Interest: The authors declare that no conflicts of interest exist regarding this study

Ethical Clearance: Taken from University Committee

Source of Funding: Hasanuddin University

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Can The Length of Nurse Employment Lead to Work-related Stress at Inpatient Ward in Hasanuddin University Hospital, A Teaching Hospital, Makassar, Indonesia

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ABSTRACT

Nurse is the most common stressed profession. They works with life threatening patients, emergency and stressed patients. The sources of stress can be personal, interpersonal and environment factors. Some literature stated that a new graduated nurse may feel more stressful when they work at hospital for the first time. This condition can decrease nursing performance and become harmful to patients. However, the study of correlation between work experience and work related stress in teaching hospital is still limited. Therefore, this study will analyze the correlation between length of nurse employment and work related stress on nurse at in-patient ward in Hasanuddin University Hospital, a teaching hospital in Makassar, Indonesia. This study is a quantitative study with applied cross sectional study. This study collected information from 72 sample (total sampling). They filled in valid questionnaires regarding work related stress. The length of nurse employment was how many years of samples works as a nurse. Chi-square was applied to this study and the result showed that p value is 0,038. It means, statistically, there was a correlation between the length of nurse employment and work related stress on nurse at inpatient ward in the hospital. The shorter of the length of employment, the more stress on nurse. This fact showed that inexperienced nurse will get more stress than experienced nurse when they work in hospital. The result implies that self efficacy of graduated nurses and working environment are important to reduce their stress. Working in a good condition can improve patient safety

Keywords: Working experience; nurse; work related stress

INTRODUCTION

Nurse is the most common stressed profession in the world. There is a substantial evidence to support this statement. A survey in France found that work related stress on nurse was 74% of all nurses. Gong *et al.*¹ reported that in France almost 30% of nurse managers got depressed and in Canada 1 out of ten nurses were depressed due to their professions and in 2012, there were 35.28% of Nurse working in a emergency ward become stress in Iran. Gholamzadeh *et al*² also found that 27% nurse were suffered from psychosomatic symptom and 38% visit doctors. They work with life threatening, emergency and stressed patients. In addition, most of them have heavily workload, lack of power, role ambiguity and role conflict³⁻⁸.

Work related stressed (WRS) can be recognised from somatic symptom such as emotional exhaustion, low

back pain⁹. This condition will influence productivity of nurse, thus WRS has to be well managed, otherwise it would have impact on nurse performance, such as inefficiency, ineffectivity and the most considerable impact is patient safety. Some research showed that a lot of adverse events in hospital occurred due to burnout and occupational stressed. Nielsen *et al*¹⁰ stated that the incidens of adverse events increased as a result of work related stress among nurses. Other studies reported that the work hour of health care workers have impact on adverse events. Some radiologist did misconduct by cause of stress syndrome^{11,12}.

In a decade, the topic of WRS among health care professional has been studied seriously. Moustaka & Constantinidis¹³ researched the causa of work related stress among nurses. They said that nurses had ambiguity in their task and sometimes come to conflict. They have responsibility to care patient, sometimes they have to

be a pharmacist regarding administer drugs to patients, occasionally, the nurses should be a psychology, at the same time they have to do administrative work as a result they get exhausted. This condition exist in midwife as well¹⁴. Other researchers has concerned counterbalancing of work related stress in intensive care unit¹⁵. Likewise Deklava *et al.*¹⁶ studied stress coping mechanism and professional burn out among lativian nurse. Golubic *et al.* identified some factors can be 'occupational stressors, they are financial issues', 'public criticism', 'hazards at workplace', 'interpersonal conflicts at workplace', 'shift work' and 'professional and intellectual demands'. Even though nurses are the most stress profession, the number of graduated nurse growth steadily in Indonesia. Board for development and empowerment human resources of health in Indonesia reported that From 2015 the number of nurse students were 17,779, then in 2016 19.058, it increases steadily to 21.017(Indonesia 2018). It seems graduated nurse to be large workforce

Recent years, the government has development some new teaching hospitals like Hasanuddin University Hospital, it has responsibility to employ them. Nevertheless, the majority studied revealed that more novice nurse experienced stress when they start to work at hospital for the first time. Their psychosocial and psychology changed because of environmental change from education to working environment. They were lacking in self confidence in caring patients, they have to be real professionals, having new role, new friends and new regulation¹⁷⁻²⁰

As discussed previously, it may be harmful for

patients if they are handled by a novice nurse. Hence, most hospital may not recruit new graduated nurse unless they have some experience before working at their hospital. The length of employment for nurse reflects the experience of nurse. Thus, the research question is that can the length of nurse employment lead to work-related stress at inpatient ward in Hasanuddin university hospital, a teaching hospital, Makassar, Indonesia, so this study will analyze the correlation between length of nurse employment and work related stress on nurse at in-patient ward in Hasanuddin University Hospital, a teaching hospital in Makassar, Indonesia

MATERIALS AND METHOD

This study was a quantitative study with applied cross sectional study. Population is all nurses working in inpatient wards at Hasanuddin University Hospital (72 respectively). The research has been conducted for a month, during April 2017. It collected information from 72 sample (total sampling) regarding their physical symptom when they were in the working place. The change of physical sign such as the increase of pulse, heart rate, headache, palpitation, fatigue syndrome, dizziness are functional somatic syndrome (FSS) resulting from decrease quality of life, anxiety and depression. They are recognized as stress symptoms²³. The respondents were asked to give their perception regarding their physical sign when they were working. Their perception was categorized into 4 categories: never, seldom, almost and frequently. Than, the data was analyzed using chi square test. This test was used for several reasons; 1) this study analyzed association between two variables from one population, 2) the data was categorical.

RESULTS

Table 1. Association Between The Lenght of Employment and The Work Related Stress at inpatient wards in Hasanuddin University Hospital, A Teaching Hospital, Makassar, Indonesia

The Length of employment (year)	Work Related Stress				Total		Statistic Test
	No		Yes		n	%	
	n	%	n	%			
0 – 3	4	25	12	75	16	100	p = 0,038
4 – 5	26	49	27	50	53	100	
6 – 7	3	100	0	0	3	100	

As seen in this tabel that most of nurses with the length of employment 0-3 years felt stress when they were working. However, nurses had the length of employment more than 5 years had no stress. Chi squire test showed p value = 0,038 < α = 0,05 means hyphothesis null was rejected and hyphothesis alterinative was accepted. It reflected that statistically, there is association between the length of employment and work related stress in the inpatient wards at the teaching hospital of Hasanuddin University.

DISCUSSIONS

Although this study is based on small sample in a teaching hospital in Indonesia, the result proved that the inexperience nurse had more stress than experience nurse when they worked at teaching hospital. The symptom of stress can be determined from their answer. Most of nurses had worked for 1-3 years at hospital answered that, they got headache when they were in working place, their heart rate increased progressively when they met patients. They also experienced like fatigue syndrome, such as lack of energy and tired. They stated that they placed under pressured, sometimes they felt guilty, hopeless when they were working. All this feeling may evoke because the inexperience nurse perceived that they lost confidence in caring patients. In addition, high demand nursing care from patients triggered this situation.

Moreover, in the teaching hospital like this hospital, nurses have other responsibilities to coach a nurse student. Some of them may feel stranger among the experience nurses. They have to adapt to new environment, new responsibility, new role, at the same time they have to handle with care anxiety patients and family.

The majority of studies were in favor in this situation. Duchscher²⁴ revealed that most of novice nurse experienced exhaustion at the first 18 months at working place. The novice nurses need to adapt the transition period from education to working environment. At this stage, new graduated nurse perceived all situation become complex, uncertainty, difficult and puzzlement. They will start to work professionally and become member of a teamwork. Team work in hospital consists of multi professions, the nurse requires professional integration. However most of inexperience nurse is lack of confidence working with other professional²⁵.

CONCLUSION

Statistically, there was a correlation between the length of nurse employment and work related stress on nurse at inpatient ward in the hospital. The shorter of the length of employment, the more stress on nurse. This fact showed that inexperienced nurse will get more stress than experienced nurse when they work in hospital. The result implies that self efficacy of graduated nurses and working environment are important to reduce their stress. Working in a good condition can improve patient safety.

Conflict of Interest: The authors declare that no conflicts of interest exist regarding this study

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Potential Honey Propolis Trigona to Prevent Arthritis Rheumatoid by Increase Foxp3 Level; A Preliminary Study

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ABSTRACT

Background: Rheumatoid arthritis is an autoimmune disease and need the balancing of immune system. Foxp3 Treg level is one of critical regulator to balance system immune. This study aim to analyze potential of propolis and honey propolis for prevention rheumatoid arthritis based on Foxp3 Treg as a target. **Methods:** It was a quasi-experimental study with pretest-posttest control design, Subject divided into 3 groups, group 1 control did not give anything, group2 given propolis 60 mg/capsule and group 3 given honey propolis 35 mg/pack. Propolis and Honey Propolis Trigona was giving through 14 days and blood sample for ELISA examination taken three times, Before intervention (baseline), 7 day after intervention and 14 days after intervention. **Results:** Analysis mean difference between baseline data with 14 days data show giving honey propolis has the highest increase of Foxp3 Treg and giving propolis has the lowest increase of Foxp3 Treg. Among the three groups, only the group given honey propolis has a significant effect. **Conclusion:** Honey propolis has potential effect as therapy for prevention arthritis rheumatoid by increase Foxp3 Treg level. Adherence to consume honey propolis is necessary to provide the maximum effect.

Keywords: Honey Propolis, Trigona, Arthritis Rheumatoid, Autoimmune

INTRODUCTION

Rheumatoid arthritis (RA) is a severe inflammatory disease and categorized as one of autoimmune disease, unproper treatment will make it improve to joint damage and disability. The most disturbing is pain and swelling due to inflammation. In advanced conditions, the disease may increase the risk of cardiovascular disease and changes in bone metabolism.^{1,2}

T regulatory (Treg) cell is critical regulator in autoimmune disease, impaired self-tolerance in autoimmune diseases such as rheumatoid arthritis occurs due to Treg cell failure to regulate its suppressive function. Reduction of Treg frequency correlate with increase of RA.

Manipulating Tregulator cells with Foxp3 as transcription factor or marker of Treg as a target of prevention and therapeutic is a very important factor in immune homeostasis.^{1,3-5}

Several studies has tried Treg injection to the the patient and successfully affect the duration of remission.^{6,7} Several studies also use Salmonella bacteria that has been attenuated as a vaccine for cases autoimmune diseases, it has ability to induce Foxp3 Treg. Although successful in inducing the expression of Foxp3 Treg, using pathogenic bacteria is still being debated.⁸ Tregulator cell involvement is the latest pathologic mechanism developed in the therapeutic target of rheumatoid arthritis, but it requires intervention to increase of Foxp3 Treg without debate and doubts about intervention safety.

South Sulawesi is one of honey and propolis producing regions and honey bee products include propolis and honey has ability to promote Foxp3 Treg both in healthy and unhealthy subject. This ability

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associated with polyphenol, quercetin and vitamin content of its.¹⁰⁻¹² Studies of honey and propolis and its correlations with immune systems have been numerous, but studies that correlate honey and propolis with Foxp3 Treg are rare. The combination of honey and propolis is also rarely studied and usually researched distinctly.

This study aim to analyze potential of propolis and honey propolis for prevention rheumatoid arthritis based on Foxp3 Treg as a target.

MATERIAL AND METHOD

Material

Trigona honey and propolis used was local honey bee products, it was taken from Masamba, a district in South Sulawesi. Honey bee farmer has been produce in a large scale and become the raw material for some industries of honey and propolis.

The water content of honey is lowered dehumidifier up to 20% then stored for 3 days in a stainless container to precipitate the dirt. Propolis extracted using water and dried using fresh dryer as long as 24 hours. Honey propolis then mixed with 85% honey and 15% honey in 35 mg/pack. Propolis packed in capsule as much as 60 mg/capsule.

Methods

Protocol Recruitment of Subject

Ethical clearance has been accepted by Hasanuddin University Ethical Committee (1046/H4.8.4.5.31/PP36-KOMETIK/2017). To recruit subject of study, we offering free rheumatic screening to those who have a rheumatic-like symptom. Thirty people were willing to take part and twenty of them were positive for rheumatic suspect (examination of ASTO, CRP and Rheumatoid Factor). They were giving information about protocol of study and asked to join the study, informed consent were giving both to them who had suspect of rheumatoid and normal subject.

Design and protocol of Study

It was a quasi experimental study with pretest post control design, Ethical Clearance from Ethical Committee of Medical faculty, Hasanuddin University). Subject divided into 3 groups, group 1 was control did not given anything, group2 given propolis 60 mg/capsule and group 3 given honey propolis 35 mg/pack. Group 1 and 3 consist of 10 subject and group 2 consist of 7 subject, because 2 subject exclude after informed consent given because they had allergic with honey.

It was a quasi-experimental study with pretest-posttest control design, Subject divided into 3 groups, group 1 control did not give anything, group2 given propolis 60 mg/capsule and group 3 given honey propolis 35 mg/pack. Group 1 and 3 consist of 10 subject and group 2 consist of 7 subjects, because 2 subjects exclude after informed consent given because they had allergic to honey.

Propolis and Honey Propolis Trigona was giving through 14 days and blood sample for ELISA examination taken three times, Before intervention (baseline), 7 day after intervention and 14 days after intervention. Protocol of ELISA was use standard od human ELISA Kit produced by mybiosource.

Statistical Analysis

Data analyse using Statistical Package for Social Sciences (SPSS), statistical test were Wilcoxon and Paired-Sample T Test to compare of mean. Mean difference considered significant if probability value (p-value) less than 0.05.

RESULT

Analysis result after seven days giving honey propolis, it has the highest effect to increase Foxp3 Treg, and it is significant statistically while propolis and control also increase Foxp3 Treg but it is not significant (Table 1). After 14 days, data indicated a decline of foxp3 both group giving honey and honey propolis while control group shows an increase of Foxp3 Treg (Table 2).

Table 1. Comparison of Mean Difference Between Baseline with 7 days After Intervention

Groups	Level of Foxp3 (pg/ml)			P
	Mean±SD			
	Baseline	7 days	Mean Difference	
Control (n=10)	0.898±0.343	1.071±0.612	0.173	0.416*
Honey Propolis (n=10)	0.538±0.539	0.901±0.581	0.363	0.005**
Propolis (n=7)	0.417±0.581	0.425±0.110	0.008	0.917**

*Paired Sample T-Test

**Wilcoxon

Analysis mean difference between baseline data with 14 days data show giving honey propolis has the highest increase of Foxp3 Treg and giving propolis has the lowest increase of Foxp3 Treg. Among the three groups, only the group given honey propolis has a significant effect (table 3 and 4).

Table 2. Comparison of Mean Difference Between 7 days with 14 days After Intervention

Groups	Level of Foxp3 (pg/ml)			P
	Mean±SD			
	7 days	14 days	Mean Difference	
Control (n=10)	1.071±0.612	1.194±0.916	0.123	0.441**
Honey Propolis (n=10)	0.901±0.581	0.888±0.529	-0.013	0.897*
Propolis (n=7)	0.425±0.110	0.616±0.262	-0.191	0.172**

*Paired Sample T-Test

**Wilcoxon

Table 3. Comparison of Mean Difference Between Baseline with 14 days After Intervention

Groups	Level of Foxp3 (pg/ml)			P
	Mean±SD			
	Baseline	14 days	Mean Difference	
Control (n=10)	0.898±0.343	1.194±0.916	0.296	0.646*
Honey Propolis (n=10)	0.538±0.539	0.888±0.529	0.350	0.037*
Propolis (n=7)	0.417±0.581	0.616±0.262	0.199	0.173*

*Uji Wilcoxon

Table 4. Comparison of Mean Difference Between Baseline with 7 days After Intervention

Groups	Mean Difference of Foxp3 (pg/ml)		
	Mean±SD		
	Baseline-7 days	7 days-14 days	Baseline-14 days
Control (n=10)	0.173	0.123	0.296
Honey Propolis (n=10)	0.363	-0.013	0.350
Propolis (n=7)	0.008	-0.191	0.199

*Paired Sample T-Test

**Wilcoxon

DISCUSSION

Intervention use honey propolis showed the significant increase of Foxp3 Treg compare to another group, both control and propolis intervention. Analysis in detail shows that increase of Foxp3 Treg happens in the first week and in the second week Foxp3 decline, we have an assumption that adherence of subject is determinant why the data is not consistent. In the first week, all subjects reported that they did not take their honey propolis and propolis regularly. Majority of subjects give a reason, they forget ones or too busy even we have remembered them. It shows that adherence is just consistent in the first week.

Propolis has the anti-inflammatory and immunosuppressant effect, the component of it that maybe has a role is Artepillin. Mechanism how propolis and honey bee products affect immunosuppressant still not clear and this study may be one explanation that Foxp3 Treg is the keyword of it.¹³⁻¹⁵

Prevention from arthritis was associated with increased of Foxp3 Treg ratio and decrease of inflammation such as IL-17.¹⁶ Rheumatoid arthritis is a chronic systemic autoimmune disease characterized by synovitis and joint erosion and involves activation of T cells in its pathogenesis.¹⁷ The abnormality that is encountered in rheumatoid arthritis due to the growth of synovial cells that damage bone and cartilage. The pathogenesis is the activation of autoreactive T cells that migrate into the synovial cavity and B cells, through a cytokine that is folded by T cells. The synovial membrane becomes hypercellular due to the accumulation large amounts of lymphocytes in various stages of activation, plasma cells and macrophages. All cells exhibit high activity and interactions between the cells that form the formation of immunoglobulin and rheumatoid factor.¹⁸⁻²⁰ Activation of excessive immune cells and the inability to recognize self-antigen is a determinant for arthritis rheumatoid an another autoimmune diseases, for this problem requires therapy that can lead to homeostasis of the immune system.

One of the main targets of therapy in rheumatoid arthritis patients is restore the immune balance system, regulatory T cells are the ideal targets in this case because their function can suppress inflammation. The better thing is that the increased amount of Treg to prevent inflammation will not inhibit the ability of the immune

response to fight infection.^{6,21,22}

Honey propolis has a potential effect to promote Foxp3 Treg in human suspect arthritis rheumatoid. This study just an eliminary study and need more studies that controls more variables so it is clear that the effect of immune balance is derived from the intervention that is done.

CONCLUSION

Honey propolis has potential effect as therapy for prevention arthritis rheumatoid by increase Foxp3 Treg level. Adherence to consume honey propolis is necessary to provide the maximum effect.

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Human Dimension Plays a Role in Realizing The Health of the Urban Dwelling, Jakarta, Indonesia

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ABSTRACT

Currently, in urban dwelling planning, the comfort and the health of the human living is set with parameters of the design standard. The human's dimension as the residents has not been considered to play actively in realizing the health of self and their residence. Meanwhile, the density and limitation of urban dwelling is an issue that causes the difficulty in designing the comfort and the health adequately. The purpose of this study was to reveal that the human dimension can play a role in the health of their home by identifying the indoor air quality. The method was quantitative and used Structural Equation Modelling (SEM). Human dimension in urban dwelling involved the dimension of residents and managers and was influenced by their knowledge. The residents' dimensions that assessed were the physical comfort, psychic comfort, potentially pollutant activity, and health participation. The result of this study indicates that the human dimension can contribute 19% in the realization of the residents' health via indoor air quality beside the design standard. The recommendation of this study is the need to include a human participation program in the policy of applying the health in an urban dwelling.

Keywords: *urban dwelling, human dimension, indoor air quality, health participation*

INTRODUCTION

Previous studies on the measurement of building quality and the environment tend to assess buildings and their environment with certain parameters professionally recognized. These studies have not place the role of humans as a factor that can be an assessment tool in influencing the value of the measurement of the buildings and the environment.¹² Unfortunately, such studies revealed that all interested human and being part of apartment operations are not already intended to optimize their healthier dwelling.³⁴ Residents and managers without good awareness tend to reduce the quality of building and its environment atmosphere that affect human health. Preliminary investigation proved that educated residents and managers still carry out actions which cause negatively the indoor health quality such as smoking, using chemical finishing materials, do not clean the room, and do not even care about things that can damage the health of neighboring units. Thus, a study that explores the role of the human dimension in this focus of residents and managers to maintain the

health in building through air quality becomes important.

The novelty of this study is the health in an urban dwelling can be optimized with the unity of the human dimension: the residents and managers through the right knowledge, behavior, and participation. The healthy urban dwelling is not only determined by luxury finishing, the reliability of occupancy, ventilation system and outdoor air quality but is also influenced by the unity of knowledge, behavior, and participation of the residents and managers as the social capital in an urban dwelling.

Jakarta has developed into a megapolitan city where many economic interests are intertwined with the surrounding cities. Therefore, Jakarta as big-city influences the lifestyle of their inhabitants and the workers particularly who work in this urban area interested live in vertical housing. Vice versa, sometimes, they still carry on negative behaviors from their origin when they live in an urban dwelling densely. They did not realize that living in an urban dwelling there are some disciplines in order

living sustainably. Meanwhile, the hazardous of IAQ was potentially caused by 4 things, that are contaminated outside air penetration, indoor human activity that carried out combustion activities (like cooking and smoking), inappropriate waste management, cleaning with chemical liquid, and building finishing materials which contains certain chemicals.⁵ The operations in building through the maintenance activities need to be supported by a social-cultural system.⁴ The supporting data shows that the prevalence of respiratory disorders in urban vertical dwellings in Jakarta was 42.4% while the Basic Health Research⁶ on the prevalence of ARI (Acute Respiratory Infection) in Jakarta was 22.6%.⁷ This shows that apartment residents are more likely to be infected with ARI double greater than the general occupancy in Jakarta.

The factor of the human dimension that care on the good ventilation condition is social capital that is important in realizing healthy air quality indoor in the urban vertical housing.⁸ Researchers looked at the factors of knowledge, behavior, and participation based on the fulfillment of the physical and psychological aspects of occupants by managers will affect the sustainability of urban dwellings. If the role of the human dimension of the occupants and managers can be improved through the right perception, behavior, and participation, then the healthy and sustainable urban dwelling can be realized.⁹ Maslow¹⁰ uses the fulfillment of physiological terms, security, ownership and love, self-esteem, self-actualization, and self-transcendence to describe patterns that motivate people to move. Thus, the interests of the fulfillment of the physical and psychological comfort of residents can be predicted as a factor that influences health in addition to directed activities and participation to realize shared health. In addition, the manager's capacity will certainly influence his ability to encourage residents. In Indonesian Government Regulation 1988 number 4 on Flat Housing,¹¹ it is stated that there are 3 manager capacities, they are the ability to manage, ability to inspect, and ability to serve. In this study, the author added a capacity manager, it is the ability to motivate according to Maslow's theory.

MATERIAL AND METHOD

The data were taken on the middle-income apartment located in central Jakarta. the total area of the apartment is 2.9 ha, located on the main road of Ahmad Yani Road with the density of the vehicle is quite dense. The road

consists of 8 lines and freeways (4 lines) and vehicle speeds between 60-120 km/hour, so it is quite noisy and the hazardous level of air pollution.

Most of the participants have lived in this apartment for 2-4 years. Most of the residents' participants live in 2 towers of the 6 towers that have been built, namely the blue and yellow towers. The youngest participant is 16 years old while the oldest is 60 years old. Participants occupy almost evenly at the levels of apartment towers. A unit of participants is occupied by 1 to 4 people but most of them are occupied by 2 people. Unit area is 33m², consisting of 2 bedrooms, 1 living room, 1 bathroom and 1 balcony. The balcony is very narrow, it can only be put for cleaning equipment and AC machine. Manager participants are from related divisions to IAQ services: maintenance staff, garbage attendant, technician, customer service, and human resource development. Manager participants are between the ages of 23 to 50 years and on average have worked between 2 and 6 years in this company. The total number of participants is 176 people, 88 residents, and 88 managers. Data collection is mostly carried out from June to August 2017 but the measurement of biological pollutant data was taken in February 2018.

This study used a quantitative method. For collecting participants data was used a questionnaire. The residents' questionnaire consists of 4 part which are the physical comfort, psychological comfort, potentially pollutant activity, and health participation. The managers' questionnaires consist of 4 parts, which are the ability to serve, ability to inspect, ability to manage, and the ability to motivate. The IAQ data consists of the measurement of physical pollutants, chemical pollutants, and biological pollutants by IAQmeter. The questionnaires and the measurements use a Likert scale (1-5). The physical pollutants were temperature, humidity, and particulate meters. The chemical pollutants consisted of carbon monoxide, carbon dioxide, and formaldehyde. Furthermore, for biological pollutants, only bacterial data was taken. The parameter for determining the scale range of pollutant measurement was used regulation of the ministry of health of the Republic of Indonesia, number 1077.¹²

The participants data were as the dependent variable and the measurements data were as the independent variable. There was a suppressor variable which strengthened the influence of the variable dependent to

the independent variables that were the residents' knowledge and managers' knowledge. The knowledge consisted of the education level, the knowledge of the pollutants impact, and the knowledge of hygiene. All data were processed using the SmartPLS 3.2 with a reflective order formation.

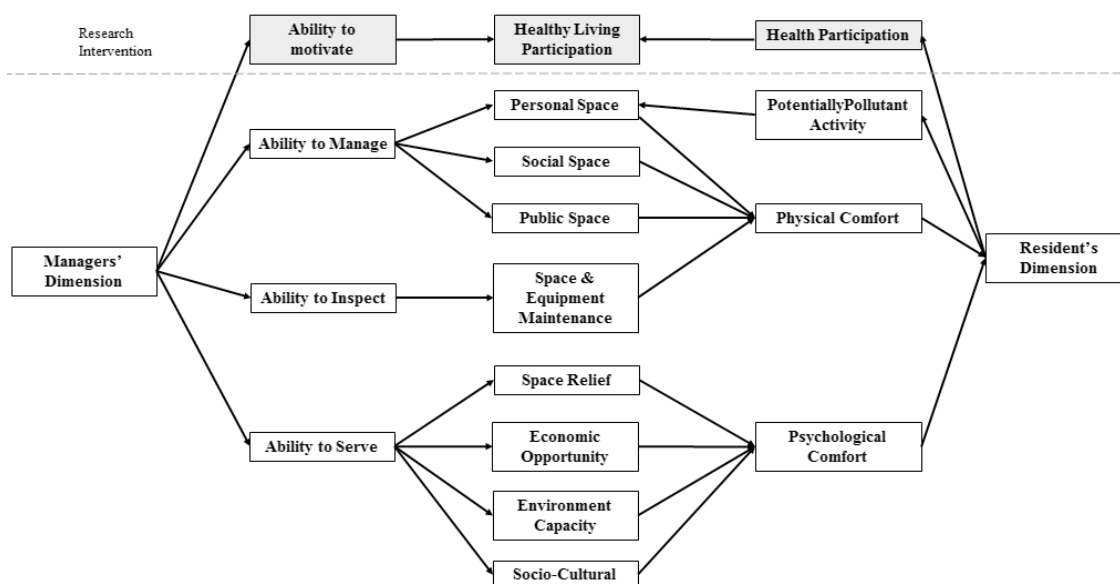


Figure 1 . The construct of SEM: the human dimensions of the Residents-Managers

Figure 1 shows how to meet the interests and responsibilities of residents and managers. From the residents' dimensions, the physical comfort relates to personal space, social space, public space, and equipment maintenance. It meets to manager's dimensions, which are an ability to manage and ability to inspect. The psychological comfort relates to space relief, economic opportunity, environmental capacity, and socio-cultural and meets the manager ability to serve. Apart from this, for this research intervention, added one variable indicator related resident and manager participation, those are the health participation and the ability to motivate.

FINDINGS

The observation and IAQ measurement show that the unit condition was influenced by the resident behavior such as determining the finishing material, doing hygiene lifestyle, and checking AC regularly.

The unit which is finished with the wallpaper showed the higher formaldehyde which prevalence causes respiratory symptoms.⁵ Although the measurement results do not exceed than the parameter limit, this could be a warning that this common wallpaper is not good for children health,¹³ moreover in the new apartment.¹⁴ The daily materials which particularly annoying smell was revealed: cigarette smoke, strong odor food which thrown to sink, and chemical air fragrance. The strong odor food that thrown away to the sink, can be smelled by the others unit via the plumbing pipes, which caused an unpleasant smell or the neighbors. The residents who choose a good quality and care the maintenance of AC, do the indoor air condition feel fresher. The unit with good quality AC has the humidity and temperature and meet the parameters. Then, a unit which is inhabited by people who diligently clean their room, has a low bacterial number and determinate to ventilate the spaces.¹⁵

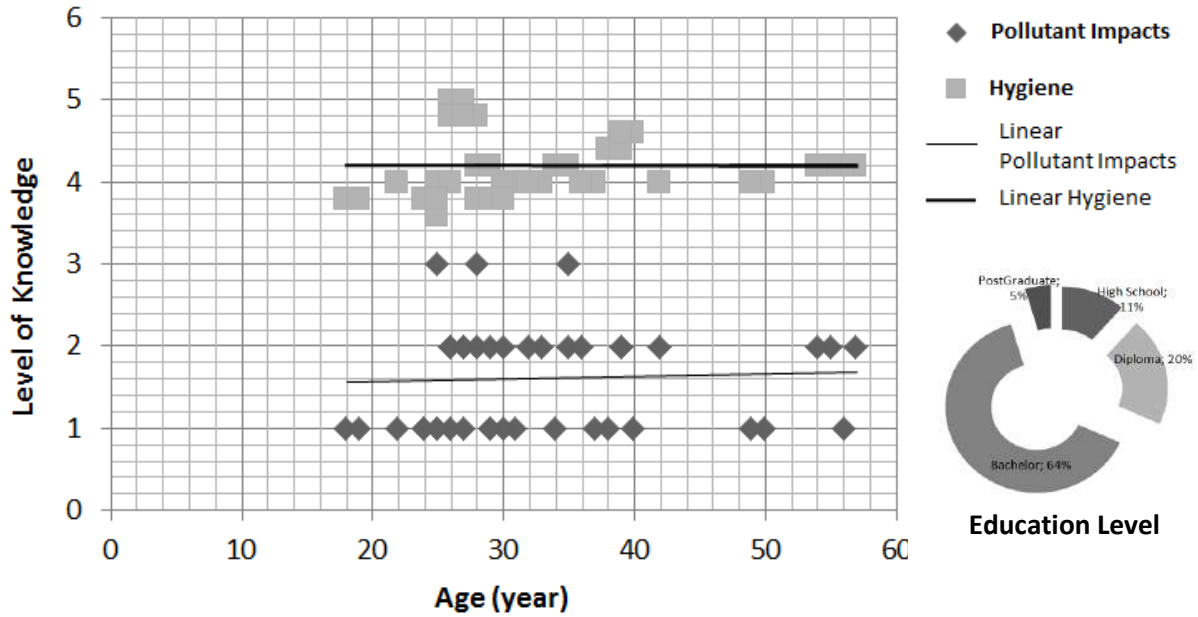


Figure 2. The characteristic of the residents' participants: Age, Level of knowledge consists of pollutant impacts and hygiene, and Education Level.

Figure 2 shows that most residents' participants are the young age 18-40 years old. The young age even single and spouse enjoy new life experiences, living in an urban dwelling as a trend lifestyle in Jakarta. Related the experience, young adults choose to live in a metropolis with mixed-use facilities and ease of transportation in one place.^{16 17} It is moreover for creative and good education workers.¹⁸ The education level shows that most residents graduated bachelor, a good education level. According to PERMENDIKTI number 44/2015¹⁹ in Indonesia, diploma and bachelor graduates are categorized as a level who able to work as executors and analysts and have the critical knowledge to solve the problem. This figure also shows that almost all of the resident state they know the hygiene and the elder age has more this knowledge than the younger. However, they confess do not have enough knowledge of pollutant impacts. Almost half of the residents have lived for 2 years and the rest have been more than that. It shows that the residents still in the adjustment period living in an apartment and newly married couples. At this stage,

learning to live independently far from parents and need the presence of people nearby can help to provide the instrument and emotional support.²⁰ This means they need to do social support for fulfilling comfort living.

According to the theory of human dimension in architecture perspective, there is two dimension of human which fully needed that are physical and psychological comfort on indoor.²¹ Figure 3 shows the residents' physical comfort and residents' psychological comfort. For the physical comfort, the residents stated the furniture size quite decent. Figure 3 reveals that most residents feel the private room is already comfortable. It means the private room is relieved enough to do their private activities. However, half less of them do not feel comfortable for the family activity. It is concluded that the residents agree that the unit room good for a couple but not good enough for a family. Further, most of them feel comfortable in the neighboring space. It means the residents are satisfied with the public space around the building.

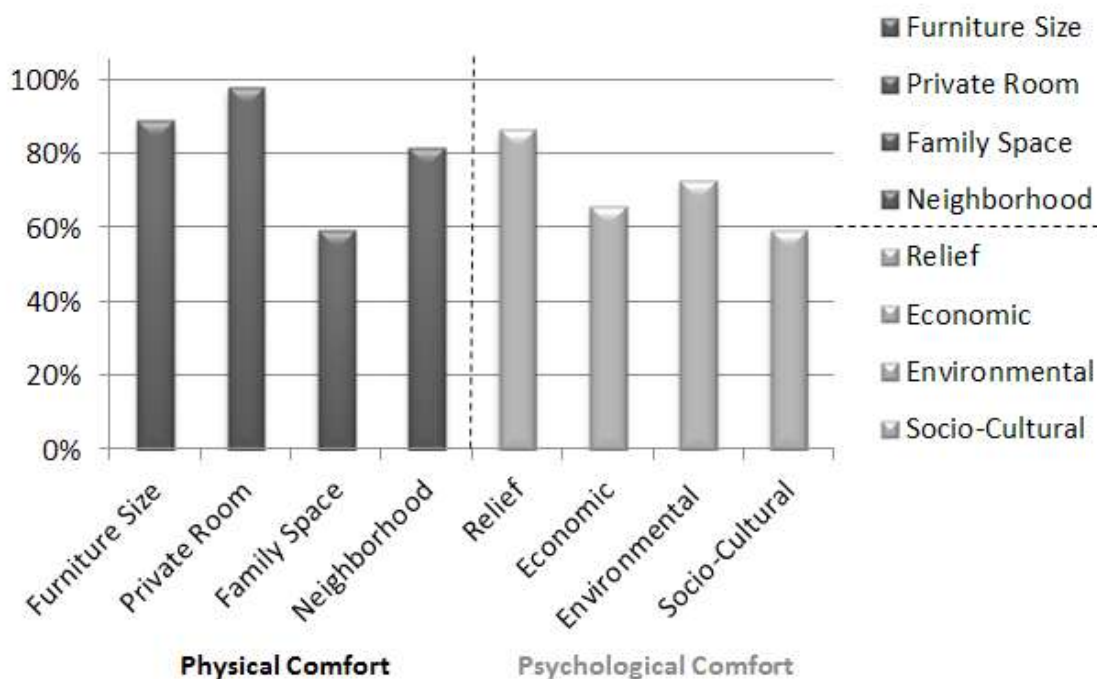


Figure 3. The physical and psychological comforts of the Residents

Further, Figure 3 shows the resident psychological on relieved space, economic opportunity, environmental capacity, and socio-cultural program. Most residents feel that the rooms in this dwelling are relieved, especially for the couple. It means that they feel appropriate on the wide of spaces. The residents state that the economic opportunity in this apartment is less good related to the cost of living, savings, and money-making opportunities

in this area. On environmental capacity, most residents feel its support for their activities. Then, for the socio-cultural program, a half residents state that less program for it. In fact, there were some like joint gymnastics and worship together on Muslim holidays but those are the rare event. The improvements in quality of life and life satisfaction while health assessment and education programs encourage positive health behaviors.²²

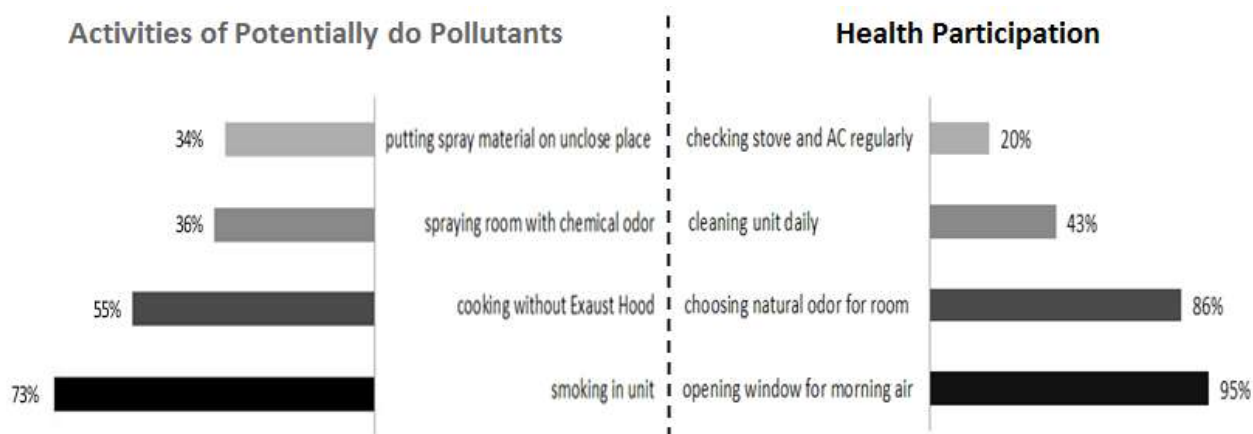


Figure 4. The activities of potentially do pollutants and health participation that influence IAQ in unit

Based on the result above, then the following discussion on its relation to their behavior which is revealed in Figure 4. Figure 4 shows the residents' activities which potentially do pollutants such as putting spray material on unclose place, spraying chemical fragrance, smoking, and cooking in large quantities. Unit room needs to be circulated in order the chemicals are sucked out through exhaust fan and AC. The ventilation

can accelerate pollutant trapping due to temperature inversion.²³ The opposite, the health participation show the residents' behavior which affects positively to IAQ such as choosing natural odor for the room, opening window for fresh air, checking the stove and AC periodically, and cleaning the rooms of dust and mold. These reveal that human dimension can play the role in realizing health air in the apartment.

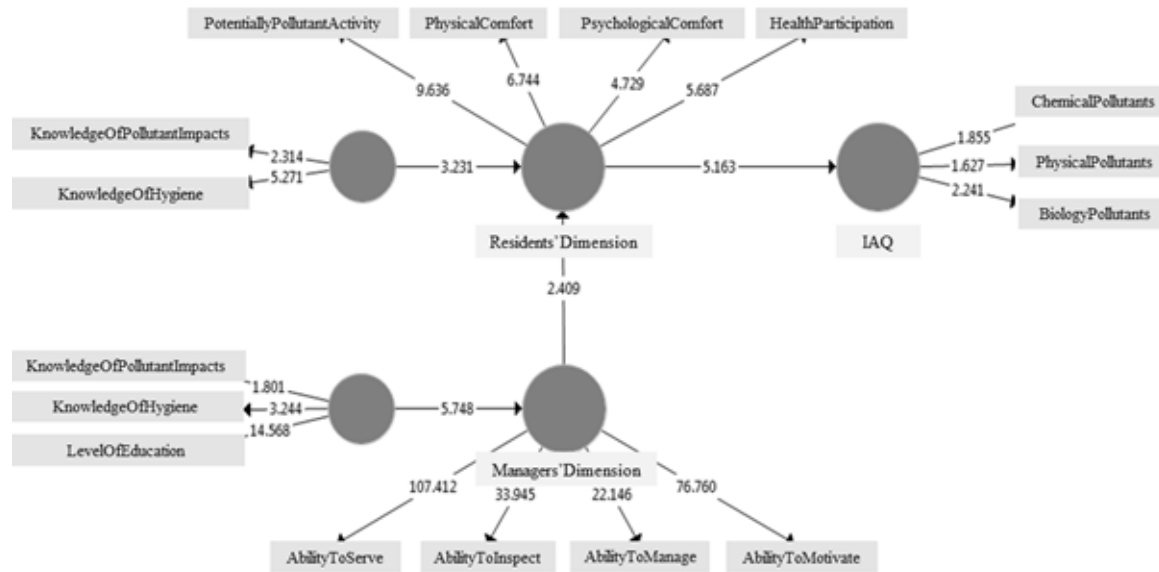


Figure 5. The human dimensions' construct in SmartPLS and the relationship values

The following discussion is on the influence of human dimension construct to IAQ. Figure 5 is a construct of the influence of the human dimension to IAQ using SmartPLS analysis. The results of the calculation of the SmartPLS, produce certain relationship values between them. However, the education level of the resident does not support this construct, its value attenuates. It reveals that awareness to participate not depends on the education level of the resident, but needs the knowledge of hygiene and pollutant impacts. Figure 5 shows all values of the outer model of all latent variables meet the requirements with >0.4 with Residents' Knowledge and Managers' Capability as suppressor variables. The capability of managers determines the improvement of residents' behavior.^{24 25} The relationship between services provided by private companies (managers) and residents' satisfaction are firm, which is supported by hygienic conditions as a major role.²⁶ Apart from that reason, the inner model value between latent variables becomes strong (5,163) and meets the reliability requirements >1.96. This means that this SEM construct

is right for this research study and confirms the human dimension can influence IAQ in urban dwelling in Jakarta, Indonesia.

To assess the value of the influence among the latent variables, it can be seen through R Square Adjusted in percentage. This analysis result shows the influence of all variable latent as the dependent variable: Residents ' Knowledge, Managers' Dimension, Managers 'Capacity, and Residents' Dimension to IAQ that is 19%. This percentage shows that the Residents' Dimension and Managers' Dimension as a human dimension influencing IAQ condition as 19%. In the theory of architecture and building equipment,²⁷ IAQ is generally influenced by the condition of air ventilation, air quality outside the building and indoor spaciousness. The result of this study indicates that the human dimension through perception, behavior, and participation can influence IAQ by 19% beside the influence of air ventilation condition, air quality outside the building and indoor spaciousness.

CONCLUSION

An effective human dimension is the manager's dimension as a driver of the resident's dimension which then influences IAQ. The managers' capacity which consists of the level of education, knowledge of the impact of pollutants and hygiene knowledge is very significant in positively encouraging the resident's dimension to IAQ. Thus it can be said that an effective human dimension for realizing the health in urban dwelling in Jakarta is by increasing management capacity that can encourage residents to behave healthily. Although this construct is only 19% as part of all variables which influence IAQ in an urban dwelling, it is a social capital can optimize the health in the unit the hidden place avoid from city hazardous pollution.

It is important to include a human participation program in the government policy of applying air quality in an urban dwelling. The residents' role is important in determining their own unit comfort and health and their neighbors. Then, to realize the role of the human dimension fully potential, the next study should include the other human role such as planners, policymakers, implementers.

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Maternal Education Level and Parental Income Toward Stunting to Students of Salulayang Elementary School in Mamuju Regency

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ABSTRACT

Stunting is a major public health problem in most developing countries and part of the risk factors toward the high incidence of diseases both directly and indirectly. In Indonesia, stunting is a national problem with the percentage of incidence above the tolerance limit set by the World Health Organization (WHO) which is $\leq 20\%$ (WHO, 2010). The results of Basic Health Research (2013) stated that stunting in children under five in Indonesia in 2010 amounted to 41.6% increased to 47.9% in 2013 and for Mamuju Regency in West Sulawesi the percentage of stunting was 47.26%. There are several factors that influence the incidence of stunting, including maternal education and parental income. The level of maternal education and low parental income will result in family limitations in providing nutritional needs both in quality and quantity. The purpose of this study was to determine the relationship between the level of maternal education and parental income with the incidence of stunting. This study was a cross sectional study conducted at SDN Salulayang Mamuju District with a sample of all 90 students. Variables were measuring through direct interviews and questionnaires methods. The results showed that the variables of maternal education levels were significantly associated with the incidence of stunting ($p = 0.005$), as well as parental income significantly associated with the incidence of stunting ($p = 0.006$). It is necessary to increase knowledge about nutrition, especially about stunting with the aim of prevention and the need for economic improvement through community empowerment so that there is no stunting problem caused by poverty.

Keywords: *Stunting, Level of Education, parental income*

INTRODUCTION

Stunting is one of the major health problems in Indonesia, especially in West Sulawesi. Stunting (extremely short) is a form of malnutrition characterized by height according to age based on WHO standard. According to WHO Child Growth Standard, stunting is based on body length index compared to age (BL / A) or height compared to age (H / A) with a limit (z-score) of less than $-2 SD$ ¹.

Stunting prevalence in Indonesia is 37.2% and in West Sulawesi especially Mamuju Regency is 47.26% (Riskedas, 2013). According to the results of the South East Asia Nutrition's Surveys (SEANUTS in the Ministry of Health, 2014) about 24.1% of boys and 24.3% of girls in Indonesia experienced short body size (stunting). A survey of more than 7,000 elementary school children in Indonesia aged 6-12 years shows that around 1 of 3 children in Indonesia experience height growth problems. If it compared with countries in ASEAN such as Vietnam, Malaysia, and Thailand, Indonesia had a greater number of children with short body sizes^{2,3}.

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Childhood is a kind of period that is very sensitive to the environment so that specific handling is needed, especially nutritional intake. Stunting as one of the nutritional problems can inhibit the development of

children which can affect the next period of life such as susceptibility to disease, intellectual decline, decreased productivity, babies born with LBW conditions (Low Birth Weight) to cause poverty. Therefore the role of the mother is needed in supporting efforts to overcome the stunting problem.

One of the main causes of stunting is socioeconomic status, including maternal education level and parental income. The results of Basic Health Research⁴ show that the incidence of stunting in children under five is influenced by low income and low parental education. Families with high parental income will allow the family to obtain optimal nutritional intake both in terms of quality and strength to produce better health. Low parental income is considered to have a significant impact on the possibility of children being thin and short³.

A high level of maternal education will be easier to access information, especially about nutrition and health compared to mothers with lower levels of education. This is consistent with the Salimar study which states that a higher level of maternal education (above high school) will have 1.405 times of chance to get children with normal nutritional status compared to mothers with low education. It was found from the study that to predict the occurrence of stunting maternal education can be used as a change factor⁵.

MATERIALS AND METHOD

Types of research

This research uses a survey design with a cross sectional study approach. This study determines the relationship between independent variables (maternal education level and parental income) with the dependent variable (Stunting incidence) in the same observation period. The relationship test is using the Chi Square test. If the Chi Square test is not eligible, the relationship analysis uses the Fisher Exact test.

Research sites

This research took place at Salulayang Elementary School in Mamuju Regency. It was chosen as the

research location due to school is in the native settlement of Mamuju Regency and it is located outside the urban area so automatically the students in the school are also native inhabitants of Mamuju Regency. This is different from elementary schools in urban areas where students are from outside Mamuju Regency.

Population and Sample(s)

The population in this study was taken using total sampling technique. The samples in this study were students in grades 1 - 5 with a total of 90 students. At the time of the research, the 6th grade students had graduated because they had gone through the national examination process.

Research Instruments

The variables in this study were measured through direct interviews using a questionnaire. The questionnaire contains questions about the level of maternal education and income of parents. While the *stunting* indicator is carried out through anthropometric measurements to students through height measurement using a microtoice. The height measurement results are then compared to the age of the student then using WHO NCHS references to assess the incidence of student stunting.

RESULTS AND DISCUSSION

Research on the relationship between maternal education level and parental income with the incidence of stunting was carried out at Salulayang Elementary School, Mamuju Regency, located in Bambu Village, Mamuju District. The samples in this study were selected by using total sampling technique in 90 students. The research that has been carried out starts with direct interviews with students of Salulayang Elementary School in Mamuju Regency. The interview was conducted using a questionnaire containing questions about research variables. Then the next step is to measure height to assess nutritional status (stunting) for all students of Salulayang Elementary School in Mamuju Regency. The results of this study can be seen in table 1 below:

Table 1. Distribution of Respondents Based on maternal Education Levels And Parental Income with Stunting incidents

characteristics	Stunting				Total		P ^a
	Stunting		Non-Stunting		n	%	
	n	%	n	%			
Maternal education							
low	36	49,3	37	50,7	73	100	0,005*
high	2	11,8	15	88,2	17	100	
Parental income							
<RMW	37	48,0	40	52,0	77	100	0,006*
≥ RMW	1	7,7	12	92,3	13	100	

^a Chi Square * p <0.05

Based on table 1 shows that the incidence of stunting in Salulayang Elementary School students in Mamuju District as many as 38 children (42.2%) and those without stunting were 52 children (47.8%). The occurrence of *stunting* in students of Salulayang Elementary School in Mamuju Regency has a difference that is not too far from students who do not experience stunting. Children who grow short have a 27 times risk for staying short before entering puberty and conversely children who grow normally at an early age can experience *growth faltering* and have a 14 times risk of short growth in pre-puberty age². *Stunting* is an illustrate of malnutrition that occurs over a relatively long period of time. The *stunting* indicator used in this study is that the Height/ Age index illustrates the nutritional status of children in the past so that the effect on malnutrition will eventually affect the child's height.

The level of maternal education based on table 1 shows that for distribution of low maternal education level (<Senior high school) as many as 73 students (81.1%) while the high level of maternal education (≥Senior high school) as many as 17 students (18.9%). For further analysis in this study shows that the relationship between the level of maternal education with the incidence of stunting in students of Salulayang Elementary school in Mamuju Regency shows a significant relationship. It shows that mothers who are highly educated will give birth to a healthy generation so that they would avoid health problems, especially stunting.

Contrary on mothers with low education will have the opportunity to give birth to children with stunting

conditions. This study is in line with research in Cambodia by Ikeda, et al⁶ and Tiwari, et al⁷ in Nepal that maternal education is a risk factor for the incidence of stunting in children under five years.

The level of maternal education will determine the level of understanding of the knowledge of nutrition obtained. The ability to have a broader knowledge of child care practices and ability to maintain. Families who are educated will live in small households, in more decent homes, can use health services that are better and more adept at maintaining a clean environment⁸. Parental income distribution shows that the incidence of stunting is more common in families with income below the Regional Minimum Wage (RMW), as many as 37 people (48%) and those who did not experience stunting with family income above the RMW as many as 12 people (92.3%). The results of statistical analysis shows the value of p <0.05 (p = 0.006) so that there is a relationship between parental income and the incidence of stunting in children of Salulayang Elementary School. The results of this study indicate that the higher income of parents will affect the health status of children, especially the incidence of *stunting*. low income will have an impact on expenditure for nutritious food. This research is in line with research conducted by Nadyah et al.⁹ in the provinces of Bali, West Java and NTT that there is a significant relationship between family income with stunting in children. Based on these studies, it was explained that economic status has more influence on linear growth than growth in body weight¹⁰. Families with high income will be able to manage a better family diet. Families will choose food ingredients in good quality and quantity to improve family health status

especially in children. Nutritious and balanced foods do not have to come from expensive foodstuffs but it can be realized through a balanced diet by prioritizing simplicity and not deviating from the general guidelines of balanced nutrition¹¹⁻¹⁴.

CONCLUSION

The results of this study indicate that there is a relationship between the level of maternal education and parental income with the incidence of stunting. Efforts are needed to improve maternal education and knowledge about nutrition, especially stunting problems so that the role of mothers in household management, especially child care and provision of food ingredients, is better and in accordance with nutritional guidelines. Then it is necessary to improve the economic status of the community through economic value productivity so that *stunting* problems no longer occur from poor families.

Conflict of Interest : None

Ethical Clearance : obtained from Health Polytechnic of Health Ministry of Mamuju

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Analysis of Educational Factors, Interest and Motivation Towards the Behavior of Early Detection of Cancer Cerviks in Women of Fertile Age in the Upt Health Center Kembangbahu Lamongan

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ABSTRACT

The purpose of the study to find out the influence of factors of education, interest and motivation towards the behavior of early detection of ca cervix in the women of childbearing age in the health Kembangbahu Lamongan design research using observational analytic with cross design sectional. The entire population is women of childbearing age was 9476 in UPT Kembangbahu Lamongan with 369 samples of respondents taken with engineering proportional cluster random sampling. Data analyzed with logistic regression test. There are educational factors influence behavior towards early detection of ca cervix in the women of childbearing age (p-value 0.000), there is interest in behavioral factors influence early detection of ca cervix in the women of childbearing age (p-value 0.000), there is the influence of motivation factors against the behavior of early detection of ca cervix in the women of childbearing age (p-value 0.05) and there the influence factors of education, interest and motivation towards the behavior of early detection of ca cervix in the women of childbearing age (p-value 0.000). to make the behavior is indeed needed a variety of factors as predisposing factors include education, interest, and motivation. It was concluded that educational factors, interest, and motivation being the dominant factor against the behavior of early detection of ca cervix in women of fertile age. It is recommended that place research improve outreach regarding early detection of ca cervix in the women of childbearing age.

Keywords: Educational, Interests, Motivation, Behavior, Early Detection, Cervical cancer

INTRODUCTION

In Indonesia based on basic health Research data the year 2013 figures recorded the incident Ca cerviks on women as much as 522,354 sufferers¹. In East Java, basic health Research data based on the year of 2013 recorded the numbers of Genesis Ca cerviks on women as much as 1.6/100%¹. Given the impact that there is that it should be done to avoid the Ca cervix. The first is ever having sexual intercourse, then having to do early detection of Caucasian with Pap smear tests regularly every two years until the age of 70 years. Abnormal symptoms such as bleeding, especially after coitus (intercourse). The third thing is don't smoke. Other methods besides pap smear are by visual inspection with acetic acid. Current cervical cancer can also be prevented

by administering the HPV vaccine. This step can cause genital warts and cervical Ca²⁻⁵.

The problem is that there are still many fertile women does not implement early detection of Ca cervix. Many of the factors that are led to the lack of implementation of early detection. According to Green^{6,7}, someone wants to do things like early detection of the cervix, he or she will know if the purpose and merits. After know will determine attitudes i.e. agree or disagree with that program. After that also depends on perception, values, belief. So, will depend on enabling factors such as the presence of affordable health facilities for early detection, the presence of social support and so on. Maslow's motivation theory says that people will be compelled to act based on need, as well as desire or

interest or motivation. A powerful motivation or impulse must be related to sufferers through various approaches. The hope will soon arise interest to implement early detection of Ca cervix.

MATERIALS AND METHOD

Analytic observational research design with cross-sectional approach i. The population is the whole fertile age of women who are on the Clinic Kembangbahu Lamongan as much as 9,479 women of childbearing age, the number of respondents as many as 369 respondents use proportional cluster random sampling. Education data collection, interests, motivation to use the questionnaire and conduct early detection of the cervix using observations that are given to women who are in the Clinic Kembangbahu, Lamongan. then analyzed by Logistic Regression.

RESULTS

Table 1. Result of Logistic Regression

Variables	B	Sig	95% C.I.for EXP(B)	
			Lower	Upper
Education	4.430	.000	21.207	332.234
Interest	1.877	.000	3.363	12.687
Motivation	-1.225	.040	.091	.944
Constant	-7.268	.000		

The results of the logistic regression test Education Factor Influences, interests and motivation towards the behavior of early detection of Ca Cerviks in women of fertile Age in the health Kembangbahu Lamongan April 12 until May 12, 2017

DISCUSSIONS

1. Implementation Of Education Ca Cervix

Almost half of the respondent's cervix ca education implementation in women of fertile Age categories include less. This is due to the implementation of this required cervix ca educational facilities and infrastructure including the existence of a program for this activity. Facilities and infrastructure in question is of the required learning media such as books, magazines, newspapers or even internet public awareness by health workers. This means it is not necessarily for everyone have it. This includes the already popular is the internet,

not all people use the android handphone that can be used to access the internet to read ca cervix are common among women of fertile Age.

In addition to the above factors is also related to the status of gravida from respondents. Based on the results of the analysis of the obtained most of the respondents were multigravida with educational categories include less. This is because in general people were less concerned with preventive action regarding the disease. Including less care about the troubles of ca cervix. Therefore despite already belongs to multigravida, besides being still about ca cervix is still lacking.

2. Interest in the early detection of Ca Cervix

Based on result above known to almost half of the respondents including the high interest has to implement early detection of ca cervix IE as much as 163 respondents (44.2%) of a total of 369 respondents.

The results of the research supported by the existence of previous research results conducted^{8,9} claims based on a test of paired t-test is known to result in the amount of 0.005 0.000 significantly and this means there are influences counseling about cancer of the cervix against interest do the pap smear. Changes between the pre-test post-test with IE the number of 29 respondents. Experience increased interest in better, thus it can be concluded that the granting of an extension of cervical cancer by the method of buzz group have the influence of maternal interest significantly to do pap smears. With the extension of the mother's interest in doing a pap smear examination be increased, because at the time the extension this is going on the transfer of knowledge and insight about cervical cancer so that increases interest in the early detection of ca by cervix Pap smear or IVA

3. Motivation towards early detection of Ca Cervix

Based on result above is known to almost half of the respondents included have low motivation to implement early detection of ca cervix IE as much as 149 respondents (40.4%) of a total of 369 respondents.

The results of this research are consistent with previous research by which stated there is influence significant (OR = 4.700; 95% CI 1.379 hingga16,016; p = 0.013) with mother motivation behavior between checks IVA. Thus the motivation can give directions

and activities that should be carried out in accordance with the outline of the objectives planned previously and selection of works, i.e. determining what works to do matching to achieve the goal, by opting out of the works that are not useful for the purpose. A selection of works that are already defined or worked on will give you the confidence that high because it is already in the process of selection.

The results showed almost half of the respondents included have low motivation to implement early detection of ca cervix. This is due to the onset of high motivation indeed must be supported by the presence of a very strong feeling of need to implement early detection of ca cervix.

4. The behavior of early detection of Cancer Cervix with Pap smear Test

Other factors that also supports the majority of the respondents including implement early detection of ca cervix with the pap smear is the age, education, occupation, status of gravida or information. In terms of age factor known to most respondents aged 35 years old with behavior > pap smear categories include Yes (do). This is due to the age that the older people are increasingly aware of the health risks. Included with age 35 years > for women are also increasingly at risk of experiencing ca cervix. Therefore in this age group most widely implement early detection of ca cervix.

Factors that affect behavior are also visible in the early detection of ca cervix is the status of gravida. The assumption is with the higher the gravida, the more so the more positive experience to early detection of ca cervix. Based on the results of the analysis of the obtained most primigravida pap smear behavior including did. This is because with his status primigravida which means the number of children 1 child, causing concern for the better so there is encouragement implement detection of ca cervix. Haliniyang behavior accomplishing the cause to implement early detection of ca cervix.

5. Influence factors of Education against the behavior of early detection of Ca Cerviks

Based on result above revealed the influence of the educational factor against the behavior of early detection of ca cervix in women of fertile age in the health Kembangbahu Lamongan (p-value 0.000).

The results of this research are consistent with previous research⁹⁻¹² stating that the most dominant factor influencing the behavior of the early detection of cervical cancer is educational intervention methods wish and drive with a value of $p = 0,010$ and OR 3.050. This is due to the method of education wish and drive became the deciding factor because it is a health education given to the respondents to pay attention to the background of the client and his needs, education is providing a form of learning with a variety of lectures covering the stimulus using LCD, CD playback, sharing, peer discussion booklets, demonstration examination pap smear and counseling involving the family as supporters.

6. Influence factors of interest in the behavior of early detection of Ca Cervix

Based on result above revealed the influence of the factor of interest in the behavior of early detection of ca cervix in women of fertile age in the health Kembangbahu Lamongan (p-value 0.000).

Interest as a tendency or desire a high against something. Interest makes a person try and apply yourself to it and eventually gained a deeper knowledge of explains that the interest is the consciousness of a person against an object, person, problem, or situation related to her. This means that the interest should be viewed as something that is conscious. Therefore interest is the psychological aspects of a person to pay attention to high specific activity against and encourage those concerned to carry out such activities. In terms of the principal elements of interest is the concern, the thrust of each individual and pleasure. The influence of positive interest will make someone they are interested to experiment like to feel pleasure, joy, and joy. Pintrich and Schunk also mentioned that interest is an important aspect of the motivations that influence attention, learning, thinking and achievement¹³.

7. Influence factors of Motivation against the behavior of early detection of Ca Cervix

Based on result above in mind there is a motivation factors influence behavior towards early detection of ca cervix in women of fertile age in the health Kembangbahu Lamongan (p-value 0.05).

The results of the analysis showed the p-value of 0.004, which means that the value of the consistency of the results of this research are 4/1000 or have an

inconsistent or there's an error four times if the research is repeated as many as 1000 times. This shows a very high trust value about the influence factors of motivation against the behavior of early detection of ca cervix in women of fertile age. Means that the results of this study provide information very credible because of the significant requirements of no more than 0.05 or there's an error 5 among 100 repetitions.

8. Influence factors of Education, interest, and Motivation towards the behavior of early detection of Ca Cervix

Based on result above revealed the influence of factors of education, interest and motivation towards the behavior of early detection of ca cervix in women of fertile age in the health Kembangbahu Lamongan (p-value 0.05).

Many of the factors that led to the lack of implementation of early detection. The study of an aspect of behavior according to Green (Notoatmodjo, 2010) someone wants to do something such as early detection of ca cervix will know if the purpose and merits. After know will determine attitudes i.e. agree or disagree with that program. After that also depends on perception, values, belief.

There are educational factors influence, interest, and motivation towards the behavior of early detection of ca cervix in women of fertile age due to behavior accomplishing indeed needed a variety of factors as predisposing (predecessor) behavior accomplishing. Many experts conduct that has already suggested this, good Green, Snehendu B Kar, the WHO or the others have suggested this. Without knowing the intent and purpose of the preventive action that so then people would never think about early detection of cervical cancer. After people already know the advantages of implementing the early detection of cervical cancer then people will want to carry it out.

CONCLUSION

Based on the research results analysis, there are educational influence, interest and motivation towards the behaviour of early detection of ca cervix in women of fertile age in the UPT Clinic Kembangbahu Lamongan. so the dominant variables can be inferred is the educational value of the regression variables 4.430 with p value $0.000 < 0.05$ then H_0 denied. Midwife or

health worker is expected to further enhance training, mentoring, and the granting of health information especially about ca cervix thoroughly in order to make the public understand and are aware of the importance of detecting early ca cervix and willing to participate in a program of early detection of ca cervix.

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Conflict of Interest : None

Ethical Clearance : Obtained from STIKIP PGRI Pacitan

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Ineffective Regulation of Narcotics Crime Prevention (Criminology Perspective)

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ABSTRACT

The reality is that it should be a reason for us to worry because it threatens the future of the young generation who are the holders and successors of the nation's relay. That said because the impact caused by drugs is so tragic. The impact of drugs includes physical, psychological, social and economic impacts. This study aims to find out the causes of the increasing number of crime narcotics in the perspective of criminology. This type of research is an empirical research. Police officials, advocates, and narcotics abusers were taken as samples in this study. Data collection is done through interviews and documentation. The results showed that the regulation of narcotics crime prevention has not been effective in practice. Narcotics crime should have been reduced to the lowest in the presence of Act Number 35 the Year 2009 on Narcotics, but in reality, tend to increase every year. In the perspective of criminology with the observation of the age, sex, education, and work of narcotics perpetrators, it is found that multiple factors are interrelated, including psychological factors, sociological factors, and economic factors as criminal etiologies that trigger an increase in narcotics crime.

Keywords: *Narcotics crime, Criminology, Crime etiology.*

INTRODUCTION

The danger of drugs is no doubt. However, drug abuse is increasingly prevalent in various countries around the world, including Indonesia. When someone starts taking drugs, there is a high chance of experiencing addiction. The longer, the user will need a higher dose in order to feel the same effect. When the effects of drugs begin to disappear, users will feel uncomfortable due to the appearance of withdrawal symptoms and will want to use them again ⁽¹⁾.

Drugs that dissolve in the body will be channeled through blood throughout the body, including the brain. The effects of drugs depend on the type consumed, dosage, duration of use, and body size of the person who consumed them. In addition to influencing the body, the danger of drugs can also cause things that interfere with a person's quality of life. An addict is also more susceptible to sexually transmitted infections, accidents, and suicide attempts due to being under the influence of drugs⁽²⁾

According to data quoted from the Provincial National Narcotics Agency (BNNP) of South Sulawesi, the impact of drugs includes physical, psychological, social and economic impacts. Physical effects such as nervous system disorders (neurological): convulsions, hallucinations, and disturbances of consciousness. The psychological impact is not the normal ability to think, feeling anxious. Dependence/always need medicine. Socio-economic impacts, for example, always harm the community, both economic, social, health and legal.⁽³⁾

Drug distribution and use at this time are very worrying. In a sign that Indonesia is a transit place for drug trafficking by the international kingpin. We should be concerned and alert to the dangers of drugs that threaten the young generation of this nation. Drugs have a very broad impact and can damage the joints of the nation's life. The danger of drugs is actually very massive, even less destructive than the dangers of corruption itself.⁽⁴⁾ The crime data cited above is the result of the national scale collection of the Republic of Indonesia case. In the local scale, it is also found that crime statistics tend to increase every year. In Makassar

City in the period of 2012 till. In 2015 the crime rate was: in 2012 there were 288 people, in 2013 there were 255 people, in 2014 there were 323 people, and in 2015 there were 429 people data from Polrestabes Makassar, 2016. Only in 2013 did the number of Narcotics crimes experience a decline, which is 33 people decreased, and in 2015 again increased to 106 people.

Subjective approach is to look at individual factors as determinants of the occurrence of crime, wrong because of your own fault (SS). In essence, this approach is influenced by indeterministic theory ⁽⁵⁾. While the objective approach is to look at factors outside individual conditions as the cause of crime, wrong because the Environment is Wrong (LS). This approach is influenced by deterministic theory.

MATERIAL AND METHOD

Research sites

This research was carried out in Makassar City, namely at the Makassar Polrestabes. The researcher took this location, considering that at that location, it was the first time that narcotics crime cases were examined by police law enforcement officers.

Type of Research

The type of research in this study is empirical research. The goal is to reveal the etiology of narcotics crime with the aim of providing legal solutions to the increase in crimes from a criminological perspective.

Data Collection Techniques

In this study interview and documentation, techniques were used. The interview technique was carried out on police law enforcement officers, advocates, narcotics abusers including users, dealers and narcotics dealers in the city of Makassar. While documentation is carried out through the collection of statistical data on crimes found in the Makassar Police

Data analysis

The data analysis method used is qualitative

analysis, by analyzing and describing the data obtained both from primary data and secondary data, the results of research through a criminological approach to the etiology of narcotics crime and its countermeasures.

RESULT AND DISCUSSION

Criminology as the science of various knowledge, the body of knowledge, is dominantly defined as the science that seeks to investigate the causes of the symptoms of evil in ways that exist in it. By conducting an investigation into the causes of these crimes, this is then the scope of the study of criminal etiology which is none other than one of the main branches of criminology ⁽⁶⁾. Related to the increasing number of narcotics crimes with a view to revealing their criminal etiology, four variables will be used which consist of the age of the perpetrator, the sex of the perpetrator, the education of the perpetrator and the work of the perpetrator.

As stated above, that because criminology uses various sciences, then to measure all four variables, it cannot be separated from anthropological approaches, psychological approaches, and sociological approaches as well as in the applied field of criminology: criminal anthropology, criminal psychology, and sociology criminal.

Age of Narcotics Crime Actors

Formulation of different criminal responsibilities between children (12 to 18 years) with adults is a further consequence of a person's cognitive phase to be able to think fully or not be able to think fully

In a psychology perspective, especially developmental psychology, adulthood should be one of the physical variables that can prevent a person from committing a crime. Ansem of developmental psychology if connected with statistics of narcotics criminals based on one's adult age, it does not support the reduction in the number of narcotics criminals. This can be noted through the following table 1:

Table 1: Number of Narcotics Crimes in Makassar City Based on the Age of the Perpetrators (2012 to 2015)

Years 10-17	Age (year)				
	18-20	21-25	26-30	> 31	
2012	15	36	59	70	122
2013	18	27	63	42	105
2014	20	39	61	75	131
2015	19	44	103	85	178
Total	72	146	286	272	536

Data Source: Makassar Polrestabes (2015)

The interesting thing from the presentation in Table 1 above is that the increase in the age of narcotics criminals is directly proportional to the increase in narcotics criminals. Physical and biological development of the stage of perfection, but perfectly cognitive is unable to hold the offender acting based on the norms of goodness contained in him as a reflection of his social environment. According to National Police Headquarters data contained in the book Population Perspective of Islam written by M Cholil Nafis, from 2004 to March 2009, there were 98,614 cases (97% more) teenage children were drug users⁽¹⁾.

Narcotics perpetrators from 10 to 17 years of age and 18 to 21 years of age are essentially unable to live independently. He has not been able to make a living on his own, has not been able to earn money independently, even if there is money in his hand it is usually obtained from his close relatives. He was most likely to get close to giving his mother's father. Therefore if you want to use or consume narcotics that are expensive, you will certainly be constrained from the financial aspect to buying narcotics ingredients.

Crime is learned through interaction with other people by learning techniques of crime, distinctive motivation, encouragement, rationalization, and attitude⁽⁶⁾. While narcotics crimes committed by adults are not influenced by totality alone. The country of Indonesia as a developing country with a poverty rate is still high, and at the same time more and more demands to live in luxury⁽⁷⁾ cause social consequences of irregularities. The deviation is by becoming a narcotics dealer so that the finances are sufficient to meet all needs that can

increase its prestige.

Gender of Narcotics Crimes

Comparing the quantity of crime based on sex, the perpetrator is still a series of individual factors as their physical and psychological state. Although in examining narcotics crime by looking at the sex of the perpetrator, it cannot be separated from environmental factors. The combination of these individual factors and environmental factors is then referred to as the bio-sociological approach⁽³⁾. The quantity of narcotics criminals who are always dominated by male-sex offenders rather than a female can be considered in the following Table 2:

Table 2: Number of Narcotics Crimes in the City of Makassar Based on Gender Actors (2012 to 2015)

YEAR	Gender	
	Male	Female
2012	259	17
2013	243	21
2014	269	39
2015	369	45
TOTAL	1.140	122

Data Source: Makassar Polrestabes (2015)

Based on Table 2 above, there are two things that need to be explained further, namely: (1) Why are the number of narcotics perpetrators dominated by male

sex offenders? (2) Why do narcotics perpetrators, both male and female, tend to increase every year? Although in 2013, male sex offenders experienced a decline. The opportunity is that men who are more demanding work to be outside the home, than women are more at home taking care of their children, family, and husband’s eating needs, of course, the opportunity for men to become narcotics abusers is more open than with women ⁽⁸⁾

It is different from narcotics abusers who are female, the cause they commit crimes is not because of economic problems which are the main reason. They become more abused by their association with the workplace. In some cases the average woman is also a narcotics abuser because the family conditions are broken (broken home), so by becoming a drug user, her family’s problems for a moment do not burden her mind again ⁽⁹⁾.

Education Status of Narcotics Crime Actors

The purpose of education for everyone is essential to form their personality with integrity, responsibility, and agility in differentiating a good and right decision. The

analogy is that the higher the level of education a person means the more his experience goes through the process of internalization of a shared value so that the output is easier to avoid all actions that have been criticized by the community in their environment.

One research in the United States also shows that prison inmates at the “Richland Parish Detention Center,” Louisiana, generally only have education in grade 2 elementary school to grade 1 junior high school (second grade to seven grade). Those with low education are always wrong in having perceptions about life and law ⁽¹⁰⁾. Some of the results of the above research, in fact, contradict the results of research found on the number of narcotics crimes in the city of Makassar, when viewed from the education status of each perpetrator. It is precisely at the level of high school education, the perpetrators are more compared to narcotics criminals who are in junior and elementary education levels. More details about the conflict can be noted in the following table 3:

Table 3: Number of Narcotics Crimes in Makassar City Based on the Level of Education Actors (2012 to 2015)

Years	Education				
	Elementary School	Junior High School	Senior High School	College	
2012	15	36	195	42	
2013	41	55	152	7	
2014	66	90	147	20	
2015	68	127	216	18	
Total	190	308	755	87	

Data Source: Makassar Polrestabas (2015)

Based on Table 3 above shows that the highest number of narcotics abusers occurs at the level of high school education compared to the level of elementary and junior high school education. Only the narcotics abusers with higher education status then the number of perpetrators, suddenly shows a decrease.

Apart from that which is a striking difference, so that narcotics criminals with higher education status suddenly decline, none other than because the population in Makassar city is far more high school educated than

college graduates.

Job Status of Narcotics Crime Actors

A person’s work will certainly be a reflection if the economic situation becomes sufficient to meet his life’s needs. If many people crave a profession as a civil servant, actually they are craving for a more established economy. A person’s job status that is directly proportional to the economic situation, associated with the potential or not to become a narcotics abuser is very difficult to measure.

Someone who has financial supplies, in the sense of an established economy, has the potential to become a narcotics abuser. For those in the group, even though the price of narcotics is expensive, it is definitely affordable, at least as a user.

The criminologist's conclusions about the close relationship between work and crime will be supported by the results of this study. The highest number of narcotics perpetrators is in fact played by those who are unemployed. This can be noted through the following table,

Table 4: Number of Narcotics Crimes Based on the Workers' Acts (2012 to 2015)

Occupation	Year (person)			
	2012	2013	2014	2015
Student	12	5	13	6
Collage Student	20	23	23	13
Government Employee	5	10	3	5
Private Employee	92	54	68	79
Police	5	-	1	-
Entrepreneur	59	58	67	108
Farmer/Fisherman	-	2	1	2
Daily Labour	40	46	63	95
Unemployment	71	57	84	121
Total	304	225	323	429

Data Source: Polrestabes Makassar (2015)

Based on Table 4 above shows that the highest number of narcotics abusers occupy the first position in each year (other than 2013), namely those who are only unemployed. Then followed by those who work as entrepreneurs, day laborers, and private employees. It was found in this study that narcotics criminals with unemployment status, the main factor causing them to be involved in these crimes, are mostly caused by economic motives compared to other reasons, such as severe stress so that narcotics are considered as life escape. This grouping is more dominant, the perpetrators act as dealers or bookies.

For narcotics abusers who come from the daily labor profession, the same situation applies to the entrepreneurial profession, which is only as a user, but not used during breaks. Daily laborers actually use narcotics with the aim to boost adrenaline work while eliminating fatigue after a full day's work. While narcotics offenders who come from the entrepreneurial profession and private employees are caused by their orientation in a social class. One experiences a shift from one choice to another because it is faced with different social activities. Then the narcotics offenders

who come from the profession of daily labor, are mostly caused by ecological and physical factors, each of these factors intertwines, narcotics cannot be separated from their parts of life and work.

CONCLUSIONS AND SUGGESTIONS

The results of this study indicate that the regulation of narcotics crime prevention has not been effective in practice. The narcotics crime rate should have been reduced as low as possible, but in reality, it tends to increase every year. In a criminology perspective with observations of age, sex, education, and occupations of narcotics criminals, it was found that multiple factors are interrelated, including psychological factors, sociological factors, and economic factors as criminal etiologies that trigger an increase in narcotics crime rates.

Reaction to the breaking law against these crimes is by eliminating the criminogenic factor which is the cause of the crime (abolitionist system). Priority should be given to increasing employment opportunities, then counseling and education of narcotics hazards in all lines regardless of the age and profession of each

person. Police and BNN must prioritize capturing narcotics dealers because these are the main causes of the emergence of dealers in the narcotics business with very promising benefits.

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Multivariate Analysis of the Occurrence of Needlestick Injuries on the Nurses at X Hospital in Makassar

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ABSTRACT

Needlestick Injuries (NSI) and sharps injuries are often experienced by nurses. This research aimed to find out the factors related to the incident of needlestick injuries (NSI) on the nurses at Ibnu Sina Hospital, Makassar. The study was analytical observational using the cross sectional study approach. The Samples were chosen using the proportional stratified random sampling technique with the total sample of 107 respondents. The collected data include age, sex, years of services, education level, employment status, enabling factors, reinforcing factors and NSI incident. The data were analyzed using the Chi-Square test for bivariate analysis and logistic regression test for the multivariate analysis. The research results indicated that 66.4% of the respondents were 20 to 29 years old, 73.8% were non-permanent employees, and 61.7% had adequate enabling factors. There was a significant correlation between the age ($p = 0.011$), employment status ($p = 0,006$) and enabling factor ($p = 0,047$) with NSI incident on the nurse at Ibnu Sina Hospital, Makassar. The result of the multivariate analysis revealed the most closely related employment status with the value $p = 0,009$. Thus, the employment status was very influential on the incident of NSI, because most employees at Ibnu Sina Hospital, Makassar were non-permanent employees.

Keywords: Needlestick injury, age, employment status, enabling factors.

INTRODUCTION

Needlestick Injuries (NSI) and sharps injuries are often experienced by nurses. Nurses have the highest prevalence of injury among healthcare workers. Research Jaber & Farideh¹ said that the age, gender, length of <2 years and significant education with NIS in 97 health workers at a teaching hospital in Iran. Research carried out in June and December 2014 at 168 randomly selected nurses who served in different wards at the University Hospital of Shiraz, Iran said that the majority injuries occur puncture needles on the morning shift (57.8%) and the cause is 41.4% because recap

needles after use (recapping needles). There is a 60.2% not report NSI with severe clinical reasons (46.7%) and the perception of the risk of infection is low (37.7%). Factors that significantly affect NSI are sex, occurred on the morning shift, work hours per week and the number of shifts per month shift².

Research in December 2014 in four hospitals of Southeast Ethiopia Bale zone of 362 randomly selected health workers. Nearly 6 out of 10 injuries (58.7%) were not reported. The main reason not report the injury is time constraints (35.1%), a sharp object causing injury is not used in any of the patients (27.0%), patients have no injuries source of infectious diseases (20.3%) and lack of knowledge that NSI and sharps injuries should be reported (14.9%). Half of health workers who were injured have sought medical treatment on their own initiative. Respondents with low pay six times more likely to report occurrence of NSI compared to respondents with high salaries³

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Number of accidents at the Hospital of Gadjah Mada (UGM) still exceeds the target of zero accident (no accident). Most accident classification by type of injury was in contact with needles and other sharp objects (69.6%), according to the cause by a portable work equipment (69.9%). Shift occurred in the morning (69.6%) in the work unit Pharmacy / Sterilization and there were 26.1% in the emergency department⁴.

Research conducted at the paramedics on duty in the emergency room, hospitalizations, ICU, operating rooms and clinical laboratories Rumkital Dr. Midiyato S Tanjung Pinang November to December 2012 the dominant factor related to adherence to SOPs paramedics and universal precautions significant program with the reinforcing factors, enabling factors and factors of perception⁵.

Factors that cause workplace accidents are very diverse, especially the incident of NSI. There are several instances of workplace accidents are never reported include NSI. Therefore, this study aims to analyze correlation between age, gender, education level, length of employment, employment status, enabling factors, reinforcing factors to the onset of NSI at Ibnu Sina Hospital in Makassar.

MATERIALS AND METHOD

Research sites

Research conducted at Ibnu Sina Hospital, Makassar in operating rooms, emergency departments, nursing and ICU. Starting from 24 April to 24 May 2017.

Population and Sample

The population was all nurses working at Ibnu Sina Hospital in Makassar amounted to 157 people. A sample of 112 nurses who work in emergency departments, operating rooms, patient wards and ICU selected by proportional stratified random sampling method with a sample selection of the population is not homogeneous and stratified proportional. Samples that meet the inclusion and exclusion criteria were 107 people.

Data collection

After obtaining permission to conduct the study, researchers identify and approach potential respondents to explain the purpose and benefits of their participation, as well as guarantee the confidentiality of prospective

respondents. Collecting respondents who selected and according to the inclusion and exclusion criteria, to explain about informed consent and how to fill out the questionnaire, and then distributed the questionnaire to be filled. Collecting the questionnaire after complete.

Data analysis

Univariate analysis to describe of variables in general. Bivariate analysis to see some of the great associated between the independent variables of individual factors, occupational factors, enabling factors and factors reinforcing with the dependent variable (Needle stick Injury). Multivariate analysis to see independent variables most associated with the dependent variable.

RESEARCH RESULT

Characteristics of Respondents

Table 1 shows that the respondent most female sex as much as 84.1% or 90 respondents. Age of the most respondents in the range 20-29 years 66.4% or 71 respondents. Most work period on working life of > 3 years employment 82.2% or 88 respondents and the most respondents in the operating room space by 15% or 16 respondents. Most respondent employment status is not fixed employment as much as 73.8% or 79 and is the highest level of undergraduate education level, amounting to 60.7% or 65 respondents.

Distribution of Needlestick Injuries (NSI)

In Table 2 shows as much as 62.6% or 67 respondents experienced of NSI. There is a 55.1% or 59 respondents had experienced NSI 1-2 times. There is a 47.8% or 32 respondents had NSI when the afternoon shift. Respondents experienced NSI when recapping syringes practice as much as 41.8% or 28 respondents. There is a 55% or 33 respondents did not report NSI because of the possibility of infection is low.

Distribution Factors Enabling and Reinforcing factors

Table 3 shows the factors enabling adequate as much as 61.7% or 66 respondents and the reinforcing factors were adequate as much as 62.6% or 67 respondents.

Respondent Characteristics relationship on the incident of NSI

Based on bivariate analysis with test Chi-Square in Table 4 variables significantly to NSI events were age ($\rho = 0.011$), employment status ($\rho = 0.006$) and $\rho = 0.047$ enabling factor.

The most variable associated on the incident of NSI

The test results of multivariate logistic regression in Table 5 shows that the employment status variables ($\rho = 0.009$) most associated with the incidence NSI.

Table 1: Distribution Characteristics of Respondents at Ibnu Sina Hospital in Makassar 2017

Characteristics of respondents		Sum	
		n = 107	%
Gender	Man	17	15.9
	Woman	90	84.1
Age	20-24 years	18	16.8
	25-29 years	53	49.6
	30-34 years	24	22.4
	35-39 years	12	11.2
Years of service	2-3 years	19	17.8
	> 3 years	88	82.2
Employment status	Non-Permanent Employee (NPE)	79	73.8
	Permanent Employee (PE)	28	26.2
Level of education	School of Nursing Education (SNE) / Diploma III (DIII)	42	39.3
	Bachelor	65	60.7
Room	Floor 2 Aisyah	9	8.4
	Floor 2 Aminah	8	7.5
	Floor 3 Assifaa	10	9.3
	Floor 3 Assafii	14	13.1
	4th floor	15	14
	5th floor	11	10.3
	ICU	14	13.1
	IGD	10	9.3
	OK	16	15

Source: Primary Data, 2017

Table 2. Distribution of Respondents Based on the Indicator NSI at Ibnu Sina Hospital in Makassar 2017

Indicators NSI	Sum	
	n	%
NSI (n = 107)		
Yes	67	62.6
No	40	37.4
Total NSI (n = 107)		
0 (never)	40	37.4
1-2 times	59	55.1
3-4	4	3.7
> 5 times	4	3.7
Shift (n = 67)		
Morning shift	18	26.8
Afternoon shift	32	47.8
Night shift	4	6
All shift	9	13.4
Approaching the morning to the afternoon shift change	2	3
Approaching the morning to the evening shift change	2	3
Working practices (n = 67)		
Recapping syringe	28	41.8
Implementation injection	15	22.4
Handling of specimens	4	5.9
Transfer equipment	6	8.9
Collisions with other workers	5	7.5
Improper disposal	9	13.4
Report NSI (n = 67)		
Yes	7	10.4
No	60	89.6
Reasons for not reporting NSI (n = 60)		
Fear discrimination	1	1.7
Not knowing how to report an incident NSI	20	33.3
Heavy workload	6	10
Possible lower incidence of infection	33	55
Shame on friend	0	0

Source: Primary Data, 2017

Table 3 Distribution of the Factors Enabling and Reinforcing Factors on the Nurses at Ibnu Sina Hospital Makassar 2017

Characteristics of respondents		Sum	
		n = 107	%
Enabling factors	Inadequate (score <2.5)	41	38.3
	Adequate (value > 2.5)	66	61.7
Reinforcing factors	Inadequate (score <6.5)	40	37.4
	Adequate (value > 6.5)	67	62.6

Source: Primary Data, 2017

Table 4 Relationship Characteristics of Respondents to the incident of NSI to the Nurses at Ibnu Sina Hospital in Makassar 2017

Characteristics of respondents		Occurrence NSI				Sum		ρ
		Yes		No		N=107	%	
		n	%	n	%			
Gender	Man	13	76.5	4	23.5	17	100	$\rho = 0.311$
	Woman	54	60.0	36	40.0	90	100	
Age	20-29	51	71.8	20	28.2	71	100	$\rho = 0.011$
	30-39	16	44.4	20	55.6	36	100	
Years of service	New	13	68.4	6	31.6	19	100	$\rho = 0.753$
	Long	54	61.4	34	38.6	88	100	
Employment status	NPE	56	70.9	23	29.1	79	100	$\rho = 0.006$
	PE	11	39.3	17	60.7	28	100	
Level of education	SNE / Diploma III	28	66.7	14	33.3	42	100	$\rho = 0.623$
	Bachelor	39	60.0	26	40.0	65	100	
Enabling factors	Adequate	36	54.5	30	45.5	66	100	$\rho = 0.047$
	Inadequate	31	75.6	10	24.4	41	100	
Reinforcing factor	Adequate	44	65.7	23	34.3	67	100	$\rho = 0.523$
	Inadequate	23	57.5	17	42.5	40	100	

Source: Primary Data, 2017

Table 5 Results of Multivariate Analysis Variable Influencing to the incident of NSI to the Nurses at Ibnu Sina Hospital in Makassar 2017

Variables	B	SE	Wald	df	Sig.	Exp (B)	95% CI for Exp (B)	
							Lower	Upper
Employment status	1,223	0.468	6.828	1	0.009	3.396	1,357	8.497
Enabling factors	0.841	0,455	3,205	1	0.073	2,257	0.926	5.502
Constant	-1388	.390	12.655	1	0,000	.250		

Source: Primary Data, 2017

DISCUSSION

This research results obtained Chi Square test, variable employment status has a significant relationship to NSI, with values obtained $\rho = 0.006$. These results are also in accordance with multivariate analysis obtained by value $\rho = 0.009$. It is known that Ibnu Sina Hospital in Makassar more nurse status of temporary employees (non-permanent, fixed fees and prospective employees)

compared to nurses permanent employee status. NSI is one of the most important issues in terms of health and safety in health services, especially for nurses. NSI can cause blood-borne infectious diseases, especially HIV that causes AIDS, hepatitis B and hepatitis C. The risk of infection after exposure to infected blood varies by bloodborne pathogens. Injury can occur at any stage of its use, demolition or disposal.

Research in the Department of General Surgery, Albany Medical Center, Albany, New York by Choi et

al (2016), said that 55% of respondents had a history NSI, a surgical nurse more frequently reported NSI than surgeons with reason patients who were at risk of infection are low and no time reporting (65%) and fear of punishment. In this study as much as 62.6% or 67 respondents experienced NSI. There are 59 respondents (55.1%) said they had experienced NSI (2012 to 2016) as much as 1-2 times and reporting on events NSI just as much as 7 respondents (10.4%) while that did not report the incident of NSI 60 respondents (89.6%) citing lower chance of infection as much as 33 respondents (55%). NSI occurred on the afternoon shift as much as 32 respondents (47.8%) and at the time recapping of syringes by 28 respondents (41.8%).

Research at the University Hospital Shiraz Iran NSI produce very high prevalence (66%) occurred in the morning shift, working practices recapping the needle, the injection device type, working hours / week and the frequency shift of the shift / month is a major factor related to NSI Jahairi et al.,² Research in the hospital Gadjah Mada in 2015 said the accident classification majority (69.6%) were injured due to needlestick and sharps⁴. Research in Iran showed a relatively high NSI prevalence among health workers, especially at a young age and nurses who rarely attend training Age categories experienced NSI 20-29 years which included the young age. Usually young nurses tend to work in a hurry or are not careful so it tends to hurt. This study is in line with research Gholami et al⁶, which is a significant age category 20-29 years ($p = 0.001$) and the incidence NSI. Responden more employment status not continue to have NSI. Temporary staff at Ibnu Sina Hospital was included in three (3) groups: non-permanent employees, salaries and prospective employees remain with the facilities provided are also different. This study is in line with research Jangjaer et al⁷ the University Hospital of Taiwan that 21.28% NSI events tend to occur during dental nurse intern (Temporary staff) with the skills and clinical experience is still low. Amira & Awobusuyi⁸ Research, said that the tenure of > 3 years of significant events NSI to nurses in Nigeria Hemodialysis Unit.

Research on hospital nurse in Bale Zone of Ethiopia by Bekele et al, said that there are (60%) of nurses had low salaries experiencing NSI and reported the incident. Which includes categories enabling factor is the hospital rarely do training in universal precautions, some nurses who have long working lives only attended 1-2 times training. This is in line with research Helmut et al⁹ which

says that education NSI the number of reported events NSI. Hospitals rarely provide a copy of the SOP for each medical action. Hospitals provide personal protective equipment (PPE) gloves but usually respondents do not wear it because it considers that it is common medical procedures done and the risk of infection is low¹⁰⁻¹².

CONCLUSIONS AND RECOMMENDATIONS

Employment status ($p = 0.009$) are the factors that most influence to the incident of NSI on the nurses at Ibnu Sina Hospital Makassar. Ibnu Sina Hospital should conducted precautions training and reporting of NSI way for nurses on a regular basis.

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Factors That Affect the Quality of Life of Pregnant Women

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ABSTRACT

Background : Health problems in pregnant women due to physiological changes, both physically and psychologically, have an impact on the quality of life of the mother. Physically, pregnant women experience back pain in pregnancy. It is estimated that around 50% of pregnant women will suffer from low back pain during their pregnancy or during the postpartum period. While the prevalence of depression often occurs in pregnancy by 4% to 29%.

Objective: to determine the relationship of family support, information media and ANC services to the quality of life of pregnant women in the work area of Massenga Health Center, Kab. Polewali Mandar in 2018.

Method: This research is quantitative with a study design *cross sectional*. Data collection of pregnant women is 176 respondents with questionnaire direct interviews about family support, information media and ANC services on the quality of life of pregnant women. Data analysis using the test *chi-square*.

Results: There is a significant relationship between family support and the quality of life of pregnant women (*Chi Square* p value <0.05; (p = 0,000). There is a significant relationship between counseling media and quality of life of pregnant women (test *Chi Square* p = 0,000 < 0.05) There is a significant relationship between ANC visits and the quality of life of pregnant women (test *Chi Square* p value = 0.035 <0.05)

Conclusion: Improving quality of pregnant women through family support, and information media on the quality of life of pregnant women. Suggested It is necessary to have good coordination between the Puskesmas and other health services

Keywords: *Quality Life, Pregnant Women, Family Support*

INTRODUCTION

Pregnancy is the most anticipated phase generally for women, as an expression of the sense of self and identity as a woman. Pregnancy is also a worrying episode in a woman's life. adjustments to these conditions, because it can have a major effect on the physical condition and the psychological state of a woman I've never experienced it. Pregnancy for a woman is a thing that is full of happiness as well as anxiety, anxious about bad things that can befall her and her fetus, especially during labor¹.

According to the *World Health Organization* (WHO) maternal mortality is still quite high, every day around the world around 800 women die from complications in pregnancy or childbirth. According to WHO, 40% of

maternal deaths in developing countries are caused by anemia during pregnancy. In 2013, there were 289,000 women died during and after pregnancy and childbirth. Between 1990-2013, the maternal mortality rate in the world (ie the number of maternal deaths per 100,000 live births) decreased by only 2.6% per year. This figure is still far from annual target of reducing the Maternal Mortality Rate (5.5%) needed to achieve the *Millennium Development Goals* 5th. Therefore the assessment of the quality of life of pregnant women is important in determining appropriate preventive measures and leads to an increase in quality of care and their well-being, with an emphasis on the health of pregnant women.²

The highest maternal mortality rate in Indonesia compared to other countries such as Thailand is only 44

/ 100,000 live births, Malaysia 39 / 100,000 live births, and Singapore 6 / 100,000 live births. The maternal mortality rate (MMR) and Infant Mortality Rate (IMR) in Indonesia is still high. Based on the Indonesian Maternal Health Demographic Survey (SKDI) in 2012, MMR reached 359 per 100,000 live births and AKB reached 32 per 1000 live births³.

Based on the West Sulawesi Health Profile in 2016 the number of maternal deaths according to the regency, namely Polewali Mandar district became the District with the highest number of maternal deaths with 14 cases of death compared to northern Mamuju by 11 cases, Majene with 8 cases, Mamuju 7 cases, Mamasa 6 cases and Mamuju 1 case⁴.

The quality of pregnant women can not only be reviewed for its impact on mortality aspects but also on aspects of morbidity, such as physical and psychological. Physically, pregnant women experience back pain in their pregnancies is It estimated that around 50% of pregnant women will suffer from low back pain during their pregnancy or during the postpartum period⁵. Depressed pregnant women have a lower quality of life⁶. While the prevalence of depression often occurs in pregnancy by 4% to 29%⁷. Besides that, there are other complaints such as nausea, vomiting and fatigue that can affect the decrease in quality of life of pregnant women. The percentage of each of nausea, vomiting and daily fatigue was 33.6%, 9.6% and 44.4%.⁸

Based on the report of Massenga Polewali Mandar Health Center, in December 2016 the number of pregnant women was 596 people. Pregnant women who are at high risk are 119 people, who follow first coverage (K1) of 49 (88.59%) visits, the fourth visit (K4) is 36 visits (65.60%), while those who experience bleeding are 17 people. Furthermore, the number of pregnant women in 2017 is 605 people. There were 121 high-risk pregnant women, who followed the first visit coverage (K1) as many as 419 (69.3%) visits, while only K4 coverage was 474 (78.3%) people visited. From the observations there are still many pregnant women who do not follow the first visit coverage (K1) and the fourth visit coverage (K4) high risk pregnant women are still high.

RESEARCH METHODOLOGY

This research is a type of research quantitative with a cross sectional approach. namely observations about the influence of a variable affecting other variables

simultaneously both independent and dependent variables, which are intended to analyze the relationship of quality of life of pregnant women.

The variables independent are family support, information media, and ANC services. While the variable dependent is the quality of life of pregnant women. Determination of the location of the study by purposive sampling, the number of Hami samples in this study was 176 respondents.

RESEARCH RESULTS

Univariate Analysis

Table 1. Characteristics of respondents

Characteristics	Amount	Percentage%
Age		
<20 years	12	6.8
20-34 years	128	72.7
> 35 years	36	20.5
education		
Elementary/ equivalent	5	2.8
SMP / equivalent	62	35.2
SMA / equivalent	70	39.8
PT / equivalent	39	22.2
Employment		
IRT	148	84.1
PNS	2	1.1
Employees	4	2.3
Entrepreneurship	22	12.5
TOTAL	176	100.0

Based on the table above shows that the characteristics of respondents according to age group are generally between 20-34 year as many as 128 respondents (72.7%), at least <20 years old as many as 12 respondents (6.8%). While the data obtained by the distribution of respondents based on education shows that the majority of respondents are high school / equivalent education level as many as 70 respondents (39.8%) and the least elementary school as many as 5 respondents (2.8%).

Furthermore, the distribution data of respondents based on work shows the majority of respondents as IRT (Housewives) as many as 148 respondents (84.1%), PNS 2 respondents (1.1%), employees as many as 4 respondents (2.3%) and entrepreneurs 22 respondents (12.5%).

Bivariate Analysis

Table 2. Relationship Family Support, information media and ANC services with quality of life pregnant women.

Family Support	Quality of Life		Total	P
	Poor	Fair		
Less than	55 (64.7%)	30 (35.3%)	85 (100.0%)	0,000
Enough	30 (33.0%)	61 (67.0%)	91 (100.0%)	
Total	85 (48.3%)	91 (51.7%)	176 (100.0%)	
Information Media				
Less	60 (68.2 %)	28 (31.8%)	88 (100.0%)	0,000
Enough	25 (28.4%)	63 (71.6%)	88 (100.0%)	
Total	85 (48.3%)	91 (51, 7%)	176 (100.0%)	
ANC Services				
Less	32 (60.4%)	21 (39.6%)	53 (100.0%)	0.035
Enough	53 (43.1%)	70 (56.9%)	123 (100.0%)	
Total	85 (48.3%)	91 (51.7%)	176 (100.0%)	

Based on the results of research conducted using Test Chi Square where the value of p value = 0,000 (p-value ≤ 0.05), shows a significant relationship between family support and the quality of life of pregnant women.

Furthermore, testing the relationship of counseling media with the quality of life of pregnant women using Test results Chi Square where the value of p value = 0,000 (p-value ≤ 0.05), indicating the existence significant relationship between counseling media and the quality of life of pregnant women.

Based on the results of research conducted at the mass health center using Test Results Chi Square where the value of p < 0.05; (p = 0.035), indicating a significant relationship between ANC services and the quality of life of pregnant women.

DISCUSSION

In this study there was a significant relationship between family support and the quality of life of pregnant women. The quality of pregnant women is directly affected by family support. Meanwhile the incidence of stress with the role of family support relates indirect relationships⁹. Maintaining stress or depression during pregnancy is very important. Because women who experience symptoms of depression at the beginning of their pregnancy have a poor quality of life for their health¹⁰

The role of husbands is enough to affect the physical and psychological health of the mother during her pregnancy. Forms of husband’s role such as delivering prenatal care, maintaining feelings in communication and giving advice on prenatal care. According to Calou¹¹, family support (husband) was a positive predictor and

found a significant relationship with quality of life.

In fact, according to Arini, states the importance of family support in pregnancy is very significant for women's adjustment in the first pregnancy. indicated by the correlation coefficient (r) of 0.7311 with $p < 0.01$. This means that the higher the family support, the higher the adjustment of women in the first pregnancy and vice versa¹². Even family support is not only during pregnancy, but also has a strong correlation with the quality of life of the mother after giving birth.¹³

This is also in line with the theory that explains family as an affective function, namely family functions related to internal functions of the family in providing psychosocial protection and support for family members. Family as a source of love, recognition, appreciation, and primary source of support, Satir, in Friedman,. Therefore family support has an important concern, especially pregnant women who experience various health problems of their pregnancy.

Furthermore, the analysis of the relationship between counseling media and the quality of life of pregnant women shows a significant relationship. Therefore, the right role of counseling media can improve the health of pregnant women, and lead to the impact of improving the quality of pregnant women themselves. According to Lupton 2016, digital media can provide the information needed in detail when they have the opportunity¹⁴.

Social media is very useful in changing general health behaviors¹⁵. The majority of studies report that women use the internet as a source of information about pregnancy. Women seek information at least once a month, especially the topic of fetal development and nutrition at pregnancy¹⁶. Besides that, it is very helpful for health workers in their efforts to improve the health of pregnant women in their working areas.

The most commonly used communication methods are 3 types. First, internet (46%), Second, talking with health care providers (33%), and third, talking to family (32%). A higher preference for talking to health care providers is high-income individuals compared to lower income¹⁷.

Furthermore, the analysis of the relationship between ANC services and the quality of life of pregnant women showed a significant relationship. Therefore it is necessary to get the attention of health workers to

improve the health of pregnant women. Even though the initial inspection visit is already high, if you look at the complete inspection (K4), it is still low. This situation occurs due to other factors, such as; the number of other health facilities and the level of mobility of the population is quite high, so there are services for pregnancy in other places as well as some pregnant women who specifically come just for maternity.

The study, supported by Nicholson¹⁸, states that almost all women (98.9%) had antenatal examinations during pregnancy, but had less (26%) of the recommended minimum number of four visits during pregnancy¹⁸. Even though the benefits obtained from prenatal care are very useful. According to the WHO Antenatal Care Trial, the results of a randomized trial show that high frequency and regular visits in the third trimester can reduce perinatal mortality¹⁹. To increase the proportion of mothers who conducted 4 antenatal visits and improve the quality of care through the use of cell phones^{20,21}

According to Chemir²², ANC services were also determined by the level of community satisfaction. Unfortunately, based on the satisfaction rate of pregnant women who received special antenatal care services, they were only above (60.4%) who were satisfied. Difficult to increase visits of pregnant women with dissatisfaction with service²². Especially with the increase in the target of visits announced by WHO^{23,24}, a minimum of eight contacts for antenatal care can reduce perinatal deaths by 8 per 1000 births when compared to a minimum of four visits.

CONCLUSION

There is a significant relationship between family support, information media and ANC services with the quality of life of pregnant women in the Massenga Health Center area.

Suggestions

Increasing awareness of healthy pregnancies needs to be supported by the support of immediate families such as husbands and parents and information media such as social media / internet.

There needs to be good coordination to obtain real ANC visit data between Puskesmas and other non-government health services.

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Conflict of Interest: Nil

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Developing and Validating Low Cost Male Catheterization Mannequin as Learning Media in Clinical Skills Learning

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ABSTRACT

Background. In medical faculty, clinical skills learning has been taught since the early years. Methods in clinical skills learning need media as mannequin and standardized simulated patient. The price of mannequins is expensive and its maintenance and the availability of spare parts are difficult because of product import. Therefore, research and development of low cost and easily maintenance mannequin are needed to solve the problems.

Aims. To develop and validate low cost male catheterization mannequin as learning media in clinical learning

Method. This was a research and development study. The research start with designing, making, then validating the mannequin. There are 18 validators who are anatomist, urologist, surgeon, internist, medical educator, and general physicians.

Results. There are 3 parts of the designed male catheterization mannequin, which are outer body part, penis part, and inner structure. The anatomy of the mannequin is alike with human body. It has light weight and portable. Another advantages are easier maintenance and cheaper than standardized mannequin. Although there is smooth leak in the urethral valve.

Conclusion. Mannequin produced from this research is a low cost and high technology product that can be used as learning media in clinical skills learning.

Keywords. *Male catheterization mannequin, low cost, clinical skills, learning media*

INTRODUCTION

Clinical skills are required for medical students to become a doctor. In medical faculty, clinical skills learning has been taught since the early years. Students learn clinical skills such as communication, examination skills and procedural skills¹. Methods in clinical skills learning need media as mannequin and standardized simulated patient.

Mannequins are used in exchange of real human body to practice procedural skills those are invasive, so it is impossible to be applied to standardized patients. Therefore students can repetitively practice without fear of mistakes and hurting patients. Furthermore, it can increase their confidence and prepare mentally before entering clinical education in hospital².

There are many clinical skills that are taught using mannequins, such as Intravenous catheterization, Basic Life Support, Leopold Examination, Neonatal Resuscitation, Gynecologic Examination, Intra uterine device (IUD), Baby Delivery, Airway Management, Male and Woman Catheterization and Nasogastric Tube Insertion. According to Indonesian Medical Council that

male catheterization is a procedural skills at level 4A. It means that this skill should be performed by a doctor independently⁵.

For some medical institutions, specially in developing countries, found a major problem in managing clinical skills laboratory. Budget costs for purchase, repairmen and maintenance of mannequins are enormous³. The price of mannequins are expensive, mostly imported products. In addition, maintenance, spare parts, and mannequin durability can be a problem for clinical skills management. Mannequin ranks first in the learning system in clinical skills before students move on to the next stage of practicing with friends, practicing with simulated patients and the latter being down directly to the community. Therefore, research and development of low cost and easily maintenance mannequin are needed to solve this problems.

METHOD

This was a research and development study. The research started with designing, making, then validating the mannequin. There were 18 validators who were anatomist, urologist, surgeon, internist, medical educator, and physicians. Data were collected through in-depth interview and analyzed in qualitative.

RESULTS

The first phase, designing phase begin with planning the material that will be use for making the mannequin. There are two main material used, which are silicone rubber and fiber. Other material will be taken from wasted material such as used bottle and hoses. There are 3 parts of the designed male catheterization mannequin, which are outer body part, penis part, and inner structure. The outer body consist of parts of stomach and thighs. The penis part consists of penis and scrotum. And the inner structure consists of bladder and urethra. Materials used were low-cost that can reduce production costs. In the outer body of the abdominal and thigh body parts used fiber and the the penis part used silicone rubber.

The second phase is making the mannequin. The step of mannequin manufacturing starts from the manufacture of outer body and penis molds using silicone rubber. The second step is to make the outer body of mannequin using resin and fiber. The next step is to make a penis part using silicone rubber added with yellow dye to find the closest color to the skin. And the last one is to make

the structure in bladder using bottles and building hoses. The urethral valve uses silicone rubber.



Figure 1. Outer part of male catheterization mannequin

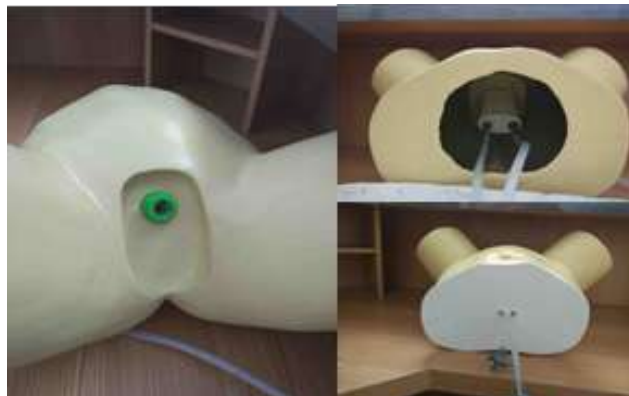


Figure 2. Inner structure of male catheterization mannequin

The third phase is the mannequin validation. The validation phase is the phase of developing the mannequin model of male catheter installation that has been created by collecting opinions from the experts about the mannequin, especially to find limitation and the feedbacks on repairing the mannequin to be realistic and can be used as learning aid. Validation is done in two stages. Validations aims to determine whether the mannequin is eligible as a tool for learning clinical skills. After the first stage validation, the mannequin will be repaired according to he feedback. Subsequently, the mannequin will be validate again by the experts as the second stage validation. At the end, there will be final revision of the mannequin that signifies the mannequin is eligible to be used as learning media.

In the first stage of validation, the mannequin was validated by the experts and 3 types of limitation were found in the mannequin. First, the glans penis mannequin looks has not been circumcised and too stiff.

Second, mannequin's urethra when can only be passed by catheter size of 12-16 while the most commonly used catheter size 18 can only enter about 5 cm. And the last the valve of bladder had not functioning optimally so that leakage of fluid when catheter inserted into the bladder.

The limitation is then corrected, then the second validation is performed. The results are the mannequin

is good enough and can be used as a learning aid in the Clinical Skills Laboratory. Although there is still a lack of urethral valve is still leaking smooth, which can be repaired by adding water tape.

The advantages and limitations of this mannequin are shown in Table 1.

Table 1. The difference of standardized and low cost male catheterization mannequin

	Standardized	Low cost
Advantages	Mannequin is standardized	Original body-like anatomical design Lighter weight Portable Easy to maintain Production is easier and faster breaking parts Low production cost
Limitations	Expensive Difficult to maintain	Smooth leak in the urethral valve

DISCUSSION

First mannequin developed for learning purpose was cardiopulmonary resuscitation, which was called Resusci-Anne. The mannequin was developed in the early 1960s⁶. Nowadays, there are several research about developing low fidelity mannequin as learning media^{7,8,9}.

Low fidelity mannequin can be used as learning media. Munshi et al said that high fidelity is not always greater than lower-fidelity. The result is depend on the type of task and the learner's level¹⁰. Conlon et al stated that there is no difference in test scores or perceived instructor or course quality among the groups who get low fidelity, mid fidelity and high fidelity mannequins¹¹.

Mannequin are created to be simple for used. This mannequin is built from low cost and easy to find material. Alike with Kumaresan et al who developed simplified suturing model from three easily available materials⁷. Another advantages are easier maintenance than standardized mannequin. maintenance becomes easier because when the mannequin is damaged, it can be replaced on the damaged part only. Moreover, It has light weight and portable.

CONCLUSIONS

Mannequin produced from this research is a low cost and high technology product that can be use as learning media in clinical skills learning. The anatomical design is

body-like and the sense obtained in the catheter insertion procedure has approached the original, therefore this mannequin can be used as a learning media in Clinical Skills Laboratory.

As the continuation of the research, future research needs by evaluating the usability of mannequin by students.

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Conflict of Interest – None

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New Approach for Referral Preparation to the Health Care Center in Denpasar City and Bogor Regency

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ABSTRACT

Knowledge, attitudes and skills of pregnant women to recognize danger signs during pregnancy to postpartum period and newborn baby is a strategic effort to prevent maternal and infant mortality. The aim of the study was to find out the results of guidance interventions for pregnant women and husbands using video media, pictorial fans with five finger signs, pocket books and maternal and child health books between before and after guidance at three Health Centers in Denpasar City and Bogor Regency. The study design was quasi-experimental with nonrandomized pretest-posttest with control group design. The research subjects were 204 pregnant women in the three intervention groups who had fulfill inclusion and exclusion criteria. The intervention group on the subject was divided into interventions 1 (video media, fans with five finger signs and and maternal and child health books). Group intervention 2 (pocket books, fans with five finger signs and maternal and child health books) and control groups (maternal and child health books). The instrument used was a questionnaire containing the socio demographic characteristics of the subject, knowledge, attitude and observation of skills. The results showed that there were differences in the scores of knowledge, attitudes and skills in the intervention among groups 1 and 2 ($p < 0.05$). The multivariate test results showed that there were four variables that consistently affected the skills score of pregnant women significantly including guidance intervention, maternal occupation, income and residence ($p < 0.005$). It is necessary to consider the awareness of midwives at the health center to innovate in order to increase alertness and early detection through family-based empowerment.

Keywords: *danger signs guidance, pregnancy, health center, empowerment*

INTRODUCTION

According to estimates from world health organizations or the World Health Organization (WHO), as many as 358,000 maternal deaths occur every year (WHO,¹ and as many as 88-89% of these deaths can be avoided. The attitudes of health workers (especially midwives and doctors), besides motivation, knowledge and practice are other factors that influence the dynamics of the need for services that forming an important basis for improving maternal and infant health^{2,3}. The maternal mortality rate (MMR) in Indonesia according to data from the Indonesian Demographic and Health Survey (IDHS) in 2012 was 359 per 100,000 live births. The MMR is much higher compared to the 2007 IDHS results of 228 per 100,000 live births.

Maternal and newborn health conditions still need serious attention from various parties, not only in Java, but also in Bali. Thus, basic efforts are carried out by midwives in order to prevent death and illness in mothers and children through efforts to increase the knowledge and awareness of pregnant women and families regarding danger signs to mothers and infants. This effort has a large impact to prevent late referrals, especially the delay in recognizing problems that generally cause delays in making decisions and referring to health facilities⁴.

Maternal mortality rate in Denpasar City fluctuating quite significantly, up to 2014 MMR had been reduced to 16.1 per 100,000 live birth but increased back in 2015 and 2016. Maternal mortality rates in the Denpasar City in 2016 (54 per 100,000 live birth) still lower than the

target of the Denpasar City Health Office Strategic Plan in 2016 (100 per 100,000 KH). During 2016 in Denpasar City there were 7 maternal deaths consisting of 5 deaths of pregnant women and 2 during delivery. All mothers die in health facilities (hospitals). Four maternal deaths in Denpasar City are caused by Non Obstetric Disease, namely 2 people due to heart disorders, 2 people with dengue syock syndrome.

The main objective of this research is to compare the skills of pregnant women and their husbands / families regarding danger signs to pregnant women and infants to prevent delays in obtaining appropriate care between before and after guidance. In this study, personal guidance methods were used in the two intervention groups and one control group. Guidance media is using videos, fans with five fingers on the left and right hand regarding danger signs picture, pocket books and maternal and child health books.

We need to know the most appropriate approach to increase knowledge, attitudes and skills of pregnant women and families to prevent delays in recognizing problems and seeking help.

MATERIALS AND METHOD

The study design was quasi-experimental, pretest-posttest control group design. Respondents were divided into two groups, namely the control group and the treatment group (1 and 2). The control group (pregnant women in South Denpasar II and Ciomas) were given guidance according to the MCH books at the health center or Puskesmas. Intervention group 1 (Puskesmas I Denpasar Timur and Ciri Mekar) were given guidance using video media, fans with five fingers on the left and right hand regarding danger signs picture and maternal and child health/MCH books. Intervention group 2 (Puskesmas II Denpasar Barat and Sukaraja) given guidance using pocket books and fans and MCH books. The sample size in the control and treatment groups will be calculated according to the population of second trimester to third trimester of pregnant women in selected health centers in Denpasar City and Bogor

Regency, which amounted to 34 pregnant women in each selected health center or 204 pregnant women in health center. Conducted pretest and posttest for pregnant women regarding danger signs for pregnant women and newborns. Data collection is carried out for three months (July to September 2017).

Pregnant women and husbands who were involved in intervention groups 1 and 2 were given a pretest before guidance. In the control group, pregnant women were given a pretest and were then asked to read maternal and child health books regarding danger signs and preparation for referrals. The time taken from the pretest to posttest is one month. Guidance in the intervention group and the control group was carried out after the pretest 3 meetings for one hour at each meeting. Guidance is carried out by the MCH management midwives who have been trained in the selected health care.

Data analysis was univariate, bivariate and multivariate analysis. Univariate analysis by calculating the mean. Bivariate analysis to analyze the relationship between independent variables and dependent variables, the intermediate variable with the dependent variable using paired t test and chi square analysis. Multivariate analysis to analyze the relationship between all research variables using multiple regression tests and modeling.

RESULTS

The homogeneity test shows if the respondent characteristics are generally homogeneous ($p > 0.05$). There were differences in the pretest and posttest scores in the intervention group on the score of knowledge, attitudes and skills ($p < 0.05$) except in the control group did not show differences in the skill score ($p > 0.05$). The results showed that if intervention 2 had a significant difference in knowledge, attitudes, and skills scores when compared with intervention group 1 and control group. In the table 1 below, the results of differences in pretest and posttest scores were displayed on the knowledge, attitudes and skills of pregnant women.

Table 1. Differences in Pretest and Posttest Scores between Intervention and Control Groups (n=204 pregnant women)

		adjusted variance	z	p-value
Knowledge	Intervention group			
	1	24650.75	2.357	0.18
	2	24528.00	4.431	0.000
	Control	25068.00	2.239	0.025
Attitude	Intervention group			
	1	26258.38	1.858	0.063
	2	26451.13	3.034	0.002
	Control	25909.38	1.948	0.051
Skill	Intervention group			
	1	26757.13	7.070	0.000
	2	26746.63	7.145	0.000
	Control	26755.13	1.284	0.199

Source : Primary data analysis (2017)

The multivariate test results using general linear model (GLM) analysis showed that there was no significant relationship in the intervention group and maternal age with a knowledge score ($p > 0.05$). There was no significant relationship between intervention and maternal occupational factors with attitude scores ($p > 0.05$). Consistently intervention, maternal occupation,

income and place of residence were significantly associated with maternal skills scores regarding danger signs for mothers and newborns baby and neonates ($p < 0.05$). The table 2 below shows the results of the analysis between the intervention, the work of the mother, income and place of residence with the skill score.

Table 2. Results of General Linear Model Analysis between Independent Variable, Intermediate and Skill (n=204 pregnant women) in 2017

	Skills				AIC
	coeff	z	p	95% CI	
Intervention group					7.275
1	7.198	3.52	0.000		
2	14.083	8.61	0.000	10.875 -17.291	
Mother occupation	4.356	2.98	0.003	1.494 -7.219	
Family income	-7.746	-4.20	0.000	-11.365 -4.127	
Residence	-8.217	-3.19	0.001	-13.263 -3.171	
Husband education:					
Middle	1.783	1.27	0.204	-0.967 – 4.532	
High	1.719	0.76	0.446	-2.704 – 6.142	
Health assurance	-1.166	-0.88	0.380	-3.769 – 1.436	
Age	1.200	0.79	0.430	-1.778 – 4.179	
Husband occupation	-1.376	-0.36	0.721	-8.919 – 6.166	
Constanta	13.773	3.65	0.000	6.371 -21.175	

Source : Primary data analysis (2017)Discussions

In general the characteristics between the intervention groups were not different ($p > 0.05$). Differences were found from the characteristics of income or socio-economic level, residence, and means of transportation used by subjects to health facilities ($p < 0.05$). The sociodemographic characteristics of the subject can affect service quality as measured by knowledge, attitudes and skills the subject knows and manages the problems faced.

According to the World Health Organization¹, there are several determinants that influence client visits to health facilities, especially to obtain reproductive health services, including: financing factors or ability to pay, distance factors to health facilities, client knowledge, education level and social status economy. Agreeing with the results of a study in Ethiopia by Tesfahun, Worku, Mazengiya, Kifle⁵, that maternal health care utilization is influenced by accessibility factors, socio-cultural beliefs, individual attitudes and health seeking behavior.

There were differences in the pretest scores of knowledge, attitudes and skills between the intervention group 1 and 2 and the control group significantly ($p < 0.05$), although the results showed that the most significant difference was in the intervention group 2. The skill score showed that only the control group who

did not show a significant difference ($p > 0.05$) when compared with intervention group 1 and 2. This was caused by factors of resistance or design invalidity, including: the interaction of the given test, the interaction of the results of the selection with the results and the existence selection with the results and the existence selection bias⁶.

The selection bias in terms of the invalidity of interaction factors from the intended test is that there is a weakness of the video media in the intervention group 1 due to the availability of a video watching device at home that is not shared by all subjects in the group, in addition to the obstacles that explain content or content of the video. Another problem with invalidity is that the characteristics of the subject from the beginning have been different, especially in the intervention group two which shows if the initial results of the pretest are much higher than the other groups⁶.

There was no significant difference between the pretest and posttest scores according to the characteristics of the transportation facilities and the distance to the health facilities with scores of knowledge, attitudes and skills ($p > 0.05$). Knowledge, attitudes and skills of individuals or subjects are influenced by socio-economic factors, values that are believed, and intention to behave. Different results were obtained by Tesfahun,

Worku, Mazengiya, Kifle⁵, that the factors that influence the utilization of postpartum care are: time constraints, transportation costs, shelter, distance from home to health facilities, previous ANC history and ability health workers provide solutions to problems faced.

The results of multivariate tests using GLM were obtained if there was only a very significant relationship between intervention, maternal work, family income, and place of residence with a skill score ($p < 0.05$). The results of the study by Amenu, Mulaw, Seyoum & Bayu⁷ and Salam, Lassi, Das and Bhutta⁸ that positive health behaviors are influenced by various factors, including: complex phenomena related to availability, quality, service financing, structure social, health beliefs and characteristics of clients or service users⁹. The success of communication between midwives and clients or pregnant women greatly influences patient / client satisfaction, increases understanding, increases mutual trust and increases the ability of pregnant women and families in decision making¹⁰. Mother's knowledge is not directly affected by the number of ANC visits due to differences or gaps between the ability of officers / midwives and the limited information provided by midwives regarding danger signs to mothers during pregnancy to postpartum, newborn baby and neonates¹¹⁻¹⁵. The husband's education contributes to the participation of husbands in delivering mothers to health facilities and helping to make decisions more precisely and quickly¹⁶.

CONCLUSION

The use of media and interesting information delivery techniques are determinants of the success of training. It is necessary to consider the characteristics of the research subjects, such as the availability of VCD devices, other communication media in the form of mobile phones for intervention groups that receive training using video media.

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The Difference Existence of *Aedes sp* Larvae based on Ovitrap Locating in Samarinda City Indonesia

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ABSTRACT

Dengue Fever is a worldwide health problem including Indonesia. Samarinda, as the capital city of East Kalimantan Province, has incidence of dengue fever every year. Generally, *Aedes sp* found inside and outside of the houses. Prevention of dengue fever could be done by some ways. One of alternative is utilization of ovitrap as a trap of larvae. This study would like to comprehend the difference existence of *Aedes sp* larvae based on locating inside and outside of the house. Research design was quasi-experimental design posttest only used control group without randomization. Ovitrap has been placed inside and outside of the house in 30 samples of the houses. Larvae existence monitored after a week of ovitrap locating. Observation result compared between ovitrap locating inside and outside of house. The research result showed that there was a difference existence of *Aedes sp* larvae based on ovitrap location (p value: 0.000 < 0.05, significantly different). *Aedes sp* larvae found more in the outside of the house of ovitrap location. Ovitrap could be used as the alternative of survey device of *Aedes sp* larvae existence in the dengue fever high risk area to prevent and control the density of *Aedes sp* in the community environment.

Keywords: Ovitrap, *Aedes sp* Dengue Fever

INTRODUCTION

Dengue fever is a public health problem in the world.. There were 2.5 billion of population (40%) was located in the high risk area of dengue fever. There were 500.000 cases and 22.000 mortality every year. Population of South East Asia country placed about 70% of citizen with high risk of dengue fever¹. Indonesia is an endemic area of dengue fever in the South East Asia area . Based on the Indonesian Health Profile in 2014, there were 100.347 cases with 907 mortality cases happened in 34 provinces in Indonesia (IR: 39.80/100,000 citizens, CFR : 0.90%). East Kalimantan Province was a province with the highest cases of dengue fever in 2014 with 4.752 cases and 55 mortality cases (IR: 135.46/100,000 citizens, CFR: 1.16%). In 2012-2014, there were 11.612 cases². Samarinda is the capital city of East Kalimantan. Report from Department of Health of East Kalimantan showed that in 2014, Samarinda was a city with the highest incidence with 1147 cases (IR : 118.7%, CFR :1.24%). One of area with the incidence was Harapan Baru Sub District. The data of Department of Health

Samarinda 2015 showed that Harapan Baru Sub District had increasing of dengue fever cases in 2013 – 2015 which included 8 cases (2013), 45 cases (2014) dan 87 cases (2015).

Geographically, *Aedes sp* mosquitos found more in the city and related to the water storage building. *Aedes sp* larvae found more in the indoors rather than outdoors. Flower vase, water storage bucket, bathroom water box, and water storage teapot were some indoors places for mosquito's development. Outdoor places included former wheel, former bottle, former glass, cuts of bamboos, and bird drinking storage and other water containers which can save the rain water could be some places for mosquito's development. The dengue fever controlling could be done by the government and community independently. It caused by the dengue fever could decrease the quality of public health. There are some ways to control the dengue fever include chemical control used larvacide and imagocide, biological control used the microorganism care through the larvae eater, environmental control and self protect used *repellent*³.

Using ovitrap (egg trap) could be done to decrease the risk of dengue fever in the environment. Utilization of ovitrap included a black water container given by enough water and closed by the filter paper. The ovitrap then placed outside and inside of the house in the dark and moist environment.

The result studies about ovitrap showed that ovitrap could be used for monitoring and controlling *Aedes sp* development in the environment. Ovitrap is an economic, specific, and sensitive controlling alternative to the sampling in the wider area. Positive larvae ovitrap of *Aedes sp* could be used as the surveillance device to indicate the real existence of *Aedes sp* mosquitos in the real environment. The decrease of density of *Aedes sp* mosquito will influence to the decreasing of dengue fever virus transmission and finally decrease the risk of incidence of dengue fever in the community.

MATERIAL AND METHOD

This research was analytic research used quasy experimental approach with posttest only control group design. The research aim was to comprehend the difference existence of *Aedes sp* larvae based on locating inside (indoors) and outside (outdoors) of the house. Population of this research was 69 houses in area of household 22. Sampling technique used purposive sampling with inclusion and exclusion criteria. Samples were 30 houses. One ovitrap located inside and outside of 30 houses. Observation did after a week ovitrap locating through larvae checking at ovitrap inside and outside of the house. Instrument used on this research was observational paper of *Aedes sp* larvae existence. Larvae checking did by the larvae monitoring group at the research location. The result of observation of larvae at ovitrap then compared between the result of ovitrap inside and outside of house. Data analysis used *Chi Square* test to compare the difference between two nominal scale variables.

RESULTS

Ovitrap used in the black bucket filled by half of water and closed by the curved filter fabric touch the water surface in the bucket with ovitrap then tighten by the rope in the outside. This study placed the 60 ovitraps in the 30 samples of houses. Each of them divided to 30 ovitraps outside the house and 30 ovitraps inside the house. Ovitrap has been placed in the potential place for *Aedes sp* mosquito's development. Indoors placing was

inside of the rest room or the kitchen as the dark place without disturbing the house owner activity. Outdoors placing was around the dark and moist garden without disturbing the daily activity. After a week of ovitrap placing, it has been examined for the larvae existence at the ovitrap inside or outside of the sample's house.

Regarding to the observation, the outdoors ovitrap with larvae inside found in the 24 ovitraps between 30 ovitraps. In the indoors ovitrap, there were 10 ovitraps with larvae inside between 30 ovitraps. *Chi Square test* showed that *Asymp.Sig.(2-sided) Pearson Chi-Square* was $0.000 < \alpha : 0.05$, H_0 was rejected. It can be concluded that there was significance difference of *Aedes sp* larvae existence based on ovitrap locating inside and outside of the house in Harapan Baru Sub District Samarinda City. Outdoors ovitrap had more larvae compared with the indoors one. It indicated that the *Aedes sp* mosquito's population more found in the outside of the house rather than inside of the house in Harapan Baru Sub District Samarinda City.

DISCUSSION

Indonesia is the endemic country with the high number of dengue fever cases. Outbreak has been happened during 3-5 years in Indonesia that caused the mortality especially for children⁴. From the past till the recent, there was no any vaccination found to the dengue fever disease. The best prevention of dengue fever is controlling the vectors of *Aedes sp's mosquitos*⁵. High density population, poor sanitation, and the easiness of transportation accessibility from one place to the other place will help the *Aedes sp* mosquito's distribution to the human environment.

Entomology survey used the ovitrap mostly used to detect the existence and distribution of the *Aedes sp's mosquitos* in the community environment. Mosquito's survey used the ovitrap was more economically efficient, sensitive and reliable to detect the existence of *Aedes sp's mosquitos* rather than the container survey⁶. Ovitrap utilization will be effective in a week. If it placed more than a week, the ovitrap could be a new place of *Aedes sp* mosquito's growth and development. Ovitrap placing could be used as the accurate device to observe the *Aedes sp* mosquito's growth in the community household⁷.

The study result based on the larvae observation in the ovitrap locating showed that the ovitrap with the positive larvae inside were found more in the outdoors

rather than indoors. The result was the same with the research of ovitrap locating in Bandung city which found that *Aedes sp* found more in the outside rather than inside of the house⁸. The other study found that there was *Aedes sp's mosquito's* egg more in the outside of the house in the Kranji village of working area of the East Purwokerto Public Health Center II⁹. The other supporting study was a study in the Uttarakhand State in India which found from the surveillance of ovitrap that the highest index number of ovitrap is in the outside of the house placing rather than in the inside of the house¹⁰.

The different findings found that the total analysis of the *Aedes sp* mosquito's egg from the ovitrap observation in the indoor and outdoor were not different significantly which means that *Aedes sp* mosquito's larvae indoor and outdoor was not different. In fact, there was found that amount of egg at the ovitrap which is placed outdoor was more than the indoor. In the indoor setting, ovitrap has been placed in the bedroom, kitchen, restroom, and the other closed rooms. Outdoor placing involved areas around the garden such as in the flower vase, around the trees, near the hedge or the other open places. In the outdoor ovitrap, it found that more larvae of *Aedes sp's* mosquito, it caused by the more amounts of the storage room and animal's stable. Those condition help the *Aedes sp's* mosquito to find the food source (blood animal) and made it as suitable place for growing an developing of *Aedes sp's* mosquito¹¹.

The amount of ovitrap which contain the *Aedes sp* larvae in the environment caused by the location of study was the area with the high incidence of dengue fever. Generally, amount of the egg will found in the area with high incidence of dengue fever rather than the lower one¹². Moreover, the *Aedes sp* larvae existence found more in the outside of the house caused by some factors. One of them is the community environment condition which increased the *Aedes sp's* mosquito's growth. Study location was an area with the swamps which has high moist condition. The study location bordered with the forest that contained of many trees for mosquito's place. The other factor was the community habit to save the rain water in to use in the daily need. *Aedes sp's* mosquito's places for growth were the water container place inside or around the house which is not directly touch the sands. That kind of place such as the drum, bucket, water box, banana stem, cuts of bamboo, piece of coconut shell, flower vase or the former can around the house¹³.

The other condition that could influence the *Aedes sp's* larvae existence was the high density in the study location due to the city area which only had the short distance between one house to the other houses. The distance between the buildings was a factor that could influence the mosquito's spread. The more the distance between the buildings, the more the mosquito could spread in the community environment^{14,15}.

The other result form the other study found the different result, which showed that from the ovitrap observation, the larvae found more in the inside of the house more than the outside of the house. The *Aedes aegypti's* mosquitos found more inside of the house and the *Aedes albopictus* found more in the outside of the house⁶. Studies about utilization of ovitrap in Malaysia showed that most of *Aedes albopictus* larvae positive found in the environment outside of the house with the ovitrap raneg index (37-78%) compared than the *Aedes aegypti* larvae index (8-47%)¹⁶. *Aedes sp's* mosquito had a habit which prefers to take a rest in the dark, moist, and hide place. It could be affected to the placing of mosquito's egg of *Aedes sp*^{17,18}.

Dengue fever prevention and controll in an area should be done quickly with the right method. The first step to determine the prevention effort from the government and the community was entomology survey used the ovitrap. Ovitrap is a simple device which effective and efficient to find the existence of *Aedes sp's* mosquitos in the community residence. By finding the existence of the *Aedes sp's mosquito's* existence inside and outside of the house hopefully could help the community to determine the independent prevention efforts to decrease *Aedes sp's* growth. The effort hopefully could decrease the *Aedes sp* mosquito's spread and decrease the risk of dengue fever in the community environment.

CONCLUSION

Regarding to the research result, there was a difference of *Aedes sp* larvae existence in the environment based on the ovitrap locating inside and outside of the house. *Aedes sp* larvae found more in the outside of house compared with the inside of house. Generally, the supporting studies showed that the *Aedes albopictus* was a common type found in the outdoors. *Aedes aegypti* found more indoors. *Aedes sp* larvae Existence which is found outside of the house could be influence by the local environment. Ovitrap could be used

as the alternative device for *Aedes sp* larvae existence survey, especially in the high risk area of dengue fever. Moreover, the ovitrap could be used for controlling the *Aedes sp* mosquitos development which worked as the effective and efficient trap of larvae to be used with the community. The efficient utilization of ovitrap could decrease the population of *Aedes sp* mosquitos in the environment and decrease the risk of dengue fever cases.

Ethics approval and consent to participate

This study did not involve living things (humans or animals) directly in the experimental research conducted. But to fulfill the research ethics in the field, informed consent was provided to the research location community to give permission for the implementation of the research.

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Relationship of Sleep Quality with Student Learning Motivation in Nursing Academy 17 of Karanganyar

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ABSTRACT

Sleep quality is a measure of where the person is obtained the ease in starting and maintaining sleep, sleep quality of someone can be described with a long sleep and perceived grievances while sleeping or after waking up sleep. Sleep patterns that are less good or less sleep will be bad for psychics one of them is declining student learning motivation, thought processes and decrease in brain activity. The motivation of learning influenced several factors such as physical, psychological factors, social and non-social. This research aims to know the relationship of sleep quality with students' learning motivation in Nursing Academy 17. The type and design of the research is quantitative with cross sectional approach. The number of population are 39 respondents. The technique of sampling method is the total sampling, and the data collection using the questionnaire. The analysis of this study uses univariate and bivariate analyses. The Chi Square test results show the value of $0.005 p \alpha \leq 0.05$, so it can be concluded that there is a relationship of sleep quality with the learning motivation of students in Nursing Academy 17 of Karanganyar. Someone with a good quality of sleep has a high learning motivation, but a bad sleep quality did not result in a decline in students' learning interest significantly.

Keywords: *quality of sleep, motivation, motivational learning*

INTRODUCTION

Rest and sleep are basic needs that are very and needed for human health. Everyone needs rest and sleep so that the body can function normally. When we rest and sleep the body will do the recovery process so that when we wake up the body condition becomes optimal and can carry out daily activities^{1,2}.

Several factors that influence the quality and quantity of sleep are physiological factors, psychological factors, environment and lifestyle. From the physiological factors have an impact with a decrease in daily activities, weakness, fatigue, decreased immune system, and instability of vital signs, while psychological factors impact depression, anxiety and difficult to concentrate^{3,4}.

Learning motivation is internal and external encouragement to students who are learning to conduct behavior, in general with several indicators or supporting elements. These indicators include: successful desire

and desire, encouragement and needs in learning, hopes and aspirations for the future, appreciation in learning, and a conducive learning environment⁵⁻⁷. Motivation is closely related to one's desire to learn and carry out tasks in fulfilling his developmental tasks entering young adulthood. Dariyo (2008) states that young adults are those who are generally aged 20-40 years. Most young adults sleep at night an average of 6 to 8.5 hours a day, but in this case vary³. The prevalence of adults who experience sleep disorders is still high, the data from WHO (World Health Organization) $5 \pm 18\%$ of the world's population have experienced sleeplessness (Lanyawati, 2001). In Indonesia, the exact number of people who experience sleep disorders is unknown, but the prevalence in adults reaches 20%⁸

Based on Fitri Rahmawati's study of the relationship between sleep quality and student learning interest, the results of the analysis showed that there was a significant relationship between sleep quality and learning interest. These results indicate that the higher the PSQI score, the

higher the interest in learning or the worse the quality of sleep, the lower the interest in learning. However, poor sleep quality does not result in a significant decrease at student learning interest.

MATERIALS AND METHOD

This study uses a *quantitative* research design with the approach used is a *cross sectional* approach. The population in this study were students of the first grade of Nursing Academy 17 of Karanganyar, with total amount of 39 students. While the sampling technique used in this study with *total sampling* is to use the entire population of 39 students. The independent variable of this study is sleep quality while the dependent variable is learning motivation. Data collection tools in this study used a sleep quality questionnaire, *the Pittsburgh Sleep Quality Index (PSQI)*, while the learning motivation questionnaire was modified by Dewi, 2014. Data analysis consisted of univariate and biivariate analyzes. Univariate analysis is used to see each frequency distribution variable, in this study univariate analysis is presented in table form, while bivariate analysis is used to see the relationship between variables. *Bivariate* analysis in this study using *chi square* test.

RESULTS AND DISCUSSION

Table 1 Frequency Distribution of Respondents by Gender and Age

Characteristics	amount	
	Frequency (n)	Percentage (%)
Gender		
Man	8	20,5
Woman	31	79,5
Total	39	100,0
Age		
18-19	33	84,6
20-21	5	12,8
22-23	1	2,6
Total	39	100,0

Based on the results of frequency distribution in table 1, it was found that students from the first grade of Nursing Academy 17 of Karanganyar showed that 39 respondents surveyed, respondents are male respondents they are 8 respondents (20.5%) and women are 31

respondents (79.5%).

Frequency distribution results in the table 1 shows that respondents with the aged 18-19 years are 33 respondents (84.6%), aged 20-21 years are 5 respondents (12.8%) and those aged 22-23 years are 1 respondent (2.6%).

Table 2. Frequency Distribution of Respondents Based on Sleep Quality

Variable	Amount	
	Frequency(n)	Percentage (%)
Sleep Quality		
Good	17	43,6
Bad	22	56,4
Amount	39	100,0

Based on Table 2, it is known that students from the first grade of Nursing Academy 17 Karanganyar show that from 39 respondents who are researched, the respondents who have good sleep quality are 17 respondents (43.6%) and those who have poor sleep quality are 22 respondents (56.4%).

Table 3. Frequency Distribution Based on Student Learning Motivation

Variable	Amount	
	Frequency (n)	Percentage (%)
Learning Motivation		
Low	12	30,8
Medium	13	33,3
High	14	35,9
Amount	39	100,0

Based on Table 3 it is known that students' learning motivation from the first grade of Nursing Academy 17 Karanganyar shows that the respondents who have low learning motivation are 12 respondents (30.8%), and who have moderate motivation learning are 13 respondents (33.3%) and who have high learning motivation are 14 respondents (35.9%).

Table 4: Relationship between Sleep Quality and Student Learning Motivation

Sleep Quality	Learnig Motivation			Total	r	Score	P
	Low	Medium	High				
Good	1	6	10	17	0,316	10,513	0,005
Bad	11	7	4	22			
Amount	12	13	14	39			

The results of table 4 can be seen from the results of the *chi square* test of 39 samples obtained 17 respondents with good sleep quality who have high learning motivation are 10 respondents, moderate learning motivation are 6 respondents, and poor learning motivation are 1 respondent, while respondents who have poor sleep quality that have high learning motivation are 4 respondents, moderate learning motivation are 7 respondents and low learning motivation are 11 respondents.

The *chi square* test results on 39 samples produced a statistical value (X²) of 10,513 with a significant level of 0,05 which was 0,316 obtained p value 0,005 where p value <0,05. Thus it was concluded that H_a was accepted that is the relationship between sleep quality and student learning motivation. Even so, there is out the possibility that there are respondents who have good sleep quality but low learning motivation and vice versa who have poor sleep quality that high learning motivation this is because there are other factors that influence learning motivation other than sleep quality.

CONCLUSIONS AND RECOMMENDATIONS

Based on the research conducted on 39 respondents about the relationship of sleep quality with students learning motivation at Nursing Academy 17 Karanganyar, shows that respondents who have good sleep quality as many as 17 respondents (43.6%) and who have poor sleep quality are 22 respondents (56.4%) while respondents who have low learning motivation are 12 respondents (30.8%) who have moderate learning motivation are 13 respondents (33.3%) and who have high learning are 14 respondents (35.9%).

The results of the *chi square* test showed a significant relationship between the quality of sleep with student learning motivation with statistical values (X²)

of 10.513 with a significant level of 0.05, namely 0.316 obtained *p value* of 0.005 where *p value* <0.05. It can be concluded that there is a relationship between sleep quality and learning motivation of first-grade students at Nursing Academy 17 of Karanganyar.

Students should improve the quality of their sleep, so that the quality of sleep will be better so learning motivation that is still low can be improved. However, students are also expected to maintain high learning motivation and increase the spirit of learning so that the achievement will increase.

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The Risk of Disease Transmission from Bat's Bacteria to Humans and other Animals

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ABSTRACT

Bats are suspected as vectors of some diseases. Bat area roaming large enough and has a complex social structure makes the bat more interesting and unique to discuss the risk of disease transmission to humans and to other animals, especially from bacteria that exist in bats. The study was conducted from March 2017 to March 2018. The research sites in the southern region of Lombok Island consist of Selong Belanak, Semeti, Areguling, Kuta and Tanjung Ringgit. Bats were collected using mistnet. Bacterial data collection comes from examination of the mouth, nose, feces, and bowel bats. The identification of bacteria based on colony morphology observation. The results show that there are 14 species of bacteria isolated from 4 species of bats. Species of bacteria are *Providencia stuartii*, *Aeromonas caviae*, *Citrobacter freundii*, *Escherichia coli*, *Serratia ribidaca*, *Klebsiella oxytoca*, *Acinetobacter calcoaceticus*, *Alcaligenes xylosoxidans*, *Neisseria sicca*, *Staphylococcus aureus*, *Providencia penneri*, *Proteus vulgaris*, *Citrobacter freundii*, and *Citrobacter aerogenes*.

Keywords: Bats, Disease, Bacteria, Humans, Animals

INTRODUCTION

The existence of bats is very important for people's lives, namely as a complement to the ecosystem, for example, bats can be dispersed fruit seeds including *Anacardium sp*, *Adenathera sp*, *Ceiba sp*, *Convolvulaceae*, *Poaceae*, *Syzygium sp*, *Musa sp*, *Muntingia sp*, and *Annona sp*, pest control insects, and guano fertilizer producers¹. In addition, Wijayanti² states that bats can act as key providers of ecosystem energy (the key factor in cycle energy) for organisms that are in the cave. Related to this, caves play an important role in maintaining the existence of bats. But there are concerns about humans and animals that interact with bats and concerns about the bat population.

Bats have recently been reported to carry several diseases that are harmful to humans and animals.

According to Veikkolainen et al.³, states that bats are effective reservoirs for the presence of human pathogenic bacteria. Some of these diseases are carried by several organisms or bacteria that live in the body of the bat. Microbes are one that is in the body of a bat. The presence of microbes can have a beneficial and detrimental impact. The beneficial impact on bats as revealed by Hyot, et al.⁴ states that bacteria found naturally in bats can inhibit the growth of *Pseudogymnoascus destructans*. So that it can protect bats from white-nose syndrome (White Nose Syndrome) and some other diseases among influences for individuals, populations, and species. Adverse effects of bats can cause several diseases to humans or other animals. Common types of bacteria found in bats are *Bartonella mayotimonensis*^{3,5}, *Pasteurella sp*, *Leptospira sp*, *Salmonella sp*, and *E. coli*⁶.

The abundance of microbes in bats is quite high, almost all types of bats have species of bacteria with various species that are diverse and even the same. This is caused by the bat's life behavior which consists of many colonies in one perch area. Bats can infect humans and animals because they have a close relationship. For

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example, the human interaction that enters the cave where the bat habitat is located, besides the presence of bats that are close to human settlements and the tendency of humans to use guano as biological fertilizer^{7,8}

Based on the description above, researchers feel interested in conducting research on the risk of transmission of diseases from bat bacteria to humans and animals. This research was carried out considering the bat spread is quite broad and very close to the daily lives of humans and animals. This study identified bacteria in several parts of the body of the bat including the mouth (saliva), feces, nose (nasal fluid), the whole body.

MATERIAL AND METHOD

Research Site

The study was conducted from March 2017 to March 2018. The location of the sampling was carried out in the southern part of Lombok Island, the location determination was based on the abundant distribution of bats in the area (9). In addition, the sampling location is a tourist area located on the island of Lombok. The sampling locations included Mount Prabu, Selong Belanak, Semeti, Areguling, Kuta and Tanjung Ringgit. The following is a map of the sampling location in Figure 1.



Figure 1. Research Site

Observation of Microba

Examination of microbial samples found in bats by examining several parts of the body from bats includes mouth swabs (saliva), feces, nasal cavity (nasal fluid) and smears throughout the body. Identification of bacteria can be carried out based on colony morphological observations, microscopic observations using various staining reactions and biochemical tests. Colony morphology observations include observation of the shape and color of colonies¹⁰. Gram staining is used to determine bacterial morphology and distinguish between Gram-positive bacteria and Gram-negative bacteria. Furthermore, bacteria can be identified through various biochemical tests, including carbohydrate fermentation

test, Triple Sugar Iron Agar (TSIA) test, motile test, indol test, citrate test, Methyl Red (MR) test and Voges Proskauer (VP) test.

RESULTS

Bacterial examination was carried out on 4 species of bats obtained in 6 locations in the southern part of Lombok Island. Examination of bacteria in 4 bat species is based on the abundance of these species in the southern region of Lombok Island based on Fajri et al⁹ report. 4 species of bats include *Eonycteris spaleae*, *Hipposideros diadema*, *Rhinophoma microphylum* and *Rhinolopus simplex* (Figure 2).

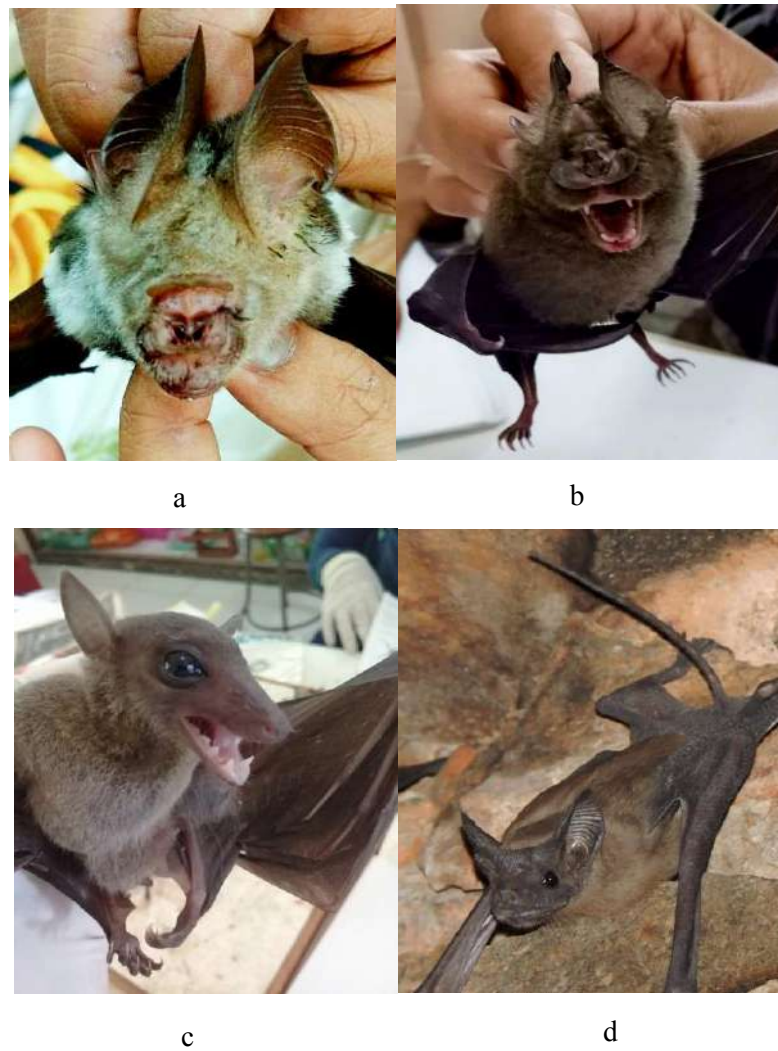


Figure 2. Species of bats; a. *Hipposideros diadema*, b. *Rhinolopus simplex*, c. *Eonycteris spaleae* and d. *Rhinophoma microphylum*

Based on the results of examination of bacterial species in 4 species of bats, there were 14 species of bacteria that were identified. The species include *Providencia stuartii*, *Aeromonas caviae*, *Citrobacter freundii*, *Escherichia coli*, *Serratia ribidaca*, *Klebsiella*

oxytoca, *Acinetobacter calcoaceticus*, *Alcaligenes xylosoxidans*, *Neisseria sicca*, *Staphylococcus aureus*, *Providencia penneri*, *Proteus vulgaris*, *Citrobacter freundii*, and *Citrobacter aerogenes*. Example of a bacteria colony in Figure 3.



Figure 3. Colony Bacteria

Eonycteris spaleae is one of the bats that have abundance high enough in the southern part of Lombok Island, its presence in all sampling sites. Considering that this research is interested in identifying bacteria in some parts of the body. based on the results of the study there were 5 bacteria that were identified among themProvidencia stuartii, Aeromonas caviae, Citrobacter freundii, Eschericia coli, and Serratia ribidaca. Hipposideros diademais one of the bats whose existence is found in the Tanjung Ringgit cave and the Buwun cave. This bat successfully identified 6 species of bacteria among themKlebsiella oxytoca, Providensia stuartii, Acinotobacter calcoaceticus, Alcaligenes

xylosoxidans, Neisseria siccaand Eschericia coli. Rhinophoma microphylumis a new record species on the island of Lombok¹¹. the existence of this bat is found in the Buwun cave and the Gale-gale Bangkang cave. this study managed to find 2 species of bacteria in the body of Rhinophoma microphylum. the bacterial species include Staphylococcus aureusand Providensia penneri. Rhinolopus simplex is a bat found in Gale-gale Bangkang cave and Buwun cave. from this bat managed to identify 3 species of bats among themProteus vulgaris, Citrobacter freundii, and Citrobacter aerogenes. More details can be seen in Table 1.

Table 1. Microbes in Bats

No	Bat Species	Inspection Location	Gram	Bacterial Species
1	<i>Eonycteris spaleae</i>	Mouth (saliva)	Gram-NegativeCocobacil	<i>Providencia stuartii</i>
			Gram-NegativeBacil	<i>Aeromonas caviae</i>
		Nasal cavity	Gram-NegativeBacil	<i>Citrobacter freundii</i>
		Feces	Gram-NegativeBacil	<i>Eschericia coli</i>
			Gram-NegativeBacil	<i>Serratia ribidaca</i>
Whole body	Gram-NegativeBacil	<i>Eschericia coli</i>		
2	<i>Hipposideros diadema</i>	Mouth (saliva)	Gram-Negative Bacil	<i>Klebsiella oxytoca</i>
			Gram-Negative Bacil	<i>Providensia stuartii</i>
		Nasal cavity	Gram-NegativeCocobacil	<i>Acinotobacter calcoaceticus</i>
		Feces	Gram-Negative Cocobacil	<i>Alcaligenes xylosoxidans</i>
			Gram-Negative Diplococcus	<i>Neisseria sicca</i>
Whole body	Gram-NegativeBacil	<i>Eschericia coli</i>		
3	<i>Rhinophoma microphylum</i>	Mouth (saliva)	Gram-NegativeCoccus	<i>Staphylococcus aureus</i>
		Nasal cavity	-	-
		Feces	Gram-NegativeCocobacil	<i>Providensia penneri</i>
		Whole body	-	-
4	<i>Rhinolopus simplex</i>	Mouth (saliva)	Gram-NegativeBacil	<i>Proteus vulgaris</i>
		Nasal cavity	-	-
		Feces	Gram-NegativeBacil	<i>Citrobacter freundii</i>
		Whole body	Gram-NegativeBacil	<i>Citrobacter aerogenes</i>

DISCUSSION

Based on the results of the study, there were 14 species of bacteria that were identified from several parts of the body of the bat. The goal is to find out what kind of bacteria there are in some parts of the bat’s body.

Thus, it can be a reference if there is an interaction with bats in their habitat or in human habitation. Bacteria that have been identified are harmful bacteria that can cause disease in organisms that interact with them, for example, humans or other animals. The presence of bacteria in bats comes from food sources and bat-foraging habitats, even

though he knows very little about this. Bacteria found in bats can become reservoirs and zoonotic pathogens in humans and other animals.

Bacteria in this study that are commonly found in bats are *Citrobacterfreundii*, *Escherichia coli*, *Klebsiellaoxytoca*, *Proteusvulgaris*, *Providenciapenneri*, *Providenciastuartii*, and *Staphylococcus aureus*. The bacteria have also been reported in bats as reported by Allocatiet⁶ and Muhldorfer¹². In addition, Muhldorfer¹³ states that there are several pathogenic bacteria found in the body of bats that can cause disease in humans and other animals including *Pasteurellasp*, *Salmonella sp*, *Escherichia coli* and *Yersinia spp*.

Citrobacterfreundii is an opportunistic bacterium and is also a nosocomial pathogenic bacterium, capable of causing neonatal meningitis among other diseases^{14,15,16}. *Escherichia coli*, a pathogenic bacterium, has also been reported in other caves visited by humans, such as Lascaux Cave in France¹⁷, six caves in northern Alabama and northwest Georgia, USA¹⁸, and diverse caves in Mizoram in northeast India¹⁹. *Klebsiellaoxytoca* is a bacterium that can cause colitis and sepsis, this bacterium also has human defilements (20). *Proteus vulgaris*, generally distributed in soil and water is responsible for approximately 90% of all *Proteus* infections in humans, especially in the urinary tract. Members of *Providenciasp* are also bacteria commonly found in soil and in water, can cause opportunistic infections in humans, including the urinary tract and eyes, as well as causes of diarrhea, abdominal pain, fever, and vomiting²¹. *Staphylococcus aureus* is one of the bacteria that cause infections in the skin and bacteremia (Sepsis). This bacterium has been reported in *E. Helvum* bats in several regions in Nigeria, Africa^{22,23}.

The types of bacteria that have never been found before in the body of the bat are *Acinetobactercalcoaceticus*, *Neisseria sicca*, *Serratia ribidaca*, and *Aeromonascaviae*. This type of bacteria is very common in humans and some other mammals. *Acinetobactercalcoaceticus* or *Acinetobacterbaumannii* are known as nosocomial pathogens that can cause skin infections in humans. The severe potential caused by *Acinetobacterbaumannii* is bacteremia and pneumonia²⁴.

Neisseria sicca is a commercial bacterium that is commonly known to be in the upper respiratory tract and is very rarely found to cause meningitis, endocarditis or

bacteremia^{25,26,27}. In addition, *Neisseria sicca* can cause a decrease in endurance with cutaneous erythematous nodules. This report adds to growing evidence that these bacteria can cause disseminated infections and cutaneous manifestations²⁸.

CONCLUSION

There are 14 species of bacteria isolated from 4 species of bats. Species of bacteria are *Providencia stuartii*, *Aeromonas caviae*, *Citrobacter freundii*, *Escherichia coli*, *Serratia ribidaca*, *Klebsiella oxytoca*, *Acinetobacter calcoaceticus*, *Alcaligenes xylosoxidans*, *Neisseria sicca*, *Staphylococcus aureus*, *Providencia penneri*, *Proteus vulgaris*, *Citrobacter freundii*, and *Citrobacter aerogenes*. The risk of transmitting the disease to humans or to other animals is quite high. This can be seen from the life cycle of bacteria that involves humans and other animals as hosts and intermediate hosts in completing their life cycles. Besides that, some bacteria are also able to cause harm to the body of the bat itself so that it will have an impact on the reduction of the bat population in every habitat.

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Ethical clearance- Taken from Faculty of Education Mathematics and Natural Sciences IKIP Mataram. committee **Conflict of Interest** – None

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The Effectiveness of Health Education on Improving Santris' Knowledge about the Dangers of Scabies at Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang

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ABSTRACT

Islamic boarding school is one area that has a high incidence of scabies. The poor personal santri hygiene is one of the causes of the spread of scabies. Santris' knowledge needs to be increased to reduce the spread of scabies in Islamic boarding school. The aim of the study is to determine the effectiveness of health education on improving santris' knowledge about the dangers of scabies in Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang. The design of the study is pre-experimental pre-test - post-test control group design. The population was all male students who live in Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang as many as 60 people, with a sample of 30 people obtained by accidental sampling. The independent variable is health education, while the dependent variable is known. The health promotion methods were used for the health education by using video as the media, while to explore the knowledge about the danger of Scabies, it used the questionnaires that were tested the validity and reliability. The data analysis used Wilcoxon matching pairs. The results obtained before the health education of the danger of scabies, most students have a sufficient category of knowledge as many as 20 people (66.6) and improved to 19 people (63.3%). It is concluded that there is an influence of health education knowledge of students about the dangers of scabies at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang.

Keywords: health education, personal hygiene, scabies;

INTRODUCTION

Scabies is a parasitic skin disease caused by *Sarcoptes scabiei*, that is characterized by strong local itching and non-specific skin changes patterns^{1,2}. The Indonesian Ministry of Health showed that the prevalence of scabies in Indonesia reached 4.6% - 12.95 the % year 2012 and ranked in the third from 12 most common skin diseases. In 1989 and 1990, the prevalence of scabies was 6% and 3.9% (Ministry of Health of the Republic of Indonesia, 2004). The prevalence of adolescents and children for scabies tends to be high at around 6% - 27% of the

general population and adolescents (Sungkar, 2005). Of the 10 biggest diseases in Indonesia, Scabies ranks in the third position with the prevalence of 4.60-12.95%.

Islamic boarding school is one of the environments where scabies is often found. Research by Dan Ratna, I., Rusmartini, T., Wiradihardja³ stated that the incidence of scabies at the Sukahideng Islamic Boarding School in Tasikmalaya Regency is quite high (27.21%). There are various causes of the scabies occurrence underlying the outbreak of the disease in the boarding school. Starting from the low knowledge of the students, students attitudes that tend to not support Clean and Healthy Life Behavior (PHBS), the hygiene issue, and the student's behavior that facilitate the transmission of scabies in the boarding school.

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The preliminary study conducted by researchers at Al Muftadi'ien boarding school found that the 15 santri is 100% experienced Scabies. The results of interviews with the respondents revealed that they often take turn using towels, lending the towels and other personal items. In addition, they assume that scabies is a natural disease experienced by them and does not become a burden for them. In fact, they are proud if they have experienced it, because of the wrong perception of students. With the scabies disease, religious knowledge has penetrated to the santri. The lack of knowledge of scabies is one of the important backgrounds to take an action. Of various brief information from some of the santri, researchers consider the need for health education to increase the students' knowledge. From the background above, we aim to examine the effectiveness of health education on improving students' knowledge about the dangers of scabies at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang 2017

MATERIALS AND METHOD

This study is a pre-experimental study pre-test post-test control group design. The population is all male students who live in Islamic boarding school Al Muftadi'ien Bahrul Ulum Jombang, as many as 60 people, with a sample of 30 people obtained by accidental sampling. The independent variables are health education, while the dependent variable is known. The health promotion methods were used for the health education by using video as the media, while to explore the knowledge about the danger of Scabies, it used the questionnaires that were tested the validity and reliability. The data analysis used Wilcoxon matching pairs.

RESULTS

Table 1. Distribution of frequency based on students' age at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang 2017

Age (Year)	F	%
Early adolescents (10-15)	22	73,3
Mid adolescent (16-20)	8	26,7
TOTAL	30	100

Table 1 shows that most students are in the category of early adolescents (10-15 years) of 22 people (73.3).

Tabel 2. Distribution of frequency of knowledge of students before being given health education the Dangers of Scabies at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang 2017

Category	F	%
Good	6	20
Fair	20	66,7
Poor	4	13,3
TOTAL	30	100

Table 2 shows that before the health education most students had sufficient knowledge about the dangers of scabies, as many as 20 people (66.6).

Table 3. Distribution of frequency of knowledge of students after being given health education the Dangers of Scabies at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang 2017.

Category	F	%
Good	19	63,3
Fair	11	36,7
TOTAL	30	100

Table 3 shows that after the health education most students have good knowledge about the dangers of Scabies, as many as 19 people (63.3%).

Table 4. Distribution of frequency of knowledge of students before and after being given health education the Dangers of Scabies at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang 2017

		N	Mean Rank	Sum of Ranks
Last Knowledge – Early knowledge	Negative Ranks	1 ^a	7.00	7.00
	Positive Ranks	14 ^b	8.07	113.00
	Ties	15 ^c		
	Total	30		

Table 5. Results test of wilcoxon test the Dangers of Scabies at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang 2017

	Last Knowledge – Early knowledge
Z	-3.260 ^a
Asymp. Sig. (2-tailed)	.001

There is an influence of health education on the knowledge of students about the dangers of scabies at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang (p value 0.001).

DISCUSSION

Before the health education, most of the santri were fairly knowledgeable and few were still lack of knowledge about the dangers of scabies. This data shows that students' understanding of the dangers of scabies is still in below category. After given the health education, there was an increase in knowledge, from most were fairly knowledgeable to be well-informed. From these data, it can be explained that there is an improvement in the knowledge of students about the dangers of scabies.

The fair and poor knowledge of santri regarding scabies is influenced by many factors. One of them is the age factor. Most of the students who experienced scabies are in the category of early adolescents, 10-15 years old (the sample is students between 0-6 years old who live in the Islamic boarding school). Accordingly, Muhammad Zayyid, Saidatul Saadah, Adil, Rohela, & Jamaiah⁴ stated that 31% of the prevalence of scabies in Penang, Malaysia is children aged 10-12 years. Early adolescence is a transition stage from childhood to adulthood. At this stage, it is the initial stage of the students to enter the Islamic boarding school that is assumed by the researchers as a beginning to adapt and finds close friends. In order to get the recognition and effort to find friends, it is possible to begin the interaction by "feeling the same", away from the family and starting to feel a sense of cooperation among students.

Santri knowledge is related to age factors. The younger a person is, the harder it will be to understand information. Scabies incident that happened to students in Islamic boarding school Al Muftadi'ien was also due to the lack of students' ability to understand or perhaps

had never heard of scabies, and may not have had experienced scabies before. The new experience of living inside the boarding school may also be one of the factors of ignorance of the disease. Mubarak (2008) stated that age is one of the factors that influence the acceptance of knowledge and attitude. In line with Wawan, A and Dewi (2010), the more efficient an individual's age, the level of maturity and strength of a person will be more mature in thinking and working. The knowledge of santri increased with the existence of health education about scabies. This health education opens and adds knowledge and helps students to maintain personal hygiene better while staying in the boarding school. Even though it is still regarded at a young age, it is hoped that students will be able to receive, digest and understand scabies.

The The use of media that involves many senses will be more able to provide additional knowledge than those that involve a few media. Knowledge is obtained through the sense of hearing and sight. If the senses of sight and hearing are involved, then the message given will be better received than by only involving one sense.

The opinion is based on the essence what is expected in a health education is to form a better santri behavior. Santris who have less knowledge about scabies will also have a poor understanding of how the parasite scabies spread, one of which is strongly influenced by the personal hygiene of the santris themselves. The lack of understanding emerges unsupportive attitudes and even the apathetic tendency of maintaining personal hygiene so that eventually exposed to scabies. Students who have experienced scabies must take a treatment for themselves, and the treatment should be carried out to all the Islamic boarding school residents through the role of the health center. Fuller stated that santri who have poor knowledge about the disease, a long incubation period, and difficulties in treating scabies will have an impact on prolonged scabies⁵. So it is true that the knowledge is related to scabies in santri. Accordingly, Dan Ratna, I., Rusmartini, T., Wiradihardja³ who conducted research at Pondok Sukahideng, Tasikmalaya Regency, stated that knowledge is related to scabies incidents. The health education about scabies was given to all male students. However, both male and female can experience scabies. Chosidow⁸ stated that male, female, all ages, ethnic groups, and various socioeconomic levels have the potential to experience scabies if they live in unhealthy communities.

Scabies is becoming a trend disease among Islamic boarding schools, where there is a mixture of santri behavior and habits that cannot be underestimated. The lack of parents supervision while studying at Islamic boarding schools to always maintain personal hygiene, enrich scabies in that schools. Scabies is an infectious disease that is often experienced by a group of people whose personal hygiene is not maintained. Terry et al⁸ conducted a study of rural areas in Thailand or a camp of homeless children in Sierra Leone about scabies and stated that scabies often attacks poorly clean institutions that take care of the children. It is also revealed by Koene et al.⁹; that staffs, employees or children who are and live in the community, will experience scabies. Agoes R, Oehadian¹⁰ stated that this disease is commonly found in children and adults who have poor hygiene, rarely bathing and changing dirty clothes, often exchanging clothes, and rarely washing bed linen. Most cases are experienced by students who live in dormitories, Islamic boarding schools, orphanages, etc.

Afriani¹¹ found a significant correlation between the incidence of scabies and poor bathing practices, the practice of maintaining hand and nail hygiene, the practice of maintaining the cleanliness of clothes and towels, the practice of exchanging clothes and towels, and the practice of maintaining the cleanliness of beds. Azizah¹² in her study at the Al-Hamdulillah Islamic boarding school in Rembang also agreed that the frequency of bathing and shampooing, the soap sharing with other students, exchanging clothes with friends and staying in the boarding school for long periods of time relates to the incident scabies.

The result of health education is the establishment of good knowledge. Good knowledge usually has an impact on good attitude in addressing the transmission of scabies and is expected to force good behavior of students as well as starting to care about personal hygiene and avoid unhealthy behavior that will harm the santri themselves. First, the student must have a good understanding of personal hygiene which is the main key to scabies transmission. A poor understanding, less supportive attitude or even careless about the transmission of scabies will make it difficult for other students who are trying to free themselves from the scabies disease. Termination of the chain of transmission begins with the knowledge justification, changes in attitude and finally the behaviors establishment that is far from the risk of disease. Attitude is the basis for the

establishment of santri acts¹³⁻¹⁵

CONCLUSION

Health education is effective in increasing the knowledge of male students about the dangers of scabies at Islamic boarding school Al Muftadi'ien Bahrul Ulum Tambak Beras Jombang. It is suggested for further researchers to include determinants of scabies disease and health education for the owners of Islamic boarding schools

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New Approach for Referral Preparation to the Health Care Center in Denpasar City and Bogor Regency

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ABSTRACT

Knowledge, attitudes and skills of pregnant women to recognize danger signs during pregnancy to postpartum period and newborn baby is a strategic effort to prevent maternal and infant mortality. The aim of the study was to find out the results of guidance interventions for pregnant women and husbands using video media, pictorial fans with five finger signs, pocket books and maternal and child health books between before and after guidance at three Health Centers in Denpasar City and Bogor Regency. The study design was quasi-experimental with nonrandomized pretest-posttest with control group design. The research subjects were 204 pregnant women in the three intervention groups who had fulfill inclusion and exclusion criteria. The intervention group on the subject was divided into interventions 1 (video media, fans with five finger signs and and maternal and child health books). Group intervention 2 (pocket books, fans with five finger signs and maternal and child health books) and control groups (maternal and child health books). The instrument used was a questionnaire containing the socio demographic characteristics of the subject, knowledge, attitude and observation of skills. The results showed that there were differences in the scores of knowledge, attitudes and skills in the intervention among groups 1 and 2 ($p < 0.05$). The multivariate test results showed that there were four variables that consistently affected the skills score of pregnant women significantly including guidance intervention, maternal occupation, income and residence ($p < 0.005$). It is necessary to consider the awareness of midwives at the health center to innovate in order to increase alertness and early detection through family-based empowerment.

Keywords: *danger signs guidance, pregnancy, health center, empowerment*

INTRODUCTION

According to estimates from world health organizations or the World Health Organization (WHO), as many as 358,000 maternal deaths occur every year (WHO,¹ and as many as 88-89% of these deaths can be avoided. The attitudes of health workers (especially midwives and doctors), besides motivation, knowledge and practice are other factors that influence the dynamics of the need for services that forming an important basis for improving maternal and infant health^{2,3}. The

maternal mortality rate (MMR) in Indonesia according to data from the Indonesian Demographic and Health Survey (IDHS) in 2012 was 359 per 100,000 live births. The MMR is much higher compared to the 2007 IDHS results of 228 per 100,000 live births.

Maternal and newborn health conditions still need serious attention from various parties, not only in Java, but also in Bali. Thus, basic efforts are carried out by midwives in order to prevent death and illness in mothers and children through efforts to increase the knowledge and awareness of pregnant women and families regarding danger signs to mothers and infants. This effort has a large impact to prevent late referrals, especially the delay in recognizing problems that generally cause delays in making decisions and referring to health facilities⁴.

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Maternal mortality rate in Denpasar City fluctuating quite significantly, up to 2014 MMR had been reduced to 16.1 per 100,000 live birth but increased back in 2015 and 2016. Maternal mortality rates in the Denpasar City in 2016 (54 per 100,000 live birth) still lower than the target of the Denpasar City Health Office Strategic Plan in 2016 (100 per 100,000 KH). During 2016 in Denpasar City there were 7 maternal deaths consisting of 5 deaths of pregnant women and 2 during delivery. All mothers die in health facilities (hospitals). Four maternal deaths in Denpasar City are caused by Non Obstetric Disease, namely 2 people due to heart disorders, 2 people with dengue syock syndrome.

The main objective of this research is to compare the skills of pregnant women and their husbands / families regarding danger signs to pregnant women and infants to prevent delays in obtaining appropriate care between before and after guidance. In this study, personal guidance methods were used in the two intervention groups and one control group. Guidance media is using videos, fans with five fingers on the left and right hand regarding danger signs picture, pocket books and maternal and child health books.

We need to know the most appropriate approach to increase knowledge, attitudes and skills of pregnant women and families to prevent delays in recognizing problems and seeking help.

MATERIALS AND METHOD

The study design was quasi-experimental, pretest-posttest control group design. Respondents were divided into two groups, namely the control group and the treatment group (1 and 2). The control group (pregnant women in South Denpasar II and Ciomas) were given guidance according to the MCH books at the health center or Puskesmas. Intervention group 1 (Puskesmas I Denpasar Timur and Ciri Mekar) were given guidance using video media, fans with five fingers on the left and right hand regarding danger signs picture and maternal and child health/MCH books. Intervention group 2 (Puskesmas II Denpasar Barat and Sukaraja). given guidance using pocket books and fans and MCH books. The sample size in the control and treatment

groups will be calculated according to the population of second trimester to third trimester of pregnant women in selected health centers in Denpasar City and Bogor Regency, which amounted to 34 pregnant women in each selected health center or 204 pregnant women in health center. Conducted pretest and posttest for pregnant women regarding danger signs for pregnant women and newborns. Data collection is carried out for three months (July to September 2017).

Pregnant women and husbands who were involved in intervention groups 1 and 2 were given a pretest before guidance. In the control group, pregnant women were given a pretest and were then asked to read maternal and child health books regarding danger signs and preparation for referrals. The time taken from the pretest to posttest is one month. Guidance in the intervention group and the control group was carried out after the pretest 3 meetings for one hour at each meeting. Guidance is carried out by the MCH management midwives who have been trained in the selected health care.

Data analysis was univariate, bivariate and multivariate analysis. Univariate analysis by calculating the mean. Bivariate analysis to analyze the relationship between independent variables and dependent variables, the intermediate variable with the dependent variable using paired t test and chi square analysis. Multivariate analysis to analyze the relationship between all research variables using multiple regression tests and modeling.

RESULTS

The homogeneity test shows if the respondent characteristics are generally homogeneous ($p > 0.05$). There were differences in the pretest and posttest scores in the intervention group on the score of knowledge, attitudes and skills ($p < 0.05$) except in the control group did not show differences in the skill score ($p > 0.05$). The results showed that if intervention 2 had a significant difference in knowledge, attitudes, and skills scores when compared with intervention group 1 and control group. In the table 1 below, the results of differences in pretest and posttest scores were displayed on the knowledge, attitudes and skills of pregnant women.

Table 1. Differences in Pretest and Posttest Scores between Intervention and Control Groups (n=204 pregnant women)

		adjusted variance	z	p-value
Knowledge	Intervention group			
	1	24650.75	2.357	0.18
	2	24528.00	4.431	0.000
Attitude	Control	25068.00	2.239	0.025
	Intervention group			
	1	26258.38	1.858	0.063
	2	26451.13	3.034	0.002
	Control	25909.38	1.948	0.051
Skill	Intervention group			
	1	26757.13	7.070	0.000
	2	26746.63	7.145	0.000
	Control	26755.13	1.284	0.199

Source : Primary data analysis (2017)

The multivariate test results using general linear model (GLM) analysis showed that there was no significant relationship in the intervention group and maternal age with a knowledge score ($p > 0.05$). There was no significant relationship between intervention and maternal occupational factors with attitude scores ($p > 0.05$). Consistently intervention, maternal occupation, income and place of residence were significantly

associated with maternal skills scores regarding danger signs for mothers and newborns baby and neonates ($p < 0.05$). The table 2 below shows the results of the analysis between the intervention, the work of the mother, income and place of residence with the skill score.

Table 2. Results of General Linear Model Analysis between Independent Variable, Intermediate and Skill (n=204 pregnant women) in 2017

	Skills				
	coeff	z	p	95% CI	AIC
Intervention group					7.275
1	7.198	3.52	0.000	10.875 -17.291	
2	14.083	8.61	0.000		
Mother occupation	4.356	2.98	0.003	1.494 -7.219	
Family income	-7.746	-4.20	0.000	-11.365 -4.127	
Residence	-8.217	-3.19	0.001	-13.263 -3.171	
Husband education:					
Middle	1.783	1.27	0.204	-0.967 - 4.532	
High	1.719	0.76	0.446	-2.704 - 6.142	
Health assurance	-1.166	-0.88	0.380	-3.769 - 1.436	
Age	1.200	0.79	0.430	-1.778 - 4.179	
Husband occupation	-1.376	-0.36	0.721	-8.919 - 6.166	
Constanta	13.773	3.65	0.000	6.371 -21.175	

Source : Primary data analysis (2017)

DISCUSSIONS

In general the characteristics between the intervention groups were not different ($p > 0.05$). Differences were found from the characteristics of income or socio-economic level, residence, and means of transportation used by subjects to health facilities ($p < 0.05$). The sociodemographic characteristics of the subject can affect service quality as measured by knowledge, attitudes and skills the subject knows and manages the problems faced.

According to the World Health Organization¹, there are several determinants that influence client visits to health facilities, especially to obtain reproductive health services, including: financing factors or ability to pay, distance factors to health facilities, client knowledge, education level and social status economy. Agreeing with the results of a study in Ethiopia by Tesfahun, Worku, Mazengiya, Kifle⁵, that maternal health care utilization is influenced by accessibility factors, socio-cultural beliefs, individual attitudes and health seeking behavior.

There were differences in the pretest scores of knowledge, attitudes and skills between the intervention group 1 and 2 and the control group significantly ($p < 0.05$), although the results showed that the most significant difference was in the intervention group 2. The skill score showed that only the control group who did not show a significant difference ($p > 0.05$) when compared with intervention group 1 and 2. This was caused by factors of resistance or design invalidity, including: the interaction of the given test, the interaction of the results of the selection with the results and the existence selection with the results and the existence selection bias⁶.

The selection bias in terms of the invalidity of interaction factors from the intended test is that there is a weakness of the video media in the intervention group 1 due to the availability of a video watching device at home that is not shared by all subjects in the group, in addition to the obstacles that explain content or content of the video. Another problem with invalidity is that the characteristics of the subject from the beginning have been different, especially in the intervention group two which shows if the initial results of the pretest are much higher than the other groups⁶.

There was no significant difference between the pretest and posttest scores according to the characteristics of the transportation facilities and the distance to the health facilities with scores of knowledge, attitudes and skills ($p > 0.05$). Knowledge, attitudes and skills of individuals or subjects are influenced by socio-economic factors, values that are believed, and intention to behave. Different results were obtained by Tesfahun, Worku, Mazengiya, Kifle⁵, that the factors that influence the utilization of postpartum care are: time constraints, transportation costs, shelter, distance from home to health facilities, previous ANC history and ability health workers provide solutions to problems faced.

The results of multivariate tests using GLM were obtained if there was only a very significant relationship between intervention, maternal work, family income, and place of residence with a skill score ($p < 0.05$). The results of the study by Amenu, Mulaw, Seyoum & Bayu⁷ and Salam, Lassi, Das and Bhutta⁸ that positive health behaviors are influenced by various factors, including: complex phenomena related to availability, quality, service financing, structure social, health beliefs and characteristics of clients or service users⁹. The success of communication between midwives and clients or pregnant women greatly influences patient / client satisfaction, increases understanding, increases mutual trust and increases the ability of pregnant women and families in decision making¹⁰. Mother's knowledge is not directly affected by the number of ANC visits due to differences or gaps between the ability of officers / midwives and the limited information provided by midwives regarding danger signs to mothers during pregnancy to postpartum, newborn baby and neonates¹¹⁻¹⁵. The husband's education contributes to the participation of husbands in delivering mothers to health facilities and helping to make decisions more precisely and quickly¹⁶.

CONCLUSION

The use of media and interesting information delivery techniques are determinants of the success of training. It is necessary to consider the characteristics of the research subjects, such as the availability of VCD devices, other communication media in the form of mobile phones for intervention groups that receive training using video media.

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Product Quality of the Local Fried Onion in Palu City, Indonesia

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ABSTRACT

Unsafe food threatens global health and puts everybody at risk. Fried Onion is a home industry product in Palu City, Indonesia. Due to its popularity, it is distributed cross the country and overseas. The main material of fried onion is raw onion which can easily be contaminated by biological, physical and chemical contaminants. This study is a descriptive observational study to examine the implementation of Good Manufacturing Practices and Hazard Analysis Critical Control Point (HACCP) at one of famous fried onion home industries in Palu City using a observational descriptive study. The GMP assessment was conducted by using a Self-Assessment Questionnaire on good manufacturing practices by Food Supplement Europe. The study found that eventhough the observed home industry has implemented the GMP, it still needs improvements in terms of transportation and distribution aspects. It is also found that the Critical Control Points of this industry are in the stages of washing the onion, frying stage I and drying the onion.

Keywords: *Fried Onion, Traditional Food, GMP, HCCP.*

INTRODUCTION

Food safety is an integrated process to ensure food safety related to both healthy and safe techniques for preventing infection and contamination in the food production chain, and helping to ensure the quality and healthy food maintenance for health improvement^{1,2}. Unsafe food can pose health problems both in local and global scope³.

GMP is a quality assurance to ensure that products are manufactured and controlled consistently based on proper quality standards as required by the marketing authorization. GMP is broadly categorized into two groups: cross contamination/mix-ups and fake labeling³

HACCP is a system designed to ensure that manufactured products are safe for consumption and

can prevent food product quality from any problem or hazards. HACCP will be able to identify critical control points (CCPs) in production systems that can potentially reduce product quality⁴. Red onion has huge use and benefit, however red onions can also potentially harm the body due to microbiological contamination including *Shigella* spp, *Bacillus cereus*, and *Salmonella*^{5,6}

Palu City is well-known with its fried onion products which are usually as a gift for visitors. The most famous fried onion in the city is UD X fried onion. Therefore, the product of UD can reach across the nation and other countries. The researchers conducted GMP and HACCP analysis on fried onion products in UD X to ensure that the fried onion products marketed are safe for consumption.

MATERIALS AND METHOD

This research is an observational descriptive study. It aims to examine the implementation of GMP and HACCP on UD X fried onion in Palu City, Indonesia. The sample of this research was UD X fried onions. The study observed all production steps based on

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the scope aspects of GMP and HACCP. The GMP assessment used a “Self-Assessment Questionnaire on Good Manufacturing Practice” questionnaire published by Food Supplements Europe and was assessed based on the gutman scale. The research setting was in UD X because UD X is the largest fried onion industry and the first home industry introducing the fried onion business typical in Palu City. UD X has been able to produce 300 kg fried onions per day, located strategically and very close to the airport, making UD X very famous and easily accessible by tourists who come or go outside the Palu City.

RESULTS

UD X is one of trading businesses classified as a cottage industry in the Palu City with its main and very famous product is fried onion. UD X also produces many products including *abon ikan* (made from sea fish), *abon ayam* (made from chicken) and *abon sapi* (made from beef). All of these products are sold directly at UD X's stores located in South Palu

Product description that will be made for GMP and HACCP planning only focuses on fried onion products, as presented in table 1.

Table 1: Product Description and Its Usage

PRODUCT DESCRIPTION	
Company Name	UD X
Characteristic Summary	
Product Description	Organoleptic Characteristic: Texture/Physical: Solid Colour: Golden Brown Fragrant: Typical Onion Aroma Taste: Savory
Composition	Red Onions (<i>Allium ascolonicum L.</i>), Starch Flour, Maizena Flour, Salt, Cooking Oil, Water
Processing Unit Capacity	300 kg/day
Usage Requirements	Products are placed in the cool place and avoid from direct sunlight
Transport/Packaging Condition	Products are Packaged by Plastic having <i>Zipper Lock</i>
Product Usage	
Fried Onion Product can be consumed by public, without any restrictions for the ages.	
Place of Sales	UD X Shop
Rule of Law	Business Act

Table 2: GMP Anayisis

GMP Indicators	The number of Questions	The number of Answers “Yes”	GMP Score
Primary Production			
Production Process	57	53	$53/57 \times 100\% = 0.92 = 92\%$
Recovery and Rework	11	11	$11/11 \times 100\% = 1 = 100\%$
Food Product and Development Process	9	9	$9/9 \times 100\% = 1 = 100\%$
Design and Facility			
Room and Equipment Place	53	41	$41/53 \times 100\% = 0.77 = 77\%$
Operation Control			
Management Quality	17	15	$15/17 \times 100\% = 0.88 = 88\%$
HACCP	6	0	$0/6 \times 100\% = 0 = 0\%$
Laboratory testing	10	2	$2/10 \times 100\% = 0.2 = 20\%$
Documentation	22	21	$21/22 \times 100\% = 0.95 = 95\%$
Maintainance and Sanitation			
Storage	18	16	$16/18 \times 100\% = 0.88 = 88\%$

Cont... Table 2: GMP Analysis

Personal Hygiene			
Personal Inspection (self-check up)	4	4	4/4x100% = 1 =100%
Transportation			
Transport and Distribution	15	5	5/15x100%=0.33 =33%
Stability and Storage Age	15	7	7/15x100%= 0.46 =46%
Product Information and Customer Awareness			
Complaint Procedures, Product or Food Withdrawals and Emergency Procedures	15	9	9/15x100%=0.6 =60%
Training			
Personnel dan Training	23	17	17/23x100%=0.73 =73%
Sub Contract Operations (Cooperation Contract as Partner)	11	0	0/11x100%= 0 =0%
GMP UD X Results	286	211	211/286x100% =0.73 =73%

GMP analysis on UD X in table 2 shows that UD X has applied GMP based on all indicators of GMP implementation, namely 1.1, 1.2, 1.3, 2.1, 3.1, 3.4, 4.1 and 5.1 . This can be seen from the score obtained $\geq 75\%$. Other indicators also show that UD X has applied GMP to its business units, which can be seen from indicators 7.1 and 8.1 with a score of $<75\%$. The final result shows that UD X has adequately implemented GMP in its business unit.

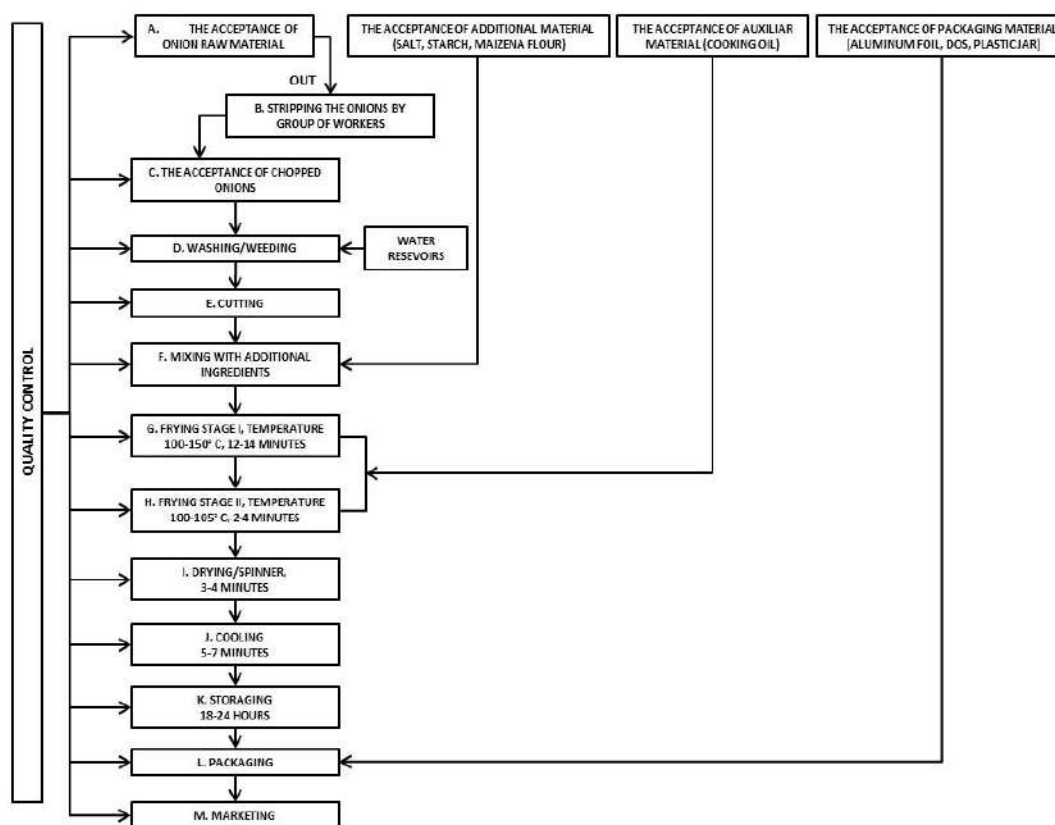


Chart 1 Flow of Fried Onion UD X Processing Process Table 3 shows that from 11 assessment stages, IR obtained is at the lower risk level ($4 \geq IR \leq 8$), increased risk ($8 \geq IR \leq 12$), satisfactory risk ($IR \leq 4$) and critical risk ($12 \geq IR \leq 16$). Table 4 shows that the washing stage, frying stage I, and draining stage are CCP. The washing

stage needs 5 minutes as CCP. The temperature of $180^\circ C$ for 2-4 minutes becomes an important aspect to reduce the risk. Lastly, the speed of rotation (650 rpm) and time of the spinner machine (10 minutes) is an important aspect to eliminate the risk.

Tabel 3: Hazard Analysis and Identification of CCPs

Process	Hazard(Biology (B)/ Physics (P)/ Chemistry(C))	Hazard Sources	Potential Hazard			Preventive measure	Decision Tree				CCP / Not CCP
			Chance	Severity	IR		Q1	Q2	Q3	Q4	
Raw Material Acceptance	B: <i>Shigella Spp</i> , <i>Bacillus Cereus</i> , and <i>Salmonella</i> , <i>E.Coli</i> C: -	The soil attached to the onion	4	4	CR		N				
	P: Soil	The soil attached to the onion	1	1	SR	cleaning the onion from attached soil from harvest	Y	N	Y	Y	Not CCP
Stripping onions	B : <i>Shigella Spp</i> , <i>Bacillus Cereus</i> , and <i>Salmonella</i> , <i>E.Coli</i> C: -	Knife and Human	3	4	IR	Cleaning of working equipments, reducing the soil attached on the onion by waving the onion roots in the ground, Personal hygiene	Y	N	Y	Y	Not CCP
	P: Soil	The soil attached to the onion	1	1	SR	The soil attached to the skin is set aside	Y	N	Y	Y	Not CCP
Onion Washing	B : <i>E. coli</i> , <i>Salmonella</i> , <i>Shigella Spp</i> , dan <i>Bacillus Cereus</i> C: -	Water and Human	3	4	IR	Checking water quality Regularly using running water.	Y	N	Y	Y	Not CCP
	P : Soil	The soil attached to the onion	1	1	SR	Cleaning is conducted until no longer soil attached in the onions.	Y	Y			CCP
Cutting	B: <i>E. coli</i> , <i>Salmonella</i> , <i>Shigella Spp</i> , dan <i>Bacillus Cereus</i> , hepatitis A, norovirus, rotavirus, other viral agents C: -	Cutting Knives and Human	3	4	IR	Cleaning of working equipments, Checking tools used regularly and personal hygiene	Y	N	Y	Y	Not CCP
Additional material Mixing	B: <i>E. coli</i> , <i>Salmonella</i> , <i>Shigella Spp</i> , dan <i>Bacillus Cereus</i> , hepatitis A, norovirus, rotavirus, other viral agents C: -	Starch Flour and Human	3	4	IR	Personal hygiene	Y	N	Y	Y	Not CCP
Frying Stage I	B: <i>E. coli</i> , <i>Salmonella</i> , <i>Shigella Spp</i> , dan <i>Bacillus Cereus</i> hepatitis A, norovirus, rotavirus, other viral agents	Frying Tools and Human	1	1	SR	Keep the oil temperature from falling	Y	Y			CCP
	C : Trans fatty acids	Cooking Oil	4	4	CR	Oil is replaced when it has turned blackish brown	Y	N	Y	Y	Not CCP
Frying Stage II	C: Trans fatty acids	Cooking Oil in the onions	4	4	CR	Oil screening is conducted by placing fried onions on this second stage on oil-absorbing xpaper.	Y	N	Y	Y	Not CCP
Draining	C : Trans fatty acids	Spinner	1	1	SR	Drying / draining is conducted for 3-4 minutes.	Y	Y	Y		CCP
Cooling	B: <i>E.Coli</i> , <i>Salmonella</i> spp, <i>shigella</i> spp, hepatitis A, norovirus, rotavirus, other viral agents	Human and oil-absorbing paper.	2	4	SR	Personal Hygiene,	Y	N	N		Not CCP

Cont... Tabel 3: Hazard Analysis and Identification of CCPs

	B: Ans, Insects	Oil-absorbing paper	3	1	SR	Visual observation	Y	N	N		Not CCP
	P: Ash	Oil-absorbing paper	2	1	SR	Oil-absorbing paper is in clean condition before it is used	Y	N	N		Not CCP
Storage	B: E.Coli, Salmonella spp, shigella spp, hepatitis A, norovirus, rotavirus, other viral agents	Human	1	4	SR	Personal Hygiene	Y	N	N		Not CCP
	B: Ans, Insects	Oil-absorbing paper and plastic container	3	1	SR	Visual observation	Y	N	N		Not CCP
Packaging	B: E. Coli, Salmonella spp, shigella spp, hepatitis A, norovirus, rotavirus, other viral agent	Human	1	4	SR	Personal Hygiene	Y	N	N		Not CCP

*CR: Critical Risk; SR: Satisfactory Risk; IR: Increased Risk

Tabel 4: HACCP Plan Data Sheet

STEP/ CCP Principle 2	Hazards (B/C/P) Principle 1	Parameter of CCP	Critical Limit Principle 3	Target Value	Monitoring Principle 4	Corrective Action Principle 5
Cleaning	P: Soil	Time	Cleaning within 4-5 minutes	5 minutes	What: Physical hazards in the form of land How : Wash the onions until the ground is invisible When: After the onion stripping process Who: The worker on duty	Rewashing if the soil is still visible
Frying Stage I	B: <i>E. coli</i> , <i>Salmonella</i> , <i>Shigella Spp</i> , dan <i>Bacillus Cereus</i> hepatitis A, norovirus, rotavirus, other viral agents	Temperature and time	100°C-105°C with a time range of 14-18 minutes	180 °C with a long frying for 2-4 minutes	What : Biological Hazards How : Recording temperature and time When : After Frying Process Stage I Who : Workers on duty	Refrying in the frying stage II
Draining	C : Trans fatty acid	Round Speed and Spinner Machine time	Draining the onions about 3-4 minutes by using <i>spinner</i>	Using <i>spinner</i> in the speed of 650 rpm within 10 minutes	What: Chemical hazards are trans fatty acids How: Measure speed and time When: After the stage II onion cooking process Who : Workers on duty	Redraining if it still looks wet

DISCUSSION

The score of $\leq 46\%$ in point 6 (transportation) indicated low quality of transportation process particularly in cleanliness of vehicles, vehicle check up, and separation of contaminated material and sterile material. Finished food (packed food) should be separated with raw material that can potentially contaminate the final food⁷.

UD X also does not implement GMP on indicator 3.2 (HACCP), 3.3 (laboratory testing) to 8.2 (sub-contract operation) with a score of $\leq 20\%$. The indicator was not achieved because UD X has HACCP system and laboratory. Laboratory testing on food production is important to detect microbial contaminants⁸.

Although UD X has not applied HACCP officially, there are some points that can eliminate the risk. Identification starts from the initial stage, the handling of the raw materials, stage 2 onion stripping, stage 3 onion washing, stage 4 onion cutting, stage 5 mixing additional ingredients, stage 6 frying I, stage 7 frying II, stage 8 draining, stage 9 cooling, stage 10 storage, and stage last packing.

From all the steps, there are microbiological hazards such as *E. coli*, *Salmonella*, *Shigella* spp, *Bacillus cereus*, hepatitis A, norovirus, and rotavirus. However, those bacteria can not live in such high temperature from 100 to 105°C for 12-14 minutes at the frying stage I⁹. The *E. coli* bacteria are likely to appear from the contaminated soil, contaminated water, and hand contamination¹⁰.

Physical hazards such as soil and dust also appear in raw materials, stripping onions, washing onions, and the cooling stage. To prevent this problem, the soil and dust must be separate from the onion and other material by washing properly.

In addition, chemical hazards can appear from oil in the frying stage I, frying stage II and the stage of draining in the form of trans fatty acids. Cooking oil used by the company is utilized repeatedly with high temperatures so that it can damage the quality of the product¹¹. Repetition of frying at high temperatures will affect the chemical quality and organoleptic of cooking oil (E and D, 2007). Thus, cooking oil can be reduced by drying onions. Draining with a spinner will separate oil from the fried onion¹².

From the 11 stages, based on the determination of IR, 3 stages are the most dangerous stages including receiving raw materials, frying stage I and frying stage II. The chances of contamination at these stages are very high due to lack of hygiene, which raises microbiological, physical and chemical hazards.

There are 3 CCP namely the onion washing stage, the frying stage I and the draining stage. The washing duration, 4-5 minutes, is a crucial aspect to eliminate the physical hazards. However, washing time also must not be too long to keep nutrition substances¹³. The frying stage I was a CCP because high temperature can eliminate biological hazards. The parameters used are temperature and frying time of 100-105°C for 14-18 minutes. The temperature and time must be control to ensure onion not overcook. The cooking oil also must be control regularly^{14,15}.

The draining stage can remove or reduce chemical hazards, cooking oil, from the frying stage I and II. The critical limit at this stage is the scouring of onions for 3-4 minutes using a spinner. The target value that can still be consumed according to¹⁶ is by drying/draining onions using a spinner with a speed of 650 rpm for 10 minutes.

CONCLUSION

Overall, UD X has applied GMP. However, there are some issues related to transportation and distribution of the products. This study has also identified the Critical Control Point of the industry that is in the washing stage of onions, frying stage I and draining stage. The application of GMP and HACCP is important to ensure good quality of fried onion products in the home industry.

Ethical Clearance- Taken from Public Health Faculty, Tadulako University committee

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Conflict of Interest – None

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Economic Burden of Cancer Patients at Hasanuddin University Teaching Hospital, Makassar : A Qualitative Study.

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ABSTRACT

Introduction: Cancer can cause disasters, economic-social consequences for individuals and household sufferers. This study reveals the phenomena experienced by cancer patients to inform the development of patient-centered policies. This paper provides a qualitative understanding of the economic and social consequences of cancer.

Method : Interviews were conducted on patients who conducted examinations and referrals at Hasanuddin University Teaching Hospital, Makassar (n=30). Data interpretation uses content analysis.

Results: The affordability of medical treatment and care needed to manage disease is identified as a key aspect of economic difficulties, which endangers the capacity of patients to proactively manage their illnesses and reduce risk. Factors that exacerbate difficulties are mainly not covered by the National Health Insurance scheme (JKN), and other government benefits. Economic burden are not only felt for those who do not have JKN and other government benefits, but also those who receive insufficient subsidies to meet the costs of managing their long-term illness over and above necessary daily living expenses.

Conclusion: This study provides insight into the economic burden of handling cancer, which shows that economic difficulties require households to make difficult decisions between medical expenses and basic living expenses.

Keywords: *Economic burden, cancer patient, social consequences*

INTRODUCTION

Cancer is a catastrophic disease with characteristics that require high costs and a large number of sufferers and diseases that are at risk of death. Cancer is the leading cause of death worldwide in both developed and developing countries. However, the burden of cancer is more prominent in developing countries¹. Lung, liver, stomach, colorectal, and breast cancer are the biggest causes of cancer deaths every year². When a person is diagnosed with cancer and must be hospitalized in the hospital, the financial consequences are a burden

that must be borne by the patient³. In Indonesia, the prevalence of cancer patients in 2013 was known to be 1.4 cases per 1000 inhabitants. Nearly 50% of them occur in populations aged > 75 years⁴.

Research findings from The Action Study Group show that out of 9,513 patients who were followed up in the 12th month, nearly 50% of cancer patients experienced bankruptcy, while 29% experienced death. In addition, almost half or 44% of survivors will experience economic difficulties caused by cancer, so use future savings⁵.

The average cost for treatment of breast cancer can reach \$ 15,000 or around Rp 207,569,923 per year. Patients with an income of \$ 1,100 (or around Rp.

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15.221 795) or lower per month will have difficulty paying for their treatment. With a 2014 per capita average GDP (Gross Domestic Product) of \$ 3,553.75 or around Rp.49,176,775 for the eight countries involved, almost all cancer sufferers must use their savings and experience bankruptcy while maintaining their quality of life. Bankruptcy or Financial Catastrophe is defined by spending as much as 30% or more of the household's main income and pocket money on cancer treatment costs 5,6.

There are many things that are not yet known about unpredictable costs for health services needed by cancer patients for example young age, low income, living opportunities, and other supporting services that are supportive⁷. So that it greatly affects the family economic burden of cancer patients. Based on data from the Basic Health Research (Riskesda) in 2013 in Eastern Indonesia, South Sulawesi Province was the province with the highest number of cancers, namely 1.7 1,7 or around 14,119 people⁸. Based on observations and preliminary surveys researchers in cancer patients originating from Eastern Indonesia in general will be referred to the Hasanuddin University Makassar Hospital.

MATERIALS AND METHOD

The informants in this study were around 30 people who were related to the economic burden of cancer patients at RSUP Unhas, Makassar. Ethical approval was given by the Health Research Ethics Committee of Hasanuddin University. All informants gave informed consent before the interview was conducted. The interview began by asking: "what does it feel like to live with cancer now," followed by questions about the challenging and useful aspects of their experience. All interviews are recorded electronically and transcribed word for word. Qualitative analysis data uses content analysis¹⁰.

RESEARCH RESULTS

General Characteristics of Informants

The general characteristics of the informants included dominance (residence), gender, age and marital status and their level of education.

Table 1. shows that informants from South Sulawesi province were 23 people (76.7%) and informants from

outside the province of South Sulawesi as many as 7 people (23.3%), the number of male informants was 10 people (33.3%) and 20 female informants (66.7%). The most age is 46-60 years which is 19 people (63.4%). Generally, there were 26 married informants (86.7%). The disease burden category perceived by patients as many as 23 people (76.7%) stated weight.

Table 1. General Characteristics of Informants

Informant characteristic	Number	(%)
Living Home		
Sulawesi Selatan	23	76,7
Outside Sulawesi Selatan	7	23,3
Sex		
Male	10	33,3
Female	20	66,7
Age		
> 45 year	7	23,3
46-60 year	19	63,4
> 60 year	4	13,3
Marital status		
Marriage	26	86,7
Not yet	4	13,3
Illness Category		
Slight	2	6,6
Middle	5	16,7
Heavy	23	76,7
Masker use		
Hospital	30	100,0
Visit frequency 1 time	18	60,0
Visit frequency 2 time	12	40,0
Private doctor practice	23	76,7
Visit frequency 1 time	16	55,3
Visit frequency 2 time	11	36,7
Alternative Medicine	19	63,3
Alternative Medicine	19	63,3
Visit frequency 1 time	17	56,7
Visit frequency 3-4 time	2	6,6
Family Treatment		
By family	12	100,0

The utilization of hospitals is 30 people (100.0%) with frequency of visits 1-2 times, private practice doctors as many as 23 people (76.7%) with a frequency of 1-2 times, and alternative treatments 19 people (63.3%) among them 17 people (56.7%) frequency of visits 1-2 times, while 3-4 times there are 2 people (6.6%). All cancer patients (100.0%) were cared for by their families, not only the nuclear family but also their close relatives.

Characteristics of Informants Based on Economic Status

Table 2. shows the employment status of informants where as many as 11 people (36.7%) as civil servants / TNI / Polri, entrepreneurs as many as 10 people (33.3%) and not working or as Housewives (IRT) there are 9 people (30, 0%). Their income above UMP is above Rp. 2,400,000 - up to Rp. 5,000,000 as many as 22 people (73.3%) and income of more than Rp. 5,000,000, - as many as 8 people (26.7%). Most of the informants have health insurance such as the Health Insurance Agency (BPJS) in the Health and Card Health Center (KIS) sectors with 24 people (80.0%).

Table 2. Characteristics of Informants Based on Economic Status

Informant Characteristic:	Number	(%)
Occupational status		
PNS/TNI/Polri/	11	36,7
Private	10	33,3
Not working	9	30,0
Income (Rp/ month)		
2,400,00 - 5,000,000	22	73,3
> 5,000,000	8	26,7
Health insurance		
Available	24	80,0
Not	6	20,0
Elder insurance		
Available	11	36,7
Not	19	63,3
Money difficulty		
Yes	30	100,0
Not		

Economic and Social Consequences

The main dimensions of the results of in-depth interviews are economic consequences (affordability of treatment, affordability of consumption of other goods, and factors that influence economic difficulties) and the social consequences of patients [11,12], as explained in the following detail.

Economic consequences

1. Treatment work

Affordability of treatment refers to the patient's ability to pay for the treatment and care needed to manage the disease condition and its consequences. The patient expressed concern about the financial pressures he felt as a result of the high costs of treating and managing his illness (for example, pocket expenses for medicines, routine checks, specialists and other medical care), often accompanied by existing economic constraints and lack of supporting resources.

As an example :

"I use free medication using the Indonesia Healthy Card (KIS), but experience cost difficulties when there are additional costs that are not covered by KIS" (Housewife, 37 years old)

The results of the in-depth interviews also showed that all informants experienced financial difficulties when they had to meet other maintenance costs, outside the National Health Insurance (JKN) scheme such as BPJS Health / Employment and KIS.

As an example :

"Before doing chemotherapy there is usually a laboratory examination, patients have to spend millions of dollars. Often the medicine for chemotherapy is not available so the patient is told to go home, if he has to buy it himself. The cost is very expensive so it cannot afford to buy and choose the medicine available "(Housewife, 52 years old)

As an example :

"Every time I take medication to the hospital, I have to pay a transportation fee of Rp. 1 million per trip, the cost of boarding is Rp. 500 thousand and for credit at least Rp. 200 thousand." (Civil Servants, 50 years)

Cost constraints to access health services, especially felt for patients from outside the province of South Sulawesi because they have to pay for transportation, boarding and communication costs.

As an example :

“Every time I take medication to a private practice doctor, I spend at least Rp 2 million for multivitamin purchases and so on.” (Private employee, 41 years)

Alternative medicine is a conventional and herbal treatment / therapy effort as an alternative or complementary to modern medicine. Some informants said “The cost of alternative medicine is only Rp. 50,000 - Rp. 100,000, - once a visit. Usually in the form of clear water, rubbed on a place that is sick or drunk. Herbal medicines can reach IDR 2,000,000 / package. We use it at most twice just because it’s expensive.”

1. Affordability of Other Goods Consumption

Affordability is also related to the patient’s ability to pay for the additional needs needed to manage their disease, such as: healthy food, exercise and healthy walking membership for cancer patients through the Indonesian Cancer Foundation (YKI) and other social activities.

Discretionary expenses include reducing more expensive and healthier foods, reducing participation in regular sports programs at the gym or other places.

As an example :

“I cannot do vacation activities or renovation of houses that incur quite high costs.” (PNS, 47 years). Incidental costs (make a choice between expenses for health care or other daily expenses). Generally informants do not have incidental costs, they tend to choose to meet their daily needs if they have to be faced with the cost of medical treatment. “If I am given a choice between medical expenses and the daily cost of living, it will prioritize daily expenses.”

2. Factors that influence economic difficulties

Factors that influence whether patients experience economic difficulties include pension salary recipients, pension savings (taspen), health insurance such as BPJS and KIS.

As an example : “I have retired, but still guaranteed

by the health BPJS, thus reducing medical expenses. After all, I received a retirement salary and had a retirement savings account (Taspen). “(Retired, 62 years old). But for some informants, this support is still inadequate to overcome economic difficulties and the additional costs not covered by the National Health Insurance (JKN) scheme or other supporting actions are an economic burden on their lives. For those who do not receive pension benefits or other government subsidies, economic difficulties are tightly felt and recognized to have a significant impact on the management of their disease.

As an example: “I don’t work, and my husband is only a private employee with a mediocre salary. I feel the burden of medical expenses and care imposed on the family.” (Housewife, 52 years)

2. Patients’ Social Consequences

As an example : “My husband is looking for other jobs that can be better expected to cope with a significant decline in income so that he can still take care of me” (Housewife, 39 years old). One of the things that made us burdened by debt was burdensome because of the arrears of credit at the Bank.

DISCUSSION

This research is in line with some of the previous studies conducted by the Group⁵, Davidoff¹³, and Guy¹⁴, where the symptoms of financial catastrophe in patients were experienced by almost all patients who spent as much as 30% or more of their primary income. stairs and pocket money for cancer treatment costs. Other problems faced by patients, especially those domiciled outside the province of South Sulawesi, such as the provinces of Southeast Sulawesi, East Nusa Tenggara and North Kalimantan, experience difficulties in accessing health services in the form of transportation, accommodation and communication costs. They have to spend an additional million rupiah to buy airplane tickets, rent boarding houses, and buy credit¹⁵⁻¹⁷. Additional incidental costs are faced with the difficulty of making a choice between spending on medication and health care or other daily expenses. They can only compromise if they want to meet their child’s needs. This means that even paying the lowest cost of living poses a challenge.¹⁸⁻²¹

With the implementation of Universal Health Coverage in Indonesia starting January 1, 2019, it is expected that no more sufferers of cancer will escape government support through their participation in the JKN scheme. However, the desire of BPJS Kesehatan to cut service facilities for patients with catastrophic diseases such as cancer, will become a new problem for health services, especially for people with cancer. The decrease in income revealed in this study was mainly due to the decline in patient productivity due to cancer. The decrease in income also results in the ability to pay for medical and non-medical expenses. This has social consequences, especially in redeeming the additional costs of treatment and care that is quite large. Significant financial consequences for cancer sufferers (having to reduce expenses, drain savings, borrow money or add bank credit), a combination of additional costs and drastic expenses, can cause anxiety and stress. It can even increase financial stress (financial stress), then it will also increase depression, anxiety and stress in cancer patients²²⁻²³.

CONCLUSION

This research is a qualitative study that examines the economic burden of cancer based on the perceptions of patients and their families. This study provides insight into the economic stress factors associated with treating cancer and evidence that these economic difficulties require households to make difficult decisions between the cost of care and basic living costs, triggering the symptoms of financial catastrophe.

Conflict of Interest : None

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The Effectiveness of 0.03% Bimatoprost Solution Vs Minoxidil 5% in Androgenic Alopecia

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ABSTRACT

Introduction. Androgenic alopecia (AGA) is the most common type of progressive hair loss with an incidence that increases with age. The role of dihydrotestosterone in AGA pathogenesis has been well-established. However, an incidental eyelash and eyebrow growth in patients treated with prostaglandin analogues, bimatoprost and latanoprost, has led to a hypothesis of their possible roles in inducing scalp hair growth. **Methods** This randomized-controlled trial included 6 male subjects, randomized into 2 groups, each consisting of 8 subjects which were given either topical bimatoprost 0.03% or topical minoxidil 5%. Hairs on the affected areas were shaved and both the terminal hair (hairs with diameter of >1 mm) diameter and terminal hair count were measured using a dermoscope on week 0, 4, 8, and 12. A hair sample from the target area was taken and the prostaglandin D2 level was examined before and after 12 weeks of therapy by using ELISA. Independent T-test and paired T-test were used to compare the result. **Results** When both groups were compared, no significant difference in terminal hair count and diameter was observed ($p > 0.05$). Both the bimatoprost and minoxidil group showed a mean increase of terminal hair diameter and hair count after 12 weeks ($p < 0.05$). There was a decrease PGD2 concentration in bimatoprost 0.03% group, but an increase in the minoxidil 5% group ($P > 0.05$). No significant side effects were observed. **Conclusion;** A 12-week topical application of bimatoprost 0.03% results in a significant increase in terminal hair diameter and count. Further studies with longer follow-up duration are needed to establish the effectiveness of bimatoprost in AGA treatment.

Keywords: bimatoprost 0.03%, minoxidil 5%, androgenic alopecia, prostaglandin

INTRODUCTION

Androgenic alopecia (AGA) is the most common type of progressive hair loss with an incidence that increases with age.¹ It is estimated that 30% of Caucasian males will develop AGA by the age of 30 years and the risk rises up to 80% by the age of 70 years.² This rate appeared to be lower in the Asian and African-American population.³

The idea that dihydrotestosterone plays an important role in the pathogenesis of AGA has been extensively

studied, resulting in treatment options that aim to inhibit its formation.⁴ However, an incidental eyelash and eyebrow growth in patients treated with prostaglandin analogues, bimatoprost and latanoprost, has led to a hypothesis of their possible roles in inducing scalp hair growth.^{5,6}

Bimatoprost is a prostaglandin analogue of prostaglandin F2 α and studies have shown that the application of topical bimatoprost results in increase eyelash hair growth, with extensive efforts to treat alopecia on the scalp.⁷ Garza et al showed a positive effect on hair growth as a result of the effects of Bimatoprost towards prostaglandin E2 (PGE2) and prostaglandin F2 α (PGF2 α).⁸

Prostaglandins are selectively called prostanoids which is formed when arachidonic acid, an unsaturated fatty acid containing carbon atoms, released from the

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plasma membrane by phospholipase and metabolized through prostaglandin G/H synthetase or cyclooxygenase. There are 4 main bioactive prostaglandins produced in vivo; prostaglandin E2 (PGE2), prostacyclin (PGI2), prostaglandin D2 (PGD2), and prostaglandin F2α (PGF2α).⁹ Prostaglandin D2 (PGD2) has recently been identified as a risk factor in androgenic alopecia.⁷ PGD2 inhibits the growth of human hair follicles and inhibits hair growth in rats through prostaglandin receptor type II (DP2). Based on these findings, the PGD2-DP2 pathway has been proposed as a new potential target for the treatment of androgenic alopecia, but the underlying mechanism is still unclear.¹⁰ In addition, to date, no clinical trials observing the effect of bimatoprost on hair growth are available.

This study aims to evaluate the effectiveness and safety profile of bimatoprost as an alternative treatment in patients with androgenic alopecia by comparing it to minoxidil, which is the standard therapy for androgenic alopecia.

MATERIALS AND METHOD

The study was conducted in the Dermatovenereology Department, Faculty of Medicine, Hasanuddin University and has obtained approval from the Institutional Ethical Review Board. This was a clinical trial using a prospective pre-and post-treatment method.

A total of 16 male subjects, randomized into 8 subjects per treatment arm, were included in this study. Patients eligible in this study were 20 to 40-year-old males with androgenic alopecia (Norwood-Hamilton degrees ≥ III) and willingness to maintain the same hairstyle, length and color of hair during the study. Informed consent was obtained from each subject. The exclusion criteria were the use of low level light comb for hair care, application of topical steroids / NSAIDs on the scalp and subject with scalp infections and various disorders of the scalp.

All subjects were diagnosed with androgenic alopecia from history taking, physical examination and dermoscopic examination. Hairs on the affected areas were shaved 1-2 cm above the scalp on the initial visit and every follow up visit on week 0, 4, 8, and 12. The target therapeutic area was marked using a tattoo with a size of 1 cm x 1 cm. During each follow-up visit, the terminal hair (hairs with diameter of >1 mm) diameter and terminal hair count were measured using a dermoscope (Firefly™ model DE350). Documentation and side effects were recorded in each follow up visit. In addition, a hair sample from the target area was taken and the level of prostaglandin D2 was examined before and after 12 weeks of therapy by using ELISA (Human PGD2 ELISA Kit, Cat No. E0989Hu, Bioassay Technology Laboratory).

The data in this study was analyzed using Statistical Package for Social Sciences (SPSS) 21.0 for Windows (SPSS Inc. Chicago, IL, USA). Results were presented in the form of tables and charts. The statistical tests used were independent T-test and paired T-test. A p-value of less than 0.05 was considered as significant.

RESULTS

A total of 16 subjects were included in this study. Most participants were in the 30-39 years age group with a total of 9 subjects (56.25%). This was followed by the 20-29 years age group with a total of 6 subjects (37.5%), and the ≥40 years age group with 1 subject (6.25%). Eleven subjects (68.75%) had a family history of androgenic alopecia. Six subjects (37.5%) were classified as grade III and IV according to the Norwood-Hamilton classification, three subjects with grade VI (18.75%), and one subject with grade V (6.25%).

Table 1 showed the comparison between terminal hair diameter and terminal hair count on the affected area in all subjects in each follow-up visit. There was no significant difference between both groups at the beginning, during and the end of the study (p> 0.05).

Table 1. Changes in terminal hair diameter and hair count in each group

Time of Measurement	Group	N	Mean	SD	P-value
Terminal Hair Diameter					

Cont... Table 1. Changes in terminal hair diameter and hair count in each group

T0	Bimatoprost 0,03%	8	0,0561	0,0599	0,312
	Minoxidil 5%	8	0,0858	0,0531	
T4	Bimatoprost 0,03%	8	0,1111	0,0056	0,767
	Minoxidil 5%	8	0,1119	0,0052	
T8	Bimatoprost 0,03%	8	0,1129	0,0049	0,515
	Minoxidil 5%	8	0,1121	0,0036	
T12	Bimatoprost 0,03%	8	0,1129	0,0051	0,630
	Minoxidil 5%	8	0,1121	0,0044	
Terminal Hair Count					
T0	Bimatoprost 0,03%	8	2,625	4,14	0,216
	Minoxidil 5%	8	6,000	6,05	
T4	Bimatoprost 0,03%	8	9,500	8,96	0,805
	Minoxidil 5%	8	10,625	8,95	
T8	Bimatoprost 0,03%	8	16,50	13,41	0,846
	Minoxidil 5%	8	17,75	11,78	
T12	Bimatoprost 0,03%	8	23,375	14,97	0,630
	Minoxidil 5%	8	24,625	13,15	

***Independent T-test**

Both groups did show a significant increase before and after treatment as shown in table 2. The bimatoprost group showed a mean increase of 0.0568 and 20.75 in the terminal hair diameter and hair count after 12 weeks, respectively, which was statistically significant ($p < 0.05$). The minoxidil group also showed a mean increase of 0.0259 and 18.625 in the terminal hair diameter and hair count, respectively, with a statistically significant result recorded in the terminal hair count ($P < 0.05$).

Table 2. Terminal hair diameter and hair count before and after treatment

Time of Measurement	Group	N	Mean	P-value
Terminal hair diameter (T0-T12)	Bimatoprost 0.0 3%	8	0,0568	0,012 0,484
	Minoxidil 5%	8	0,0259	
Terminal hair count (T0-T12)	Bimatoprost0,03%	8	20,75	0,012
	Minoxidil 5%	8	18,625	0,012

***Paired t-test**

Table 3 showed PGD2 concentration before and after treatment in both groups. There was a decrease PGD2 concentration in bimatoprost 0.03% group, but an increase in the minoxidil 5% group. There were no significant results in the concentration of prostaglandin D2 before and after therapy in both groups ($P > 0.05$).

Table 3. Prostaglandin D2 concentration before and after treatment

Time of Measurement	Group	N	Mean	SD	P-value
PGD2 on day 0	Bimatoprost 0.03%	8	199,32	199,65	0,394
	Minoxidil 5%	8	66,39	104,29	
PGD2 on week 12	Bimatoprost 0.0 3%	8	192,31	268,75	0,911
	Minoxidil 5%	8	179,35	320,21	

***Mann-whitney test**

The side effects of this study were shown in table 4. Erythema and pruritus were observed in both groups. More than half (62.5%) of the subjects in the minoxidil groups experienced erythema. These side effects, however, were mild and did not require treatment cessation.

Table 4. Side effects found during the study

Groups	Side Effects	N
Bimatoprost 0,03%	Erythema	3
	Pruritus	3
Minoxidil 5%	Erythema	5
	Pruritus	2

DISCUSSION

Androgenic alopecia (AGA) is known as a pattern of hair loss in men and women characterized by progressive miniaturization that does not cause scarring of hair follicles with a distribution pattern that tends to men compared to women.¹¹ AGA prevalence varies between races and ethnics. In Asian population, several studies have been carried out showing lower rates in white skin population with a prevalence of 20% in men and 5-6% in women. Prevalence increases according to age in all populations. Hair thinning occurs at the beginning of puberty.¹² Studies by Faghihi et al showed that from 94 samples aged >18 years old, the mean age was 30.46 ± 6.28 years old.¹³ Study by Olsen et al showed from 352 subjects with MPHL age 20-49 years with a mean age of 39.2 years old.¹⁴ The results of our study has similar result with the highest frequency found in 9 subjects (56.25%), with an average age of 32.62 ± 5.795 years old. Severity of AGA is directly proportional with increasing age.

This study showed that there was a significant increase in terminal hair count in both groups ($P < 0.05$). In terms of terminal hair diameter, the results were significant in the bimatoprost 0.03% group ($P < 0.05$) but not significant in the minoxidil 5% group ($P > 0.05$). A study showed that Bimatoprost 0.03% solution was shown to increase the percentage of eyelash follicles in the anagen phase and prolong this phase. In addition, bimatoprost 0.03% induces stimulation of melanogenesis, which results in darker eyelashes and increases the size of the dermal papilla and hair bulb thus affecting the thickness of the eyelashes.¹⁵ The results of this study are in accordance with a double-blind, randomized phase II study conducted on 244 men

to compare two formulations of bimatoprost solution with vehicle, which showed a greater change in the terminal hair count in the target area in group 1 and 2 (Bimatoprost) with the vehicle compared to the initial condition (group 1: 12.7, group 2: 9.3 and group 3: 5.8 terminal hair/cm²) and changes in terminal hair diameter were greater in group 1 and 2 compared to the vehicle group after 6 months of therapy (group 1 = $0.067 \pm 1,185$, group 2 = $0,92 \pm 1,435$ vehicle group $0.05 \pm 1,018$ mm/cm²).¹⁶

This study showed a decrease in PGD2 concentration in the bimatoprost 0.03% group but there was an increase in PGD2 concentration in the minoxidil 5% group before and after treatment ($p > 0.05$). There is a fundamental role of prostaglandins in modulating the cycle of hair follicles and regulate hair growth, especially prostaglandin D2, prostaglandin E2 and prostaglandin F2 α . Prostaglandin D2 inhibits hair growth in AGA.⁹ However, the underlying mechanism has not been clearly identified.¹⁷ Bimatoprost is a prostaglandin F2 α analog. The mechanism of action of the prostaglandin analogue on hair growth is still unclear. It is suspected that prostaglandin analogues induce hypertrichosis through their effect on the prostaglandin target receptors in the hair follicles.¹⁵ The prostaglandin D2 receptor is in the outer root sheath of the hair follicle. The exact location of the receptor illustrates the importance of hair follicle activity. Minoxidil, the current approved and most widely used treatment, was also shown to have an effect on prostaglandins.⁷ An in vitro study showed that minoxidil stimulates prostaglandin E2 and leukotriene B4 in dermal papilla cells, while prostacyclin synthesis is inhibited. In addition, minoxidil increases the expression of one of the four PGE2 receptors (EP2) which contribute to prolonging anagen.⁹

The side effects occurred in during this study in both groups were erythema and pruritus. This result is consistent with the study conducted by Zaher et al, in which side effects found during application of bimatoprost 0.03% were folliculitis, erythema and pruritus and a burning sensation in the application area.¹⁸ We hypothesize that these occurrences might be due to mild allergic or irritant reaction towards the active compound and/or solvent. In this study, no subjects dropped out as a result to the side effects.

The limitation of this study is that the hair growth phase (anagen, catagen, or telogen) was not identified and hence more precise examination was unable to be conducted.

CONCLUSION

A 12-week topical application of bimatoprost 0.03% results in a significant increase in terminal hair diameter and count. Further studies with longer follow-up duration are needed to establish the effectiveness of bimatoprost in AGA treatment.

Conflict of Interest : None

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Expression of TLR-4 in *Salmonella typhi*-Induced Balb/c Mice Treated by Miana Leaves (*Coleus scutellaroides* (L) Benth)

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ABSTRACT

Introduction: Miana is one of the most widely used medicinal plants in Indonesia because its antibacterial activity, but its mechanisms not clear. This study aims to determine mRNA TLR-4 expression in Balb/c Mice induced by *Salmonella typhi* after miana leaf extract (MLE) treatment.

Material and Method: Mice were divided into four groups, antibiotic (levofloxacin eight mg/kg body weight) as positive control, placebo (Na CMC), MLE and mixed of MLE and antibiotic. Blood of the mice was taken before (H0) and after induction of 103 CFU/mL *Salmonella typhi* (H1) and seven days after intervention (H7). The mRNA TLR-4 expression was measured by real time PCR. The results obtained were processed using SPSS.

Results: There were significant difference in H0-H1 for all groups. TLR-4 expression in H1-H7 had a different pattern between placebo and positive control, MLE, and the mixed of MLE and antibiotic. In placebo, there was an increase of TLR-4 expression in H1-H7). In the positive control, MLE treatment group and the mixed of MLE and antibiotic, there was a decrease in TLR-4 mRNA expression.

Conclusions: Miana leaves treatment in Balb/c mice induced by *Salmonella typhi* significantly gave the same effect as positive control to expression of mRNA TLR-4.

Keywords: *Toll-like Receptor-4 mRNA, Typhoid Fever, Miana, Real-time PCR, CFU.*

INTRODUCTION

Typhoid fever is an acute infection of the digestive tract caused by *Salmonella typhi*. Typhoid fever is an endemic disease in Indonesia and often cause an outbreak.¹⁻³ According to WHO data in 2008, patients with typhoid fever in Indonesia recorded 81.7 per 100,000.⁴ Typhoid fever in most developing countries is underestimated so that many cases are undiagnosed.⁵

Salmonella is a gram-negative rod-shaped bacteria, Enterobacteriaceae family, comprising 2463 serovars.⁶ *Salmonella* has a Vi antigen, an acidic polysaccharide polymer present on the surface of the membrane. *Salmonella typhi* is an intracellular facultative microorganism that can live and even multiply in macrophages, resistant to lysosomes, has the ability to prevent and inhibit fusion of phagolysosomes.⁷⁻⁹

One of immunological mechanism against *Salmonella typhi* is by spurring macrophage function to destroy and eliminate bacteria. By complex of Toll-like receptors (TLR)-5 and TLR-4/MD2/CD-14, macrophages recognize pathogenic molecular patterns

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(PAMPs) such as flagella and lipopolysaccharides.²⁻³ The bond between LPS and TLR4 that activates MyD88 plays an important role in controlling exponential growth of *Salmonella typhi*.¹⁰

The existence of resistance problems of some antibiotics in the treatment of typhoid fever encourages the development of a new paradigm in traditional to treat typhoid fever.¹¹ Natural products comprise one of the most popular sources of complementary and alternative medicines for treating inflammatory and immune disorders.¹² The facts show that medicinal plants play a vital role in maintenance health because they have many advantages, among others, easy to obtain, very cheap and have very little side effects.¹³⁻¹⁵ The use of medicinal plants in most developing countries as a primary means for maintaining health has been considerably observed by UNESCO.¹⁶ Miana leaves contain flavonoid and tannin compounds, in which flavonoid has antibacterial activity because it can denature and coagulate bacterial cell protein.¹⁵

MATERIALS AND METHOD

Settings and Design

This study was conducted at Laboratory of Molecular Biology and Immunology, Faculty of Medicine, University of Hasanuddin, Makassar, South Sulawesi, Indonesia. This was a laboratory experimental study in Balb/c mice animal model with a simple randomized design.

Balb/c mice

Balb/c mice (35-50 grams) were obtained from the Laboratory of Molecular Biology and Immunology, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia. They were well kept under both 12-h light and 12-h dark periods, fed and drink sufficiently for seven days. They were divided into four groups (n = five/group) based on intervention, positive control (antibiotics), negative control (placebo), MLE; and mixed of MLE and antibiotics. Blood samplings were performed three times, before *Salmonella typhi* induction (H0), a day after *Salmonella typhi* induction (H1) and seven days after intervention (H7).

Miana Leaf Extract (MLE)

Leaves of miana were obtained from Tana Toraja district, South Sulawesi, Indonesia and extracted at

Phytochemical Laboratory, Faculty of Pharmacy, Hasanuddin University, Makassar, Indonesia. Miana leaves powder were macerated with alcohol 70% for about 48 h occasional shaking. Dose of MLE used in this study was 510 mg/kg body weight (bw), suspended with natrium CMC 15 w/v.¹⁶

Salmonella typhi preparation

S. typhi bacteria was from the Molecular Biology and Immunology Laboratory, Faculty of Medicine, University of Hasanuddin, Makassar, Indonesia. The amount was 10³ CFU/mL (Mc Farland Standard).

Nucleic Acid Extraction

The sample volume of about 100 µg/ul blood was fed into 900 µl of "L6" solution consisting of 120g of Guanidium thiocyanate (GuSCN) in 100 ml 0.1 M Tris HCl, PH 6.4, 22 ml 0.2 M Ethylene Diamine Tetra Acetate (EDTA) pH 8.0 and 2.6g Triton X-100 (Packard, Instrumens) with final concentration 50 mM Tris HCl, 5 M GuSCN, 20 mM EDTA, 0.1% Triton X-100. Next played at 12,000 rpm. The sediment added a 20 µl diatom suspension consisting of 50 ml of H₂O and 500 µl of 32% (w / v) "Celite" (Jansen Chimica, Beerse, Belgium, 10,846.79), then vortex and centrifuged in a 1.5 ml eppendorf tube at 12,000 rpm for 15 min. The supernatant was removed and the sediment was washed with a solution of "L2" consisting of 120 g of GuSCN in 100 ml 0.1 M Tris HCl, pH 6.4 by adding 1 ml of "L2" solution. Then vortex and centrifuged at 12,000 rpm for 15 min, then washing repeated 2 times using "L2" solution, followed by washing with 1 ml of 70% ethanol twice and 1 ml of acetone. The result was then heated in a water bath at a temperature of 56°C for 10 min and added 60 µl of "TE" solution comprising 1 mM EDTA in 10 mM Tris HCL pH 8.0, then vortex and centrifuge followed at 12,000 rpm for 30 s, then incubated in Oven for 10 min at a temperature of 56°C. Then performed vortex and centrifuge again for 30 sec at a speed of 12,000 rpm and taken supernatant. The supernatant of this process will be obtained by nucleotide extraction and stored at -80° C before PCR analysis.¹⁷

Real Time Polymerase Chain Reaction

Quantitative Real-Time PCR analysis total RNA was extracted from blood using L6 buffer according to the Boom methods. RNA quality and concentration were detected by a NanoDrop 2000 device (Thermo Scientific,

Wilmington, DE, U.S.A.). In a reaction volume of 20 μ L using M-MLV reverse transcriptase, 2 μ g RNA was then reverse transcribed to cDNA using a RT-PCR kit. The mRNA level of the target gene was quantified by real-time PCR using a SYBR® Premixed E x Taq kit on a CFX Connect system, Biorad Laboratories, Real Time PCR 96 well 0.1 ml, USA. The standard PCR conditions were as follows: 95°C (10 min), 40 cycles of 95°C (15 s) and 60°C (1 min), followed by a standard denaturation curve. mRNA expression levels of the relevant genes and β -actin were determined using relative quantification by comparison with a standard curve for each gene, which was included in each PCR run generated from the serial dilution of a cDNA pool from the blood samples in the study. The primer pairs TLR-4 For: TGACAGGAAACC CTATCCAGAGTT and TLR4 Rev: TCTCCACAGCCACCAGATTCT and β -actin For: AGA GGGAAATCGTGC GTGAC and β -actin Rev: CAATAGTGATGACCTGGCCGT. Relative mRNA levels were calculated using the 2- $\Delta\Delta$ Ct method with data normalized to the Beta actin housekeeping gene.¹⁸⁻²¹

STATISTICAL ANALYSIS

All groups of data are normally distributed with significant values of 0.076-0.200 (Kolmogorov-Smirnov Test) and 0.064-0.964 (Saphiro Wilk Test). Repeated Anova was used to test the mean difference on mRNA expression of TLR-4 between H0, H1 and H7 in each group. All statistics were performed on IBM SPSS version 20 statistical software.

RESULTS

This study showed a significant difference in mRNA TLR-4 expression in H0-H1 for all groups with p = 0.000. Differences in mRNA expression of TLR-4 in

H1-H7 had a different pattern between negative control and positive control, MLE treatment group and the mixed of antibiotic and MLE treatment group (Figure 1). In the negative control, there was an increase in mRNA expression of TLR-4 from H1 to H7 with significance level p=0.000, mean difference 4.94 and CI95% 4.71-5.17. In the positive control group, MLE treatment group and the mixed of antibiotic and MLE group, there were decrease in mRNA expression of TLR-4 with mean difference in negative values (Figure 1).

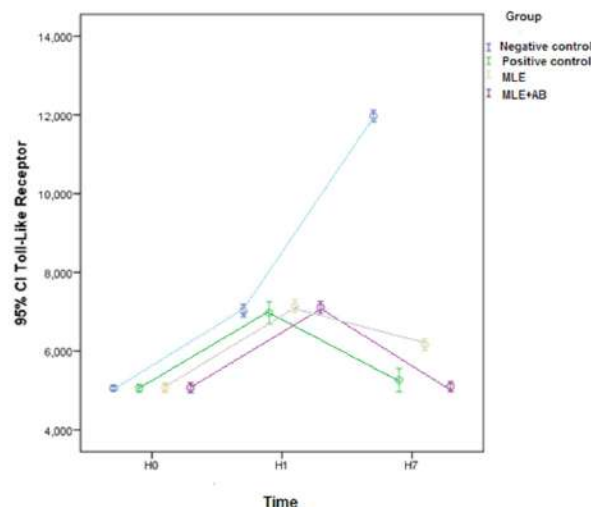


Figure 1: Trend mRNA TLR-4 Expression for placebo, positive control, MLE and Mixed of MLE and Antibiotic in H0, H1 and H7

In the positive control, there was a significant decrease in mRNA expression of TLR-4 with significance level p=0.000, mean difference -1.70 (CI95% (-2.02) - (-1.38)), had a greater decrease than the MLE group with mean difference -0.98 (p=0.000, CI 95% (-1.18)-(-0.77)) whereas in the mixed of antibiotic and MLE group had the highest decrease mRNA expression of TLR-4 with mean difference -2.01, significance level p = 0.000 and CI 95 % (-2.27)-(-1.75) (Table 1).

Table 1. Differences Analysis of mRNA expression of TLR-4 Balb/c Mice between before (H0) and 24 hours after (H1) Salmonella typhi induction and Seventh Day After Intervention (H7)

Group	H0	H1	Mean Difference (95%CI)	P*	H7	Mean Difference (95%CI)	P*
	Mean±SD	Mean±SD			Mean±SD		
Negative Control	5.058±0.495	7.025±0.128	1.96(1.82)-(2.11)	0.000	11.971±0.114	4.94(4.71)-(5.17)	0.000
Positive Control	5.057±0.078	6.970±0.225	1.91(1.60)-(2.22)	0.000	5.265±0.238	-1.70(-2.02)-(-1.38)	0.000
MLE	5.071±0.094	7.148±0.132	2.07(1.90)-(2.24)	0.000	6.164±0.118	-0.98(-1.18)-(-0.77)	0.000
MLE+AB	5.069±0.099	7.111±0.118	2.04(1.93)-(2.15)	0.000	5.100±0.102	-2.01(-2.27)-(-1.75)	0.000

DISCUSSION

Significant increase of TLR-4 expression occurred in H0-H1 for all groups. *Salmonella typhi* has a very immunogenic structure called lipopolysaccharide (LPS). LPS are bound by LPS-binding protein (LBP) in the blood and then activate TLR4. The activated TLR4 recruits the MyD88 adapter protein. Then MyD88 conscripts IRAK4, IRAK1 and IRAK2. The IRA kinase then phosphorylates and activates the TRAF6 protein allowing NF κ B to diffuse into the nucleus and activate the transcription and induction of inflammatory cytokines.^{3,10,22-23}

At H7, the MLE group showed a significant decrease in TLR-4 expression, as did the positive control and the mixed of antibiotic and MLE group. Alleviation of TLR-4 expression at H7 in the group administered by MLE, positive control and the mixed of antibiotic and MLE group were linear to LPS levels in mice's blood indicating a healing process of *Salmonella typhi* infection in body of mice. In contrast, TLR-4 expression in negative control continued to increase until H7 indicating that LPS remained high. Another study said that the most vital thing in stimulating a non-specific immune response against LPS as a part of *Salmonella typhi* is activation of TLR-4. The presence of LPS will stimulate TLR-4 then cause nuclear translocation of NF κ B and TNF- α cytokines as well as inducible NO synthase (iNOS).²²

One of the herbal mechanisms as complementary and alternative medicine (CAM) in improving immunity is modulation of pathogen response/T cell regulation. Herbs can enhance immunity by changing the balance between inflammatory and anti-inflammatory cytokines and modifying the level and quality of immune responses of T cells, B cells and cytokines.²⁴ Miana as one of the medicinal plants family lamiaceae contain among other essential oils, flavonoids, tannins and alkaloids.¹⁵ Administering of MLE and combined antibiotic and MLE had an effect for mRNA expression of TLR-4 subsequently affecting host immunity (mice).

Previous study showed that MLE contains active substances such as alkaloids, saponins, steroids, tannins, triterpenoids, flavonoids and polyphenols that are potential as immunomodulators. MLE contains chemical components as active substances that have antioxidant activity with IC50 MLE value = 34.407 ppm.¹⁵ Another study mentioned that the main active substance of

the plant *Coleus aromaticus* is an essential oil. The potential of *Coleus aromaticus* therapy can be used as a potential source of bioactive compounds. *Coleus aromaticus* antioxidant activity is reported mainly due to rosmarinic acid, chlorogenic acid and caffeic acid. Essential oils have a large antimicrobial activity in gram-negative, gram-positive, drug-resistant microorganisms, phytopathogenic microorganisms and fungi.^{13,25} According to Kouakou (2013), immunomodulatory activity is determined by knowing the ability of plant extracts to induce NO (nitric oxide), cytokine production and activated mitogen protein kinase fosforilase (MAPK).²⁶

CONCLUSIONS

MLE with dosage 510 mg/kg body weight in Balb/c mice induced by *Salmonella typhi* showed a similar value to positive control on mRNA TLR-4 expression. This study represent that MLE could be a pledging alternative medicine in patients with *Salmonella typhi* infection.

Conflict of Interest: The authors declare no conflicts of interest regarding the publication of this paper.

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Correlation of Stimulation with Development of 2-Year-Old Babies (Baduta) in Mamuju District, West Sulawesi

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ABSTRACT

Children are the nation's future generation. One of factors that influences children's quality is early stimulation. Early stimulation is given according to the children's development. *Baduta* or infants aged 0-24 months is the baby's golden period (golden age period) which is a period where the baby's brain is experiencing very rapid development, because at this time the baby's brain is functioning properly so that it can absorb up to 100% of information affecting and determine their next development. The purpose of the study was to determine the effect of stimulation on the level of development of *Baduta* (2-year-old babies) in Mamuju District, West Sulawesi. This research is an analytic observational study with cross sectional design. The population in this study were all infants aged 0-24 months in the working areas of Binanga, Bambu and Tampapadang Public Health Centre. Sampling using accidental sampling, the number of samples is 96 infants. The Pre-Screening Development Questionnaires (KPSP) were used at the age of 3-24 months, KPSP measured gross motor development, fine motor development, speech and language skills, socialization and independence skills, and stimulation questionnaire according to the development of children aged 3-24 months. The data was collected by distributing stimulation questionnaires according to the child's development and direct observation of the level of development using KPSP according to the age of the child, giving explanations to their parents if there is a statement in the questionnaire is not understood. Research shows that there is a significant influence between stimulation ($p = 0.039$) with the level of development of *Baduta* in Mamuju District. Parents are expected to provide stimulation according to the child's development continuously with loving care, doing early detection to child development, and giving health counseling to parents about the importance of parents' role to provide early stimulation to children according to the stage of child development.

Keywords: *development, stimulation, baduta, 2-year-old babies*

INTRODUCTION

Children are nation's next generation, one of the nation's determinants in the future. The quality of the next generation is determined by the success of growth and development in childhood. Early stimulation according to children's development is one of children's intelligence determinants. Development requires stimuli, especially in families¹. This is similar with the results of the study by Iin which states that there is a correlation between developmental stimulation and the development of 0-5 years old children in RW 8 Kalicari Village, Semarang City². The same research was done by Febrina Suci Hati and Prasetya Lestari, their results showed that there was a correlation with strong and statistically significant strength between stimulation of

growth and development of children aged 1-3 years in Sedayu District³.

Children are individuals who are in a range of changes in growth and development starting from babies to adolescents. This period starts from the baby (0-1 years) playing age/toddlers (2-3 years), pre-school (4-6 years), school age (6-12 years) to adolescence (13-18 years). This range is different from one child to another, changes in growth and development can take place sooner or later. Given the large number of children under five in Indonesia, which is about 10% of the entire population, then as a prospective future generation, the quality of child development in Indonesia needs serious attention such as getting good nutrition, adequate and affordable stimulation by quality health services

including early detection and early intervention of growth and development deviations to children. This can be included in the monitoring program for child development at the family stage as the beginning of the formation of a child's life^{1,4}

Coverage services for Early Stimulation, Detection and Intervention of Toddler Growth and Development in Mamuju District have not been maximal, especially in infants aged 0-24 months. This can be seen from the report of the Family Health Development Division of the District Health Office in 2015, the coverage of children (infants aged 0-23 months) weighing 6,156 million or 55.3% of the total number of children reported as many as 11,136. Compared to 2014, there was a decrease in the amount of the total coverage of 6,485 million or 66.4% of the total reported million of 9,769. Coverage of children under five who received health services (at least 8 times) was 90.9% or as many as 16,953 toddlers, decreased from the previous year where the coverage of under five children who received health services (at least 8 times) in 2014 was 93.92% or as much 18,585 toddlers. The coverage of BGM toddlers in Mamuju Regency in 2015 was 575 or 4.44%, had an increase from 2014 in which the BGM Toddler Cover was 564 or 3.47%. Child development data using SDIDTK evaluation has not been reported in the working areas of the District Health Office. Mamuju

Baduta or infants aged 0-24 months is the baby's golden period (golden age period) which is a period where the baby's brain is experiencing very rapid development, because at this time the baby's brain is functioning properly so that it can absorb up to 100% of information affecting and determinetheir next development. This period is the right time to teach everything about life even though its nature is still limited. To optimize the

growth of the brain, parents need to provide nutrition, good emotional connection, proper parenting and stimulus and early detection of growth and development, so that even the slightest abnormality, if not detected and not handled properly, it will reduce the quality human resources later.

The efforts to get high quality children can be achieved through Early Stimulation, Detection and Intervention of Child Growth and Development at the Basic Health Service Level (SDIDTK). The Indonesian Ministry of Health has issued facilities to carry out simple growth and development monitoring, namely the Pre-Screening Development Questionnaire (KPSP). Monitoring efforts are carried out to find out as early as possible the existence of irregularities in growth and development and to follow up on parents' complaints regarding the problems of growth and development of the infants and toddlers¹.

MATERIALS AND METHOD

This research is an analytic observational study with cross sectional design. The population in this study were all infants aged 0-24 months in the working areas of Binanga, Bambu and Tampapadang PublicHealth Centre. Sampling using accidental sampling, the number of samples is 96 infants

Data analysis was carried out by univariate analysis by displaying the distribution and percentage of each variable. Furthermore, bivariate analysis was performed using chi-square to determine the correlation of stimulation, maternal psychology and parenting to the level of development of *baduta* with a 95% confidence level (α 0.05).

RESULTS

Univariate Analysis, a. Characteristics of respondents

Table 1. Characteristics of Respondents

Characteristics of Respondents		n = 96	%
Mother's age (years)	< 20	3	3,1
	20 – 35	84	87,5
	> 35	9	9,4

Cont... Table 1. Characteristics of Respondents

occupation	housewives	62	64,6
	businesswoman	3	3,1
	nurse	2	2,1
	farmer	1	1,0
	government employees	17	17,7
	entrepreneur	11	11,5
education	College	25	26,0
	Senior high school	28	29,2
	Junior high school	8	8,3
	Elementary school	17	17,7
	No education	18	18,8
Infants' age (months)	0 – 3	12	12,5
	> 3 – 6	17	17,7
	> 6 – 9	18	18,8
	> 9 – 12	15	15,6
	> 12 – 15	7	7,3
	> 15 – 18	9	9,4
	> 18 – 21	3	3,1
	> 21 – 24	15	15,6
Infants' gender	boys	41	42,7
	girls	55	57,3

Table 1 shows the highest number of respondents' ages are mothers aged 20-35 years as many as 84 people (87.5%). The highest number of jobs are housewives (IRT) as many as 62 (64.6%). The highest number of education is high school as many as 28 (29.2%). The most age of infants are > 6-9 years as many as 18 (18.8%). The highest number of sexes is 55 (57.3%) women.

Research variable(s)

Table 1 Frequency Distribution of Research Variable

Research variable(s)	n = 96	%
Infants development		
appropriate	69	71,9
inappropriate	27	28,1
stimulation		
good	68	70,8
less	28	29,2

Table 2 shows the development of *baduta* according to the stage of growth and development is 69 (71.9%). Good stimulation was carried out by 68 (70.8%).

Bivariate analysis

Bivariate analysis was conducted to determine the correlation of stimulation given by the family to the level of development of *baduta*. The test performed is

Chi-square Test.

correlation of Stimulation to *Baduta* Development Level

Table 2: Correlation of Stimulation to *Baduta* Development Level

stimulation	<i>Baduta</i> Development				Total		p
	appropriate		inappropriate				
	n	%	n	%	n	%	
good	53	55,2	15	15,6	68	70,8	0.039
less	16	16,7	12	12,5	28	29,2	
Total	69	71,9	27	28,1	96	100	

Table 3 shows the correlation of stimulation to the level of *Baduta* development. Chi-square test shows that there is a significant correlation between stimulation to the level of *baduta* development with a value of $p = 0.039$.

DISCUSSION

This research was carried out in the working areas of the Binanga Bambu and Tampapadang Public Health Center. This region was chosen with considerations of the largest number of million populations in Mamuju City. Primary data collection uses questionnaires for respondents totaling 96 parents and children. The sample consisted of 55 girls, more than boys if compared, with 41 boys. The results showed the development of *baduta* in this study were 71.9% in accordance with the growth stage. children begin to experience very rapid development because children at this age have demonstrated the ability to move more activities, develop curiosity and explore objects around them⁶.

Developmental aspects that can be assessed in monitoring development are divided into 4 (four) parts, such as the development of social personal, fine and gross motor development and language skill. These developments are interconnected with each other. If there is a developmental disorder in one aspect of development, it can affect other aspects of development. For this reason, development monitoring needs to be carried out early to immediately recognize child with developmental disorders so that the development of movement, speech and language, socialization and independence in children according to their ages optimally⁷

Children development can be influenced by internal and external factors. This study looks at the influence of external factors, stimulation of the level of *baduta* development. The existence of a meaningful correlation between stimulation to the level of development of children under five in this study is in line with the research conducted by Lestari and Hati which states that there is a positive and significant correlation and the strength of the correlation between stimulation of growth and development by the mother to the development of toddlers aged 1 -3 years⁸. Stimulation must be given routinely and continuously with love, playing methods, etc. so that the child's development will run optimally. The correlation of language skills with stimulation is also related to the golden period, window of opportunity, as well as the critical period of brain development in children aged 1-4 years. the ability of brain plasticity at this time causes children more easily to accept the learning process and stimulation, also more sensitive to supportive environments such as nutritional status, stimulation and health status⁹ It is in line with Gogia S's research, Sachdev HS says zinc is very important for the formation and migration of neurons along with the formation of neuronal synapses. Its deficiencies can interfere with neural pathway formation and with neurotransmission, thus affecting behavior (eg attention, activity, involvement, temperament) and development (eg, gross and fine motor skills, social skills¹⁰. Grantham-McGregor SM, Fernald LCH, Kagawa RM, Walker S (2014) also conducted research on the effects of developmental stimulation and nutritional intervention on child development, the results of the trial showed that nutritional interventions usually profitable nutritional status and sometimes profitable children's development. Stimulation is consistently beneficial for

child development. There were no significant effects that were lost when the intervention was combined, but there was little evidence of a synergistic interaction between nutrition and stimulation in child development¹¹.

The earlier stimulation is given, the better the child's development will be. The more stimulation that is given, the children's knowledge will be broad so that the child's development is more optimal. The brain tissue of children who get a lot of stimulation will reach 80% development at the age of less than 4 years. Conversely, if the stimulations never given to the child, the brain tissue will shrink so that brain function will decrease. This is what causes the child's development to be hampered¹².

The success of stimulation is also influenced by the basic abilities of individuals, health, family, environment and socio-economic conditions. In line with Miller S, Maguire LK research, Macdonald G (2011) states that parenting competence and environmental quality play an important role in supporting the development of children and parents have an important role in optimizing child development and reducing the negative impact of social losses¹³. Another study conducted by Bryanton J, Beck CT, Montelpare W states that education about infant behavior increases maternal knowledge about infant behavior four weeks after birth¹⁴.

Besides, it is also influenced by the initial time the stimulations given, how long and how to do it. The child's development ability has a distinctive characteristic, which has a fixed pattern and occurs in sequence, so that early stimulation must be directed and emphasized first for the formation of basic abilities before developing cognitive-academic abilities and more complex behaviors¹⁵⁻¹⁷. To achieve optimal development of *baduta* physical education from the role of nurses as part of the integration of health services is inseparable including documenting the care provided accurately, up to date, and relevant according to the needs of *baduta*¹⁸⁻²⁰.

CONCLUSIONS AND RECOMMENDATIONS

The level of *Baduta* development in Mamuju district generally accordance with the development stage. There is a meaningful correlation between stimulation, maternal psychology and parenting to the level of *baduta* development in Mamuju District. Parents are expected to provide stimulation according to the child's development

continuously with loving care, early detection of child development, and giving health counseling to parents about the importance of the role of parents to provide early stimulation to children according to the stage of child development.

Conflict of Interest : None

Ethical Clearance: This study has obtained recommendations for ethical approval at the Health Research Ethics Commission of the Makassar Health Polytechnic with the number: 009 / KEPK-UK / VII / 2017 and recommendations for research on the Kesbangpol Kab. Mamuju with numbers: 070/325 / VIII / 2017 / BKBP.

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Analysis of Malaria Incidence based on Behavioral Factors in the Islands

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ABSTRACT

Malaria is still one of the most serious public health problems which is faced by developing countries in the world, especially in tropical and sub-tropical countries, including Indonesia. This study aims to determine the relationship of behavioral factors with the incidence of malaria in the islands. The type of research is cross sectional study with a population consists of 515 people. 254 samples were selected by Exhaustive sampling. Bivariate statistical test with Chi Square and Multivariate with Logistic Regression.

The results of the research showed that the habit of going out at night ($p = 0.019$) and the use of mosquito nets ($p = 0.046$) were related to the incidence of malaria. Whereas the use of mosquitoes repellent ($p = 1,000$) is not related to the incidence of malaria. Multivariate logistic regression test found that the habit of going out at night was the most influential factor on malaria incidence (Wald 4.096; $p = 0.043$). This study found that the habit of going out at night and using mosquito nets was associated with the incidence of malaria. Some efforts should be made to develop community empowerment programs, especially to increase prevention practices, such as providing information to the public about the importance of avoiding the habit of going out at night, using mosquito nets, and using mosquitoes repellent to reduce contact with Anopheles with healthy humans.

Keywords: malaria incidence, behavior

INTRODUCTION

Malaria is still one of the most serious public health problems faced by developing countries in the world, especially in tropical and sub-tropical countries, including Indonesia¹.

WHO data shows that the estimated deaths globally caused by malaria in 2010 were 655,000 cases of malaria worldwide. In addition, 86% of deaths occurred in children under 5 years. The sufferers of the disease are spreading in many areas around the world, especially in endemic areas such as Africa and Asia². The malaria prevalence in Ethiopia shows that despite the tendency of positive malaria cases showing a pattern of decrease in the overall of five-year malaria prevalence data from hospitals (2009-2013) revealed that the number of children who infected <10 years is still higher³.

The percentage of malaria incidence in Indonesia in 2013 decreased as much as 1.9% compared to 2007

(2.9%), but in West Papua there was a sharp increase in the number of malaria sufferers. Malaria prevalence in 2013 was 6.0%. The five provinces with the highest incidence and prevalence were Papua (9.8% and 28.6%), East Nusa Tenggara (6.8% and 23.3%), West Papua (6.7% and 19.4%), Central Sulawesi (5.1% and 12.5%), and Maluku (3.8% and 10.7%). There were 15 provinces of 33 provinces in Indonesia which have malaria prevalence above the national figure, most of them were in Eastern Indonesia, due to limited government resources in the matter of labor and funds and the high differences in inter-regional endemicity are also considered to be a challenge for malaria prevention. Provinces in Jawa Bali are areas with lower malaria prevalence than the other provinces⁴.

Indonesia is an archipelago that has thousands of islands. The Central Statistics Agency (BPS) in 2016 recorded the number of islands in Indonesia is 17,504 islands. The number of islands, causes Indonesia having

a diversity of cultures, habits, regional characteristics and other diversity. Indonesian people in each areas have their own habits, thus forming a pattern of community life that characterizes the habits of the Indonesian people. The general life style in a daily habit that humans do for interests of their lives. This modern era has a lot of people who want to be instantaneous in doing everything that is supported by technological advancements in facilitating interests and human desire. This instantaneous desire has an impact on the healthy lifestyle of the community⁵.

During 2000-2009 period, rates of malaria endemic throughout the country tended to show an increase. In Java and Bali, Annual Parasite Incidence (API) during the period of 1995 - 2000 per 1000 population increased rapidly from 0.07 (1995), 0.08 (1996), 0.12 (1997), 0.30 (1998), 0.52 (1999), and 0.81 (2000). In 2002 the API dropped from 0.47 and became 0.32 in 2003 per 1000 population. Outbreaks of malaria during 1998 - 2003 period have been attacked 15 provinces, including 84 endemic villages with a total of 27,000 sufferers with 368 deaths⁶.

Malaria is still a health problem for Indonesian people, especially in eastern part of Indonesia⁷. In South Sulawesi, 24 districts / cities that reported in 2007 about the number of clinical Malaria sufferers was 13,029 patients with a positive number of 1,927 people (14.79%) with the highest cases in Selayar District, Bulukumba, Enrekang and Tator. Whereas for 2008 the number of clinical malaria sufferers decreased to 8,886 cases with a positive number out of 1,153 cases (12.98%). The highest case occurred in Selayar District, Pangkep, North Luwu, Enrekang and Tator or AMI amounted to 1.14 per 1000 inhabitants⁸.

There was an increase in malaria cases in Islands Pangkajene Regency, especially in Kapoposang Island, in 2000 found 262 cases, whereas in 2001 there were 1106 clinical sufferers. Parasite rate (PR) reported for the last two years also increased from 5.14% (2000) to 13.76% (2001)⁹. In 2010 the incidence of malaria in Mattiro Ujung Village was 33 people out of 1,309 population. In 2010 the Kapoposang island reported API = 17.57 permille and AMI 25.21 per mile. This figure causes the Kapoposang island as the meso-endemic area to malaria.

Malaria appears as a result of interactions

between agent (Plasmodium), transmission and host processes (humans and anopheles) which are all affected by the environment¹⁰. The existence of community housing that has a condition of an open house without ceilings, ventilation without wire netting and the wall condition of the perforated house is one of the risk factors for the occurrence of malaria. This is because mosquitoes are very easy to enter the house which is not closed like a wall with holes.

Habitat breeding of anopheles is puddles of both fresh water and brackish water that must always be associated with the soil. The breeding place for brackish water anopheles found in estuaries and covered swamps. Research conducted by Kazwaini (2006) found that the anopheles breeding site is in the form of a lagoon to become a potential breeding place for mosquitoes with turbid and clear conditions¹¹.

Socio-culture also affects the incidence of malaria, such as: the habit of going out late into the night, where the vector is exophilic and exophagic will be easy contact with mosquitoes. The level of community awareness about the danger of malaria will affect the willingness of the community to eradicate malaria such as environmental sanitation, using mosquito nets, installing wire netting on the house and using mosquito repellent. Various human activities such as dam building, road building, mining and the construction of new settlements / transmigration often result in environmental changes which is profitable to malaria transmission¹².

MATERIAL AND METHOD

The study is an observational study with a Cross Sectional Study design. The population in this study were all inhabitants living on the island of Kapoposang, Pangkajene Regency and Islands. Sampling taken by non probability sampling with "Exhaustive sampling", which every individual who lives on the island and has been tested for blood as many as 254 people.

Primary data was obtained by taking blood samples, conducting direct interviews with respondents based on the available questionnaires which contained questions and statements used to extract information about the variables to be analyzed in this study which were closely related to the incidence of malaria. Data analysis in this study uses univariate, bivariate and multivariate analysis. Display of categorical data in frequency and percentage and bivariate analysis using chi square with fisher exact

test with $\alpha = 0.05$ and multivariate with logistic multiple regression.

RESULT AND DISCUSSION

Malaria causes problems, especially endemic areas that cause humans trying to find the right methods to eradicate them. The disease is caused by a certain agent which is infective by the plasmodium parasite by the intervention of the anopheles which can be spread from one source of infection to humans. Physical

environmental health, chemical, biological, and socio-cultural factors are very influential on the spread of malaria.

The number of malaria sufferers in this study was 5 people. All malaria sufferers are male sex with varying ages, levels of education and occupation. Distribution of malaria sufferers according to the characteristics of the location of residence, age, sex, level of education and occupation can be seen in Table 1.

Table 1. Distribution of Malaria sufferers by Residential Location, Age, Gender, Educational Level and Employment on Kapoposang Island Pangkep Regency

Malaria Sufferers	residence	age (years)	sex	Education level	occupation
sufferer 1	RT 1	45	man	Not graduating from ES	fisherman
sufferer2	RT 1	9	man	Primary school	Go to school
sufferer 3	RT 1	20	man	Graduated from primary school	fisherman
Sufferer 4	RT 1	11	man	Graduated from primary school	Go to school
Sufferer 5	RT 1	64	man	Graduated fro Senior high School	Village chief

Source: Primary Data

The results of the study are in line with the research conducted by Ahmad, et al (2013) who found that men were more infected with malaria than women, which is 58% of cases in men and 42% occurred in women. Possible reasons for the high incidence of malaria in men compared to women because women are more exposed to malaria parasites than men. In addition, men who work in the field would have a higher chance of

infection. Kapoposang island people, especially men, have jobs as fishermen, where their habit of fishing is to work at night until dawn, thus the possibility of being bitten by mosquitoes is greater than women¹³.

Statistical Test Results (Table 2) show that the habit of going out at night and using mosquito nets is related to the incidence of malaria, while the use of mosquito repellent is not related to the incidence of malaria.

Table 2. Results of Bivariate Analysis of Variable(s) Examined in Kapoposang Island in Pangkep District in 2011

Variable(s)	Incidence of malaria				total		p
	Positive		Negative				
	n	%	n	%	n	%	
Habit of Going out at night							
yes	4	5,9	64	94,1	70	100,0	0,019
no	1	0,5	185	99,5	185	100,0	

Cont... Table 2. Results of Bivariate Analysis of Variable(s) Examined in Kapoposang Island in Pangkep District in 2011

Use of mosquitoes nets							
no	4	4,7	82	95,3	86	100,0	0,046
yes	1	0,6	167	99,4	168	100,0	
Use of mosquitoes repellent							
No	5	2,2	221	97,8	226	100,0	1,000
Yes	0	0,0	28	100,0	28	100,0	

Source: Primary Data

The habit of going out at night is an effective time for transmission. Female anopheles bite humans or animals for the development of their eggs. Anopheles actively foraging at night usually begin to bite late in the evening until early morning with a peak bite for each different species. The habit of going out at night by most residents of Kapoposangisland. Due to their occupation, because almost all household heads on the island work as fishermen. They start working at night that they have a greater chance of being bitten by mosquitoes

The use of mosquito nets is the most effective effort to prevent mosquitoes from being bitten during sleep compared to other efforts. The use of mosquito nets

is better than the use of mosquito repellent in various ways. These risks include being able to avoid the entry of insecticides into the human body through inhalation or skin tissue and other risks of burning mosquito repellents, especially for people who have respiratory system disorders. The use of mosquito repellent is a way to avoid contact or bite from the anopheles at night by using mosquito repellent, either in the form of mosquito repellent, spray, electric or repellent¹⁴⁻¹⁶

Statistical test results (Table 3) show that the variable habit of going out at night is the most influential factor on malaria incidence with a wald value of 4.09.

Table 3. Model of Multiple Regression of Logistics Spatial Patterns and Analysis of Malaria incidence on Kapoposang Island in Pangkep Regency in 2011

Variable(s)	B	Wald	Sig,	Exp(B)
Habit of going out at night	-2,299	4,096	,043	,100
Mosquitoes nets	1,921	2,852	,091	6,829
Constant	4,330	17,199	,000	20,786

Source: Primary Data

CONCLUSION

This study found that the habit of going out at night and using mosquito nets was associated with the incidence of malaria. Some efforts should be made to develop community empowerment programs, especially to increase prevention practices, providing information to the public about the importance of avoiding the habit of going out at night, using mosquito nets, and using mosquitoes repellent to reduce contact with Anopheles with healthy humans.

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Conflict of Interest: The authors declare that no conflicts of interest exist regarding this study

Ethical Clearance: Taken from Institute Committee

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Community Empowerment in Management Community-based Total Sanitation through Health Education in Majene

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ABSTRACT

Efforts to empower communities in community-based total sanitation program through health education methods play an important role in program effectiveness. This study aims to determine the effect of health education by using lecture and discussion methods towards knowledge, attitude and action changes of the community in East Tande Sub-district and Adolang Dhua Village, Majene District. This study is a quantitative research through experimental approach with design non-equivalent control group with pre-test – post-test which is conducted from September - October 2016. Method of determining samples in this study using purposive technique so that obtained 66 people consist of 2 groups, the group with discussion method treatment in Tande Sub-District, and the group with lecture method treatment in Adolang Dhua Village. Data collection conducted by giving pre-test questionnaire, and then gave them intervention, and end up by giving the post-test questionnaire to the respondents. Data were analyzed using paired t-test, wilcoxon test and Mann-Whitney test. Independent variables in this study are health education by using lecture method and group discussion method while the dependent variables are knowledge, attitude and action. The results showed that the knowledge variable influenced by lecture method but not influenced by group discussion method, while the attitude variable is not influenced by lecture and group discussion methods. For the third variable, the action variable is not influenced by the lecture method but influenced by the group discussion method. Meanwhile, the lecture method is more effective in changing respondent knowledge, attitude and action in the effort to empower communities to obtain STBM facilities.

Keywords: *community empowerment, health education, community-based total sanitation*

INTRODUCTION

The poor condition of basic sanitation has effect to the decrease of the environmental quality and pollution to clean water source used by communities to fulfill their daily necessity, so that the patient number of environmental-based diseases are increasing, especially for children under five. Related to this, the access to proper basic sanitation in Indonesia is still under Philippines, Singapore, Laos, Myanmar, Thailand and even neighboring Malaysia. In West Sulawesi Province in 2013, Sub-districts/ villages which carrying out STBM are 354 of 645 Sub-districts/ villages. Villages which stop doing BABS (defecate at random) is 100 Sub-districts/ villages (28.25%)^{1,2}

Low community action towards STBM can be seen through ODF (Open Defecation Free). In Majene District, there are 82 Sub-districts/ villages (89.02%) which implement STBM, only 4 Sub-districts/ villages of ODF (On Defecation Free). The results of 2015 researchers' study using qualitative research method indicates that in East Sub-district as the ODF location, community knowledge, attitude, and action support the formation of ODF while in Adolang Dhua Village (not yet ODF) knowledge and attitude stated good, unless the community action.

The effort is necessary to empower the community in solving the problem by implementing 5 (five) pillars of STBM, which are stop defecation at random place

(SBABS), hand washing with soap (CTPS), household drinking water and food management (PAMM-RT), household waste management (PS-RT) and household waste water management (PLC-RT), through health education by group discussion method using guideline book and lecture method using guideline book^{3,4}.

In line with this, the actions to improve basic sanitation facilities through STBM need to be encourage in communities, especially in areas which have not been ODF yet. According to Wijayanti³, health education with folder is better compared with health education without folder. Therefore, at this study location, the SBTM study will try to be conducted by discussion and lecture methods.

Based on some descriptions that the researcher pointed out above, that the pro-active behavior to encourage the STBM program is necessary for the promotion of STBM through health education by group discussion and lecture methods, because both methods will facilitate and accelerate the increase of knowledge, attitude and action in obtaining basic sanitation facilities (5 Pillars STBM) in each resident’s house.

MATERIALS AND METHOD

This study design is quazi experimental with design of non-equivalent control group design with pretest - posttest. The study was conducted in East Tande Sub district, East Banggae Subdistrict and AdolangDhua Village, Pamboang Sub-District, Majene District, West Sulawesi Province. The study was conducted from September to October 2016. The population is residents

in East TandeSub-District, East BanggaeSub-District and AdolangDhua Village Pamboang Sub-District, Majene District. The sampling technique was purposive sampling that obtained 66 samples which consist of 2 groups. The group with discussion method treatment in Tande Sub-District, and the group with lecture method treatment in AdolangDhua Village..

Data collection in this study was conducted by the researchers along with the facilitators by using questionnaires consist of three categories of knowledge, attitude and action. Each questionnaire has 25 questions. Questionnaires were distributed prior to health education by using lecture and discussion methods, after the questionnaires were collected, health education was conducted. Health education using lecture method was conducted in Adolang Village while group discussion method was conducted in East TandeSub-District, each group consist of 33 people.

Data obtained in this study were processed and analyzed by using paired t-test, wilcoxon test and Mann-Whitney test.

RESEARCH RESULTS

General characteristic of respondents

Based on the study results that has been done, it is found that most respondents in the lecture method group which total 33 people, are in the age range between 41 – 50 years old, while in the group whit group discussion method which also 33 people, most respondents are in the age range <21 years (see table 1).

Table 1. Respondent Characteristics by Group Treatment

Characteristic	Lecture		Discussion		Total (n=66)	%
	n=33	%	n=33	%		
Age						
< 21 yo	1	3.0	14	42.2	15	22.7
21 – 30 yo	10	30.3	11	33.3	21	31.8
31 – 40 yo	7	21.2	5	15.2	12	18.2
41 –50 yo	11	33.3	1	3.0	12	18.2
>50 yo	4	12.1	2	6.1	7	10.6
Gender						
Male	18	54.5	24	72.2	41	62.1
Female	15	45.5	9	27.3	25	37.9

Differences Pre-Test and Post-Test Results regarding Knowledge, Attitudes and Action between Lecture and Discussion Methods

Knowledge

Based on the Wilcoxon test output, it showed differences in knowledge prior and after health education by lecture method. There are 3 people who had decreased knowledge after health education by lecture method compared to prior the lecture, 25 people had increased knowledge and 5 people had steady knowledge. While the result of health education with group discussion method, there are 10 people who had decreased knowledge after discussion compared to prior discussion, 18 people had increased knowledge and 1 person had steady knowledge. Based on Wilcoxon test, it showed that there was significant difference to respondents' knowledge between pre and post-test of health education by using lecture method, while there was no significant difference to respondents' knowledge between pre and post-test of health education by using group discussion method, in the effort to empower the community to obtain STBM facilities (see table 2).

Table 2. Knowledge Differences of Pre-Test and Post-Test Respondents with Lecture and Discussion Methods

Method	Pre and Post Test Score	n	Z	p
Lecture	Decrease	3	-3,282	0,001
	Increase	25		
	Steady	5		
Group Discussion	Decrease	10	-1,739	0,082
	Increase	18		
	Steady	1		

Attitude

Based on Wilcoxon test output, it showed attitude comparison between prior and after health education by using lecture method and group discussion method. There were 15 people who had decreased attitude after health education with lecture method compared to prior the lecture, 15 people improved their attitude and 3 people had steady attitude. As for health education with group discussion method, there were 18 people had decreased attitude after group discussion compared to prior discussion, 14 people improved their attitude and 1 person had steady attitude. Based on the Wilcoxon test, it showed that there was no significant difference in both health education by using lecture method and group

discussion method towards the respondents' attitude pre and post-test, in the effort to empower the community to obtain STBM facilities (see table3)

Table 3. Comparison Respondent Attitude of Pre-Test and Post-Test with Lecture and Discussion Methods

Method	Value Pre and Post Test	n	Z	p
Lecture	Decrease	15	-0320	0,749
	Increase	15		
	Steady	3		
Group Discussion	Decrease	18	-0,122	0,903
	Increase	14		
	Steady	1		

Action

Based on the Wilcoxon test output that showed comparison of 'Action' prior and after health education by using lecture method. There are 9 people had decreased practice after health education by using lecture method compared to prior lecture, 17 people had improved practice and 7 people had steady practice. Based on Wilcoxon test, it showed that there was no significant difference in practice between respondents' pre and post-test of health education by using lecture method while for group discussion method there was significant difference to respondents' practice, in the effort to empower community to obtain STBM facility (see Table 4).

Table 4. Comparison Respondent Action of Pre-Test and Post-Test with Lecture and Discussion Methods

Method	Pre and Post Test Score	n	Z	p
Lecture	Decrease	9	-1,686	0,92
	Increase	17		
	Steady	7		
Discuses*		33	-3,038*	0,005

Note: *Paired t-test

Effectiveness of Health Education by Lecture and Group Discussion Methods on Improving Knowledge,

Attitude and Action of STBM Management

Based on Mann-Whitney value test, it was found that Z test statistical value were: knowledge -4.062, attitude -3.188 and action -1.582, while the sig.2-tailed value were: knowledge 0.000 <0.05, attitude 0.001 <0.05 and action 0.114 > 0.05. Based on the output rank, we can see that the mean value of respondents' knowledge, attitude and action who had been given health education by using lecture method is greater than the mean value of respondents who had been given health education by using group discussion method which were: knowledge (42,98 > 24,02), attitude (41.02 > 25.98) and action (37.21 > 29.78).

Table 5. Effectiveness of Health Education by Lecture and Group Discussion Methods in Improving Knowledge, Attitudes and Action of STBM Management

Variable	Mean Rank	Z	p
Knowledge Lecture Discussion	42,98 24,02	-4,062	0,000
Attitude Lecture Discussion	41,02 25,98	-3,188	0,001
Action Lecture Discussion	37,21 29,78	-1,582	0,114

DISCUSSION

'Knowledge' Pre and Post-test Differences between Lecture and Discussion Methods

This result means that after the respondents were given health education by lecture method and group discussion method respectively, there respondents whose knowledge were increased, decreased or even steady of their pre and post-test, but the increased knowledge of both group were different, where in lecture group, the increased knowledge of post-test was higher than the discussion group.

The presence of respondents whose post test score is lower than the pre-test score was probably due to get

boring in reading the distributed questionnaires so that they are lazy to re-read after being treated, but they just fill it out without reading it.

Based on p-value of pre and post-test knowledge with lecture method, p-value was; 0.001 or $\alpha (0.05)$ and the group discussion method p-value was; 0.082 or >math>\alpha (0.05)</math>. It can be concluded that there was difference of pre and post-test knowledge in lecture method but there was no difference of pre and post-test knowledge in group discussion method

This suits with the Notoatmodjo opinion⁵ who said that the lecture method is a good method for the target of people with both high and low education. This lecture method is effective when the speaker can master the target of the lecture. Health education with lecture method was conducted in Adolang Village, besides guided directly by the Researcher Lead, also involved the Health Center Sanitarian, because they were considered very familiar with the target background, because the village has been fostered for about 3 years so they provides material according to the necessity and language which can be understood by the target^{6,7}.

In line with the above theory, this study is also in line with the study result conducted by HendraHibrata⁸ which aims to see the different knowledge about STI (sexually transmitted infection) by using lecture, discussion and leaflet method at SMK Tangerang Airport. The result of this study indicates that there is an increase in knowledge after being given health education by lecture, discussion and leaflet method, which obtained smaller ρ value ($\alpha = 0.05$).⁹

Other study result that also support this study was also conducted by Mely Sakiyah, Jaji and PutriWiditaMuharyani⁹ about the effectiveness difference of discussion and lecture method on the worker knowledge about personal protective equipment (PPE) in welding workshop of Bukit Lama Sub-district, Palembang. In this research, it is found that there is difference of respondent knowledge between prior and after health education by discussion method with p value 0,001 and also there is difference of respondent knowledge between prior and after health education by lecture method with p value 0,001.

'Attitude' Pre and Post-test Differences between Lecture and Discussion Methods

This result means that after the respondents were given health education by lecture method and group discussion method respectively, there respondents whose attitude pre and post-test were increased, decreased or even steady, but the increased attitude of both group were different, where in lecture group, the participants number who had increased and decreased attitude post-test are the same, while in discussion group, the participants number with decreased attitude was higher than the increased one after they were given health education.

Based on p-value attitude pre and post-test, p-value of lecture method: $0,749 > \alpha (0,05)$ and p-value of discussion method: $0,903 > \alpha (0,05)$. It can be concluded that there are no difference of attitude pre and post-test both in lecture and discussion methods.

This study was also in line with the study result conducted by Aris Ardila, Abduh Ridh, Abdul HarisJauhari¹¹ a case study on teenagers class X IPA at SMA Negeri 01 Bengkayang about the effectiveness of group discussion and lecture methods to increase adolescent knowledge and attitude regarding premarital sex behavior. The result of this study indicates that there are differences in students attitude prior and after given counseling using lecture method.

However, there is study result that opposite with this study result which is a study conducted by Dwi Novrianda¹² regarding the effectiveness comparison of health education to the mother knowledge and ability to treat infants ARI (acute respiratory inspection) at Padang Pasir & Health Center. Study result which conducted to the respondents regarding the ability of treating under-five children with ARI after being given health education through lecture method in Padang Health Center and Pauh Health Center area showed significant difference with p value = 0,004. The ability of mothers in ARI treatment is the ability of mothers in treating children with ARI. The increasing of mother's ability to take care for children under five with ARI is influenced by the method usage in providing health education. Dwi research has opposite result study with this study result which actually there is no significant difference in lecture methods to change the respondents actions.

Comparative effectiveness of Lecture and Discussion method

This study result indicates that the lecture method is

more effective in improving the knowledge, attitude and action of respondents about STBM in Majene District. This can be seen from the average score of knowledge, attitude and action are higher in the lecture method group compared with the average score of knowledge, attitude and action in the group of group discussion method.

This due to in the discussion method all participants are required to be actively involved in expressing their opinions and experiences, as well as discussing STMB materials which are distributed until getting the appropriate conclusion. While based on the observation to the respondents, in this case the discussion participants are divided into three groups, each consisting of 11 people, generally only acting as a listener and not able to play an active role in the discussion process, they prefer to be silent and heard than to convey the idea.

Discussion and lecture are methods that can be used in health education to measure someone's knowledge. Discussion and lecture methods will be effective in improving knowledge if the delivery way is conducted properly. The difference between these two methods can be seen through the way the information is delivered, but both methods have its respective advantages that can improve someone's knowledge.

Through the way of delivering information, discussion method is able to more develop thinking ability of each participant in expressing the opinion that can trigger the interaction and reciprocity of information from each participant so that the information obtained can be diverse and can be more increasing the participants' knowledge. While in lecture method the one who plays more role is the researcher because the communication that occurs only one direction. Participants are more likely to listen and are given few opportunities to ask if there is something that is not understood so that the information obtained is also not too broad⁵.

However, this study has the opposite result to the study conducted by Tarigan in his thesis regarding the effectiveness of group discussion and lecture methods towards knowledge and attitude about reproductive health in adolescents at the Pendidikan Harapan Mekar Foundation, Medan, which stated that the method of group discussion is more effective in improving students' knowledge and attitude about adolescent reproductive health. The differences in the result with this study is due to differences in respondents' characteristics.

CONCLUSIONS

There is influence of health education by lecture method but there is no influence of health education with group discussion method to the knowledge in the effort to empower the community to obtain STBM facilities

There is no influence of health education by lecture and group discussion methods to the attitude in the effort to empower the community to obtain STBM facilities

There is no influence of health education by lecture method but there is influence of health education by group discussion method to the action in the effort to empower the community to obtain STBM facilities

Lecture method is more effective in changing knowledge, attitudes and practice of the respondents in the effort to empower the community to obtain STBM facilities

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Changes in Attitudes in Stunting Prevention through ASAKI Animation Media for Pregnant Women

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ABSTRACT

The prevalence of short-sized toddlers is a public health problem if the prevalence is 20% or more, according to WHO, The percentage of short-sized children under five in Indonesia is still high and it is a health problem that must be addressed. Based on data from the Basic Health Research / Riskesdas in 2013 there were about 37% (nearly 9 million) of children under five experienced stunting and in worldwide, Indonesia is the country with the fifth largest stunting prevalence and West Sulawesi is the second highest for stunting problems in Indonesia (48%). ASAKI (Animation Media Development Model (to overcome Early Stunting) is one of the educational methods created to provide understanding to pregnant women especially that West Sulawesi is in an emergency stunting condition. The purpose of this study was to see changes in attitudes in the prevention of stunting through ASAKI Animation media. The type of research used is the Quasi Experiment study, with 57 samples. The results showed that there were differences in attitudes before and after intervention until 1 week after the intervention, then there was a significant difference in the attitude of pregnant women before and after intervention until 4 weeks after intervention. Based on the results of this study can be formulated further research related to behavioral models that are effective against the prevention of stunting.

Keywords: *Stunting, Attitudes, ASAKI Animation Media*

INTRODUCTION

Stunting or short-sized child is described as a toddler with a height lower than the height of a toddler's height in his age. Stunting is one of the characteristics that indicates the occurrence of recurrent and long-term nutritional problems. In early childhood, stunting is known to have a lower level of intelligence, motor ability, and neurosensory integration. Thus, stunting during infancy will affect the quality of life at school age, adolescence, and even adults¹.

The prevalence of short-sized toddlers is a public health problem if the prevalence is 20% or more, according to WHO,. The percentage of short-sized children under five in Indonesia is still high and it is a health problem that must be addressed. Compared to several neighboring countries, Indonesia is the country with the fifth highest prevalence of stunting for Asian countries compared to Myanmar (35%), Vietnam (23%), Malaysia (17%), Thailand (16%) and Singapore (4%) (UNSD, 2014). The Global Nutrition Report in 2014

shows that Indonesia is one of 117 countries that have three nutritional problems, such as stunting, wasting and overweight in toddlers. The magnitude of the stunting problem in Indonesia in 2012 is estimated to have 162 million short-sized toddlers. it is projected to be 127 million in 2025².

Based on data from the Basic Health Research / Riskesdas in 2013 there were about 37% (nearly 9 million) of children under five experienced stunting and worldwide, Indonesia is a country with the fifth largest prevalence of stunting. The percentage of nutritional status of short-sized (short and very short) toddlers in Indonesia in 2013 was 37.2%, compared to 2010 (35.6%) and in 2007 (36.8%) did not show a significant decrease / improvement. The highest percentage in 2013 was in East Nusa Tenggara Province (51.7%), West Sulawesi (48.0%) and West Nusa Tenggara (45.3%)³.

According to the results of Nutritional Status Monitoring (PSG, 2015) 29% of Indonesian toddlers are in the short category, with the highest percentage in the

provinces of East Nusa Tenggara and West Sulawesi. Whereas the 2016 PSG results, short-sized toddler presentations were 27.5% and the highest percentage were in East Nusa Tenggara and West Sulawesi Provinces. Both the data collection above shows that West Sulawesi is in the second highest position for stunting problems.

Stunting can specifically originate from a pregnant mother. Nutritional conditions of pregnant women, before becoming pregnant even afterwards will determine fetal growth. Pregnant women who are malnourished will be at risk of giving birth to low birth weight babies, and this is the main cause of stunting⁴. After birth, babies who are not breastfed properly will be at risk of suffering from various infections due to eating patterns that are not sufficiently nutritional and unhygienic. Feeding babies and children determines the growth them. After the age of 6 months the child needs to get nutritional intake that can fulfill the needs of micronutrient intake, macro nutrition and safe⁵

Interventions that can be used to overcome child stunting are prenatal and postnatal as specific and sensitive interventions according to the World Health Organization. Along with this, prenatal and postnatal interventions through nutritional improvement movements focus on the first 1000 days of life at the global level, through the SUN (Scaling Up Nutrition) strategy and referred to as the National Movement for Nutritional Awareness in Indonesia.

Specific nutrition of intervention efforts for stunting toddlers were focused on the 1000 First Day of Life (HPK) group, such as Pregnant Women, Breastfeeding Mothers, and Children aged 0-23 months, because the effective short-sized toddler prevention was carried out on 1,000 HPK. The 1,000 HPK period includes 270 days during pregnancy and the first 730 days after the baby is born has been scientifically proven to be the period that determines the quality of life. Therefore, this period is called as a “golden period”, “critical period”, and the World Bank (2006) calls it a “window of opportunity”. The adverse effects that can be caused by nutritional problems in that period, in the short term are disruption of brain development, intelligence, impaired physical growth, and metabolic disorders in the body. Whereas the bad consequences that can be in the long term caused decreased cognitive abilities and learning achievement, decreased immunity so that it is easy to

get sick, and a high risk of diabetes, obesity, heart and blood vessel disease, cancer, stroke, and disability in old age and uncompetitive work quality which results in low economic productivity.

ASAKI Animation Media Development Model (to overcome Early Stunting) is one of the animation media developed as a form of nutritional education which aims to provide information to pregnant women about stunting. Animated media is used as a facility of nutritional education because the messages conveyed can be more interesting and understood, so that the target can learn the message until deciding to adopt positive behavior and audiovisual media also has advantages that are not available in other media, including all senses, face to face, and more interesting because there are sounds and moving images⁶

this animation will contain information in the form of understanding, causes and prevention of stunting. This method is carried out on classes of pregnant women in the Binanga Health Center area which has been formed and then given nutritional education regarding the risk of stunting using animated media. Based on the explanation above, researchers will measure changes in attitudes before and after the use of ASAKI animation media.

MATERIALS AND METHOD

The research's type used the Quasi Experiment study, which wants to see the influence of the ASAKI Animation media development model on attitudinal changes in pregnant women about prevention of stunting in the Binanga Health Center area on 2017.

The study was carried out in the working area of the Binanga Health Centre of Mamuju District. In 2017. The population in this study were all pregnant women in the Binanga Health Center work area in 2017. Samples were taken by purposive sampling as many as 57 people.

RESULTS AND DISCUSSION

The results of the study showed that the characteristics of respondents based on age group, the highest result was in the age group 19-29 years (36.8%) where respondents in the age group 19 to 38 years. Characteristics of respondents based on the level of education, the highest was in the group graduating from high school (42.1%), the level of education was in the

group not schooled to college. Characteristics of Respondents based on employment, the highest was in the non-working group (91.2%) (Table 1).

Table 1. Characteristics of Respondents by Age Group, Level of Education and Employment

Characteristics of Respondents	n	%
Group of age		
19 – 29	21	36,8
30 – 35	29	51
36 – 38	7	1,2
level of education		
Not schooled	4	7
Graduated from elementary school	15	26,3
Graduated from junior high school	12	21,1
Graduated from senior high school	24	42,1
undergraduate (S1)	2	3,5
Work		
Does not work	52	91,2
Private / government employees	4	7
Others	1	1,8

The analysis' result by paired samples test found that shortly after the intervention of the pre-test the average test was 64.91 and the post test was 66.88 with a value of $p = 0.001$. This means that the average attitude score results of the pre and post test respondents increased and showed that there were differences in attitudes of respondents before and after being given counseling through ASAKI animation media with a significance level of $p < 0.05$. The results of the analysis after 1 week intervention mean pre-test were 64.91 and 66.89 post tests with $p = 0.001$. This means that the average

attitude score results of the pre and post test respondents increased and showed that there were differences in attitudes of respondents before and after being given counseling through ASAKI animation media with a significance level of $p < 0.05$. The results of the analysis of 4 weeks of pre-test intervals were 64.91 and post test were 67.40 with $p = 0.001$. This means that the average attitude score results of the pre and post test respondents increased and showed there were differences in attitudes of respondents before and after being given counseling through ASAKI animation media with a significance level of $p < 0.05$ (table 2).

Table 2. Analysis' Results of Paired Samples Test of Attitude Variable based on Intervention Time

Intervention duration	average	Sig
Shortly After Intervention		
Pre Test	64,91	0,001
Post Test	66,88	
One Week After Intervention		
Pre Test	64,91	0,001
Post Test	66,89	
Four Weeks After Intervention		
Pre Test	64,91	0,001
Post Test	67,40	

Attitude is an operational form of behavior that is the inner response to the stimulus from outside the subject. Attitudes can be interpreted as the degree or level of suitability of a person towards a particular object. Attitude is a tendency to carry out certain actions against an object in a way that expresses signs to like or not to enjoy the object. Attitude is only part of human behavior⁷. Psychology views human behavior as a reaction that can be simple or complex. In humans, in particular and in various animal species, there are generally forms of instinctive behavior based on the nature to sustain life. One of the characteristics of an interesting human behavior reaction is its divergence. It means, one stimulus can cause more than one different response and several different stimuli can cause the same response. Kurt Lewin in Azwar, on 2009, formulated a behavioral relationship model which says that behavior was a function of individual and environmental characteristics. Individual characteristics include various variables such as motives, values, personality traits and attitudes that interact with other environmental factors in determining behavior. Environmental factors have great power in determining behavior, sometimes its strength is bigger than individual characteristics⁸. This is what makes predictions of behavior more complex. Behavioral problems are the cause of various health problems. Public health experts agree that to overcome this, an effort is needed in the process of public health education. It is expected that behavior changes will occur towards achieving healthy behavior through this process⁹.

According to Newcomb in Notoatmodjo suggests that attitude is readiness or willingness to act and is not an implementer of a particular motive. Attitude is not an action or activity, but it is a predisposition to an act of behavior, as well as the attitude of respondents to malaria is still a closed reaction¹⁰. The results of this study are in line with the research conducted by Andriani, et al that the differences in maternal attitudes were also shown in the ranking of minimum scores and maximum scores in the pre-test and post-test. The influence of personal experience is one factor that influences the formation of one's attitude. Personal experience must leave a strong impression to be able to become the basis of attitude formation. Attitudes will be easier to form if the personal experience involves emotional factors¹¹. The experience of mothers through the process of health education through ASAKI Media. The longer and more focused the mother follows the ASAKI educational video screening,

the more likely it is for mothers to understand things related to stunting and try to prevent it through changing attitudes. The influence of others is considered to be important and quite influential. In general, individuals are conformist or in line with the attitudes of people they consider to be important. This tendency is motivated, among others, by the desire to be affiliated and the desire to avoid conflict with people who are considered to be important¹². This research activity was carried out by gathering respondents at a place to watch ASKI's animated video as a form of education to respondents. Mother's willing to join in watching ASAKI animation videos certainly cannot be separated from the influence of others, whether support from family at home or perhaps calls and insistence from friends or neighbors or health cadres in the local area¹²⁻¹⁴. Personal experience and influence from other people that are considered to be important, indicate the occurrence of an increase in attitudes towards mothers of children under five due to the knowledge gained can generate understanding and confidence in their needs as a mother of toddler who also has to prevent stunting before entering the next pregnancy or at during the first 1000 days of life^{15,16}.

The results of this study are also in line with research conducted by Dewi and Mimin (2016) regarding the effect of nutritional education on feeding practice, which found that the interventions provided during the study could improve the attitude and feeding behavior of research subjects. The results of this study indicate that, the more frequent interventions given to respondents, the higher the attitude changes that occur in general^{13,14}.

CONCLUSION

Based on the results of the research that has been done it can be concluded that there are differences in attitudes before and after the intervention until 1 week after the intervention, then there is a significant difference in the attitude of pregnant women before and after intervention until 4 weeks (after the intervention).

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The Effect of Pornography Accessity to Influence Sexual Behavior

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ABSTRACT

A quantitative trait related to the strength of sensing behavior associated with stimuli. Behavior is all human action caused by encouragement and psychological desires as well as the effect of society and culture. This study aims to determine whether there is an influence between pornographic access to adolescent sexual behavior in MTS "X" kalipare. The design used in this study is quantitative descriptive, with a cross sectional study design. The population is all MTS X students as many as 150 students, with a sample of 109 respondents taken Simple Random Sample using a questionnaire. Then analyzed by person / product moment test. From the results of the study, the results for the category of pornography access in Kalipare MTS X are mostly classified as rare as 72.5%, while the good category is 25.7%, and the category never is 1.8%. For the category of sexual behavior, the results were mostly classified as quite as much as 65.1%, while the good category was 34.9%, and the less category was 0%. Based on the results of the test person / product moment in getting the results ($p = 0,000 < 0,05$, H_0 is rejected). Then it is known that there is an influence between the influence of pornographic access to adolescent sexual behavior in MTS X in Kalipare village. Accessing pornography is a deviant behavior, because it is expected to be the basis for making policies related to the use of social media in students as well as supporting government policies related to efforts to combat cases of sexual deviation.

Keywords: Pornography Accessibility, Sexual Behavior, Teenagers

INTRODUCTION

The development of information and communication technology has become one of the efforts to realize an advanced and intelligent generation of Indonesians. Information and communication technology can be used as a tool for students to expand their knowledge and develop themselves in order to achieve quality life. But on the other hand, the existence of communication and information technology tools actually creates a negative threat to children's behavior¹⁻⁴.

Indonesia in 2012 reached 60 million people or around 23.5% of the total population and of that number,

40% of them accessed the internet more than 3 hours a day. The number of internet users who use mobile phones reaches 58 million. Based on data obtained from Internet World Stats in 2012 Indonesia is the number eight largest internet user in the world after China, America, India, Japan, Brazil, Russia and Germany with a total of 55,000,000 users out of a total population of 359 million or as many as 2.3% of world internet users.

Internet users in Indonesia in 2014 have reached 82 million people. With these achievements, Indonesia is ranked 8th in the world. Of the number of internet users, 80 percent of them are teenagers aged 15-19 years. For Facebook users, Indonesia is ranked 4th in the world. The survey results from Frontier Consulting Group, adolescents aged between 13-19 years in six major cities in Indonesia in 2011 showed that 91.2% of teenagers have social media accounts. This percentage increased in 2012 where as many as 97.5% of teenagers had social

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media accounts⁵⁻⁷.

The mass media currently also shows a lot of shows that highlight the pornography aspect which is believed to be closely related to the increase in various cases of sexual violence. The progress of communication technology that occurs at this time, has resulted in almost no power capable of controlling or censoring news and entertainment including news or impressions that are included in the pornography category.

Data from Statistics Pornography shows that as many as 12% of sites on the internet contain pornographic content. Every second there are 28,258 people viewing pornographic sites and from all types of data downloaded on the internet 35% download content containing pornography. Data on age of access to pornographic sites aged 18-24 years is 13.61%, age 25-34 years is 19.90%, age 35-44 years is 25.50%, age 45 - 54 years is 20.67% and age 55 years and over as much as 20.32%, and the average age of children who first access porn site sites is 11 years.

Based on preliminary studies that have been carried out in MTS "X", the results show that the total number of 9th grade students is as much as 50 students consisting of A class with 25 students, class B with 25 students. According to one BK teacher, in the 2009/2010 school year there were 2 students who quit / resigned from school and it turned out that after being traced the student came out due to an unwanted pregnancy (KTD). in the 2015/2016 school year there was one student who was expelled from school because the student had an unwanted pregnancy (KTD). Researchers interviewed 25 students on the "X" MTS by asking the question "Do students access social media every day?", 90% said accessing social media every day and 10% said it was rare because they did not have the facilities to access social media. The purpose of this study was to determine whether there was an influence between pornographic access to adolescent sexual behavior in the "X" MTS kalipare.

RESEARCH METHOD

The design used in this study is quantitative descriptive, with a cross sectional study design. The population is all MTS X students as many as 150 students, with a sample of 109 respondents taken Simple

Random Sample using a questionnaire. Then analyzed by person/product moment test.

RESULTS

Subject Characteristics

Table 1. Characteristics of respondents in this study include age, sex, education, parent's job, access to pornography and sexual behavior.

No	Karakteristik	ΣN	Σ%
1	Age (year) 13-17	109	100
2	Gender Man Female	48 61	44 56
3	Education No school Elementary school Junior high school Senior high school University	10 43 34 18 4	9,2 39,4 31,2 16,5 3,7
4	Parent's job Government employees Employees Entrepreneur Farmer etc	3 14 22 50 20	2,8 12,8 20,3 45,9 18,3
5	Access to pornography Often Rarely Never	28 79 2	25,7 72,5 1,8
6	Sexual behavior Good Enough	38 71	34,9 65,1
	Total	109	100

STATISTICAL TEST RESULTS

Table 2. Pearson Statistical Test/Momet product Pornographic Accessibility With Sexual Behavior

Correlations			
		Access to pornography	Sexual behavior
Access to pornography	Pearson Correlation	1	.681**
	Sig. (2-tailed)		.000
	N	109	109
Sexual behavior	Pearson Correlation	.681**	1
	Sig. (2-tailed)	.000	
	N	109	109
**. Correlation is significant at the 0.01 level (2-tailed).			

The table above explains that the results of the product moment / Pearson analysis test obtained a p value of 0,000 then H0 is rejected and it can be concluded that there is an influence of pornographic access to adolescent sexual behavior in the “X” MTS Kalipare.

DISCUSSION

Pornography Accessibility at MTs “X” in Kalipare Village

According to this study that pornography access in the “X” Kalipare MTs is often as high as 25.7%, while the rare category is 72.5%, and the never category is 1.8%. Teenagers often engage in conversation around sex, promiscuity, love, recreation, and so on as a result of being accustomed to seeing pornographic scenes. Teenagers are often seen walking hand in hand, embracing the opposite sex, hugging in public places without being awkward and shy. The results of a survey conducted during 2010 by an NGO regarding the frequency of accessing pornographic sites in Indonesia showed that the Indonesian people were in the fourth place in the world who opened internet for pornographic sites. In 2008 and 2009, the survey showed that Indonesians accessing the internet with the keyword “sex” are usually between 14 and 16 years old and 30 to 45 years old and spread evenly throughout Indonesia.

Based on the research conducted by the author, there are students who conduct pornography behavior as there are students who abuse the internet to access pornographic things, there are students who save porn

videos from internet downloads on their mobile phones, there are students who watch porn videos at rest or at hours empty at school, there are students who imitate pornographic scenes due to accustomed to watching porn videos, there are students who are alone and embrace the shoulders in the school environment, and so on.

Adolescent Sexual Behavior at MTs “X” in Kalipare Village

According to the data presented in the previous chapter that adolescent sexual behavior in Kalipare “X” MTs is known that most are classified as sufficient, namely 71 respondents (65.1%).

Adolescent pornography behaviors are adolescent sexual behavior related to biological needs or sexual needs as well as things that influence it such as pornographic images and videos, which are based on emotional aspects that play a role namely sexual desire to get pleasure or enjoyment of sexual organs through intercourse, making love and dating. Another opinion says that the behavior of teenage pornography is all forms of sexual behavior that is influenced by pornographic content that gives rise to sexual fantasies that encourage someone to do pornographic behavior^{3,12,13} argues that in relationships especially during courtship, adolescents experience an increase in hormones inside themselves so that dreams or fantasies of sexual acts arise because of natural sexual desire, so that it requires channeling in a form of behavior. certain behavior.

The Influence of Pornography Accession to Adolescent Sexual Behavior in MTs “X” in Kalipare Village.

The results of the product moment / Pearson analysis obtained p value of 0.000 where 0,000 is less than 0.005, then H0 is rejected and it can be concluded that there is an influence of pornographic access to adolescent sexual behavior in MTS “X” Kalipare.

Increased sexual drive makes teenagers try to find various sexual information. From the information sources they managed to get, generally only a few teenagers get sexual ins and outs that are not necessarily appropriate, for example at school, discussing with friends, books on sex, mass media or the internet. Teenagers today can easily access sites, images or shows that smell porn through internet on their mobile phones.

Instilling religious norms is considered to have a very large role to face the globalization situation which results in a shift in the value of life. Teenagers who adhere to religious norms will be protected or able to withstand the adverse effects of their environment. In addition, sexual education can also be done to overcome adolescent sexual problems. Sexual education is a way of teaching that can help young people to deal with life problems because of sexual drive. This education intends to explain everything related to sex and sexuality in a reasonable form. In this case sexual education should ideally be given first time by parents at home, remembering that the one who knows best about the child’s situation is his or her own parents¹³⁻¹⁷.

CONCLUSION

From the results of the questionnaire on pornography access, the majority of respondents rarely access pornography as many as 79 respondents (72.5%).

From the results of the questionnaire on sexual behavior, it was found that the majority of respondents had enough sexual behavior as many as 71 students (65.1%),

The results of the statistical test Effect of Pornography Accessibility on adolescent sexual behavior from statistical analysis obtained Pearson test results of 0,000 where 0,000 is less than 0.005 then H0 is rejected and it can be concluded that there is an influence of pornographic access to adolescent sexual behavior in the “X” MTS Kalipare.

Ethical Clearance- Taken from STIKes Surya Mitra Husada committee

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Conflict of Interest – None

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Developmental and Growth Delays (Stunting) on Students of Salulayang Elementary School in Mamuju Regency

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ABSTRACT

Stunting in Indonesia becomes national problem because the percentage of stunting is above the tolerance which is only 20% set by the World Health Organization (WHO, 2010). Results of Basic Health Research (2013), the incidence of stunting nationally occurred about 30.7% in children aged 5-12 years. Stunting percentage in West Sulawesi Province is above the national percentage. The incidence of stunting is very closely related to zinc levels in the body that can be observed through hair. The study was a cross-sectional study, conducted on all students of Salulayang Elementary School in Mamuju Regency. Hair samples were examined in Makassar health laboratory using the AAS (Atomic Absorption Spectrophotometry) method. The results showed that hair zinc level with the incidence of stunting in elementary school children had no correlation with $p > 0.005$ because this study only have a small proportion of children who experienced stunting and school-age children were in static growth periods that is not too sensitive to detect zinc deficiency. Researcher needs more observation to find out correlation to hair zinc levels, such as environmental factors (air, soil, water) and infectious diseases.

Keywords: *Stunting, Zink Level, growth delay, environmental factors and infectious diseases.*

INTRODUCTION

Stunting is a growth delays in a child with an index of body length or height below -2 SD growth according to WHO. This occurs due to inadequacy food intake that insufficient as a daily need as well as frequent children experiencing infectious diseases during the first 1000 days of life¹.

Stunting in Indonesia becomes national problem because the percentage of stunting is above the tolerance which is only 20% set by the World Health Organization². Results of Basic Health Research (2013), the incidence of stunting nationally occurred about 30.7% in children aged 5-12 years. SEANUTS data shows that growth based on 4 indicators in pre-school children and school age in Indonesia is still below WHO standards³.

The main factor causing zinc deficiency is the inadequate daily intake of zinc. Low Zn absorption due to phytate fiber from vegetal foods, disease status (hypoalbumin, impaired zinc absorption and infection), and physiological status (rapid growth and pregnancy).

Zinc deficiency in children can result in loss of appetite, disorders of taste, growth disorders, alopecia, immune dysfunction, hypogonadism, long illness and cognitive impairment. Zn status measurement can be measured through various parameters such as plasma / serum levels, hair and red or white blood cells. The tissue that contains lots of Zn, is in the hair. Analysis of Zn level in hair can describe long-term Zn status, which is more sensitive and stable than Zn level in blood or urine⁴. Analysis of Zn levels in hair describes more accurately chronic-zinc levels in the past so it is appropriate to measure zinc levels in a long term of malnutrition.

The low level of zinc in infancy is visible in growth delay and lack of appetite which has an effect on hair zinc levels $< 1.07 \mu\text{mol/g}$ ⁵. Study in Malang Regency showed that there is a correlation between hair zinc levels and the incidence of stunting in elementary school children. Hair zinc levels show stable results, are not easily fluctuated, most trace elements have a high concentration of hair than the other parts of body⁶⁻⁷.

METHODS OF RESEARCH

Types of research

The type of research conducted in this study was analytic research using a *cross sectional study* design, to determine the correlation between independent variables (Zn levels in hair) and the dependent variable (Stunting incident) which was observed simultaneously at one time period.

Research sites

The study was conducted at Salulayang elementary School, Mamuju regency, with the consideration that the school was located outside Mamuju City and was a reflection of the native population of Mamuju Regency. It is contrast to elementary schools which are located in the center of Mamuju Regency with students coming from outside and from within Mamuju regency. Research was conducted in May to November 2016.

Population and Sample

The population and samples in this study were all students of Mamuju Regency Salulayang Elementary School by using total sampling technique. Samples taken were students in grades 1-5

Research Instruments

Anthropometry instrument consisting of weight scales in digital stepping scales with accuracy of 0.1 kg and a height measuring device that is *microtoice* with accuracy of 0.1 cm. Laboratory examination to determine zinc levels in children's hair. Measurement of zinc hair content was carried out in 2 stages: wet destruction process and reading of Atomic Absorption Spectrophotometer (AAS) which was taken for 3 times. Hair samples taken by cut around 4-5 cm from the scalp or if the hair is less than 4 cm, it is taken from the tip to the base of the hair. Hair is taken randomly in the occipital head using stainless steel scissors. Samples of hair taken are approximately 50-80 mg and stored in polyethylene

plastic. Samples of hair that have been collected are dried and washed with water and then put into Erlenmeyer and added 10 mL of aquaregia consisting of concentrated HCl (chloric acid) and HNO₃ (nitric acid) with a ratio of 3: 1. Then the hair sample is allowed to stand for 1 night, then heated until boiling using a hotplate until the hair sample is mixed, then it got to be cooled. Samples of hair that have been mixed into solvent are being diluted using aquadest to a volume of 25 mL. The solvent is a result from destruction of hair samples to be analyzed by AAS reading. AAS readings of hair zinc levels are expressed in parts per million (ppm).

RESULTS

The study was conducted at Salulayang Elementary School in Mamuju Regency during June - October 2016. The sampling technique was total sampling technique, by taking all students as many as 90 students as samples study. Salulayang Elementary School is one of the primary schools located in Mamuju District, Bambu Village, which is located on the Salulayang street. Salulayang Elementary School is one of the public elementary schools in Mamuju Regency.

This study began with an assessment of all students of Salulayang Elementary School in Mamuju Regency by doing anthropometric measurements in body weight (BB) and height (TB) of all students. Hair samples are used as a *biomaker* to determine zinc levels. Analysis of Zn levels in hair describes more accurately chronic-zinc levels in the past so it is appropriate to measure zinc levels in a long term of malnutrition. The hair sample taken from occipital head hair (back of the head) along 1.5 - 3 cm from the scalp with a total hair weight per sample of 0.3-0.5 grams. Examination of hair zinc levels using the Atomic Absorption Spectrophotometry (AAS) method with Perkin Elmer spectrophotometer at the Makassar Health Laboratory in August - October 2016.

Zink Levels (Zn) Toward Stunting

Table 1. Correlation between Zink Hair Levels and Stunting

Zn Level	Sample				Total		P ^a
	Stunting		Non-Stunting				
	n	%	n	%	n	%	
Less	5	71,4	2	28,6	7		0,12
Normal	33	40,0	50	60,0	83	100,0 100,0	

^aFisher $p < 0,05$

Table 1 shows that zinc levels in 83(92.2%) primary school students were normal and the results of statistical analysis showed $p > 0.05$ ($p = 0.12$) so that there was no correlation between the incidence of stunting and zinc hair levels on students. This research is similar with Oktiva BR, Adriyani M's research; Nur, R. et.,al^{8,9} that there is no difference in zinc levels.in toddlers either stunting or non-stunting. Zink (Zn) is a trace element that plays an important role for growth and reproduction, the immune system. The low regulation of growth hormone can inhibit linear growth. Zinc deficiency results in impaired bone development, delayed child sexual maturation, hair loss (alopecia), and vitality decreased.

Zinc in the hair can provide information on past nutritional status because zinc deficiency will affect hair growth. Analysis of zinc levels using hair is also more stable because it is not much affected by daily food intake and changes in zinc levels which occur in periods of 3-6 months or even more. High levels of zinc hair can be influenced by long-term diet, gender, age, coloring, shampoo, economic status, consumption of drugs, supplements, smoking habits and environmental status (air, water, soil)¹⁰⁻¹², The low level of zinc hair in children is an indicator of low zinc status in the body, but zinc levels in normal hair as in this study cannot fully describe the body's zinc status. High levels of hair zinc can also be influenced by external factors such as dust, dirt or shampoo, and has not been observed. Beside school age children is a relatively static growth period.^{13,14}

CONCLUSION

Hair zinc levels with the incidence of stunting in elementary school children have no correlation because the age of the sample is in a period of static growth as well as the level of zinc hair can be influenced by

external factors such as shampoo, dust, dirt.

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Ethical Clearance: Obtained from institute

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Implementation of Low Power LFSR's Design through the use of GDI Method

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ABSTRACT

The Linear Feedback Shift Register is utilized in testing for ASIC chips by producing pseudo random patterns. This compacts with low power LFSR's design through the use of GDI method. The GDI method is the low power technique utilized to executing the different advanced circuits. This method utilizes 2 transistors to configure quick and low power circuits with enhancement in features of power. The conventional and GDI technique is used to execute the LFSR in Cadence Virtuoso at 90nm technology. In previous work 4-bit LFSR is designed in cadence tool in 90nm technology and we are proposing the same work in 8-bit LFSR in 45nm cadence tool. The power and delay values are calculated and compared with traditional CMOS logic. Comparative analysis shows up to 45.4 % in power in Gate Diffusion Input technique. The area of the circuit is reduced in this technique when compared to CMOS. The analysis shows the 20% reduction in area. In chip manufacturing method, diminishment in size of chip retains great concern for power dissipation. The testing of low power has become a significant problem like power dissipation through testing mode will be high as compare with typical mode. Hence the GDI technique is most efficient than CMOS.

Keywords: Logic Gates, Transistors, CMOS technology, VLSI, Built in self test

INTRODUCTION

Linear Feedback Shift Register (LFSR) will be a shift register whose input bit is a linear function of its past state. The X-OR gate may be utilized to give response to the register¹ that moves from left to right. The maximum arrangement holds all probable state except the "0000" state. Typically XOR gate will be favored for linear function for single bits. Therefore, an LFSR is frequently a shift register whose input bit will be driven by the X-OR (Exclusive-or) of a few bits of the complete shift register value¹. An LFSR could a chance to be identified through its generator polynomial over a Galois field^{2,3}

The starting value of the Linear Feedback Shift Register is termed as seed. Since the procedure of the register is deterministic, the vast number of values happening from the register will be totally decided by its (or present) state. Correspondingly, the register has permanent probable conditions it should enter a rehashing cycle⁶. The arrangement of numbers made through LFSR or its X-OR counter segment might be treated as the natural binary code or Gray code⁷ the

settlement of taps for reaction in a Linear Feedback Shift Register could a chance to be proclaimed in finite field arithmetic with a polynomial of mod 2. The polynomial's coefficients should be 0's or 1's.

The vast number for Linear Feedback Shift Register's output may be dependent upon determinism. You might envisage the following state just when you recognize the current state and the sequence of the X-OR gates in Linear Feedback Shift Register. It will be not conceivable when irregular occasions happen. It will be significantly simpler to execute the following state, with minimal-length LFSRs, as there are just an effectively set amount of them to every length. The stream for yield will be reversible a LFSR for comparative taps will happen through the yield management in opposite order. Subsequent state just when you recognize the present state and the sequence of the X-OR gates in the Linear Feedback Shift Register. It is not probable when irregular occasions happen. It is much simpler with figure those next state, with minimal-length Linear Feedback Shift Registers, as there is only an effortlessly finite number of them for every length⁸. The stream of

yield may be reversible a Linear Feedback Shift Register with comparative taps will happen through the yield succession for opposite order.

Now-a-days power consumption is considered as a major design concern due to the fast development in the technology of portable devices and mobile communications that uses portable power supplies. The requirement of low-power systems has prompted the development of basic cells that are more power efficient. While making an attempt to decrease the power⁹ consumption, maintaining the high performance is the most challenging task. The intensified research efforts in low-power microelectronics.

The “VLSI systems” have been in demand due to massive growth in the usage of mobile communication devices and technology scaling. Today, there is a high demand for low-power small-area high-throughput circuitry for portable applications. Therefore, for microprocessor and system component design, circuits with low power consumption are the first choice. The battery technology does not increase at par with the microelectronics technology and for the mobile systems the available power is limited.

Executing and simulate of the LFSR in the GDI method and executing it in sub threshold, power consumption, and decreases the power and are delay product with respect to the conventional CMOS circuits. The binary logic has been broadly utilized in the electronic^{10, 11} fields. It is traditional and more than the multiple valued logic. Nevertheless, along the electronic industry and the information booming, the absences of binary circuits initiated to develop.

Proposed Architectures

In this chapter inverter, NAND gate, D-Flip Flop, X-OR gate and LFSR has been designed in Cadence Virtuoso tool. And their features are deliberated.

Inverter

The inverter is elementary gate in electronics. It contains of a PMOS (P-channel Metal Oxide Semiconductor) and NMOS (N-channel Metal Oxide Semiconductor) linked as shown in Fig.4.1. It yields the output that is the exact opposite of input. The working of inverter is same in GDI and CMOS technique.

CMOS based NAND gate

The NAND gate is the two input gate and the NAND gate is the universal gate. The NAND gate’s outcome is logically 1, when one of the inputs is low. Whether both the inputs are high then the output is logically 0.

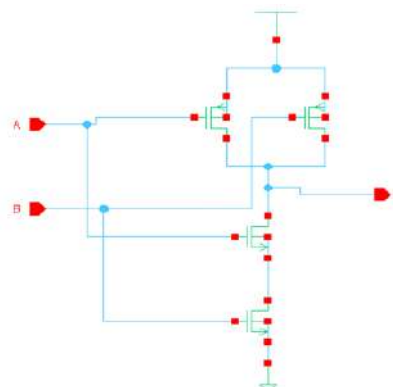


Figure.1. CMOS NAND architecture

CMOS based X-OR gate

The X-OR gate is two input gate. The X-OR gate’s output is logically 1, when one of the inputs is logic 1. If both the inputs are equal, that is logic 1 or logic 0. Then the output is logically 0.

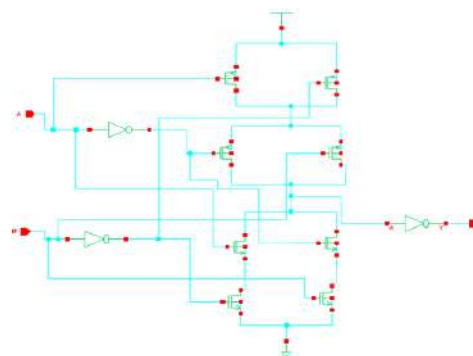


Figure.2. CMOS X-OR architecture

CMOS based D-flipflop

The CMOS D-Flip Flop contains 4 inputs. In which D & CLK are synchronous inputs and CLEAR & PRESET are asynchronous inputs. The D-Flip Flop’s output is depends on the CLR and PR values. The output is same as input when the CLK input is active low and PR & CLR values. CMOS D-Flip flop architecture.

GDI based X-OR gate

The GDI based X-OR consists of less number of transistors. The output of the GDI X- OR is logically 1, when one of the inputs is high. The output is logically 0, when both the inputs are equal that is either logic 0 or logic 1.

GDI based D-FlipFlop

The GDI D-Flip Flop has 3 inputs. In which D & CLK are synchronous inputs and PRESET is asynchronous inputs. The D-Flip Flop's output is depends on the PRESET value. The output is same as input when the CLK input is active low and Preset is low.

CMOS based LFSR

The Linear Feedback Shift Register is a shift register whose input bit is a linear function. It is a shift registers that when clocked changes the signal through the register from one flip flop to next flip flop.

The Linear Feedback Shift Register's primary value is termed as seed, and due to the procedure of the register may be deterministic, the arrangement of values generated by the register is totally confirmed by its present state. Similarly, due to the register has a limited number of probable states, it should inevitably enter a rehashing cycle. Nevertheless, a Linear Feedback Shift Register with a well-selected feedback function could transform an arrangement of bits that need a long cycle and that seems irregular in nature.

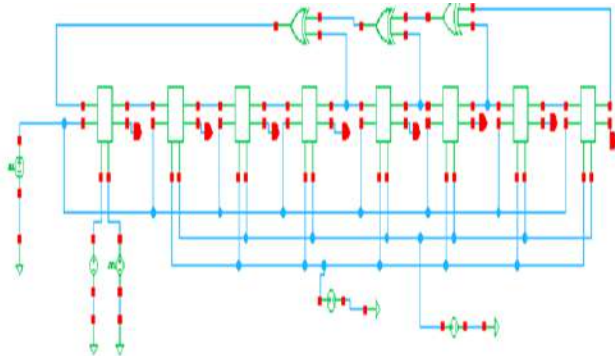


Figure 3. CMOS LFSR architecture

Several outputs are mixed in X-OR configuration to create a feedback device. A Linear Feedback Shift Register might be created by implementing X-OR on the yields of 2 or more flip flops together and serving those yields back into the input of one of the flip flops as depicted in Fig.3.

METHODOLOGY

GDI Architecture

The Gate Diffusion Input permits to execution of a extensive variety of complex logic functions utilizing two transistors only. The inputs are straightforwardly diffused under the gates PMOS, NMOS transistors.

Consequently, it is termed as a Gate Diffusion Input. This strategy is suitability for fast, the low power circuits decreasing to the number transistors as contrasted with CMOS⁴. This strategy will be dependent on the basic mobile as demonstrated in the figure.

GDI X-ORGATE

X-OR Gate is implemented and the comparison is done among typical GDI and CMOS methods and outcomes are stated. Among all the executed techniques Gate Diffusion Input consumes the least number of transistors and the least power. If one of the inputs is logic 1 then we will get the output as "1" if not the output is "0".

GDI Based Linear Feedback Shift Register

The Linear Feedback Shift Register is a sequential shift register whose input bit will be a linear function dissimilar to the majority commonplace gadgets whose operations and inputs are adequately predefined. The Linear Feedback Shift Register, when clocked changes the indicator through the register starting with particular case flip flop to next. A portion of the outputs are consolidated in X-OR configuration to structure a feedback mechanism. A linear Feedback Shift Register¹² might be shaped by executing the X-OR on the outputs of two or a greater amount of the flip flops together and bolstering the outputs back under the input of one of the flip flop.

LFSR is a combination of the logic circuits to generate a pseudo-random sequence of binary numbers. The LFSR X-OR gate is used as a feedback of series of flip flops. The generation of sequence depends on the choice of the taps given to X-OR. Primary value of Linear Feedback Shift Register is termed as seed value and the maximum sequence contains all possible states except the zero's states. The maximum length of the sequence is $2^n - 1$ where n is bitvector.

RESULTS

Input and Output Wave form of Inverter

The net (5) is the input pin and Y pin is the output pin. If the input signal is high or low the output will be inversion of the input signal. The Figure.4 below shows the input and output wave forms of the inverter.

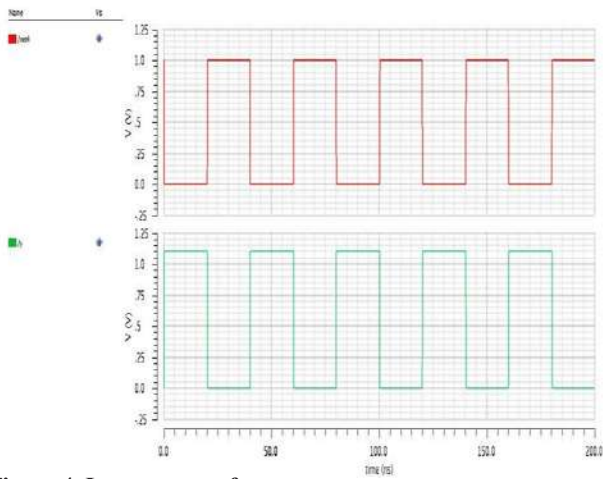


Figure 4. Inverter waveform

The above Fig.5.1 depicts the power consumption of Inverter is 9.20 Nano watts and the delay is 20.8 nano sec and the supply voltage is 1 volt.

Input & Output wave form of NAND Gate

It is a two input NAND gate. The input pins and Y pin is the output pin. If one of the input signals is low then the output will be high. The Fig.5 below shows the input and output wave forms of the NAND gate in CMOS.

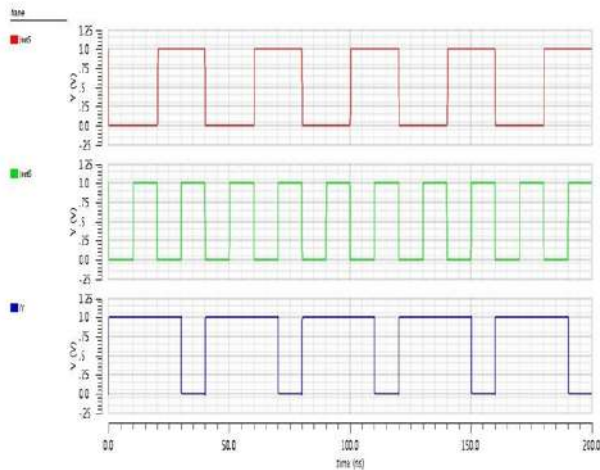


Figure.5. CMOS NAND waveform

Table.1. Comparison of power and delay values in NAND gate

Parameters	CMOS
Power (nw)	11.97
Delay (ns)	20.57

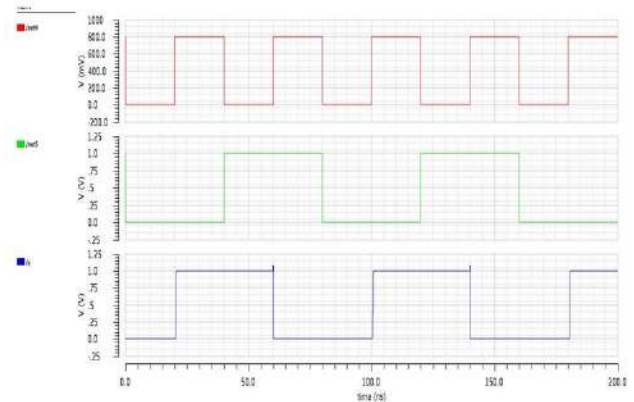
The above fig.5.2 it is evident the design of NAND gate in CMOS technique is an advantage of low power consumption. The power consumption of NAND gate in CMOS is 11.97 nano watts and the delay is 22.57 nano sec and the supply voltage is 1 volt.

Input and output waveform of X-OR inCMOS

It is a two input X-OR gate. The net (4) and net (5) are the input pins and Y pin is the output pin. If the input signal is 1 or 0 and 0 or 1 then the output will be high. The Fig.6 below shows the input and output wave forms of the X-OR gate in CMOS.

Input and Output Wave form of X-OR inGDI

It is a two input X-OR gate. The net (4) and net (5) are the input pins and Y pin is the output pin. If the input signal is 1 or 0 and 0 or 1 then the output will be high.



The Fig.6 below shows the input and output wave forms of the X-OR gate inGDI.

Figure.6. GDI X-OR waveform

Table.2. Comparison of power and delay values in X-OR gate

Parameters	CMOS	GDI
Power(nw)	14.15	9.34
Delay(ns)	25.5	15.08

The above Fig.5 it is evident the design of X-OR gate in GDI technique is an advantage of low power consumption. The power consumption of X-OR gate is 9.34 nano watts and the delay is 78.3 nano sec.

Table 3. Comparison of power and delay values in D-flip flops

Parameters	CMOS	GDI
Power(nw)	102.7	45.11
Delay(ns)	40.22	15.35

The above Fig.5 it is evident the design of D-flip flop in GDI method is an advantage of low power consumption. The transistors used for the D-flip flop in GDI and CMOS are not same. The power consumption of D-flip flop is 45.1 nano watts and the delay is 15.35 nano sec.

Table 4. Comparison of power and delay values in LFSR

Parameters	CMOS	GDI
Power(μ w)	17.22	6.71
Delay(ns)	65.97	25.25

The above Fig.6 It is evident the design of LFSR in GDI technique is an advantage of low power consumption. The transistors used for the LFSR in GDI and CMOS are not same. The power consumption of LFSR is 65.97 micro watts and the delay 25.25 nanosec.

Comparisons

Table 5. Comparison of CMOS and DELAY techniques

Parameters	Power(nw)	Delay(ns)	Number of Transistors
Inverter	9.20	20.8	2
CMOS X-OR	14.15	25.5	14
GDI X-OR	9.34	15.08	4
CMOS DFF	102.7	40.22	38
GDI DFF	45.11	15.35	20
CMOS LFSR	17.22	65.97	304
GDI LFSR	6.71	25.25	160

To analyze the 8-bit LFSR will be analyzed in table 5.5. The Investigation is carried at 45nm technology utilizing cadence virtuoso tool the yield waveform of the LFSR indicating the distinctive

arrangements acquired for circuit testing is showed in Figure 5.4. The correlation of DFF and Linear Feedback Shift Register in terms of number of transistors, delay and power utilizing GDI and conventional method is explained in table 5.4 and table 5.5. The execution of the circuit will be resolved in regard of power dissipation at 25 MHZ frequency is shown in Figure 5.8. The execution of the circuit may be resolved at supply voltage for 1 volt. The over table indicates development in power dispersal with expansion in supply voltage and recurrence of operation and additionally indicates the number of transistors need to configure GDI and CMOS.

CONCLUSION

A new GDI procedure to low-power configuration might have been introduced. An 8-bit CLA adder might have been created utilizing CMOS and GDI utilized as a test vehicle. Various high-level advanced circuits and logic gateways are executed in different techniques, and their experimental outcomes are deliberated. Correlations for existing TG systems and N-PG systems were conveyed out, demonstrating an dependent upon 45% diminishment for power-delay result in the test contribute GDI again CMOS Also huge upgrades the preferences about GDI method, specifically, Shannon-based outline algorithm, two-transistor usage of intricate logic functions, and in-cell swing rebuilding under specific working conditions, need aid exceptional inside existing low-power outline systems. This, together with sure estimation Also reproduction results, gives proof that GDI plan could improve the toolmaker about VLSI circlet designers. We trust that those exhibited comes about will sway further re- look exercises on the GDI strategy. Usage about different sorts for advanced and blended circuits must a chance to be conveyed out in request with figure out those fields for meandering the place GDI will be unrivaled over different styles.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Analysis of Image Segmentation of Magnetic Resonance Image in the Presence of in homogeneities

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ABSTRACT

The present work proposes the Image processing plays a vital role in medical diagnosis system. Out of various processing tools, image segmentation is very crucial in identifying the exact reason of disease. Image segmentation clusters the pixels into silent image regions i.e. regions corresponding to individual surfaces, objects or any part of objects. Various algorithms have been proposed for image segmentation. We have analyzed the various systems that have been developed to medical diagnosis analysis. Reviewing of these frameworks will be dependent upon level set strategies from claiming segmenting pictures. The theme, merits, faults from claiming Different frameworks will be talked about in this paper. Dependent upon that, another framework need been suggested to segmenting those MRI picture utilizing variety level situated calculation without re initialization for MRI image. Those framework could be used both to recreated and also genuine images.

Keywords: MRI, Segmentation Level set, Image processing

INTRODUCTION

Force level in homogeneity regularly happens previously, real-world pictures because of Different factors, for example, spatial varieties previously, brightening and imperfections from claiming imaging gadgets on particular, picture division might be extensively was troublesome to pictures with power previously, homogeneities because of those overlaps between the ranges of the intensities in the areas will fragment¹. This makes it incomprehensible will distinguish these locales in view of those pixel power. The individuals generally utilized picture division calculations generally depend around force homogeneity, Furthermore consequently would not appropriate with pictures with power in homogeneities. Clinched alongside general, power in homogeneity need been a testing challenge on picture division.

The level set method, initially utilized Concerning illustration numerical method to following interfaces What's more shapes¹⁴, need been progressively connected should picture division in the secret word decade^{2,4,5}. In the level situated method, forms or surfaces would spoken

to Likewise the zero level set of a higher dimensional function, as a rule known as An level situated capacity. For those level situated representation, those picture division issue could make figured Furthermore tackled Previously, a principled route In light of well-established scientific theories, including analytics of varieties and potential differential equations (PDE).

Most of region-based models need aid In light of the supposition about force level homogeneity. An ordinary sample will be piecewise steady (PC) models recommended over⁴, level situated techniques need aid suggested In light of a general piecewise smooth birch (PS) plan initially suggested Toward Mumford Furthermore shah¹³. These strategies don't expect homogeneity about picture intensities, Also consequently would equipped to section pictures for force level in homogeneities. However, these routines would computationally excessively awful exorbitant and need aid truly delicate of the introduction of the shape¹⁰, which incredibly cutoff points their utilities. Edge-based models utilize edge majority of the data to picture division. These models don't expect homogeneity from claiming picture intensities and along these lines could

make connected on pictures for power in homogeneities. However, this kind of strategies are as a rule truly touchy of the beginning states Also regularly endure from genuine limit spillage issues in pictures with feeble item limits.

In this paper, we recommend a novel region-based strategy to picture division. Starting with An for the most part acknowledged model from claiming pictures for force in homogeneities, we infer An neighborhood force level grouping property, What's more In characterize An neighborhood grouping paradigm capacity to the intensities to An neighborhood of every purpose. This nearby grouping paradigm is coordinated again those neighborhood focal point should define a vitality functional, which is changed over with a level set detailing. Minimization for this vitality will be attained toward an interleaved transform for level set advancement Furthermore estimation of the segregation racial inclination field. Concerning illustration a critical application, our strategy might be utilized to division and inclination revision about attractive reverberation (MR) pictures. Note that this paper may be a stretched out rendition for our preliminary fill in introduced in our meeting paper⁹.

Literature Survey

Mohamed Lamine ¹ the examination which addresses those infections of the mind in the field of the dream toward machine may be a standout amongst those tests as of late in medicine, the particular architects also specialists as of late propelled tests should do innovations for innovation pointed clinched alongside symbolism. This paper keeps tabs around another calculation for cerebrum division from claiming color pictures In view of fluffy order to diagnose faultlessly those area from claiming tumor and the region for epilepsy. Done a principal venture it returns by a fine division utilizing the calculation from (FCM). It At that point applies an test combination about fluffy classes. Those aftereffect may be a coarse segmentation, the place every locale is those unit for Primary locales developed from FCM. Those fluffy C-Means (FCM) grouping may be a iterative parceling strategy that produces ideal c-partitions. That standard FCM algorithm takes quite a while to segment an expansive information set. The recommended FCM system must peruse the whole information situated under a memory to transforming. Our Outcomes indicate that the framework execution will be hearty to diverse

sorts of pictures.

Matei MANCAS² our Scrutinize bargains for a semi-automatic region-growing division method. This system just necessities one seed inside the area for interest (ROI). We connected it to spinal line division at it also indicates outcomes to parotid organs or Indeed tumors. Moreover, it appears should a chance to be a all division technique concerning illustration it Might a chance to be connected for other PC dream domains that point medicinal imaging. We use both that thresholding effortlessness and the spatial data. Those gray-scale What's more spatial distances from the seed will every last one of different pixels are registered. By normalizing What's more subtracting with 1 we acquire that likelihood for a pixel to have a place with the same district Likewise the seed. We will demonstrate those calculation what's more demonstrate a few preliminary comes about which need aid swaying.

Weibei Dou[3]A skeleton from claiming fluffy data combination may be recommended in this paper to naturally section tumor regions about human mind starting with multispectral attractive reverberation imaging (MRI) for example, such that T1-weighted, T2-weighted Also proton thickness (PD) pictures. An from the earlier learning around tumors portrayed Toward radiology masters to diverse sorts from claiming mri will be extremely supportive with aide An programmed Also an exact division. However, the wording utilized toward radiology masters may be variable on expression about picture sign. So as to profit from claiming these descriptions, we recommend on modeless them toward fluffy models. Person fluffy model will be fabricated for one sort from claiming MRI succession.

Implementation

Level Set Formulation and Energy Minimization

Our recommended vitality to may be communicated as far as the districts. It will be troublesome with infer an answer of the vitality minimization issue from this statement about. In this section, those vitality may be changed over will a level situated plan Eventually Tom's perusing speaking to the disjoint locales with An number about level set functions, for a regularization term once these level set capacities. In the level situated formulation, that vitality minimization can make comprehended by utilizing well-established vibration routines ⁶.

$$\Omega_1 = \{x : \phi(x) > 0\}, \text{ and } \Omega_2 = \{x : \phi(x) < 0\} \quad (1)$$

Which structure a segment of the Web-domain? To that situation of, two or that's only the tip of the iceberg level situated works can a chance to be used to speak to locales. The level set plan of the vitality for the cases about and, called two-phase Also multiphase formulations, respectively, will be given in the next two subsections.

Two-Phase Level Set Formulation

We to start with Think as of those two-phase case: those picture area is fragmented under two disjoint areas and. In this case, a level set capacity may be used to speak to the two locales furthermore provided for toward (2).

$$M_1(\phi) = H(\phi) \text{ And } M_2(\phi) = 1 - H(\phi), \quad (2)$$

Respectively, the place will be the Heaviside work. Thus, for the situation of, the vitality in (3) might make communicated as those accompanying level set formulation.

$$\varepsilon = \int \left(\sum_{i=1}^N \int K(y-x) |(x) - b(y)c_i|^2 M_i(\phi(x)) dx \right) dy L(\phi) R_p(\phi) \quad (3)$$

Toward trading the request for integrations, we have.

$$\varepsilon(\phi, c, b) = \int \sum_{i=1}^N e_i(x) M_i(\phi(x)) dx \quad (4)$$

Where is the function defined by

$$e_i(x) = \int K(y-x) |I(x) - b(y)c_i|^2 dy. \quad (5)$$

The functions can be computed using the following equivalent expression:

$$e_i(x) = I^2 1_K - 2c_i I(b * K) + c_i^2 (b^2 * K) \quad (6)$$

Where is the convolution operation, and is the function defined by

$$1_K(X) = \int K(y-X) dy, \quad (7)$$

Which will be equivalent to consistent 1 all over but close those limit of the picture Web-domain. The over characterized vitality is utilized Likewise the information haul in the vitality of the recommended variation level set formulation,

$$F(\phi, c, b) = \varepsilon(\phi, c, b) + \nu L(\phi) + \mu R_p(\phi) \quad (8)$$

With $L(\phi) R_p(\phi)$ being the regularization terms as defined below. The energy term is defined by

$$L(\phi) = \int 1 \nabla H(\phi) | dx \quad (9)$$

Which computes the circular segment length of the zero level shape about and subsequently serves on smooth birch the shape Toward penalizing its circular segment period [4], [10] the vitality term will be characterized Eventually Tom's perusing.

$$H_\varepsilon(x) = \frac{1}{2} \left[1 + \frac{2}{\pi} \arctan \left(\frac{x}{\varepsilon} \right) \right] \quad (10)$$

$$\delta_\varepsilon(x) = H'_\varepsilon(x) = \frac{1}{\pi} \frac{\varepsilon}{\varepsilon^2 + x^2}.$$

$$R_p(\phi) = \int p(|\nabla \phi|) dx \quad (11)$$

For a possibility (energy density) capacity such-and-such to all, i. E. May be a base side of the point for. In this paper, we utilize the possibility capacity characterized toward. Obviously, for such an potential, those vitality will be minimized when, which will be those trademark of a marked separation function, called those marked separation property.

Energy Minimization With Respect to

For fixed and, the minimization of with respect to can be achieved by using standard gradient descent method, namely, solving the gradient flow equation

$$\frac{\partial \phi}{\partial t} = - \frac{\delta F}{\delta \phi} \quad (12)$$

Where is the Gateaux derivative (12) of the energy by calculus of variations we can compute the Gateaux derivative and express the corresponding gradient flow equation as

That same limited distinction plan to execute the DRLSE, Similarly as portrayed done¹¹, could be utilized for those level situated Development. Throughout the advancement of the level situated capacity as stated by, the constants Furthermore over and the segregation racial inclination field are updated Toward minimizing the vitality for admiration to Furthermore, respectively, which would portrayed The following.

3.3 Energy Minimization With Respect to:

For fixed and, the optimal that minimizes the energy, denoted by, is given by

$$c_i = \frac{\int (b * K) I u_i dy}{\int (b^2 * K) u_i dy}, i = 1, \dots, N \quad (13)$$

$$u_i(y) = M_i(\phi(y)). \quad (14)$$

Energy Minimization With Respect to:

Energy minimization can be denoted by

$$b = \frac{(IJ^{(1)}) * K}{J^{(2)} * K} \quad (15)$$

$$J^{(1)} = \sum_{i=1}^N c_i u_i \text{ and } J^{(2)} = \sum_{i=1}^N c_i^2 u_i$$

Note that those convolutions for a part work clinched alongside (15) confirm those gradually fluctuating property of the determined ideal estimator of the inclination field.

Numerical Implementation

That execution of our strategy may be straight forward. That level set Development in and can a chance to be executed by utilize that same limited distinction plan With respect to the DRLSE furnished clinched alongside¹¹. Same time we use a simple full area execution on actualize all the recommended level situated strategy in this paper, it will be worth pointing crazy that those limited band execution of the DRLSE, furnished in¹³, could be likewise utilized with execute those suggested method, which might extraordinarily decrease those computational cosset Also make those algorithm fundamentally quicker over those full area execution. Previously, numerical implementation, the Heaviside work may be traded by a smooth birch work that approximates, known as those smoothen Heaviside function, which is characterized by.

$$H_\epsilon(x) = \frac{1}{2} \left[1 + \frac{2}{\pi} \arctan \left(\frac{x}{\epsilon} \right) \right] \quad (16)$$

$$\delta_\epsilon(x) = H'_\epsilon(x) = \frac{1}{\pi} \frac{\epsilon}{\epsilon^2 + x^2}.$$

At each time step, the constant and the bias field are updated according to the above equation.

Notice that the two convolutions what's more to (16) for those calculation about likewise show up in the calculation for to the sum. An additional two convolutions also are registered to to that segregation racial inclination field. Thus, there need aid what added up to four convolutions will make registered toward every chance venture Throughout the Development

for. Those convolution portion may be constructed as a mask, for continuously the littlest odd amount such that, the point when will be characterized concerning illustration the Gaussian part for for example, provided for an scale parameter,

Magnetic Resonance Imaging (MRI)

MRI may be principally a restorative imaging strategy practically regularly utilized for radiology

should visualize point by point inward structure What's more restricted work of the figure. MRI gives a great part more excellent difference keeping the middle of those different delicate tissues of the physique over figured tomography (CT) does, making it particularly advantageous in neurological (brain), musculoskeletal, cardiovascular, Also ontological (cancer) imaging. Dissimilar to CT, it utilization no ionizing radiation, yet all the utilization and capable attractive field to adjust those atomic charge from claiming (usually) hydrogen atoms done water in the figure. Radio recurrence (RF) fields are used to deliberately change the arrangement from claiming this magnetization, bringing on the hydrogen cores to prepare a pivoting attractive field perceivable by the scanner. This sign could a chance to be manipulated toward extra attractive fields should develop enough majority of the data will build a picture of the muscle to.

Attractive reverberation imaging may be a generally new engineering. The initially MRI Images might have been distributed clinched alongside 1973 and the 1st cross-sectional picture of a existing mouse might have been distributed On January 1974. Those principal investigations performed for people were distributed for 1977. By comparison, that initially human X-beam picture might have been made clinched alongside 1895. Attractive reverberation imaging might have been created starting with learning picked up for atomic attractive thunder. On its right on time A long time the system might have been alluded with Concerning illustration atomic attractive thunder imaging (NMRI). However, as a result those expressions atomic might have been connected in the government funded mind for ionizing radiation introduction it may be by and large currently alluded should essentially as MRI. Researchers at present utilize the expression NMRI at examining non-medical units operating on the same standards. The term Magnetic Resonance Imaging (MRT) may be additionally at times utilized.

How MRI Works

Those physique is generally created from claiming water particles which every hold numerous two hydrogen nuclei or protons. At an individual device inside the capable attractive field of the scanner, those attractive minutes for a few for these protons adjust to those bearing of the field. A radio recurrence transmitter may be At that point briefly turned on, generating an electromagnetic

field. Done basic terms, the photons about this field need the polar right energy, known as the thunder frequency, should flip the turn of the adjusted protons. As that power What's more span of the field increases, a greater amount adjusted spins are influenced. Then afterward the field is turned off, those protons rot of the unique spin-down state and the distinction in vitality between the two states is discharged likewise a photon. It is these photons that prepare that indicator which can make distinguished by that scanner. The recurrence at which those protons resound relies on the quality of the attractive field. Concerning Representation a delayed consequence regarding insurance to energy, this also dictates the individuals repeat of the released photons. It is this relationship the middle of field-strength Also recurrence that permits the utilization for atomic attractive thunder to imaging. Extra attractive fields need aid connected Throughout the examiner in place will settle on those attractive field quality rely on upon those position inside the patient, giving An clear strategy on control the place the protons are energized Toward those radio photons. These fields would make by passim electric ebbs and flows through solenoids, known as gradient coils. Since these coils would inside the exhaust of the scanner, there will a chance to be substantial power the middle of them and the fundamental field coils, handling a large portion of the clamor that is listened throughout operation. Without endeavors should hose this noise, it might methodology 130 decibels (the human ache threshold) for solid fields ⁷.

RESULTS AND ANALYSIS

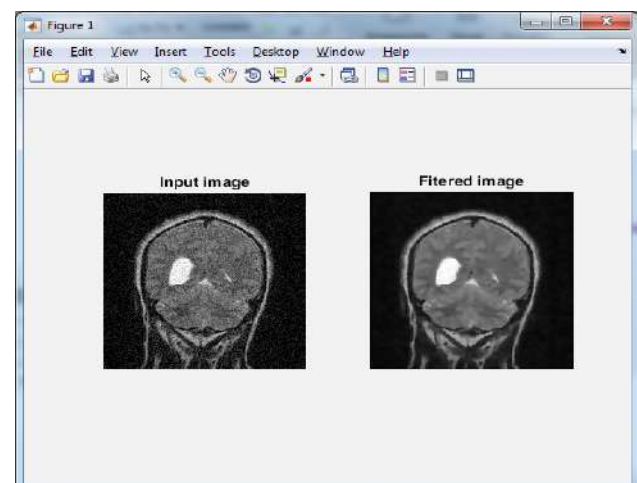


Figure .1.Selected Input Image, Filtered Image

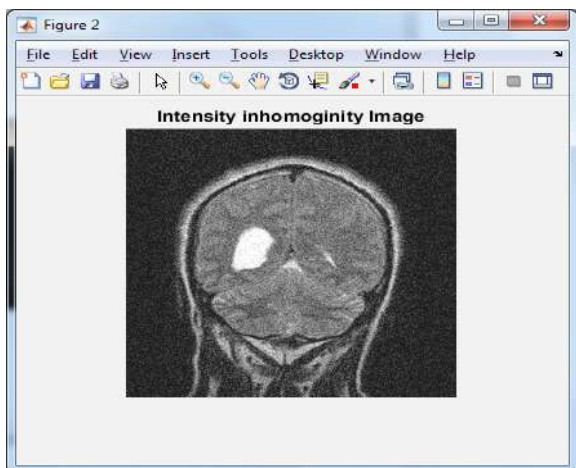


Figure.2. Intensity Inhomogeneity Image For Given Input Image

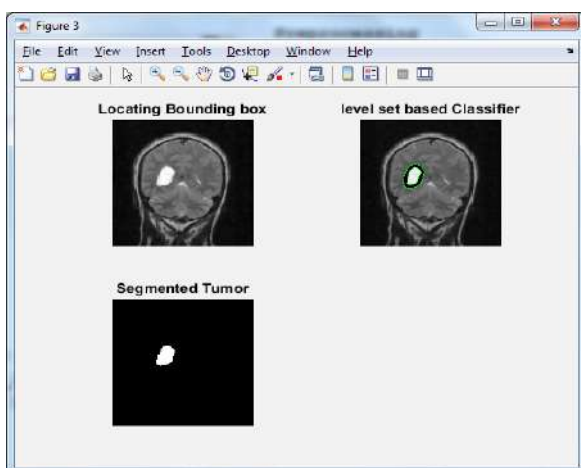


Figure.3. Locating Bounding Box, Level Set Based Classifier, Final Segmented Tumor

CONCLUSION

We have introduced a variation level set structure to division Also inclination revision from claiming pictures with force in homogeneities. Dependent upon a by and large acknowledged model of pictures for power in homogeneities Furthermore a inferred nearby power grouping property, we characterize vitality of the level set works that speak to An segment of the picture space Also An inclination field that accounts to those force level in homogeneity. Division Also inclination field estimation need aid subsequently mutually performed toward minimizing the recommended vitality practical. Those gradually changing property of the inclination field inferred starting with the suggested vitality is characteristically guaranteed by the information term done our variation framework, without the requirement to force a express smoothing haul on the segregation racial inclination field. Our system is significantly that's only the tip of the iceberg hearty will introduction over

the piecewise smooth birch model. Test outcomes bring exhibited predominant execution of our system As far as accuracy, efficiency, and heartiness. Likewise an application, our system need been connected to MRI picture division and inclination revision for guaranteeing outcomes.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Monitoring and Controlling of Pest in Agriculture Plantations using Pre Processing algorithm

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ABSTRACT

Mon cropped plantations need aid interesting with India furthermore a handful for nations for that globe. Essentially, the woodland methodology of developing espresso alongside clinched alongside India need enabled the plantation on battle a lot of people outbreaks from claiming pests Also maladies. Mono edited ranches need aid under consistent danger about bother and ailment occurrence on it favors that development about bother populace. On adapt to these problems, a programmed bother identification algorithm utilizing image transforming strategies for MATLAB need been suggested in this paper. Picture procurement gadgets need aid used to procure pictures from claiming ranches at general interval. This pictures are afterward subjected should pre-processing, conversion and grouping.

Keywords: Image Processing, Matlab, cluster method

INTRODUCTION

Today present are more than 250 natural pesticides and many formulations. The espresso industry shockingly depends on these toxins on protect those plant and berries from creepy crawly ambush and ailment spread. Over a portion propelled nations flying showering about these unsafe chemicals will be conveyed away to keep on work expenses. The majority, farmers support the utilization for expansive range pesticides. These need aid that's only the tip of the iceberg hazardous over systemic pesticides in light of they follow up on numerous insects both gainful what's more unsafe. There is each possibility that these chemical can effectively float alternately get wash or leached by overwhelming shower and achieve groundwater or release estuaries there toward defiling the earth's valuable water save ¹ yet, the development from claiming these harvests to ideal yield What's more nature transform will be exceedingly specialized foul. A considerable measure for Scrutinize need was done once greenhouse agro system ²

Furthermore more by around secured products will control pests a and maladies by living implies As opposed to pesticides. Examination On farming will be meant towards build of benefit What's more sustenance

personal satisfaction at decreased consumption and with expanded profit, which need gained vitality over later run through. A strong demand currently exists to numerous nations to non -chemical control techniques for pests alternately ailments. Nonetheless no automatic strategies would accessible which decisively and occasionally recognize the pests on plants. To fact, on generation conditions, greenhouse disappointments and outrage on his/her staff occasionally observe plant life and look for pests. This physical technique is the long run devouring. For those late headway clinched alongside image transforming example different techniques³ it is could reasonably be expected should create a self-sufficient framework for sickness order of crops.

In this paper, we concentrate on initial bother identification. In this infers on consistently watch the plants. Ailment pictures need aid procured utilizing cameras alternately scanners. At that point the procured picture need should make transformed to interpret those picture substance toward image transforming systems. That center for this paper may be on the translation for picture to pest detection.

Image Segmentation

On PC vision, division may be that methodology from

claiming parceling an advanced picture under various segments (sets from claiming pixels, otherwise called super pixels). Those objectives from claiming division will be to improve or change the representational from claiming a picture under something that is that's only the tip of the iceberg serious and simpler on investigate ⁴. Picture division is regularly used to spot Questions and limits (lines, curves, and so on) in pictures. Additional precisely, picture division will be the transform from claiming relegating a name on each pixel over picture such-and-such pixels with the same mark offer specific visual qualities.

The outcome of picture division will be a set from claiming segments that all things considered disguise the whole image, alternately a set of forms concentrated from that picture. Each of the pixels done a locale will be comparative with admiration to some trademark alternately registered property, for example, color, intensity, or texture.

Clustering Method

This will be an iterative strategy that is used to segment a picture under groups. System of grouping technique may be clarified to figure.1. Groups can a chance to be chosen manually, randomly, or In view of exactly states. Separation the middle of those pixel and bunch focal point may be computed toward those squared alternately supreme Contrast among a pixel and a cluster centre.

Groups might be chosen manually, randomly, alternately In view of a few states. Separation between the pixels what's more group core will be ascertained toward the squared or supreme Contrast the middle of a pixel What's more a group focus ⁵. That distinction is regularly In view of pixel color, intensity, texture and location, or a weighted blending from claiming these components. All the more regularly utilized grouping calculations are k – implies algorithm, fluffy c-means algorithm, desire – expansion (EM) calculation. The personal satisfaction of the last come about of the grouping system relies mostly on the starting situated from claiming groups. Since the algorithm is greatly fast, an aggregate system may be will run those algorithm a few period and choose the greatest grouping possible ⁶.

A deterrent of the grouping calculation will be that that amount from claiming group's k may be an information parameter. A not right decision from

claiming k might yield poor comes about. The algorithm likewise accepts that the difference is a suitable measure about bunch scramble. The Emulating system might be utilized will discover the bunch centers.

The place k is a parameter of the algorithm (the number of groups should a chance to be found), i iterates through those every last one of intensities, j iterates again every last one of cancroids and μ_i are those centric intensities. The k-means grouping might have been developed clinched alongside 1956. That large portion widely recognized structure of the algorithm ⁷ utilization an iterative refinement heulandites known as Lloyd's calculation. Since the calculation is greatly fast, a normal system is should run the algorithm a few times and return the best grouping found.

Advantages of k-means clustering

Specifically when utilizing heuristics for example, Lloyd's algorithm will be rather simple to actualize all that apply significantly with respect to vast information sets. Similarly as such, it need been effectively utilized within Different topics, extending from market segmentation, workstation vision, geo-statistics to farming worker. It regularly is utilized concerning illustration a pre-processing step to other calculations. To example, on discover a beginning setup. Other existing strategies to picture division would layering based, histogram based, district developing techniques, edge detection, part Furthermore blend methods, In view of fractional differential equations etc.

Proposed Method

That division calculation alone can't provide for worthy gainful way output, it necessities pre-processing dare. Pre-processing could contain to distinctive steps for example, de-noising Furthermore picture overhaul. De-noising outfitted to those rank filter ⁸, which great suitor for the individuals trouble picture. It will be non-linear filter, which preserve those shape, edge likewise other information without nonattendance of clarity (Kritsomkanth, 2011), (R m Hodgson 1985). Due to the individuals irregularities Furthermore drawbacks with trouble images, it will be necessary will fuse the individuals pre-processing wander in front from claiming the individuals division technique for those bore Besides accurate yield. The individual's suggested framework may be shown through ⁹. Figure 1.

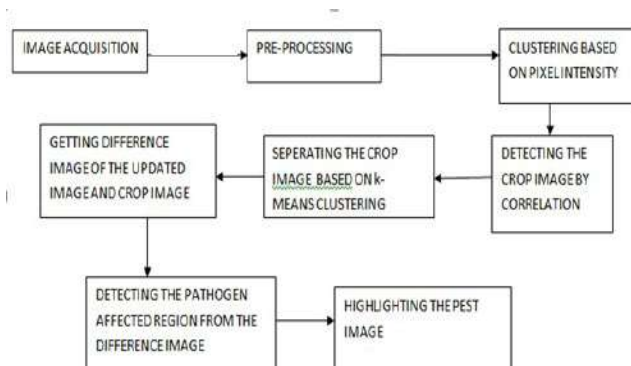


Figure.1. block diagram for the proposed method

In the recommended method, pre-processing will be included in the recent past the division and volume estimation may be included after those division. Likewise a picture subtraction step will be included then afterward those calculation. Recommended system diminishes those issues because of noises Furthermore different irregularities done procured pictures also likewise it succeed the Hindrances in force Previously, homogeneity Furthermore artifacts, and so forth throughout this way, observing and stock arrangement of all instrumentation may be given as

RESULTS AND ANALYSIS



Figure 2. Selection of coffee plantations affected with pests

The figure 3 indicates the ROI determination of a localized necrosis area. This Choice serves should investigate the necessary locale alone. In this method, the pixels inside that rectangular masjid alone would take and the remaining pixels are cleared out. It completed by consistently catching those field pictures.

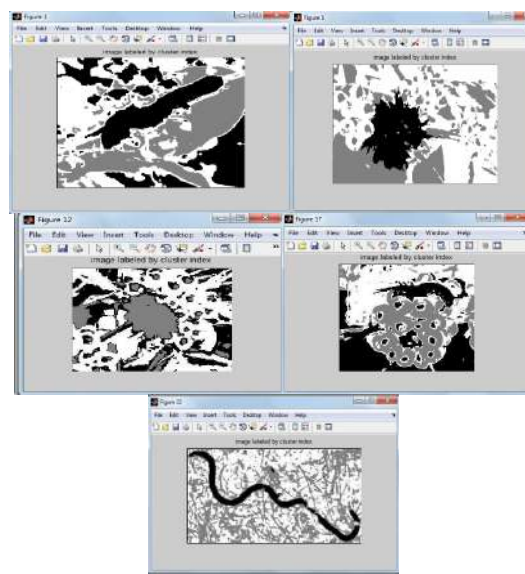


Figure.3. clustering based on intensity and threshold separation

Clustering To Separate Plant and Pest

Masking and removing green pixels

Masker intends setting the pixel quality done a picture will zero alternately some other foundation worth. In this step, we identify mostaccioli those green colored pixels. Following that, In view of specified edge worth that is registered for these pixels. Those green segments of the pixel intensities would situate should zero though it may be under those pre-computed edge esteem. Afterward red, green What’s more blue segments about this pixel would be out zero esteem by mapping RGB segments. The green colored pixels mostaccioli represent able the solid territories of the leaf beet Furthermore they don’t include any profitable weight to malady ID number.

Segmentation

From the over steps, those contaminated bit of the leaf beet may be concentrated. Those contaminated area is then fragmented under a number of patches for rise to measure. In this methodology atavism span for 32X32 will be made.

Obtaining Useful Segments

In this step the advantageous segments are given span of the atavism may be picked in such an approach that that huge majority of the data may be not lost. Not at segments hold numerous huge sums for data. Along these lines the patches which need aid hosting more than fifty percent of the majority of the data need aid taken

under represent the further Investigation.

CONCLUSION

The utilization for simulated insect sprays also nematicides have been debasing the nature for plantation yields for a significant number a considerable length of time. In this paper a novel algorithm may be exhibited for effectively recognizing those bother contaminated regions for these harvests. That algorithm might a chance to be further changed to finding the ailing regions in the harvests Eventually Tom's perusing utilizing complex software's and better picture securing units. Everywhere the universe farming masters would attempting on destruction from claiming bioagressors What's more contaminated espresso plantation would a standout amongst the tests crazy from claiming it. Image transforming procedure assumes a basic part On it. Our principal objective may be should recognize infections similar to espresso berry on ranches What's more different bioagressors (aphids) or plant infections.

Cognitive methodology introduces new Questions will identify alternately new image transforming projects on extricate those relating data. We recommend a unique methodology to initial identification of the bother once harvests. To recognize living Questions around an intricate background, we consolidated scanner picture acquisition, inspecting optimization, What's more propelled cognitive dream. It illustrates those coordinated effort about reciprocal controls What's more techniques, which prompted a automated, hearty What's more versant framework. The model framework demonstrated dependable for fast identification about pests. It is rather straightforward to utilize Furthermore exhibits the same execution level as a established manual approach. Our goals instead on better spot the beginning focuses about bio a gressors strike What's more to check these Along these lines that essential move could be taken.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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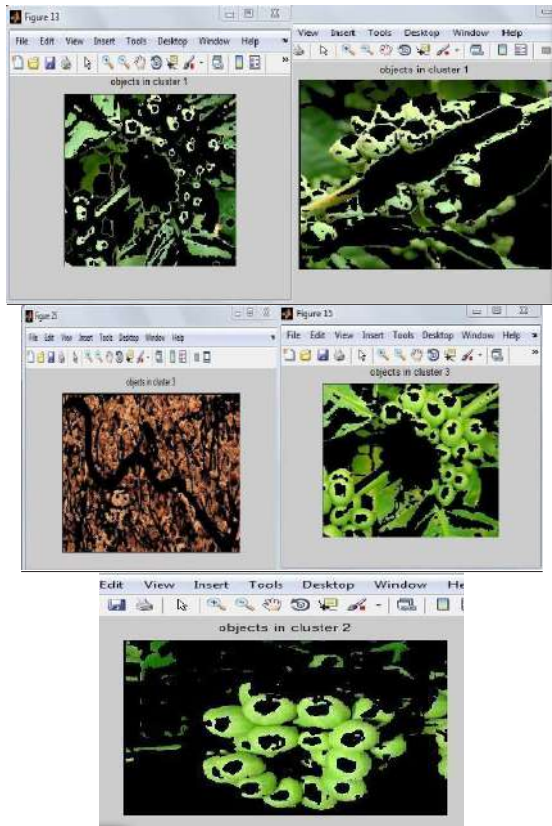


Figure.4. Clustering to separate plant areas

Final Clustering To Separate Pest Images Based On Image Subtraction

Those last grouping called differential grouping is finished toward subtracting those bunched plant picture from those obtained picture. Hence from that distinction image, we acquire the bother picture likewise indicated.

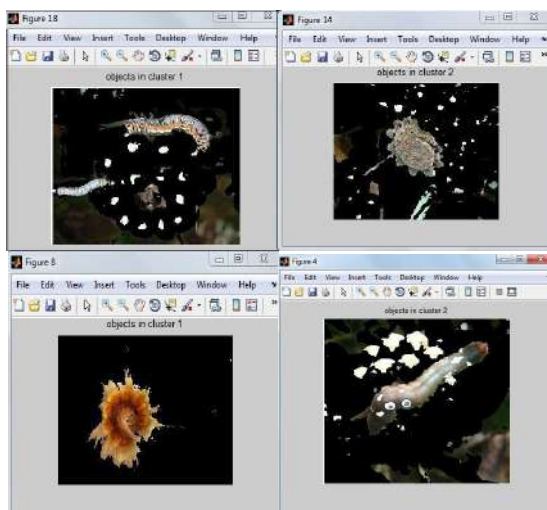


Figure.5. final clustered image of the pest

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Analysis of Conical Dielectric Probe is Used to Identify the Defective Skin Phantom

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ABSTRACT

The Conical dielectric probe (CDP) will be an effective method for analysis for mankind's tissue sickness like initial stage of skin cancer. This sick will be greatly treatable when skin cancers are distinguished initially and removed utilizing non-invasive skin tumor identification devices such as dielectric probes. To detect the dielectric probes, cancers could use a millimeter wave with of either 95 GHz or 35 GHz frequencies. This millimeter wave has a sensitive reflective response to water content in that it utilizes a method of identifying skin cancers. Such cancers have and parameter over that of healthy skin, and the probes spot cancers by recognizing these abnormal S-parameters utilizing COMSOL Multi physics software. Through experiment, evaluating the use of CDP and assure its protection as an optional for detecting the cancers of skin.

Keywords: Dielectric Probe, Defective skin, COMSOL Multi physics, Heat transfer module, RF Module.

INTRODUCTION

The COMSOL Metaphysics will be a cross-platform finite element analysis, Multi physics simulation software. The COMSOL gives unified workflow and IDE for chemical, mechanical, electrical, and fluid provisions. Alive link for MATLAB and API for java might a chance to be utilized to manage the software externally, and the same API is likewise utilized through the Method¹ Editor.

The COMSOL holds an App Builder that might be utilized to progress the independent domain- specific applications with custom user-interface. Clients might utilize drag-and-drop devices or programming. Particular offers might a chance to be included from the model or new offers might make presented through programming. It also holds a Physics Builder to make custom physics-interfaces available from the COMSOL desktop with the same look-and- feel as the built-in physics interfaces.

The COMSOL server ² is the engine and software for running simulation applications and the stage for handling their distribution and deployment. Client formed applications could be run in COMSOL server through Windows-installed client. Svante Littmarck and Farhad Saeidi start the COMSOL in July 1986 at

the Royal Institute of Technology (KTH) in Stockholm, Sweden. Numerous components are accessible for COMSOL, characterized according to the application regions, namely Fluid, Mechanical, Electrical, Chemical, Interfacing, and Multipurpose³.

METHODOLOGY

The reaction of a millimeter wave with frequencies of 35GHz and 95GHz is known to be delicate to content of water. This method utilizes a low-power 35GHz ka-band millimeter wave and its reflectivity to humidity for non-invasive cancer analysis. Since skin tumors hold more humidity over healthy skin, it prompts stronger reflections on this frequency band. Subsequently the probe identifies abnormalities in terms of S-parameters during the tumor areas. A circular waveguide at the dominant mode and conically decreased dielectric probe are rapidly analyzed, alongside the probe's radiation ⁴ characteristics, utilizing a 2D hub symmetric model. Temperature variety of the skin and the portion about necrotic tissue dissection would likewise perform too.

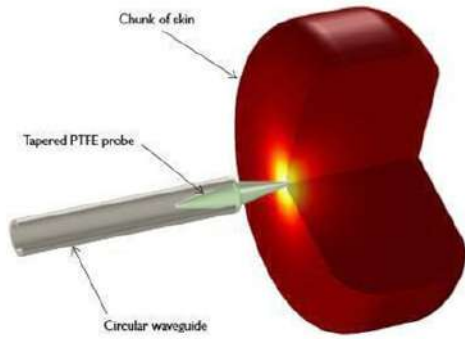


Figure.1. 3D Visualization of the 2D Ax symmetric model
Model Definition

The model contains of a tapered PTFE dielectric rod, a metallic circular waveguide, and a phantom of a skin chunk. The entire model is enclosed by an air domain which is truncated at its outermost shell with PML (perfectly matched layers) to absorb any radiation directly from the rod or reflected from the skin phantom.

One end of the waveguide is terminated with a circular port and excited using the dominant TE_{1m} mode, where m is the azimuthal mode number of this 2D axisymmetric model ⁵ defined as 1 in the Electromagnetic Waves, Frequency Domain physics interface settings. The other end is connected to a tapered conical PTFE dielectric (ε_r = 2.1) rod. The shape of the rod is symmetrically tapered so the radius is increasing from the inside to the outside of the waveguide, then it is decreasing gradually for the impedance matching among the air domain and the waveguide. There is a ring structure in the middle to support the rod on the rim of the waveguide ⁶. The tip of the rod is touching the skin phantom. The conductivity of the metallic waveguide is assumed to be high enough to neglect any loss and is modeled as PEC (perfect electric conductor). With the given radius of the waveguide and excited TE mode, the cutoff frequency is around 29.3 GHz, which is calculated by

$$f_{cm1} = \frac{c_0 p'_{nm}}{2\pi a} \quad (1)$$

where c₀ is the speed of light, p'nm are the roots of the derivative of the Bessel functions J_n(x), m and n are the mode indices, and a is the radius of the waveguide. The value of p' 11 is approximately 1.841.

The operating frequency of the probe, 35 GHz, is higher than the waveguide cutoff frequency. The

excited wave is propagating along the waveguide. The circular port boundary condition is placed on the interior boundary where the transmission characteristics and reflection characteristics are computed automatically in terms of S-parameters. The interior port boundary with PEC backing for one-way excitation requires the slit condition. The port orientation is identified to describe the inward direction for the S-parameter calculation. First, the electromagnetic properties of the model are analyzed without a phantom to check the design validity of the waveguide and dielectric rod. Then, complexity is added, first with a healthy phantom, then a phantom with a skin tumor ⁷.

Though the waveguide excited by low power is expected to be harmless, its effect on necrotic tissue is reviewed by studying Bio-heat Transfer as well as temperature, over a 10 minute period. The real part of the electric field E_r excited from one end of the waveguide without a phantom is shown below. Its radiation pattern is visualized in the Modeling Instructions section.

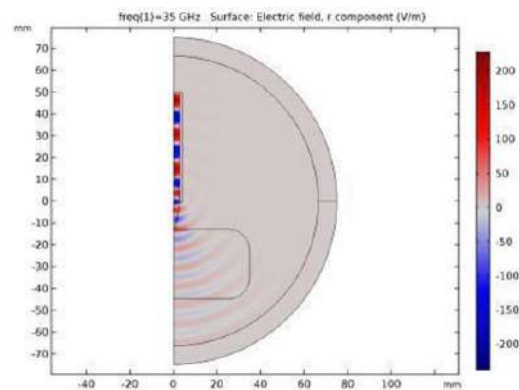


Figure.2. Wave propagation from the dielectric rod plotted with E Temperature change on the surface of the phantom with the tumor is plotted as shown.

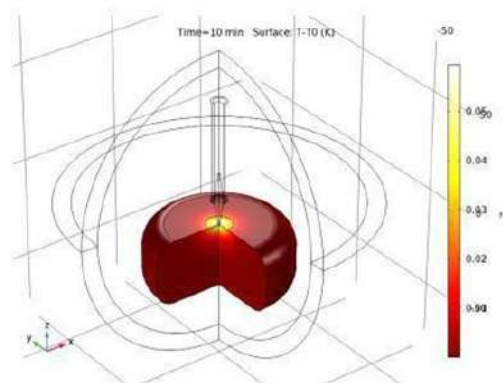


Figure.3. The temperature after 10 minutes

Since the input power from the waveguide port is low, 1mW, the temperature change is within 0.06° even after 10 minutes of millimeter wave exposure. The color

difference shows the relatively hotter spot where the temperature is still very close to the initial temperature, 34 °C. Though the temperature analysis for the healthy phantom case is not included, it is easily expected that the temperature variation is less than the case with the tumor because the resistive loss should be lower due to the smaller imaginary part of the permittivity of the healthy skin ⁸. So the visualized temperature profile is the worst-case scenario of temperature increase among all three cases ⁹. The damaged tissue ratio is visualized in Figure 3. It shows that the effect of the low-power millimeter wave is negligible.

The computed S-parameters indicate more reflection when touching the skin with the tumor due to its higher moisture content, and they are approximately summarized below:

The electromagnetic material properties of skin and tumor at 35 GHz are approximated to show the feasibility of the S-parameter method by detecting the areas with higher moisture content. For any further research, extracting accurate data in the given frequency range is recommended.

Implementation

In the Model Wizard window, click on 2D Axisymmetric.

In the Select Physics tree, choose Radio Frequency>Electromagnetic Waves, Frequency Domain (EMW).

Click Add.

Click Study

In the Select Study tree, choose Preset Studies>Frequency Domain. Click on Done.

Global Definitions

Name	Expression	Value	Description
r1	.003[m]	0.003 m	Waveguide rad
fc	1.841*c_const/2..	2.928E10 1/s	Cutoff frequen
f0	35[GHz]	3.5E10 Hz	Frequency
lda0	c_const/f0	0.0085655 m	Wavelength, fre
l_probe	12.0[mm]	0.0120 m	Tapered probe
w1_probe	3[mm]	0.003 m	Tapered probe
w2_probe	0.50[mm]	5.0E-4 m	Tapered probe
T0	34[degC]	307.15 K	Initial skin temp

Parameters

On the Home toolbar, click on Parameters.

In the Settings window for Parameters, locate the Parameters section. In the table, enter the following settings:

STUDY1

Step1: Frequency Domain

In the Model Builder window, under Study 1 click Step 1: Frequency Domain. In the Settings window for Frequency Domain, locate the Study Settings section.

In the Frequencies text field, type f0.

GEOMETRY1

In the Model Builder window, under Component 1 (comp1) click Geometry 1.

In the Settings window for Geometry, locate the Units section. From the Length unit list, choose mm.

Circle1 (c1)

On the Geometry toolbar, click the Primitives and select the Circle.

In the Settings window for Circle, locate the Size and Shape section. In the Radius text field, type 75.

In the Sector angle text field, type 180.

Locate the Rotation Angle section. In the Rotation text field, type 270. Click to expand the Layers section. In the table, enter the following settings:

RESULTS & ANALYSIS

Far Field, 3D plot with actual parameters and respective s-parameters:

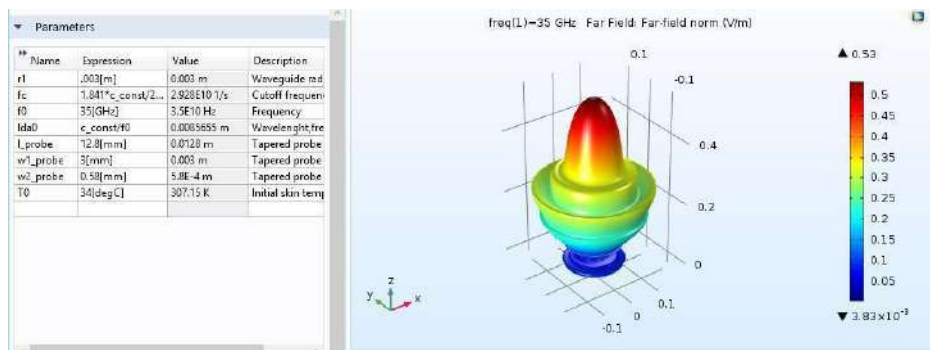


Figure.4. Comparison of actual parameters with low and high values and respective s-parameters Tapered probe width-1 Tapered probe width-1 (low value)

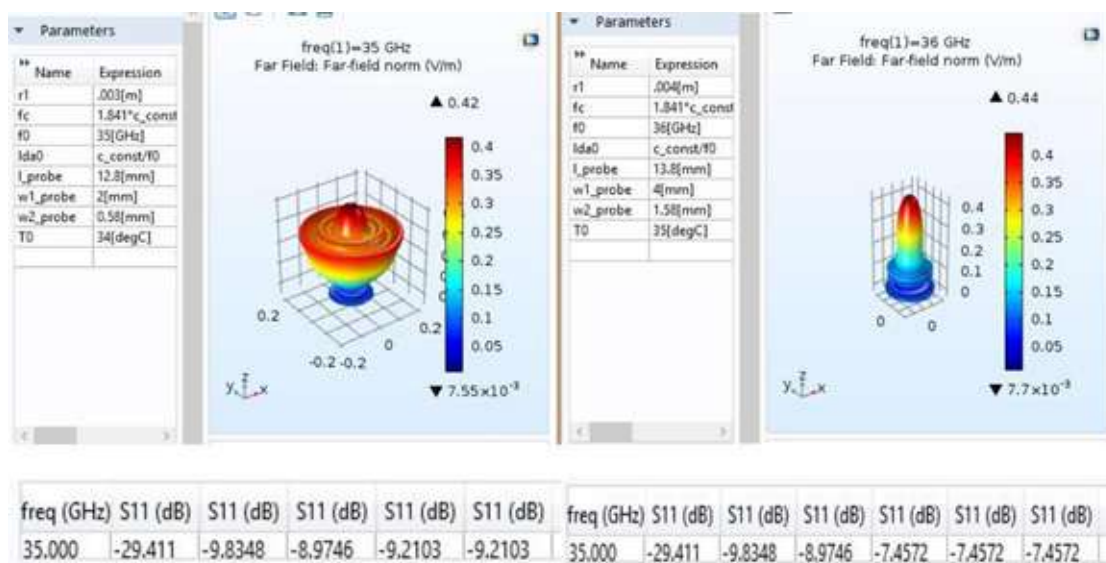


Figure.5. Tapered probe width-1(low value)

Temperature

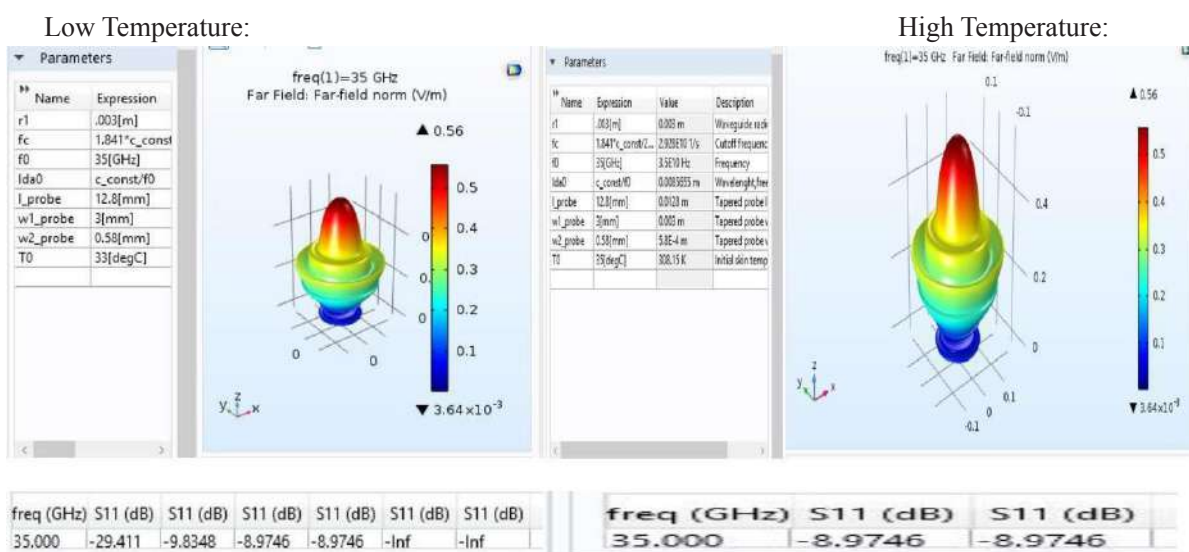


Figure.6. Here the actual parameters are compared with its low and high values of radius cut of frequency, length, tapered width-1, tapered width-2, temperature and s-parameters

CONCLUSION

By analyzing various values of parameters, we observed that the variation in the actual parameters causes great effect on skin and the tissues can be damaged. The computed S- parameters indicate more reflection when touching the skin with the tumor due to its higher moisture content. The electromagnetic material properties of skin and tumor at 35 GHz are approximated to show the feasibility of the S-parameter method by detecting the areas with higher moisture content. Thus defected skin phantom are detected by the conical dielectric probe.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Integration of Unobservant Web Information for Enhanced Information Retrieval System

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ABSTRACT

Present majority of the data recovery procedure concentrate in downloading web content and also examine the indexing starting with surface web, exist about interlinked HTML pages. Majority of the data recovery has limits no information behind the query interface. Response relies on the uncertainty in arraigning the previous dialog and arrange for those data information in web. In this paper we recommended methodology depend on selection and coordination of unobservant web and our suggested algorithm is efficient for that method. We demonstrate through the experiment result our result is more successful. Unobservant web seeking contributes of the improvement of a general development.

Keywords: *Unobservant web, Information retrieval, resource selection, integration of unobservant web.*

INTRODUCTION

That unobservable Web eludes all the on WWW content that is not part from that surface Web Also it will be inaccessible will preservationist quest engines On account it resides for free databases behind portals as opposed around html pages. It is predictable Eventually Tom's perusing brilliant Planet that the unobservable Web is various requests for extent better than the surface Web, and the unobservable Web might have been expanding considerably more quickly over those surface Web ^{1,2}. Despite the fact that some of the fulfilled may be not open to the widespread public, splendid Planet predictable that 95% of the unobservable Web can a chance to be accessed through specific hunt. As stated by Deep(invisible) Web investigate 2008 by Marcus p. Zillman ³, those profound Web blanket all over in the region for 900 billion and present Google Look into uncover an ever increasing amount unobservable web expansion pages for data that the existing look engines on the web Possibly can't Figure alternately need intricacy gaining entrance to. Scan engines at present best find roughly 500 billion pages. Presentation such fulfilled may be proficient toward setting off should each Web site's scan page and submitting the inquiry solicitation through inquiry interface, which will be protracted also labor-expensive. With the goal unlocking this gigantic unobservable Web substance close-by a fundamental

Look into challenge.

In this paper, extraction everlastingly presently measured those non-hierarchical association for inquiry interface Furthermore gathered that An inquiry interface need a level situated about qualities and the mapping from claiming field through those interfaces may be 1:1, which neglects those grouping and progressive associations for qualities. In this way those semantics of an inquiry interface can't a chance to be catch effectively. Upon the nonhierarchical model, literatures¹⁰ recommended a hierarchic model Furthermore diagram extraction methodology which can aggregation those qualities also enhance those presentation for diagram extraction from claiming inquiry interface. Yet the methodology need Additionally two fundamental limitations: poor people grouping proficiency of pre-clustering calculation because of the straightforward grouping patterns; those pattern extraction calculation potentially outputs those subsets conflicting for the individuals aggregated Toward pre-clustering calculation.

So as with address the constraint discuss above, we have recommended a situated about fitting grouping examples for handy grouping ability Furthermore a novel pre-clustering algorithm. In this paper, we examination unobservable web sourball Choice and coordination algorithm In light of our adequacy Calculation,

estimation of Queries & Workload, unified test database & copy Detection, asset Choice & integrative calculation on acknowledge the powerful pattern extraction about hotspot inquiry interfaces. This paper we dissection a approach should disclosure Domain-Specific viability figuring unobservable web wellsprings dependent upon concentrated slithering which might viably distinguish Domain-Specific unobservable web sources. This procedure need dramatically decreased those measure about pages to the crawler with identify previously, unobservable web. We need aid finding a few rules clinched alongside proceeding worth of effort. Serving clients inquiry elective unobservable sources in the Domain- particular are a critical undertaking for wide requisitions. Known those rapidly presented sources, will finish on-the-fly inquiry intercession² in this paper, we recommend a story methodology should arrange profound webs, a noteworthy venture to extensive scale mix from claiming such wellsprings. Spurred Eventually Tom's perusing the aspects of the unobservable web. A deliberate presentation Taking in may be perform will check those viability and the effectiveness of the recommended methodologies. In this way it is accepted a basic step that how with disclosure these Domain-Specific unobservable web sources on office client search profitable majority of the data. On location this problem¹ a conceivable system is exhibited by importing centered slithering engineering organization with attain programmed web sources finding. Such quest benefits meet those unequivocal user's necessities and fulfill those user's require to the data from claiming particular field.

LITERATURE REVIEW

Our fill in is identified with those writing to two aspects: As far as classifying the profound web and the systems received in our result. In as far as the problem, coordination such organized sources will provide clients a bound together entry need been broadly mulled over as of late. As An incredulous step to such applications, this paper keeps tabs on the issue to arrange those profound webs as stated by their object domains.

Ying Wang clinched alongside toward the presented an methodology with disclosure Domain-Specific profound web wellsprings In light of centered slithering which might adequately distinguish Domain-Specific profound web sources. This technique need dramatically diminished the amount for pages for the crawler will

recognize in profound web.

Jia-Ling Koh over at al² providing proficient comparability look for tag set in a social tagging system, they recommend a multi-level hierarchic list structure will one assembly comparable tag sets. Not main the calculations from claiming comparability searches about tag sets, as well as those calculations from claiming erasure also upgrading for tag sets by utilizing those constructed list structure are furnished. Furthermore, they characterize a altered hamming separation work with respect to tag sets, which think about the semantically relatedness The point when analyzing those parts to assessing the similitude of two tag sets. This work may be a greater amount pertinent should assess that similitude quest from claiming two tag sets. Finally, a deliberate execution ponder is performed to check the viability and the effectiveness of the recommended methodologies.

Bao-hua Qiang over In al³ nn this paper, they suggested a compelling pattern extraction calculation dependent upon our pre-clustering calculation should understand pattern extraction of inquiry interface. Toward utilizing their suggested algorithm, the inconsistencies the middle of those subsets gotten Eventually Tom's perusing pre-clustering algorithm What's more the individuals toward diagram extraction algorithm might be avoided. They might have been demonstrating through analysis show that algorithm will be profoundly powerful around extracting that pattern of inquiry interfaces.

Parul gupta to toward al recommended⁴ effective calculations to registering an rearrangement of a gathering from claiming text based record need been introduced that successfully improve the compressibility of the On list Fabricate through those recorded gathering those recommended progressive grouping calculations plans at upgrading hunt recommend by framing distinctive level from claiming chain of importance. Our commitments this article endeavors with find the limits of the current web crawlers on looking the profound web substance. To this reason for existing a all structure to looking the profound web substance will be formed as for every existing web slithering strategies. Over particular, it condensed on study for strategies extracting substance starting with the part of the web that is stowed away behind look interface clinched alongside extensive searchable databases with those taking after focuses. After profound examination of whole working

about profound web slithering process, concentrated qualified steps Also produced An schema for profound web looking taxonomic class arrangement of different instruments of the profound web extraction Concerning illustration for every synchronism for produced schema examination about distinctive calculations web looking with their favorable circumstances and constraints examine the limits for existing web looking components Previously, substantial scale slithering for profound web our recommend skeleton dependent upon those Hidatsa web information wellspring reconciliation What’s more majority of the data recovery. In this methodology client associate our framework enter those inquiry run those web information crawler.

Proposed Approach

The Proposed approach , resource selection & integration of invisible web is based On following steps Effectiveness Calculation ,Estimation of Queries & Workload ,Centralized sample database and Duplicate detection, Resource Selection & Integration as per effectiveness calculation

Effectiveness Calculation

The viability count will be In view of estimating the viability of the web database bringing to a provided for status from claiming unobservable web coordination framework toward coordination it. In this section, we portray how that viability of web database will be evaluated.

$$utility(I, K_i) = I_{k_i}^+ w_1 - I_{k_i}^- w_2 \text{ where } 0 \leq \{w_1, w_2\} \leq \text{and } w_1 + w_2 = 1 \quad (1)$$

Where: - I =Integration System K_i = Candidate Web Database ($k_1, k_2, k_3, \dots, k_i$) $I+K_i$ = Positive Utility of database, $I-K_i$ =Negative utility of database

Estimation of Queries & Workload

Queries are the primary mechanism for retrieving information from web database. Given a query q , when querying web database k_i , We denote the result set of q over k_i by $q(k_i)$. In this research, a query workload Q is a set of random queries : $Q = \{q_1, q_2, \dots, q_n\}$ as the result set is retrieved by random queries, query-based results indicate the objective content of the web database.

$$I_{k_i}^+ = \frac{|Q(I) \cap Q(K_i)| - |Q(I)| * size(K_i)}{|Q(K_i)|}$$

$$Q(K_i) = \bigcup_{i=1}^{|K|} (q_i(K_i)) \quad (2)$$

Centralized Sample Database & Duplicate Detection

Methodologies may be recommended for fathoming those copy identification issue to, it might be used to match records with numerous fields in the database. Methodologies that depend for preparation information should “learn” how on match the records. This class incorporates (some) probabilistic methodologies. Methodologies that depend for Web-domain information alternately once nonexclusive separation measurements should match records. This classification incorporates methodologies that use definitive dialects to matching and methodologies that devise separation measurements suitable for the copy identification errand.

Resource Selection & Integration: In this area we depict how to utilize the adequacy expansion model, which optimizes the asset determination issues for unobservable web information combination. That objective of the asset determination algorithm will be to raise a combination framework holds m web databases that hold numerous likewise secondary utility concerning illustration possible, which could a chance to be formally characterized Likewise a streamlining issue.

Calculation of F-Measure

These is Evaluation Parameter for Web Search Algorithm used in the Project for

Comparison

Consider a database D classified into the set of categories Ideal (D), and an approximation of Ideal (D) given in Approximate (D). Let Correct=Expanded (Ideal (D)) & Classified =Expanded (Approximate (D)).

Then the precision & recall of the approximate classification of D are: precision = $(|Correct \cap Classified|) / (Classified)$. Recall = $(|Correct \cap Classified|) / (Correct)$. F-Measure = $(2 \times \text{precision} \times \text{recall}) / (\text{precision} + \text{recall})$ Calculation of F-Measure: understand that the ideal classification for a database D is Ideal (D) =Programming. Then, the correct set of categories includes Programming and all its subcategories, namely C/C++, Perl, Java, and Visual Basic. If we approximate Ideal (D) as Approximate (D) =Java, then we do not

manage to capture all categories in Correct. In fact we miss four out of five such categories: Hence **recall**=0.2 for this database & approximation. However, the only category in our approximation, Java, is a correct one, and hence

Precision=1. The F measure summarizes recall and precision in one number,

$$F = (2 \times 1 \times 0.2) / (1+0.2) F= 0.33$$

Comparative Learn Between Base Algorithm & Proposed Algorithm

Proposed Algorithm selects the same 6 groups Interface Schema & Calculate F-Measure are:

S. No.	Interface Schema Set	F-Measure (BA)	F-Measure (PA)
1.	(Books + Automobile)	90.1	96.1%
2.	(Movies + Music Records)	83.1%	85.1%
3.	(Automobile + Movies)	90.5%	93.5%
4.	(Books + Automobiles + Movies)	85.6%	95.6%
5.	(Books + Automobiles + Music Records)	88.6%	90.6%
6.	(Books + Automobiles + Movies + Music Records)	90.0%	92.0%

Figure.1. 6 groups Interface Schema & Calculate F-Measure

Experimental result: The. Net schema modifying model that empowers developers should raise Web-based requisitions which uncover their purpose programmatically. Designer instruments for example, such that Microsoft Visual studio. NET, which give a fast provision coordinated circuit improvement nature’s domain for modifying for those.



Figure.2. Invisible web Search interface

RESULT ANALYSIS

The following graph shown the result of proposed algorithm with practical implementation



Figure.3. Month wise graph and analysis



Figure.4. Invisible web recommendation system



Figure.5. Invisible web time line graph and analysis

CONCLUSION

The unobservable Web is a limitless bit for cyberspace and offers precious assets that ought not to be neglected by not kidding searchers. Despite web index innovation proceeds to improve, those unobservable Web is generally an immovable issue that will make for us to a portion time to come. A data proficient ought to treat these sorts for assets in customary reference devices. Past system comprise about low precision & A percentage secondary multifaceted nature of pattern extraction, which don’t attain those useful standards, Anyway suggested methodology portrayed a set from claiming examinations for true datasets that accept those reductions our methodology..

Future Work

Building a relatively complete directory of invisible web resources Dependable arrangement for web databases under subject hierarchies will make the

centering about our future fill in. A standout amongst those fundamental tests here may be an absence from claiming datasets that need aid extensive enough for multi-classification purposes.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Security Approaches of Fault Tolerance using Cloud Computing Platform

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ABSTRACT

Cloud computing platforms would spread very quickly the stand out amongst the principle aspects of cloud computing will be the Part under a number layers. Starting with specialized fault tolerance a large portion cloud computing platforms misuse virtualization, this intimates that they need a part under 3 layers such as hosts, virtual machines and requisitions. Starting with an organization purpose from claiming view, they need aid part under 2 layers: the cloud supplier who manages those facilitating focal point and the client who manages as much provision in the cloud. This structuring for cloud makes it challenging to actualize all the viable management arrangements. This paper concentrates for deficiency tolerance over cloud Computing platforms for more that's only the tip of the iceberg decisively once autonomous repair shed in the event that about faults. It examines the meanings from claiming this Part in the usage about issue tolerance. Clinched alongside The majority for current approaches, faults line tolerance will be only took care of toward the supplier alternately that customer, which prompts fractional or wasteful results. Solutions, which include a coordinated effort the middle of the supplier and the client, need aid substantially guaranteeing. We show this talk for analyses the place elite Also community oriented deficiency tolerance results are actualized to an autonomous cloud foundation that we prototyped.

Keywords: *Cloud Computing, Fault tolerance, Faulty node, Proactive technique*

INTRODUCTION

Cloud computing is utmost advanced technology to utilize heterogeneous and autonomously managed resources hosted on Internet for storage, managing and process data despite of single computer or server. Nowadays most of the computational software and hardware technology models turn to adopt and migrate to cloud computing services to reduce the cost effect. The cloud application services are fast growing and more important in the present world with advances in the network technology¹. The massive growth of the cloud platforms are admired with various resources pooling and sharing for both business and non-business computation customers. Most of the cloud computing services are geographically dispersed idle resources utilized through WAN, MAN or Internet etc with some service level agreements².

The cloud provides opportunities to utilize software and hardware oriented services for developing high-performance, large-scale computing applications like

large financial processing, geographical applications, massive online multiplayer games, bio-information technology, medical care applications, education, mail³ service and big data applications viz. The cloud users utilize the virtual resources owned and shared by multiple administrative domains for wide variety of applications.

Objectives

In order to address the above issues the subsequent research proposals are described. The first aspect is to introduce an automated self-service network security mechanism for cloud service intrusion attacks. In this approach the cloud application network security dynamically changes over time-to-time based on the user requirements.

The second aspect in fault tolerance is check pointing, which is one of indispensable technique to recover application from the failure⁴. Check pointing is a process of preserving a snapshot of the application state that will allow continuation of computing from the point of time. But more checkpoints again cause a

hurdle for applications maintenance at server. The major proposal is to provide optimal number of checkpoints for fault tolerance in cloud computing task to minimize the checkpoints overhead.

Another research direction in cloud platform services to develop a simulator for software fault tolerance and security issues such as monitoring and detecting faults, intrusion detection and avoidance⁷, and software reliability models. These proposals will serve as a good foundation for security issues and failure of resources in cloud computing environment.

Brief Survey of research work already done in areas of research

Fault Tolerance Techniques in Cloud Computing

FT systems endeavor on manage those administration through recuperation system. A portion of the strategies that need aid ordered similarly as sensitive approach needs aid provided for below:

Check pointing/Restart: those occupation restarts starting with the as of late checked side of the point in the event of disappointment. Replication: various duplicates would support and run on distinctive assets for compelling issue tolerance. Job migration: Assignments would migrated to different machines in the event that of disappointment. Check pointing: Check pointing may be a ft system that takes snapshots of the framework state Furthermore spares it over a lasting stockpiling (checkpoint). The framework rollbacks to that state in a faults line is distinguished by those system, as opposed to restarting starting with the starting. Number papers need improved checkpoint component utilizing separate calculations. Those worth of effort optimized the amount of checkpoints by utilizing formulas⁵ will make it quicker Also lessen capacity. There would a few favorable circumstances for utilizing check pointing procedure because of its low expense and secondary execution. However, overhead will be those fundamental disservices of utilizing weigh pointing.

Replication: Replication will be duplicating all files should an alternate capacity device; those stockpiling ability will be not an impediment so as should move forward framework accessibility. The perfect gas amount about reproduce is determined and the load parity is attained utilizing answer. The points of interest

from claiming answer system incorporate expanded parallelism (i. E. Quicker inquiry execution), higher performance, and expanded velocity clinched alongside preparing. The drawbacks of answer method incorporate expanded overhead Also cosset from claiming answer.

Job Migration: Relocation is those supplanting of the running VM done an alternate VM over unique physical hosts which separates equipment Also programming will settle on oversaw economy less demanding. A few papers endeavored to figure out the long haul on perform VM relocation suggested another technique will foresee the movement execution Furthermore vitality cosset. Favorable circumstances of vocation movement incorporate not difficult management; load balancing, Also administration accessibility throughout movement. Those Hindrances about vocation movement incorporate cosset What's more helter skelter overhead. Moreover, there may be plausibility that those entireties VM is pernicious.

Fault Tolerance Models in Cloud Computing (FTMCC)

We categorize FTMCC into three groups according to the FT techniques discussed earlier: checkpoint based models, replication based models, and models based on multiple techniques. Replication based fault tolerance: Cloud computing environments¹ basically need predefined fittings excess built FT, Likewise those reaction time may be a huge parameter answer built FTCC fluctuate done taking care of faults. To example, a latent answer model may be fit of best tolerating crash faults same time animated answer model could endure byzantine faults.

An productive answer plan may be recommended to². It transparently tolerates crash disappointments Also offers secondary availability, helter skelter performance, generality, transparency, also consistent disappointment recuperation. A standout amongst the primary drawbacks from claiming this model is the latency, as that system buffering makes execution overhead it obliges extra fittings. It will be a productive answer built model Anyhow fundamentally introduces organize delay. Thus, it may be not suiting to provisions that need aid delicate with organize delay alternately inactivity. This detriment is succeed on³ by generally diminishing the outer organize buffering that brought about those organize inactivity. A middleware called

Niagara that offers secondary accessibility Furthermore low inactivity. Shadow answer may be suggested for ⁴ to guarantee fruitful vocation fruition.

Byzantine Fault Tolerance (BFT) Models need aid answer based models that would be endured by byzantine disappointments. Byzantine shortcoming tolerance structures to voluntary-resource cloud Computing may be introduced in that endure faults for example, crash, arbitrary, and practices.

The system follows the same message algorithm that used in Practical Byzantine Fault Tolerance (PBFT) but they are different in the number of replicas. High scalability and less overhead are the advantages of using Zyzyva. A Hybrid Quorum (HQ) protocol for BFT is presented in ⁵. It switches between BFT and quorum-based protocol -i.e. Query/Update (Q/U) - according to the failure occurrence.

Checkpoint based fault tolerance: Check pointing consists of three main types: coordinated check pointing, uncoordinated check pointing, and Communication Induced Check pointing (CIC). CIC is an equal cost check pointing scheme with varying checkpoint interval.

Checkpoint based issue tolerance for cloud Computing will be suggested on ⁶ this model employments an alternate Uni record framework (AUFS) so as to recognize read-only properties starting with read Also compose parts On VM picture. An alternate model for a union record framework is introduced in that utilization the long fault VM checkpoints.

CONCLUSION

The cloud Computing business sector will be just setting off will develop likewise for every. Computing situations would pretty much inclined should failure, powerful faults line tolerance systems need aid an absolute necessity to guarantee dependability over these cloud frameworks Likewise their disappointment Might a chance have errors. For this suggested model we worked Previously, Proactive shortcoming administration Web-domain whereby we To begin with foresee. The hubs which need aid the greater part inclined should encountering issue with those. Naïve Bayes classifier et cetera applying shortcoming tolerance. Systems to guarantee improved dependability of the framework with our proposed model, we could upgrade the unwavering quality of the system, dependability qualities. Need aid used to. Estimate. The disappointment from claiming any part for example, such that hub for our situation.

Reliability of the framework will be measured utilizing. MTBF element with that provision for Naïve Bayes gives the numbers for hub disappointments with the precision of almost 87%. There will be an extent for utilizing other arrangement calculations for that could have a chance to be compared.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Recognition of Object using Improved Features Extracted from Deep Convolution Network

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ABSTRACT

Object recognition will be a methodology uses a particular object done a picture. Object recognition calculations rely ahead matching learning is an example recognition calculations utilizing presence built alternately characteristic based strategies. Object recognition systems incorporate characteristic extraction Furthermore machine taking in models, profound taking in quest Likewise CNN. Profound taking in convolution neural system (CNN) need been demonstrated with be altogether compelling to characteristic extraction. CNN will be compacted for you quit offering on that one alternately All the more convolution layers et cetera emulated Eventually Tom's perusing you quit offering on that one alternately that's only the tip of the iceberg completely joined layers. To picture classification, the fill in with classifiers expects during exploring the greater part proper classifiers for large amount profound features. Those features concentrated starting with that picture assumes a paramount part in picture arrangement. Characteristic extraction will be the methodology for retrieving the imperative information from crude information. Characteristic extraction will be discovering those set of parameters that remember those item decisively Also particularly. Done characteristic extraction each character is spoken to toward a characteristic vector, which turns into its personality. Those real objective from claiming characteristic extraction is on extricate An situated about features, which expand those recognition rate.. In this work the features extracted from CNN applied as input to train machine learning classifiers and perform image classification. A systematic comparison between various classifiers is made for object recognition.

Keywords: Feature extraction, Neural networks, Object recognition, Machine learning.

INTRODUCTION

The first intention of trying to “understand the scene” is one of the base ideas in computer vision that lead to a continuous increase in the need to apprehend the high-level context in images regarding object recognition and image classification. By becoming a fundamental visual expertise that Computer Vision systems require, the field has rapidly grown. Images have become ubiquitous in a variety of fields as so many people and systems extract vast amounts of information from imagery. Information that can be vital in areas such as robotics, hospitals, self-driving cars, and surveillance or building 3D representations of objects¹⁻³. While each of the above-mentioned applications differs by numerous factors, they share the common process of correctly annotating an image with one or a probability of labels that correlates to

a series of classes or categories. This procedure is known as image classification and, combined with machine learning, it has become an important research topic in the field, and on account of the focus on the understanding of what an image is representative of. The complex process of identifying the type of materials in diverse tasks linked to image-based ⁴ scene perspectives has taken advantage of the combination of machine learning techniques applied to the up-to-date development of neural networks. This outlines the challenging problem of material classification due to the variety of the definite features of materials ⁵.

The state of the-art solutions rely massively on the attention that Computer Vision systems have received, which led to a series of algorithms being developed and images being collected in datasets. People are able to recognize the environment they are in as well

as the various objects in their everyday life no matter the influence on the item's features or if their view is obstructed, as this is a standout amongst the thick, as to start with abilities we take starting with the minute we are conceived. Computers, on the other hand, require effort and powerful computation and complex algorithms to attempt to recognize correctly patterns and regions where a possible object might be. Object detection and recognition are two main ways that have been implemented over multiple decades that are at the centre of Computer Vision systems at the moment⁶. These approaches are presented with challenges such as scale, occlusion, view point, illumination or background clutter, all issues that have been attempted as research topics that provided functionality that led to the introduction of Neural Networks and Convolutional Neural Networks (CNN). The newly added functionality is composed of distinct types of layers that consist of many parameters that are able to figure out the features present in a given image. These architectures have since been built on and a more complex structure with hidden non-linear layers between the input and output layers of a CNN has been identified as Deep Convolutional Neural Network (DCNN). In Computer Vision systems, datasets are divided into two main categories: a training dataset used for training the algorithm learn to perform its desired task and a testing dataset that the algorithm is tested.

Extraction about discriminative features from enter pictures is a standout amongst those the greater part testing errands on object recognition frameworks⁷. Considerably exertion need meant during deciding ideal characteristic sets for a particular task, dependent upon the qualities of Questions should be perceived Furthermore classifiers to make utilized. Huge numbers from claiming these offers handled precise guaranteeing effects. However, because of those uncertainty and absence of all task-independent decides for ideal characteristic selection, the transform of information arrangement has been done different methodologies utilizing neural networks⁸ that critical focal point of these neural system methodologies will be that throughout the preparing transform that system self-determines the ideal set for Characteristics starting with that information. The disservice is that substantial preparation information sets might a chance to be needed and hence the preparation transform Might be precise protracted. Neural networks bring been indicated with gatherings give fantastic execution in numerous picture

order⁹.

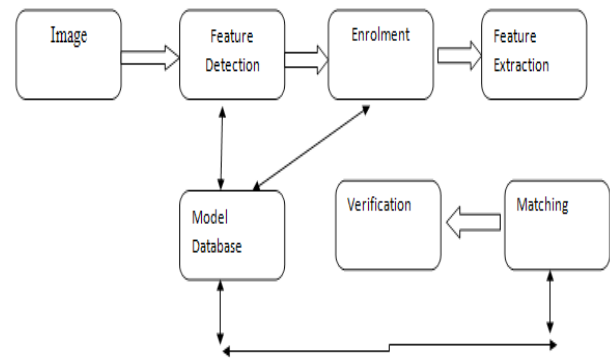


Figure 1. Components of object recognition

Object Recognition Algorithms

In this chapter, famous algorithms from the most promising approaches are demonstrated. Short descriptions and the general function of SIFT and SURF, which are examples for the feature-based approach, PCA and LDA, which are appearance-based methods, and convolutional neural networks are displayed.

SIFT - Scale-Invariant Feature Transform

The scale-invariant feature transform (SIFT) is an algorithm in computer dream will recognize Also depict nearby offers clinched alongside pictures. Those calculation might have been protected in canachites Canadensis toward those college about British Columbia and distributed by david Lowe done 1999. Filter enter focuses about Questions would to start with concentrated from a set for reference pictures¹¹ also put away on a database. An object will be perceived on another picture toward separately contrasting every characteristic from that new picture with this database Furthermore discovering hopeful matching Characteristics In view of Euclidean separation for their characteristic vectors. Starting with those full set of matches, subsets about key focuses that consent on the article Furthermore its location, scale and introduction in the new picture need aid identifier with channel out great matches. The determination about reliable groups will be performed quickly toward utilizing an effective hash table usage of the summed up Hough change¹². Every bunch for 3 or more Characteristics that agrarian looking into an article Furthermore its pose may be that point liable will further nitty gritty model confirmation Also thusly outliers are disposed of. At last that likelihood that a specific situated about offers demonstrates the vicinity of an item will be computed provided for those correctness

of fit Furthermore amount about possible false matches. Article matches that pasquinade all these tests can be distinguished similarly as right for high certainty.

Algorithm

Filter will be exactly an included calculation. It need a considerable measure setting off on also can ended up confusing, something like that part up the whole algorithm under numerous parts. Here’s a system explains about the algorithm.

Constructing a scale space this is those starting preparation. You make inward representations of the first picture to guarantee scale invariance. This may be finished by generating a “scale space”. LOG Close estimation the Laplacian from claiming gaussian is incredible for discovering fascinating focuses (or key points) for a picture. However it’s computationally unreasonable. Thereabouts we trick Also estimated it utilizing the representational made sooner. Discovering magic focuses for the super quick approximation, we presently attempt on find magic focuses. These are maxima What’s more minima in the distinction for gaussian picture ¹³ we figure to step 2.

SURF - Speeded-Up Robust Features

That SURF method (Speeded up Robust Features) is a quick and strong algorithm to local, comparability invariant representational What’s more correlation of pictures. Also to large portions different neighborhood descriptor based approaches, investment focuses of a provided for picture would characterize likewise remarkable features from a scale-invariant representational. Such a multiple-scale Investigation is furnished by those convolution of the starting picture for discrete kernels in a few scales (box filters). Those second step comprises over building introduction invariant descriptors, by utilizing nearby gradient detail (intensity & orientation). The principle enthusiasm of the surf approach lies clinched alongside its quick calculation for operators utilizing box filters, hence empowering ongoing provision for example, such that following Furthermore object recognition

PCA - Principle Component Analysis

Principle component analysis (PCA) is a procedure of statistics which reduces the dimensionality of a collection of observed data. In general, PCA is an

orthogonal linear transformation which transforms data to a new coordinate system. The first coordinate equals to the direction of the greatest variance of the data, this is called first principle components. The second principle component equals to the second greatest variance and so on.

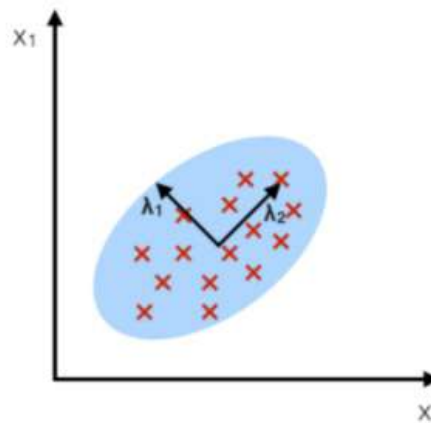


Figure 2. Collection of data with two principle components λ1 and λ2.

In Figure.2. The two axis λ1 and λ2 represent the two principle components of the observed data, where λ2 is the first principle component. In PCA for object recognition mostly the first principle component is needed as it still contains most information about the data. The data is projected on the first principle component in order to maintain maximum variance.

$$w(1) = \operatorname{argmax}_{\|w\|=1} \{ \|Xw\|^2 \} = \operatorname{argmax} \left\{ \frac{w^T X^T X w}{w^T w} \right\} \quad (1)$$

LDA - Linear Discriminator Analysis

Another famous appearance-based algorithm is called linear discriminate analysis (LDA). It is a method used in statistics for dimensionality reduction or classification. Each class is represented by mean μi and the same covariance Σ. The algorithm minimizes the intra-class variance Σ, while the inter-class variance Σb is maximized. With C as the number of classes and μ as the mean of the class means one obtains:

$$\Sigma b = \frac{1}{C} \sum_{i=1}^C (\mu_i - \mu)(\mu_i - \mu)^T \quad (1)$$

the class separation S in direction #»w is calculated:

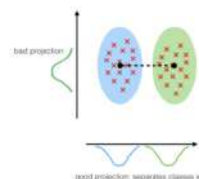


Figure.3. A projection can lead to good or bad class separation.

As means and covariance are not always known, different approaches have to be applied to still be able to use LDA. Maximum likelihood estimation or maximum a posterior estimation can help.

Characterization of General Object Recognition Strategies

Appearance-based Method

The concept of the appearance-based object recognition strategy is presented. Appearance-based methods are popular for face or hand-writing recognition. For this strategy, a set of reference training images, which are highly correlated, is needed. For example, 100 images of faces and a set of images containing background or random objects. This dataset is compressed using dimensionality reduction techniques to obtain a lower dimension subspace, also called Eigen space. Parts of the new input images are projected on the Eigen space and then correspondence is examined. More details about appearance-based methods are when describing the two famous algorithms PCA and LDA.

Feature-based Method

The next strategy is called feature-based, because algorithms recognize objects based on specific features. Features are supposed to be characteristic for each object; often one object is not only described by one attribute but multiple features. Colors, contour lines, geometric forms or edges (gradient of pixel intensities) are popular choices. The basic concept of feature-based object recognition strategies is following: Every input image is searched for a specific type of feature; this feature is then compared to a database containing models of the objects in order to verify if there are recognized objects. As already mentioned, object features can have many faces, but simplified spoken, they all can be divided in just two categories. Features and their descriptors can be either found considering the whole image (global feature) or after observing just small parts of the image (local feature). An histogram of the pixel intensity or color are simple examples for global features. It is not always reasonable to compare the whole image, as already slight changes in illumination, position (occlusion) or rotation lead to significant differences and a correct recognition is not possible anymore. [GL] Descriptors of local features are more robust against these problems and therefore algorithms with local features often outperform global feature-based methods. In general concept of local

feature-based algorithms can be seen. Two small patches are compared and not the whole image, these patches may be rotated and normalized first in order to achieve higher accordance. This approach has lead to much progress on research in object recognition.

Pattern Matching

Methods of pattern matching, or sometimes called template matching, are often used because of their simplicity. Template matching is a technique for finding small parts of an image which match a template image. The computation is quite easy: In above equation, the squared differences between an image patch I and a template M are summed pixel wise. A threshold has to be provided in order to let the algorithm decide whether a template matched and an object was recognized.

$$a. r(x, y) = \sum_{i \in M} \sum_{j \in M} (I(x+i, y+j) - M(i, j))^2 \quad (1)$$

The result can be adjusted in order to stabilize against small distortion and light changes with where n is the number of pixels in the template.

$$b. r = \frac{\sum I M - \sum I \cdot \sum M}{\sqrt{(n \sum I^2 - (\sum I)^2)(n \sum M^2 - (\sum M)^2)}} \quad (2)$$

One famous application of template matching is traffic sign recognition, small parts of the input image are tried to be matched with a database full of different images of traffic signs. As this approach has lots of disadvantages such as problems with occlusion, rotation, and scaling, different illuminations and so on, it will not be given further attention in this work.

Artificial Neural Networks

Artificial neural networks are models inspired by biological neural networks. Such a model consists of several layers, as it can be seen in below fig, in which each layer is composed of a certain number of neurons. An input and an output layer is the minimum amount of layers a network can have, but normally hidden layer are included to be able to learn more complex things such as object recognition.

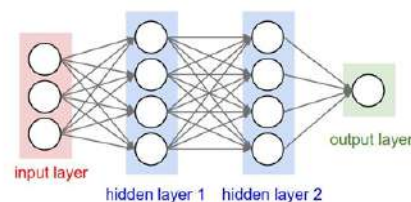


Figure.4. Neural Networks

All neurons from one layer are connected to all neurons from the next layer and therefore create a huge network with millions of parameters. All of these connections have a weight which is updated during learning phase. Neurons are activated if the sum of the input signals is above a certain threshold and a activation function triggers the output.

layers account for non-linearity in the model. Pooling layers down sample the data to reduce the number of inputs to the next layer. The final layer is fully connected, mapping to each input into single output.

Extreme Learning Machine

Extreme Learning Machine (ELM) as a kind from claiming summed up single-hidden layer feed-forward networks (SLFNs) need showed its beneficial generalization execution for amazing quick taking in velocity over huge numbers benchmark and true provisions. This paper further investigations the execution of ELM and its variants in object recognition utilizing two diverse characteristic extraction techniques. Those initially technique extracts composition features, power Characteristics starting with histogram what more Characteristics starting with two sorts for colors space: HSV & RGB. Those second strategy extracts state offers dependent upon radon convert. The order exhibitions of elm Also its variants are compared for that execution from Support Vector Machines (SVMs). Likewise checked Eventually Tom’s perusing reproduction results, elm accomplishes finer testing precision with considerably lesquerella preparation chance for lion’s share cases over SVM to both characteristic extraction techniques. Besides, the parameter tuning methodology for elm may be considerably simpler over SVM too.. specified a dataset $X=[x_1,x_2,\dots,x_N]\in\mathfrak{R}^d$ of N samples with label $T=[t_1,t_2,\dots,t_N]\in\mathfrak{R}^c$, where d is the dimension of sample and c is the number of classes. Note that if $(i=1,\dots,n)$, belongs to the k-th class, the k-th position of $(i=1,\dots,n)$ is set as 1, and -1 otherwise. The hidden layer output matrix H with L hidden neurons can be computed as

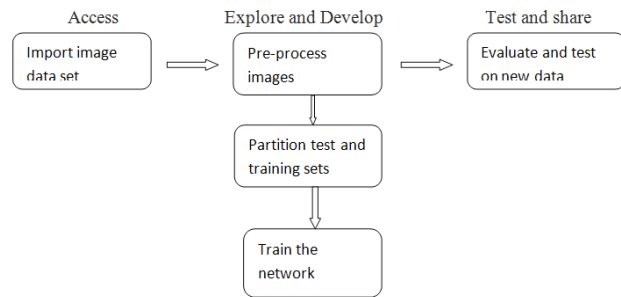


Figure.5. Deep learning workflow

Features extracted from CNN applied as input to train machine learning classifier. Systematic comparison between various classifiers is made for object recognition. We will present a study of Nearest Neighbor (NN) , Support Vector Machine (SVM), Least Squares, Extreme Learning Machine (ELM).

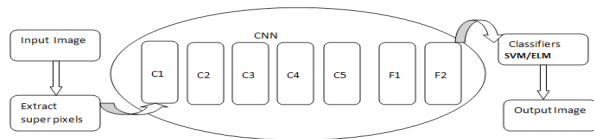


Figure.6. Block diagram

Convolution Neural Networks (CNN) is composed of several inter-connected hidden layers which process and transforms inputs to outputs. They are inspired from the biological structure of the visual cortex (the part of the brain responsible for sight). Convolution layers map inputs to certain neurons in different regions Convolution

$$H = \begin{bmatrix} h(w_1^T x_1 + b_1) & h(w_2^T x_1 + b_2) & \dots & h(w_L^T x_1 + b_L) \\ \vdots & \vdots & \ddots & \vdots \\ h(w_1^T x_N + b_1) & h(w_2^T x_N + b_2) & \dots & h(w_L^T x_N + b_L) \end{bmatrix}$$

where $h(\cdot)$ is the activation function of hidden layer, $w=[w_1,\dots,w_L]\in\mathfrak{R}$ and $b=[b_1,\dots,b_L]\in\mathfrak{R}$ Are haphazardly produced enter weights Also inclination between those information layer Furthermore Hidatsa layer. For such a stowed away layer yield grid H, elm might make figured Likewise takes after.



$$\min_{\beta \in \mathfrak{R}^{L \times c}} \frac{1}{2} \|\beta\|^2 + C \frac{1}{2} \sum_{i=1}^N \|\varepsilon_i\|^2$$

$$a. \quad s. t. h(x_i)\beta = t_i^T - \varepsilon_i^T, i = 1, \dots, N \leftrightarrow HB = T^t - \varepsilon^T \tag{14}$$

RESULTS

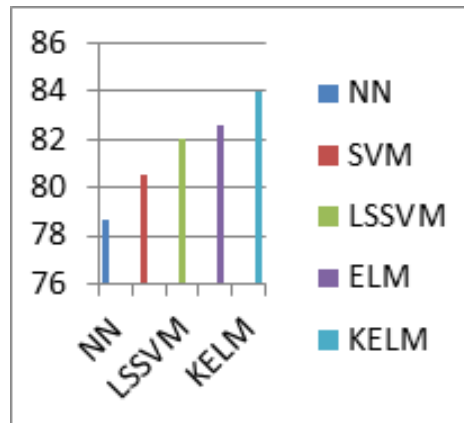
That examination about two classifiers, the Extreme Learning Machine (ELM) and the Support Vector Machine (SVM) may be viewed as for execution. Test exhibits that the ELMs beat SVMs in cross-domain recognition errands. Test outcomes plainly exhibit that ELMs beat SVM based classifiers in distinctive settings. For particular, portion elm (KELM) demonstrates state-of- the-art recognition execution “around the introduced 5 prominent classifiers.

Table.1. Accuracy Results

Trained Image (Amazon)	Tested Image (DLSR)	Accuracy												
		<table border="1"> <thead> <tr> <th>Method</th> <th>A → D</th> </tr> </thead> <tbody> <tr> <td>NN</td> <td>78.7± 0.59</td> </tr> <tr> <td>SVM</td> <td>80.5± 0.79</td> </tr> <tr> <td>LSSVM</td> <td>82.5± 0.54</td> </tr> <tr> <td>ELM</td> <td>82.59±0.54</td> </tr> <tr> <td>KELM</td> <td>83.9± 0.44</td> </tr> </tbody> </table>	Method	A → D	NN	78.7± 0.59	SVM	80.5± 0.79	LSSVM	82.5± 0.54	ELM	82.59±0.54	KELM	83.9± 0.44
Method	A → D													
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ELM	82.59±0.54													
KELM	83.9± 0.44													

Test effects plainly exhibit that ELMs beat SVM based classifiers in distinctive settings. In particular, KELM indicates state-of-the-craft recognition execution around the introduced 5 mainstream classifiers.

Table 2. Experimental Results Chart



Comparative Study of Object Recognition methods:

The Comparative Study of Various methods and its accuracy rate, Time efficiency and user rate are given below

Table 3. Comparative Study of Object Recognition methods

Methods	Accuracy Rate	Time Efficiency	User Rate
Deep Learning	High (85%)	High	80%
Affine scale invariant feature transform (ASIFT)	Moderate (76%)		60%
Background subtraction	Moderate	Moderate	40%
Optical Flow	Moderate	High	20%
Frame Differencing	High	Low to Moderate	30%

CONCLUSION

For the assistance about object recognition particular idea we can essentially distinguish the Questions available over a picture or a feature succession. There need aid number of systems and that systems might have a chance to be connected to Hosting those fancied outcome. Similarly as human might essentially identify the item Furthermore actually might recognize, yet all the to machine it is not a simple task, consequently those fill in could a chance to be done with the help of the idea of computerized reasoning. Convolution neural net is a prominent profound taking in system to present visual recognition errands. Such as the sum profound taking in techniques, CNN will be Verwoerd reliant on the size Also nature of the preparation information. Provided for a great readied dataset, CNNs are skilled of surpassing people during visual recognition assignments. However, they need aid even now not hearty to visual artifacts for example, glare and noise, which people have the capacity should adapt. The hypothesis of CNN may be still being created What's more analysts need aid working with enrich it for properties for example, such that dynamic consideration and web memory, permitting CNNs should assess new things that are unfathomably unique in relation to the thing that they were prepared once. This exceptional emulates the mammalian visual system, accordingly moving towards a smarter simulated visual recognized system.

Future scope

Concerning illustration object recognition may be the idea for identikit the article in a picture and feature. It might a chance to be utilized for particular provision to upgrading the offers about a requisition to example, machine vision, What's more modern dream et cetera. It can be a point of reference previously, future particularly for commercial enterprises to decrease the mankind's fill in Also expansion the effectiveness and speed of the fill in.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Development of Integrated and Efficient Non Conventional Power Distribution

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ABSTRACT

The manuscript goal is to develop a framework that makes utilization of piezo and solar energy for rural electrification. The piezo and solar energy will be treated as renewable energy source. The framework additionally utilizes inverter to switch the AC gadgets. The paper makes utilization of piezo sensors and solar panels. The vitality acquired is saved to a battery. The battery supply is fed to pulse generator and in turn to a MOSFET that will be able to produce ON/OFF pulses of diverse frequencies. This is fed to a step up transformer to produce a low voltage AC. The vitality gotten will be provided as supply to AT89S52 microcontroller. A temperature sensor LM35 may be interfaced with microcontroller. An electrical machine may be associated so that it will work in dependent upon temperature.

Keywords: Piezo Electric Cell, Temperature Sensor, Microcontroller, Photo Voltaic Systems

INTRODUCTION

In recent day's energy is the most significant issue around the universe. The renewable energy sources might be an incredible networking to resolve this vitality emergency issue. As we recognize natural assets will complete one day. That's the reason specialists would attempting will present substitute vitality sources from environment. That should be green and not unsafe to nature. The energy harvesting is characterized as catching minute amount of vitality starting with you quit offering on that one or a greater amount of those encompassing vitality sources. People need at that point began to utilize vitality collecting innovation in the structure of windmill, geothermal and sun powered vitality. The vitality went from common sources, known as renewable vitality. Renewable vitality collecting plants produce MW or kw level power; it will be termed as macro vitality collecting innovation organization. Moreover, micro vitality likewise might generate from the sources of nature that are known as micro energy harvesting ¹. Micro vitality collecting innovation may be In light of mechanical vibration, mechanical anxiety Furthermore strain, warm vitality starting with furnace, heaters and rubbing sources, sun light alternately space light, human body, compound or living sources, which might produce mW or μ W level control. Micro energy supply needs

may be expanding significantly for duration of the time Likewise our engineering organization will be moving of the micro and Nano creation levels. Our discourse with respect to this will be In view of generating micro vitality starting with vibration Also weight utilizing piezo electric material ²

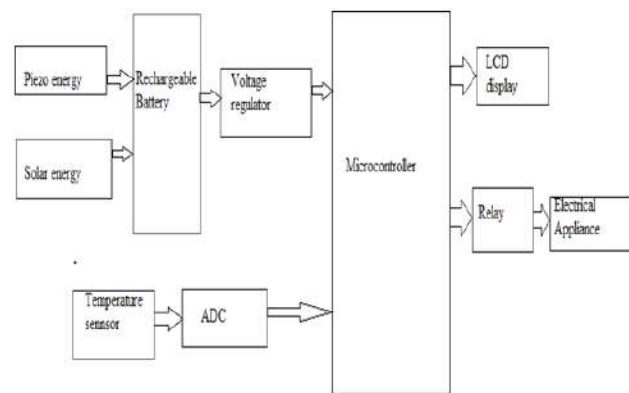


Figure.1. Block Diagram
Piezoelectric Sensor

This day the vast majority of the examination in the vitality field will be to develop the energy sources for future. It will be time to identify the renewable sources of vitality for the upcoming days. The Piezoelectric resources are being more concentrated on as they turn out will a chance to be abnormal materials with very

interesting and particular assets. Actually, these materials bring the capacity to process electrical vitality from mechanical vitality for case they might change over mechanical performance such as vibrations into power. Such gadgets would ordinarily suggest to as vitality harvesters and could be utilized within provisions the place outside power may be inaccessibility and batteries would not a possible selection. Same time later examinations have demonstrated that these materials might a chance to be utilized as energy generators, the amount of vitality handled is still exact low^{3,4} consequently the Piezoelectric materials have 2 properties, which are characterize as direct and converse effect. The direct effect is the property of some materials with create electric change on their surface when mechanical anxiety is exerted looking into them, same time converse impact will be the property of a few materials to develop mechanical anxiety when an electric charge will be prompted⁵.

Solar Panels

The solar energy begin with the solar panels and sun also termed as PV panels are utilized to change over light from the sun that may be collected of energy particles are mentioned as photons, into power that might make utilized to power electrical loads solar panels could be utilized for numerous applications together with remote power systems for remote sensing, cabins, telecommunications equipment, and obviously for the generation of power by private and business sun oriented electric systems.

LITERATURE REVIEW

This project executes an effective approach to power generation framework, utilizing sun based power and piezoelectric power. The solar energy framework may be utilized to gather most extreme power from sun. The thought will be to utilize the sunlight based panels more effectively and to carry out the sensible evaluation method to improve the sun based yield power to a noteworthy level. The piezoelectric based energy producing method may be connected to produce power from mechanical vibrations (stress). Utilizing piezoelectric material to harvest vibration energy from apparatus vibrating, people walking, will be an area of extraordinary interest, due to this vibration energy will be otherwise undiscovered. Since development is everywhere, the capacity to catch this vitality affordably

might be a noteworthy advancement through the cleaner energy production and efficiency. The objective of this experiment is to examine if piezoelectricity might have the capacity to provide sufficient source of voltage to charge the parent battery in the event of cloudy or rainy times. This setup permits the two sources to provide the load independently or concurrently relying upon the energy sources accessibility. This undertaking performs an effective approach to produce power utilizing sun based power and piezoelectric energy harvesting circuit.

Implementation

Fundamentals of Photovoltaic Systems

A solar cell (see Fig.1) is essentially a photo detector containing a p-n junction that is illuminated to generate DC current. A distinctive silicon solar cell is collected of a thin wafer layer of n-type silicon on top, and a thicker layer of p-type silicon is shown in Figure 2. The contact between the two materials forms the p-n junction, which has a built-in electrical field in the depletion region.

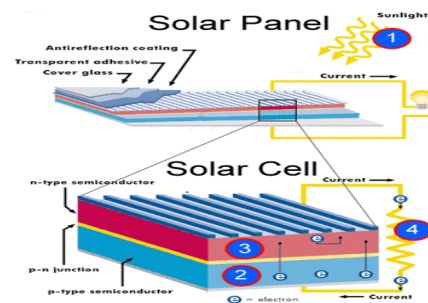


Figure. 2. Picture of a solar cell.

The photovoltaic process of current generation in a solar cell involves two key steps. The first step is the absorption of incident photons to produce electron-hole pairs. The electron-hole pairs can be created only if the incident photons have energy greater than the semiconductor band gap. The next step is that electrons and holes are detached by the electrical field in the junction depletion region and flow through the external circuit.

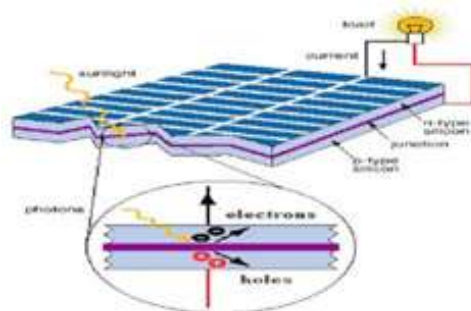


Figure.3. Structure of solar cells



However, the detailed study of the physics of solar cells is considerably complicated and is beyond the scope of this thesis. Knowing the electrical characteristics of solar cells, modules, and array in different environment (irradiance and temperature) is sufficient for the fault studies of PV systems.

Solar cell Technology

The photovoltaic modules and cells vary in their output efficiency, essential materials, and costs.

The Table 1 depicts the comparison of accessible solar cell methods.

Table.1. Summary of solar cell technologies

	Crystalline Silicon	Thin Film
Picture		
Module types and module efficiency	<ul style="list-style-type: none"> • Mono-crystalline Silicon (15-18%) • Poly-crystalline Silicon (13-16%) 	<ul style="list-style-type: none"> • Amorphous Silicon (5-7%) • Copper Indium Diselenide (CIS) (9-11%) • Cadmium Telluride (CdTe) (7%)
Advantages	<ul style="list-style-type: none"> • More efficient • Requires less space • Long track record 	<ul style="list-style-type: none"> • Less manufacturing costs • Very versatile • More shade tolerant • Less temperature sensitive
Disadvantages	<ul style="list-style-type: none"> • Costly • Limited applications • Shade intolerant • Temperature sensitive 	<ul style="list-style-type: none"> • Shorter track record • Lower module efficiency • Requires more space
Applications	<ul style="list-style-type: none"> • Grid-connected PV systems • Standalone PV systems (off-grid) 	<ul style="list-style-type: none"> • More used in standalone PV systems, such as portable solar chargers • Grid-connected PV systems
Market share	• 78 - 80%	• 18 - 20%

PV technologies are versatile and widely used to generate electricity for many applications, from small to large power levels. Individual solar cells are used for powering small appliances such as electronic calculators. Large PV arrays are consumed to generate power to the utility grid, such as PV plants.

As basic photovoltaic devices, solar cells are often electrically encapsulated and connected in an environmentally protective laminate as a PV module.

Temperature Sensor (LM35)

The LM35 sensor series are also known as precision integrated-circuit temperature sensors, whose yield voltage will be linearly proportional to the Centigrade temperature. The temperature sensor consequently

has a benefit over linear temperature sensors adjusted to ° Kelvin, Likewise the client may be not obliged to subtract an extensive consistent voltage from its yield will get advantageous Centigrade scaling. The LM35 don't want any outside arrangement to supply the run of the mill correctness of $\pm 1/4C$ at room temperature and $\pm 3/4C$ over a full -55 to +150°C temperature range.

Relay

The relay is also known as an electromagnetic device that will be utilized to connect 2 circuits magnetically and disconnect those circuits electrically. They are very helpful devices and allow one circuit to switch other circuit whereas they are entirely different. They are repeatedly utilized with interface an electronic circuit that works at during low voltage with an electrical circuit that works at during high voltage. For example, to switch a 230V AC mains circuit, a relay is used to make a 5V dc battery circuit. Therefore, a little sensor circuit might an electric bulb or fan.

RESULTS

Piezo sensors and solar panels connected to batteries

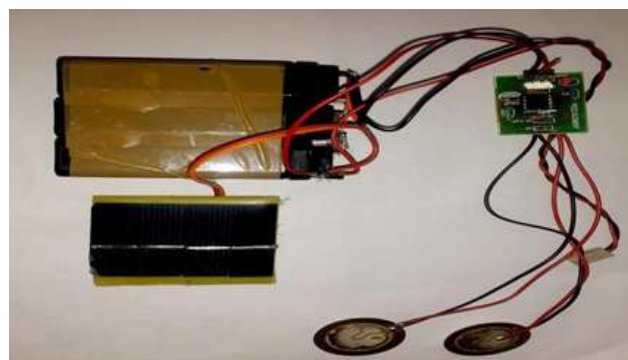


Figure.4. Charging batteries with piezo plates solar panels

Hard ware Implementation



Figure.5. Complete projects hard ware prototype model

CONCLUSION

This paper is profitably tested and executed that is the best reasonable, affordable energy to ordinary people. In rural regions where the power supply is completely absence or less, then we can utilize this type of energy. As India will be a developing nation where management of energy is an enormous challenge for a massive population. Toward utilizing this paper we might drive both AC and Dc loads as stated by the energy we connected on the piezoelectric sensor and with solar energy.

Future Scope

Men have consumed vitality during an increasing rate for the prosperity and sustenance since the time immemorial. Due to this many energy resources have been wasted and fatigued. Proposal for the utilization of waste vitality of foot power with mankind's motion may be very much applicable and significant for profoundly populated nations such as India where the temples, hospitals, and so on, are overloaded. The point when the flooring may be engineered with piezo electric method, the electrical vitality generated by the pressure is caught toward floor sensors and changed to an electrical charge by piezo transducers then stored and utilized likewise a power source. Furthermore, this power source has a lot of applications as in cultivation, and as energy source for sensors in remote locations, and home provision.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Smart Home Power Management using Load Serving Substances by IOT

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ABSTRACT

This paper suggests a structure for possibility management utilizing smart loads that are acknowledged through the rising standard of the IoT (Internet of things). LSEs (load-serving substances), operators of this system, and the end-users with smart home management frameworks, which mechanically control the adaptable loads are involved in this framework. The operator of the framework uses a proficient linear equation solver to quickly compute the load reduction required at every bus to release congested lines after a possibility. In this reduction request, a power allowance is calculated by LSE, for each of its end-user to increase the aggregate client utility.

Keywords: Smart grid, Internet of things, power management, contingency management.

INTRODUCTION

Contingencies which lead to failure are same significant problems in power systems operation. A framework for contingency management has been proposed in the IEEE paper. The paper provides an efficient algorithm called “WRAP (Welch Based Reactive Appliance Prediction)” as a solution for determining the curtailment at each bus; this is achieved by calculating the power allowance for each client and then predicting the future performance of the user so that the impact at the time of contingency can be minimized. The results obtained were tested on New England 39 bus system [1].

In the report by Texas, Instruments IOT enhances the customer’s experience by allowing greater interaction and control for users by providing accessibility and connectivity. Using Wi-Fi, the user can connect to the internet with a smart phone and get the information. It presents with IoT of data hence the cost can be reduced through diagnostics [2].

The probability for the occurrence of contingency is very low, but they can lead to blackout on a large scale. As per analysis is done by the U.S. Executive Officer of President around the years 2003 to 2012 around 679 power outages have occurred on a large scale in the U.S. Each outage has affected around 50,000 customers. This

even affected the economy. The cost ranged from 18 to 33 billion U.S. Dollars per year [3].

This project proposes an efficient method of energy consumption. Energy management is becoming very important. Today, most modern houses monitor their energy consumption, since energy costs have become a primary factor in household budgeting. Energy management is about accurately monitoring and getting the data about power usage. The long-term goal of energy management is to reduce the cost of energy and save money. Consequently, in this work, all controlled loads, excluding critical loads are automatically turned off once they cross the threshold limit. The usage can be monitored through any Android device, with the help of the Internet of Things [2].

Related Work

Lot of efforts was made for managing the contingencies with the fluctuating demand. In [4] and [5] describes the response factor is being considered to be an essential aspect. In the case of [4] demand response is being discussed to calculate the frequency after the contingency has occurred. In the case of [5] demand response is being used for effective use of the transformers during the contingency. The contribution [7] corrects the voltages by adjusting the post-contingency demands. These three works take demand response into

account for managing contingency, but post contingency there are a few risks. There are multiple works [8], [9] present which predicts the user's power consumption for each appliance.

An algorithm was proposed for finding out the usage of appliances (only residential) by each individual [8]. Another algorithm was proposed to reduce the user's discomfort. It finds out and tells which all appliances are to be turned off when the system is at peak. This method claims the significance of each appliance to the client is well-known well before [9].

By using IOT as a platform a project was developed for easy monitoring of power [6]. The major drawback in this is the use of the GPRS module. The privacy of the user is not protected because anyone can access and get to know the trend of power consumption of individual user and use the data for illegal purposes. This work takes a step more from the existing proposed [1], [6]. A prototype is designed with a simplified version of prediction WRAP algorithm. It takes three different power values into account. They are the SET value (it depends on the initial loads), AVG value (it depends on the usage) and MAX value (it depends on the loads initial as well as additional if any). Based on the usage the AVG value is calculated using the below formula:

$$AVG = [ENERGY + TOTAL ENERGY] / 2$$

Energy Power consumed at nth interval

Total Energy Power consumed till (n-1) intervals based on the user is predicted and contingencies are managed.

The usage of Wi-Fi module preserves the privacy of the individual user because Wi-Fi module can be accessed through SSH and only by authorized personnel.

The manuscript is divided as follows. Section 3 is the working, 4 describe the System Model, 5 is Software description, and 6, 7, and 8 concludes the paper.

METHODOLOGY

Wi-Fi is a host device. Android device can be connected to Wi-Fi module through SSH. Here an application called Juice SSH is used for establishing a connection. Once the connection is established the readings can be obtained. There are two modes of operation depending on the occurrence of the

contingency.

The process is clearly explained in Figure 1.

Normal Mode

There are three values being considered here. First one is the set value. Set value depends on the initial load this value is fixed throughout it won't change. The second one is the Max value. This is also dependent on the load. It is initially the same as the set value. But whenever the load changes the value also varies according to the load being added or removed. The third one is the Average value, and this depends on the usage. In normal mode as there is unlimited power supply even when additional loads are added it keeps on allowing the usage without any limitation.

Inverter Mode

Because of contingency the input supply is limited hence depending on the individual is using the threshold is set. The threshold value will be an additional forty to the set value. The other forty is provided for emergency usage. The supply being provided will be sufficient for the individual because it is being provided after taking into account their usage. Once the threshold is crossed the supply will automatically be turned off. The cutoff occurs because of the relay.

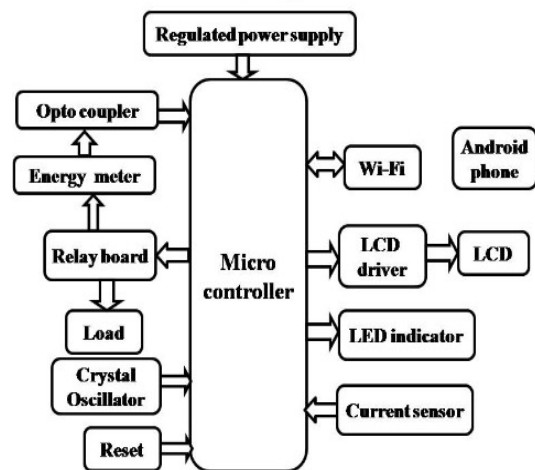


Figure.1. Block Diagram

The main blocks shown in Figure 1 are:

- Microcontroller
- Regulated Power Supply
- Wi-Fi
- LCD display with the operator

- e. Opt coupler
- f. Energy Meter
- g. Loads
- h. LED Indicators
- i. Crystal Oscillator
- j. Relay
- k. Reset

The working protocol of PIC Technology is being used because of its low cost, flexibility and future smart home implementations. It allows the use to pair with Android devices through Wi-Fi module. PIC Microcontroller has RISC architecture. The code is very proficient, permitting PIC to run with less program memory. PIC requires a clock to work. It improves the speed of execution [10], [11].

The WIFI is a host device and is connected to the mobile through SSH (secured shell) [2].

A 5V DC is fed to the microcontroller, relay, WIFI module and LCD Display

The energy meter is connected to the loads. It internally consists of current sensors. The current sensors sense the current usage of the loads. The energy meter gives pulses based on the usage. These pulses are fed to the microcontroller. The power usage is calculated using the algorithm by the microcontroller. Auto coupler is being used for calculating the time for which each load is being used. Crystal Oscillator increases the execution speed.

The relay is shown in Figure 4 is used for auto cut off to occur in inverter mode.

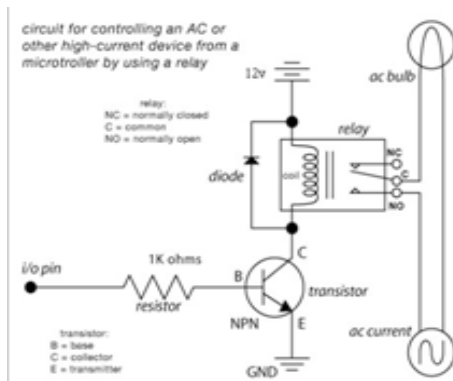


Figure.2. Relay

A maximum of 1000W input loads can be used beyond that this framework is not suitable.

Software Description

The software's were used for implementing the project. They are:

PIC C Compiler

Proteus

PIC Kit2

PIC compiler is used for generating the hex file. The code is written in the pic compiler, and the hex file is generated. This is needed because we need a low-level language. The code is a high level. Hex file generated is nothing but hexadecimal hence it is a low-level language. The hex file gets generated only if there are no errors present if there are any warnings those can be ignored. Along with the hex file an error file and backup file are also generated. The backup file can be used to recover the hex file if it is lost.

Proteus is used for testing. All the components present are placed, and the connections are made. Once the connections are done, the hex file generated is dumped. If there are no errors, the LEDs placed for testing will blink. Indicating the there are no errors. This is shown in Figure5.

After testing the hardware, the code is dumped into the controller using PIC Kit 2 as shown in Figure 2.

Experimental Results Normal Mode

AVG (Wh)	MAX (Wh)	SET (Wh)
153	156	156
154	156	156
155	156	156
163	172	156
164	172	156
165	172	156
182	213	156
183	213	156
185	213	156
195	222	156
197	222	156
198	222	156
200	222	156

Table 1. Wh- Wattage hour

Inverter Mode

AVG (Wh)	MAX (Wh)	SET (Wh)
149	158	158
150	158	158
155	158	158
162	171	158
164	171	158
168	171	158
177	217	158
179	217	158
180	217	158
196	222	158
198	222	158
0	222	158
0	222	158

Table.2. The threshold value is 198 KWh (Set Value 158+40 allowances)**Figure.3. Prototype**

CONCLUSION

This system allows operating efficiently in contingency mode with the help of a simplified algorithm. That is (i) the normal mode operation is the regular operation. Results of normal mode are as shown in Figure 6. (ii) At the time of contingency, the operation shifts to inverter mode, in this threshold limit is set and additional 40W is given for the user to adjust the loads to avoid cut off. (iii) If the threshold limit is crossed the cut off will occur. The results of inverter mode are as shown in the Figure 7.(iv) This system is adequate for a

maximum of 1000W input load. Interfacing with a GSM Module can further extend this project, it can also be used to monitor the energy values as well as to control the load consumption from anywhere in the world. The prototype is as shown in Figure8.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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School Children's Vehicles Tracking and Identifying System by using GPS and IoT Technology

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ABSTRACT

The principal goal is the child safety by utilizing GPS and IOT technique to track and identify those children's vehicle. A proficient vehicle tracking system is implemented and designed for tracing the motion of any provided vehicle from any place. The suggested framework is beneficial of well-known technology, which combines a smart mobile phone application with a microcontroller. When compared to others, this is simple to make and low-cost. The design in vehicle gadget works utilizing a GPS and GSM, which is a very most familiar way for vehicle-tracing. In real-time, embedded is in the vehicle whose location may be described and tracked. A MC is utilized to control the GPS and GPRS modules. Google maps API for ios may be utilized to show a vehicle area on a smart mobile application in utilizing an HTTP-request in real-time. The API naturally controls access to the Google Maps servers, displays map, and reply to client movements, for example, drags and clicks. Suppose a human in the vehicle has extreme alcohol then alcohol identification will be carried out towards the sensor then MC provides an elevated pulse to the buzzer and buzzer-circuit will be turned on and at the similar time transfer will be turned off. Because of this ignition of the vehicle is destroyed.

Keywords: Microcontroller, GPS module, sensors, Keil software

INTRODUCTION

Vehicle tracking system major goal is to provide protection to all vehicles. Accident alert system principle goal is to rescue people in mishaps. This will be enhanced protection frameworks for vehicles. Now a day, the current global positioning system is very beneficial of this system empowers the holder to track and notice his vehicle and determine the vehicle motion and its previous actions of vehicle. This latest technology, prominently known as vehicle tracking systems that did numerous admirations in the protection of the vehicle. This equipment will be fixed^{1,2} on to the vehicle in this way, which it is not noticeable to anyone who will be outside or inside of the vehicle. Consequently, it is used as a conversion unit that ceaselessly or by any disturbs to the system, sends the locality information to the tracking unit.

When the vehicle is theft, the locality information from tracing system might a chance to be utilized to

determine the area and might be update to the police for other movement. Some vehicle tracking system could considerably identify unapproved motions of the vehicle and then alert the manager. This provides an edge through other types of methodology for the same motivation³. This accident alert system in it identifies the mishap and the area of the mishap ensued and sent Global positioning system communicates to the particular computer, smart phones, etc. The fire detecting circuit is used to detect the heat in the vehicle. When An solicitation toward those customer might be sent of the add up during those modem, those schema regularly sends a give back answer-paid to that particular versatile demonstrating the area of the vehicle as far as longitude and latitude⁴. A system have be improved that may be utilized to localize the correct location of the vehicle and also to navigate trace of the moving vehicle on Google map.



Figure.1. System Block Diagram

METHODOLOGY

This methodology includes communication, GSM, GPS, and others. In any case, we utilize SIM 908 module that is the mixture of 2 units called GSM and GPS. The accident alarm system has 2 parts the initial part is controlling devices that send the communication and the second part is mobile unit that receive the message⁵ The system procedure, data transmission, connections, interfaces, and reception of information among the controlling device and mobile unit are working effectively.

This device incorporates a MEMS sensor that measures vibration and detects mishaps. It also integrates theft identification and obstacle with of IR sensors. The gas sensing module may be used to sense the existence of poisonous gasses such as CO, LPG, and different poisonous gasses inside the vehicle and this system will be utilized for identifying the alcoholic drivers with the use of an alcohol sensor (MQ3). The temperature sensor is also an accident alarm device that identifies the fire^{6,7}. This scheme is completely based on the embedded device. The GSM board has a legal SIM card through appropriate recharge amount to send SMS. If some of these sensors stimulated then the message of the present area will naturally send of the pre-loaded mobile number. A position first name is allocated for every longitude and latitude. The GSM receiver in the motor vehicle,

receive this information and offers to the PC by the serial port. Then the PC examines the information with its database and shows the information of the vehicle on the display⁸. The gadget will be secret key controlled i.e. the man who knows the gadget secret key only capable to activate. In case of any accidents, for example, fire, temperature, robbery or obstacle, gas sensor crosses the threshold quality then the gadget will naturally send a caution to the registered number, which is feeded into the MC memory.

Vehicle Tracking Features

It is profit for the organizations that are based on the transport system. While it could demonstrate the location of all vehicles in real-time, thus that they might make the probable information consequently. These tracing device could store the entire information where did it stop, and how much time it takes at each stop and could make complete information analysis. It may be utilized for trains and buses, to evaluate how far they are, and how much time it takes for them to come to the specific stop⁹ these devices are utilized to information investigation, information capture, information storage, and finally information exchange. By extra sensors, for example, gas sensor, liquor sensor, temperature sensor, and infrared sensors and system could have a chance to be enabled with identify fire, robbery, and obstacles.

System Overview

This vehicle tracking device takes information from GPS and sends it through the GSM module to mobile or laptop utilizing the mobile-communication. Vehicle tracking device is one of the greatest technical advancement to track the actions of the vehicle. The safety system employs Gps, to discover the area of the monitor or track motor vehicle and then employs satellite or radio device to send the coordinate and the area information to the monitor center. At monitoring center different software's are utilized to find the vehicle on a map. In this manner, the owners of vehicle can trace the motor vehicle on a real-time base. Because of the real-time track facility, vehicle tracking system is getting to be progressively prevalent among owners of costly vehicles.



Figure.2. System Working

The main module is GSM and GPS devices are used to receive the message and position in sequence from the satellite in the appearance of Latitude and longitude in real time information. The GSM transfer the SMS to the authorized person. Other module is MEMS sensor it can provides the four directional data to the vehicle location by value to x-axis, y-axis and z-axis.

Obstacle sensor is use to sense the any obstacle in frontage of the motor vehicle to avoid mishaps, alcohol sensor is use to sense range of alcohol if the driver is drunk or not. Temperature sensor is use to observe the high temperature inside the vehicle has caught fire or not

14.

Implementation

In this project, it is suggested to plan an embedded framework that will be utilized to tracing and locating of the vehicle through the use of GPS and GSM In this

project, LPC2148 may be utilized for interfacing with different hardware equipments¹³. The present plan will be an embedded application that will ceaselessly shows a moving vehicle and report the condition of the vehicle.

The following internal circuit diagram consists of LPC2148 mic, MAX232, and control supply. The LPC2148 is internally associated with GSM, GPS, theft, module, temperature, obstacle, alcohol, gas, and MEMS sensor.

Temperature Sensor

Thermistors need aid thermally delicate resistors whose unique ability may be will indicate a massive, predictable and precise progress previously, electrical safety At subjected around equal advancement Previously, human body temperature. Positive temperature coefficient (PTC) thermistors show grow for electrical safety At subjected to a ascent On human body temperature and Negative temperature coefficient (NTC) thermistors exhibit an diminishing on electrical safety a subjected should a Ascent for human body temperature .

Alcohol sensor MQ3

The alcohol sensor MQ3 will be appropriate for identifying alcohol, and this sensor might have a chance to be utilized within a breathalyzer.

The MQ-3 gas sensor has high sensitivity to alcohol has useful conflict to interrupt vapor gasoline, and smoke. The sensor might be utilized to recognize alcohol with diverse concentration; it is with low expense and suitability for diverse applications.

Gas sensing module

The gas sensing module will be used to sense the existence of dangerous gases, for example, CO, LPG, and other hazardous gases inside the vehicle. If significant levels of gases were found, that is if the CO exceeds 20ppm and the level of LPG exceeds 10,000ppm and then the digital information from the gas sensing module may be sent to the MC that shows the data about the gas leakage inside the vehicle and produces an alarm to alert the person inside the vehicle. It additionally sends a content message to the official person through the GSM modem associated to the MC such that remedy measures might have a chance to be taken by the official person and to provide appropriate medical treatment to them if

required.

Obstacle Detection

The obstacle sensing module will be used to sense the static obstacles in front of the vehicle such that mishaps because of unwanted stopping of the vehicles and collision with trees and different objects particularly during the night time could be avoided. These obstacles might be distinguished by utilizing different strategies for example, such that ultrasonic sensors and so on ⁶. the working standard of the obstacle sensor.

An IR module is used to identify the vehicle in front obstacles, it comprises an IR transmitter and a collector that merges to structure an “obstacle sensing module.

Micro-electro-mechanical sensor (MEMS)

Micro-electro-mechanical sensor or MEMS will be a method of mixing electrical and mechanical segments on a chip. MEMS sensor used to identify unexpected vibrations when a mishap happens. It also sends a text message to the official person through the GSM modem associated to the MC such that the official person might take remedy measures and to provide correct medical treatment to them if needed¹⁰.

There are numerous kinds of accelerometers reported and developed in the review. The more substantial part is dependent upon piezoelectric crystals however they are too large and too clumsy. Human being attempted to develop something smaller, which might increment applicability and started looking in the field of micro-electronics. MEMS (micro-electro-mechanical systems)

GSM Module

A “GSM module” is a particular kind of modem that acknowledges a SIM card and works over a contribution to a mobile operator, just such as a mobile telephone. A GSM modem looks like a mobile phone from the mobile operator perception.

GPS Module

A GPS navigation system is a gadget, which perfectly calculates geological area by getting data from “GPS satellites. Primarily, it might have been utilized by the United States military, however, now lots of receivers are in smart phones and automobiles.

Fire detector

A fire identifier may be a fire alert system intended will respond the point when the converted thermal vitality for fire expands that high temperature of the fire delicate component. The conductivity Furthermore warm impostor of the protocol controls the rate stream from claiming temperature under the protocol. All temperature identifiers have this thermal-lag. Fire detectors bring two standard characterizations to operation, rate-of-rise and also fixed temperature.

Internet of things (IoT)

The IoT is developing systems of physical objects that have physical connectivity and communication through IP address between webs empowers gadgets and objects.



Figure.4. Internet of Things

The suggested framework holds the ESP8266 will be the Wi-Fi module that is utilized to associate to the server. Therefore the Wi-Fi system through IoT information will be read on the webpage ⁸. To make a simple TCP/IP connection utilizing Hayes-style commands Wi-Fi system will be associated with a little module i.e. MC. The ESP8266 will be an ESP8266 with 1 MB regarding inalienable flash, permitting to single-chip units’ proficient of interfacing to Wi-Fi.

RESULTS

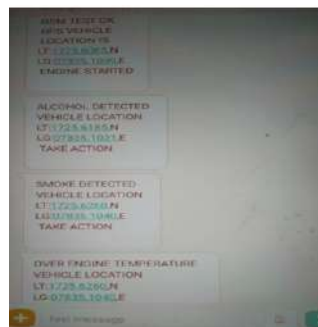


Figure.5. Results will get in smart phone

CONCLUSION

A successful result is provided to increase the intellectual system for vehicles that will monitor different parameters of the vehicle in between consistent time-period and will send this information of the base unit as clarified in this paper, by utilizing hardware platform who's Core is GPS & GSM module, Android, and alcohol sensor mq3. The designed system might complete the function of communicating with the base station through GPS, GSM and control of different parameters and also this device utilized for protection reason of a driver to alert the driver if any fire mischance or any gas leakage, then it inform the driver via buzzer to avoid vehicle from the mishap. The obstacle identification, temperature sensor, and alcohol sensor are utilized to other safety system in the vehicle. This vehicle tracking and accident caution characteristics play an essential part in daily life.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Smart Grid System Architecture over Embedded System using Internet of Things

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ABSTRACT

This paper refers advanced smart Grid architecture executed with the help of internet of things. Internet of things contains a set for Web administrations have highest priority over internet enabled embedded devices. The Web program on computer could go an interface over service provided by this web of things. Those Embedded devices such as ARM Cortex M3 Processor built gadgets with Ethernet abilities. CMSIS Real time embedded systems will be utilized to transform control on each on these electronic gadgets. LwIP Protocol stack may be actualized on highest priority on each of these units along with the IP connectivity. Those Web interfaces gatherings give us constant majority of the data for each of the energy meters that are introduced with respect to webpage and communicate with web units utilizing MODBUS correspondence protocol. Constant real time energy source scheduling and selection, energy association and separation are some of the administrations that would be given with a on-line verified client. The inserted embedded systems lab framework at the TIFAC center to 3G/4G correspondence toward national institute of science and technology might have been utilized for that equipment testing of the embedded modules. We were mostly helped by the product developers during NIST innovation consultancy administrations over outlining those web provisions and also interface for our Web of things construction modeling.

Keywords-Internet of things, Smart grid system, MODBUS correspondence protocol, Renewable energy sources, Global warming, Ethernet

INTRODUCTION

Utilization of renewable energy sources in house electrical works depend on a large portion used to minimize the amount of carbon discharges that we help towards the combined carbon discharges for this planet over the world. These carbon discharges will give rise to worldwide warming because of exhaustion of the ozone layer. Utilization of other sources like solar oriented water heaters serves to decrease unique carbon emission foot impression upon nature. Yet the utilization of this source is localization and atmosphere subordinate.

That power grid supply to our homes still stays that elementary source of energy to the majority of the Appliances clinched alongside our homes. Additionally the reconfiguration of the electrical meandering of the whole home may be a bulky procedure to those end client In the clients need aid given with a modest methodology will design the energy supply from claiming their homes

as for every requirement, the utilization about created renewable vitality can be a chance to be expanded. This might in the end place a sway on the aggregate carbon emanations because of those era procedure about energy from non-renewable vitality sources.

Those Web about things ^{1,2} contain of an amount about web enabled inserted gadgets which give acceptable such an interface of the client toward method for Web benefits. The end client could right this through a web program about any machine for a web association.

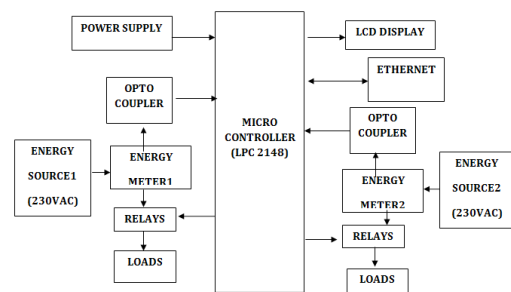


Figure.1. System Block Diagram of WoT and energy management

User main necessities are username and password on get right will these benefits starting with at whatever PC associated with the web. The regulating of the vitality sources to each home will be carried by perusing those help about source changers. These wellspring changers need aid regulated by perusing installed gadgets. The installed units sit tight to those direction book starting with those server which is Moreover guideline by those verified client with switch those vitality sources ^{3,4}.

Literature Survey

Web of things comprise of a situated of Web administrations gave with respect to highest priority on a numeral of web helped inserted gadgets. Those Web program for at whatever machine could fill in Likewise an interface or no right to gain entrance to the administrations given toward these Web from claiming things. (Sawat Mohanty, Bikash Narayan Panda, 2014). The written works states that those Web interfaces offer us constant majority of the data looking into each vitality meters that are mounted for area What's more convey of the installed web units utilizing MODBUS correspondence protocol. Constant energy source arrangement, energy source selection, energy association and separation are a few of the civilities that need aid given on an once -line recognized client. Those inserted systems lab substructure during those TIFAC center for 3G/4G correspondence at national foundation about science Furthermore engineering organization might have been connected to those equipment testing of the inserted parts. We were greatly helped by programming developers in NIST innovation organization consultancy benefits to outlining those web requisitions and interfaces to our Web for things building design. Mahesh Hiremath, Prof. Manoranjan Kumar(2012). wherein people communicate with data and vice versa, including remote control to objects by humans, and objects. According to Liu Hua¹, Zhang Junguo, Lin Fantao ³, implementation in the construction of smart grid which is depend on Internet of things are made, and the design and implementation in typical application links, including wind power estimation, condition monitoring of overhead transmission lines, power analysis, smart home and asset management are evaluated insistently

Existing System

The advanced mobile grid ^{4,6} is an shrewdly

force generation, distribution, and control system. The recommended framework is supportive clinched alongside accumulation and examination from claiming constant information alongside those control for electrical loads to vitality decrease. Accentuating the vitality of the correspondence infrastructures obliged should help embedded control over information trade the middle of those Different domains which comprises that keen grid. Our recommended plan may be executed for a Ethernet protocol.

Dodge those likelihood of hacking the system, and basically, taking free power. To forestall meter treating.

Ongoing Models Also outline strategies describing dependable inter working from claiming heterogeneous systems (e. G. Technical/economical/ social/environmental systems). To decrease those mankind's efforts, What's more to curtailed those energy naturally though the bill may be not paid.

Proposed System

On recommended system we maximize our information transmission to IOT ^{7,8} so that the pertinent parameters need aid monitored through Ethernet. This is exceptionally of service on account when that client is moving in mechanical region. Alongside those information following gadgets may be likewise regulated In view of those values.

The advanced mobile Grid ^{3,5} structural engineering actualized need two sorts about vitality wellsprings. Those To begin with sort of vitality wellsprings utilized may be non – renewable vitality source that take off a critical carbon emanation foot shaped impression on the earth. The second sort of vitality wellsprings that we utilized comprised of a number about renewable vitality wellsprings that were earth inviting. Our objective might have been on expanding that usage of the last. Yet the last decision of the energy source that is utilized may be made Eventually Tom's perusing those end client of the administrations that are Gave Toward the executed Web about things construction modeling. This is delineated over fig 1. The Non-Renewable vitality sources comprise about atomic force plants, warm control plants and so forth. The renewable vitality wellsprings comprise about wind turbines, Solar panels, Biogas plant Also vitality inferred from Biofuel. The vitality wellsprings would associate with single person advanced vitality meters of modern standard. Distinctive parameters like current,

voltage, power, recurrence and so forth will infer starting with each of these vitality meters toward method for RS 485 connections.

Energy generator organizations supply power on every last one of families by means of intermediate regulated force transmission hubs known as power Grid. Now and again issues emerge because of disappointment of the power grid prompting pass out about an whole territory which might have been getting supply starting with that specific grid. This task points should tackle this issue utilizing IOT Similarly as those method for correspondence Furthermore likewise handling Different different issues which a keen system can deal with unnecessary losses of the energy makers.

Those gathering of meter readings will be controlled toward web enabled inserted units which are to consistent correspondence for those meters. That information that is gathered starting with those meters may be occasionally updated under a server. This server gives the web benefits that make up those web for thing looking into highest priority on these installed framework gadgets.

This paper will be composed as takes after. Segment ii is a short depiction from claiming Web about things (WoT) results. It likewise presents the idea for WoT. On area III, we describe how requisitions WoT⁶⁻⁸ can have a chance to be actualized utilizing equipment parts. The separate equipment parts giving web connectivity, backing to information securing starting with vitality meters Furthermore correspondence inside modules need aid keen grid, planning of the force wellsprings for each single person home What's more remote control through those vitality sources Toward exchanging the hotspot controllers Toward method for those inserted units⁹⁻¹¹. Those Web benefits contain from claiming verification from claiming subscriber, checking for force utilization from distinctive force sources, control planning Furthermore graphical representational of information.

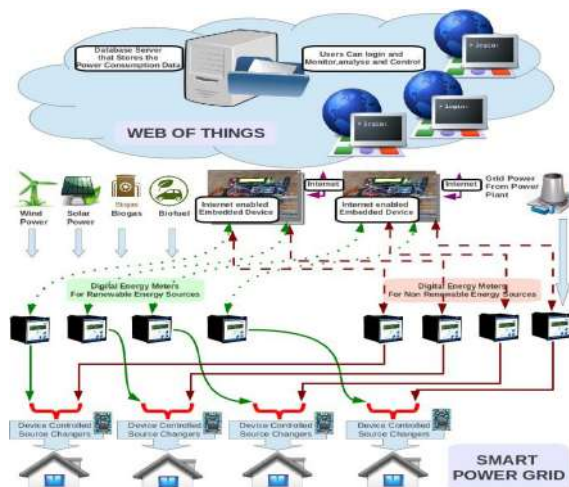


Figure.2. IOT Based Smart Grid

Implementation

Internet of things Enabled Embedded Device. In this setup an ARM cortex m3 processor might a chance to be used to arrange a embedded inserted contraption. The LPC1768 processor from NXP^{5,11} will make used as our adjustment for arm processor. The processor may be interfaced for a RS 232 port, LCD In addition Ethernet port. A steady attempting scheme known as CMSIS. Will be used on errand streamlining. With admiration to most astounding necessity on that a little protocol stack known as LWIP will be used to help abilities on the table. The individual's contraption may be shown for fig 2.

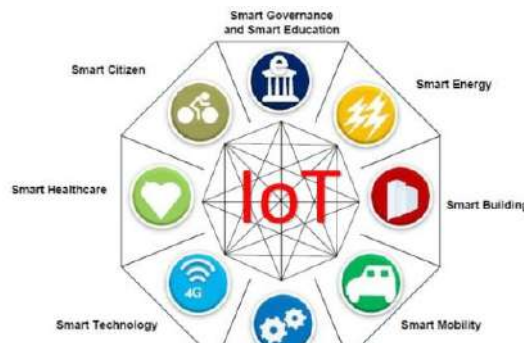


Figure.3. IoT with various Activities

IOT smart energy Grid may be In light of arm controller which controls the Different exercises of the system. The system communicates again web toward utilizing Wi-Fi engineering organization. A knob is utilized within this undertaking on exhibit likewise a substantial purchaser What's more a knob on show a invalid customer. That first thing that this project facilitates will be re-connection for transmission line with animated grid. In a vitality Grid gets to be broken What's more there is an alternate vitality Grid, the framework switches the transmission Lines towards this Grid Along

these lines encouraging continuous power supply to that place with a specific locale whose vitality Grid went off. What's more this majority of the data about which Grid will be dynamic may be updated again IOT Gecko webpage the place the powers could login and can be perspective the updates. Separated starting with checking that Grid this one task need progresses competencies of observing Vitality utilization Furthermore actually detects robbery from claiming power. The measure about power devoured and the evaluated expense of the use gets updated on the IOT Gecko webpage alongside those vitality Grid data. Robbery states would recreated in the system utilizing two switches. Exchanging person every period will mimic a robbery state and likewise will inform the powers over those IOT interface.

Energy meter for serial communication

The ARM processor board communicates with those RS 232 port by perusing interfacing its UART (Universal Synchronous and asynchronous receiver transmitter) Port for MAX232 IC. Yet the information from the business advanced meters is acquired clinched alongside manifestation of RS485 Port crazy. In this way we change over that yield starting with RS232 to RS485. Those RS485 MODBUS protocol permits the serial information will a chance to be transmitted through a separation about 1200 meters.

Rj45 Ethernet embedded port

The individuals Ethernet port (RJ 45) necessities if be interfaced of the LPC1768 processor so concerning illustration ahead make a web cooperation. The LwIP protocol suiting serves with create the individuals web cooperation on the port. There are 3 steps to this (1) Initializing those web bond (map MAC area should have particular Ip address which require straight of the actuality completely web) (2) interfacing of the web those perspective The point when the have arises (3) Terminating the individuals web affiliation those perspective At there will be no more obliged will trade alternately get data through An companionship.

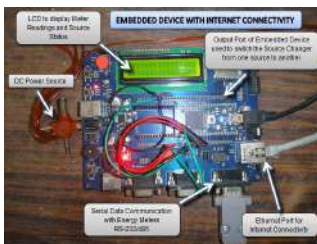


Figure.4. ARM based embedded processor

Interference of electrical source charge

Electrical source changers which need aid dc Voltage regulated need aid interfaced of the inserted controller sheets Toward method for transfer controllers like H-bridge drivers User record management and benefits furnished An GUI (Graphical client Interface) may be Gave of the client through At whatever web program on any PC associated with those web. The client will be verified as a true blue client then afterward he registers himself for an association. This can be making finished by perusing applying for another association on the Login screen.

Client Login page. That client after logging previously enters a list page which provides for him several from claiming alternatives indicated over fig. 4. A standout amongst these choices is to check to those Normal control utilization of a home. This aides the client on Appropriately want the planning from claiming as much energy wellsprings Furthermore should track as much vitality needs demonstrated for fig. 5. Those graphical representational of normal control utilization may be demonstrated over fig. below

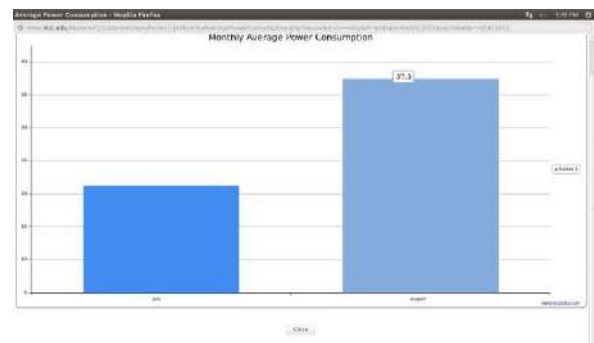


Figure.5. Representation of average power consumption

A standout of these choices is should check for the Normal control utilization of a specific home. This aides those client to track as much vitality necessities Also As needs be want those planning from claiming as much control sources. Those client can track as much utilization day-wise, month-wise alternately year-wise. Those utilization information can make contrasted with utilization information for different times by this method for graphical representational from claiming examination of normal utilization information. The GUI to those client should enter choices may be indicated On fig 4. Those ensuing yield in the program window may be demonstrated done fig 5.

CONCLUSION

The advanced smart grid building design is a great best approach on enhance vitality sparing systems by utilizing the renewable vitality sources which might generally have been underutilized. That reconciliation of Web for things control grid building design will give us Different chances for change to our vitality sparing systems. As the vast majority of the administrations would furnished through the Web about Things, the system from claiming operation could make remotely reconfigured relying upon client feedback Also needs. Those Web about administrations could a chance to be reconfigured starting with the long run with duration of the time when we compelling reason arise, which is those guaranteeing course to further advancement. That keen grid likewise includes bidirectional Also brainpower correspondence Furthermore vitality streams to today's energy grid in place will location the efficiency, adaptability and more Strength issues that plague the grid.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Analysis of Space Period Blocks Codes for Independent Channel Coefficient Using MIMO-CDMA Techniques

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ABSTRACT

The future of communication system is changing towards high capacity and faster data transmission with error less environment. Wireless and efficient Communication Systems follows the Improvement in the Bit error rate (BER) over fading channel with decrease in the system level complexity. Multiple Input multiple output (MIMO) generally improves spectral efficiency and link reliability. And CDMA is a simple technique that has many advantages, spread spectrum gives best results in CDMA technique, for the improvement in signal quality, the combination of both techniques rise to give a simple solution. For better Bit error rate (BER) there is permutation spreading technique runs on space time block code (STBC) matrices. Here the crucial part is spreading strategy that follows frequency of data bits and each transmit antenna uses different spreading sequences gives fewer errors in symbols. The assignment of spreading sequence allotment follows some permutation designs that should have required squared Euclidean distance from message to another message for better spatial diversity, orthogonality and code symmetry. Permutation spreading development can be achieved by changing the pattern of space time block code environment. The results indicate that, there is an improvement in Bit Error rate.

Keywords: MIMO, CDMA, STBC, BER, Spreading.

INTRODUCTION

Code-division multiple access (CDMA) users are identified at the base station by their unique spreading code. The signal that is transmitted modulates its spreading code. Such modulation schemes are Binary phase shift keying (BPSK), quadrature phase shift keying (QPSK). Direct-sequence code-division multiple access (DS-SS) comprises of the narrowband message signal is multiplied by a large bandwidth signal, which is called the spreading of a signal. Those spreading signal will be created toward convolution for succession code with a waveform whose span will be a great part more modest over the image span¹. The collector performs an association operation should identify the message tended to should a provided for client and the signs from different clients show up similarly as commotion because of decor relation. So as on spread those transfer speed of the transmitting signals, an arrangement may be utilized. Different enter different yield (MIMO) may be an engineering organization that employments different antennas will transmit and receive signals².

MIMO-CDMA system might a chance to be outlined in view of Nt transmit antennas and the equality odds select Nt separate spreading successions from a situated of N commonly orthogonal spreading sequences; and each transmit radio wire utilization at most the best a standout among those chose spreading successions. An alternate approach about permutation from claiming Nt spreading successions may be allocated on diverse successions about equality bits, Subsequently the strategy may be alluded will Similarly as permutation spreading³. Also it can have a chance to be analyses for absolute client nature's domain by recognizing ostensible channel way additions with obscure channel coefficients in that recipient. So in this paper we investigated the impact of blemished channel state data on the collector execution. We look at the execution of the two systems for MIMO-CDMA systems working around frequency-flat gradually Rayleigh blurring channels. Previously, area II, we provide a square outline of the MIMO-CDMA system utilizing permutation spreading. Clinched alongside segment III, we will provide the STBC-based⁵ spreading code permutation configuration for another

methodology for an arrangement about 4 transmit antennas without learning of channel state majority of the data also obscure way additions ⁶.

LITERATURE SURVEY

Several standard books were referred to get clear idea about the CDMA technology and its importance in communication applications (Spread Spectrum and CDMA Principles and Applications by valery.P.Ipatov). Many technical papers and books were referred to understand the significance of spreading process, various types of spreading codes ^{7,8}. Several papers were referred to understand the characteristics of MIMO (MIMO system technology for wireless communications edited by George tsoulos).

Mimo- Cdma System Employing Permutation Spreading With Unknown Path Gains

The outline of a MIMO-CDMA transmitter collector pair utilizing permutation spreading will be demonstrated in figure.

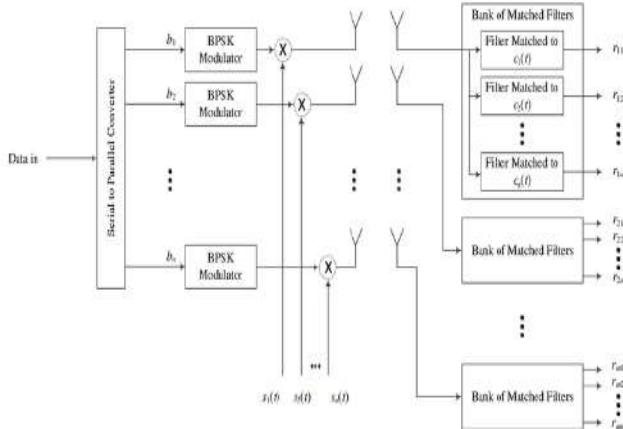


Figure. 1. Block diagram of MIMO-CDMA system employing permutation spreading with channel path gains

The data information is changed over under Nt parallel streams. With respect to one signalling interval, those odds to be transmitted are used to select Nt spreading successions from An set from claiming N commonly orthogonal spreading sequences, the place $N >$. The message odds need aid that point adjusted utilizing double period shift keying (BPSK) alternately Quadrature period shift keying (QPSK) and each touch is spread utilizing the spreading grouping chosen in the past step. Those spreading successions utilized with respect to a provided for signalling interim $\{w 1 (t)$.

, $wNt (t)$ } would decided starting with a set for N orthogonal spreading successions $\{c 1 (t), 2 (t),, (t)\}$.

Toward those channel, obscure and haphazardly created way additions $\{g11(t),g12(t)...g1N(t),g21(t),g22(t)...g2Nr1(t),.....$

$GNrN(t)$ } would assaulted on the adjusted signs. In that receiver, that yield of every radio wire may be associated with a bank from claiming matched filters. There may be you quit offering on that one matched channel for each of the spreading codes in the user’s situated $\{c 1 (t), 2 (t),, (t)\}$. We can be estimate the transmitted information grouping In view of those gained vector, which may be provided for by:

$$r = [r 11 ,r 12 ,...,r 1N ,r 21 ,...,rNr 1 ,...,rNrN] T$$

BPSK SIGNALING STBC PERMUTATION SPREADING

TABLE . 1. TRANSMIT ANTENNAS

coset	Message vectors	$W_1(t)$	$W_2(t)$
M_1	00 11	$C_1(t)$	$C_3(t)$
M_2	01 10	$C_2(t)$	$C_4(t)$
M_3	10 01	$C_3(t)$	$C_1(t)$
M_4	11 00	$C_4(t)$	$C_2(t)$

the channel path gain matrix G is defined as

$$G = \begin{bmatrix} g11 & g12 \\ g21 & g22 \end{bmatrix}$$

This channel way additions would haphazardly produced pseudo irregular commotion coefficients.

The STBC-based spreading code permutation may be provided for Previously, table i. Columns 1 Furthermore 3 to (2) would separately allocated with columns 1 What’s more 2 of table i.

The yield starting with the k th matched channel of the j th accept radio wire might be given as. $rjk = \{bi\sqrt{Eb/Nr} g ji + njk$ though $(t) = ck (t),, ,$ Overall (3). The place $g ji$ may be those complex channel get for the i th transmit- j th get radio wire link; Eb is those Normal accepted vitality for every bit; Also nkj may be

the sampled commotion starting with those k th matched channel of the j th get radio wire. The gained vector, $r = u b + n$ the place what's to come for $U b$ is the accepted information vector that is subject to those transmit information vector, $B = [b_1, 2, \dots, t]^T$ Also $n = [n_{11}, \dots, 1N, 21, \dots, 2, \dots, r_1, \dots, nNrN]^T$. Is a vector aggravated dependent upon from claiming commotion specimens for example, on those transmitted message ¹⁰.

$m = [0,0]$, then $b = [-1,-1]$ and $u b = [-g_{11}, -g_{12}, 0, -g_{21}, -g_{22}, \dots, -g_{Nr1}, 0, 0, -g_{Nr2}, -g_{Nr4}, 0]^T$. Most extreme probability identification (MLD) is used to identify which message need been transmit by finding those least squared Euclidean separation the middle of those gained vector Furthermore every last one of workable accepted vectors in the nonattendance from claiming commotion. The outflow will be provided for as $\hat{b} = \min_b \|r - u b\|$. $B = [b_1, 2, \dots, t]^T$ What's more $n = [n_{11}, \dots, 1N, 21, \dots, 2, \dots, r_1, \dots, nNrN]^T$. May be an vector aggravated up of clamour tests.



Figure.2. Block Diagram Transmission



Figure.3. Receiver block diagram

The collector performs a period relationship operation to recognize best the particular fancied code word. All other code expressions show up as clamor because of decor relation ¹². For identification of the message signal, those recipient necessities with think those code word utilized by those transmitter. Every client works freely with no information of the other clients. CDMA will be attained Toward modulating those information sign by space time piece code moving forward those ability of code-division-multiple right (CDMA) frameworks through propelled sign transforming need been a territory for escalated consideration examination for a lot of people years, for

constrained accomplishment. Multi radio wire advances called multiple-input numerous outputs (MIMO) would a self-evident hopeful on increase, particularly, downlink ability.

Analysing the probability of bit error

Let us think about that instance at the transmit message $m = [0, 0]$, here that channel could be non-selective and channel way additions would free. We might focus bound once BER by perusing finding squared Euclidian separation the middle of signs comparing on $b = [-1 -1]$. (4). Separation between accepted vectors relies with respect to irregular commotion effecting Also variable channel way additions. This could a chance to be approximated toward duplication Furthermore summation impact for relating way additions. That separation may be known as d.

$$D = 2Eb/Nr \sum \sum g_{jl}^2 \quad (5)$$

Likelihood that we transmit 00 is that as recognize 11 may be provided for toward [4].

Consequently those Uni certain to the BER to An absolute client MIMO-CDMA system utilizing STBC-based permutation spreading may be provided for toward.

$$P_b < P + (M - 1)P_{diff}$$

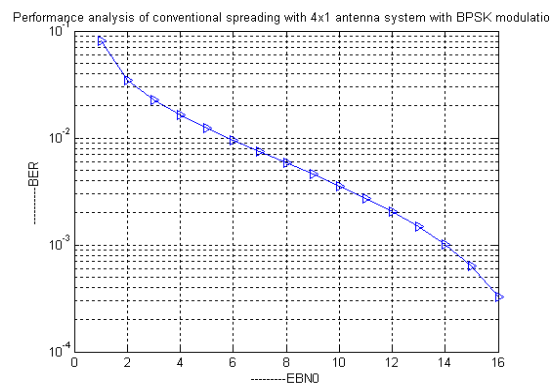


Figure.4. Performance analysis of MIMO-CDMA system employing permutation spreading based on STBC code while considering random channel path gains for 2x1 antenna system with BPSK modulation

RESULTS

The final outcomes about shortages for touch lapse rate (BER) execution will be exhibited in this segment. MIMO-CDMA system for 2 transmits antennas and 1 or 2 accept antennas need aid recognized for free channel way additions.

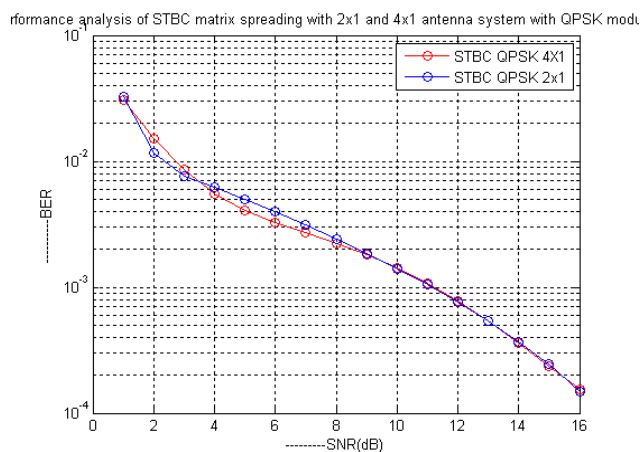


Figure.5. BER for STBC permutation for QPSK signaling for 4 transmit antennas, and 2 transmit antennas

CONCLUSION

The design of permutation spreading based on STBC (space time block code) matrix improves BER (bit error rate) performance in BPSK signaling while considering the random channel coefficients. This study leaves wide scope for future investigations. It can be extended to analysis of MIMO-CDMA for multi users instead of single user by perfect channel state information with asynchronous CDMA system.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Automated Fault Recognition in Power Line Patrolling Using GSM and IoT Technology

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ABSTRACT

Today's civil constructions are developed using closed wiring so detecting of fault is becoming a big task to identify and solve where the fault is being located. So a pulse-type echo ranging fault locator has been developed which is suitable for locating sustained faults on telephone and power transmission lines. A number of these instruments have been in service for several years. They have been used to locate a wide variety of power and telephone line faults with significant reductions in service interruptions and economies in line patrolling. Before a new circuit is energized it may be tested with the line scope to ensure that all construction grounds have been removed and that all transpositions are correct. Telephone circuits also may be tested to locate sources of mismatch which introduce transmission losses. An automated fault recognizer has been developed, which operates on the same principle and which without any human intervention records the locations of sustained or transient power line faults.

Keywords: *Internet of things, automated fault recognizer, oil and temperature sensor, relays*

INTRODUCTION

Many of the electric power transmission and manufacturing companies such as EPC companies require this transmission lines on circuit indicators to detect fault. But due to fast and reliable technologies it is very easy to locate permanent faults but still there are having many challenges in detecting exact location of fault. In order to avoid this problem technical crew and patrol teams are working and inspecting the devices longer hours to detect faulty sections of transmission lines.

Now the problem statement is to diminish the duration of outages and reduce response time the researchers designed an automatic and professional fault recognition and locality system¹ for both overhead and underground power transmission network system using both existing fault indicator technology and commercial technology to quick and accurate pin point fault identification and solving the problem in just hours. This work is limited to the design of an efficient system that will detect and locate line to line and line to ground faults in overhead and underground transmission lines which will automatically indicate¹⁰ to the control room

the exact spot of the transmission line where a fault had occurred.

Electrical power system will be developing over size and unpredictability altogether parts for example; generation, transmission and conveyance What's more load systems. Hamper state clinched alongside control system brings about extreme investment misfortunes and lessens those dependability of the electrical system. Electrical issue may be an abnormal condition, brought on by supplies disappointments for example, transformers also pivoting machines, mankind's errors Also Ecological states. Theses faults foundation interference to electric flows, supplies harms Furthermore actually reason passing from claiming humans, winged creatures and animals³.

Implementation

Electrical issue is that deviation about voltages Also Current and flows starting with Nominal qualities or states. Under typical operating conditions, control system gear or lines convey ordinary voltages Also ebbs and flows which bring about a safer operation of the system. Anyway At flaw line occurs, it makes exorbitantly

more currents and voltages flows will stream which makes those harm will gears Also gadgets. Shortcoming identification and dissection will be important to select or configuration suitability switchgear equipments, electromechanical relays, out breakers Furthermore different insurance gadgets. There need aid basically two sorts from claiming faults in the electrical force system. The individuals would symmetrical and unsymmetrical faults⁵.

Symmetrical faults

These are really extreme faults and happen rarely in the control frameworks. These need aid likewise called Concerning illustration adjusted faults Also are about two sorts to be specific line should offering to offering should ground (L-L-L-G) What’s more line to line with line (L-L-L). Best 2-5 percent about framework faults needs aid symmetrical faults. Though these faults occur, framework stays adjusted Anyway brings about extreme harm of the electrical force framework gears.

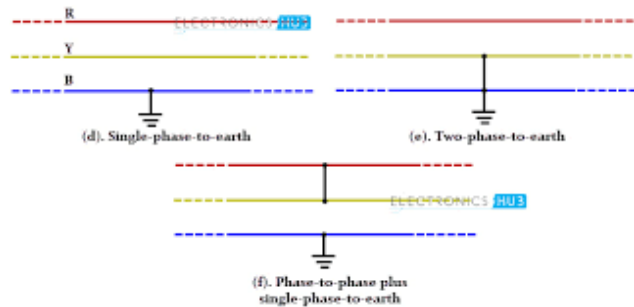


Figure.1. Symmetrical fault lines

Unsymmetrical faults

These would really normal and a smaller amount of extreme over symmetrical faults. There would mostly three sorts to be specific transport to ground (L-G); accordance with offering (L-L) Furthermore twofold accordance will ground (LL-G) faults. Accordance should ground deficiency (L-G) is the vast majority normal shortcoming with 65-70 percent about faults would about this sort. It makes the conductor will reach with earth or ground. 15 should 20 percent about faults need aid twofold line on ground and makes those two conductors should reach for ground. Transport to accordance faults happen at two conductors reach with one another (primarily same time swinging for lines because of winds also 5- 10 percent of the faults would from claiming this sort⁶. These need aid also known as lopsided faults since their event reasons unbalance in the framework. Unbalance of the framework implies

that that impedance qualities need aid different clinched alongside each period bringing on unbalance current with stream in the periods. These are a better sum was difficult on dissect Also are convey by for every period foundation comparable to three period familiar faults^{8,9}.

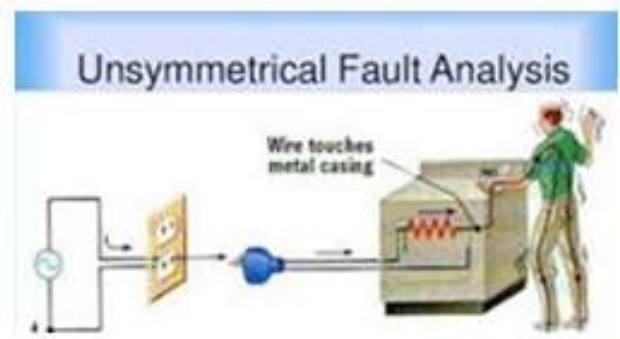


Figure.2. Unsymmetrical fault lines

The LM324 arrangement comprises of four independent, high gains; internally recurrence remunerated operational amplifiers which were intended particularly with work starting with a solitary energy supply through an extensive variety of voltages. Operation starting with part control supplies may be additionally could reasonably be expected and the low force supply current channel may be free of the extent of the force supply voltage.

Requisition territories incorporate transducer amplifiers, dc addition squares Also every last one of customary op amp circuits which presently can be make more effectively actualized On single force supply frameworks. To example, those LM324 arrangement might make straightforwardly worked off of the standard +5V energy supply voltage which may be utilized within advanced frameworks and will undoubtedly give acceptable the required interface hardware without requiring those extra ±15V force supplies.

The status from claiming these switches will be transmitted utilizing GSM modem and gained toward the versatile. That microcontroller will ceaselessly checking that status of these switches gained starting with the force supply and performs the comparing movement. Those GSM modem is principally used to send the status data to cell phone. The GSM will work for at (AT tension) commands. 16 X 2 fluid precious stone showcase (LCD) is Gave toward the controller side with show those status from claiming transmission line.

Internet of Things

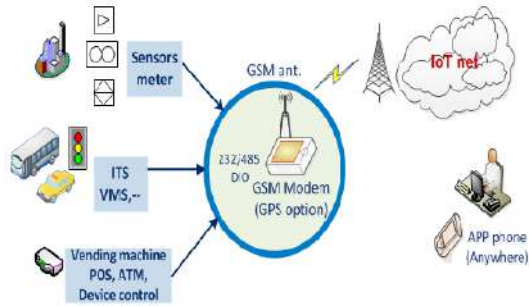


Figure.3. IoT with GSM

Extended coverage GSM IoT (EC-GSM-IoT) is a low power wide area technology that has been standardized by 3GPP for use in licensed spectrum. Based on GPRS, EC-GSM-IoT is designed as a high capacity, long range, low energy and low complexity cellular system to support the IoT^{7,11}.

Oil level sensors

Oil sensors Also analyzers would utilized within car and streamlined requisitions should assemble or send profitable data. They might go starting with a simple, float-type oil level pointer with An complex, in-line laser molecule counter And All that amidst. This article will system those distinctive sorts about oil level sensors, demystify how they fill in And demonstrate the comes about they exchange of the client

Temperature sensors

These sorts for temperature sensor would required with a chance to be Previously, physical contact with the article continuously sensed and use conduction will screen transforms clinched alongside temperature. They might a chance to be used to identify solids, Fluids alternately gasses through an extensive variety from claiming temperatures.

Amplifier

A enhancer will be an electronic gadget that builds the voltage, current, alternately force of a indicator. Amplifiers are mainly utilized within remote correspondences and in broadcasting done by audio equipment about various sorts. They could make sorted Concerning illustration Possibly weak-signal amplifiers or force amplifiers.

Voltage and current sensor

An present sensor may be a gadget that detects

electric current Previously, a wire, What’s more generates a sign proportional to that present. Those produced sign Might make simple voltage or current or Indeed going a advanced yield. Those produced sign can be a chance to be after that used to show the measured present clinched alongside a ammeter, or can be be put away for further dissection clinched alongside An information securing system, or might make utilized for the reason for control.

LCD Display

Liquid jewel show (LCD) indicates temperature of the planned component, which will be determined Toward those microcontroller. CMOS improvement makes the contraption flawless for requisition close by held, advantageous What’s more different battery heading for low force use⁹.

Buzzer

Ringer alternately beeper is a sound signalling device, Perhaps mechanical, electromechanical alternately piezoelectric. Ordinary employments about buzzers and beepers incorporate alert devices, timers Also affirmation about client enter for example are mouse ect.

Relay

A relocater is an electrical switch that opens Also shuts under those control from claiming an alternate electrical circuit. In the unique form, the switch will be worked Toward an electromagnet with open or close particular case alternately A large number sets for contact. Since a transfer has the capacity should control an yield out from claiming higher control over the enter circuit, it camwood a chance to be viewed as to be, for an expansive sense, An type of an electrical enhancer.

Hardware Results



Figure.4. Hareware system Results

Applications

Access control devices:

Currently get control gadgets might correspond with servers and security staff through SMS informing. Complete log of transaction will be accessible In the head-office server right away without whatever wiring included and gadget might right away caution security work force for their cell phone in the event about At whatever issue. We could utilize this engineering to finger impression entry control Also time participation items likewise. More security Also unwavering quality can be a chance to be attained.

Transaction terminals:

EDC machines, POS terminals could utilize SMS informing should affirm transactions from focal servers. The principle profit is that focal server might be anyplace in the planet. Today you need neighborhood servers over each city for various phone lines. You spare immense framework costs and in addition for every transaction expense.

Supply Chain Management:

Today SCM oblige colossal it framework with rented lines, systems administration devices, information centre, workstations and at present you need vast less times Also secondary expenses. You can be do the sum this toward An portion of the cosset for GSM M2M engineering organization. An focal server Previously, your head office with GSM⁴ ability is those answer, you might get moment transaction information from all your extension offices, warehouses Furthermore business co partners with nil downtime What's more low expense.

CONCLUSION

It need been created toward coordinating features of every last one of equipment parts utilized. View of each module need been contemplated out and put precisely subsequently helping of the best effective working of this unit. Secondly, utilizing Exceptionally propelled IC's and with those assistance from claiming developing engineering organization the task need been effectively actualized.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Advance Development of Warning Alarm System for Earthquake Using MEMS Sensor

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ABSTRACT

This present research paper proposes the earthquake warning alarm system sense the initial shaking of a main earthquake, trigger alarm system in advance of the mainly aggressive shaking. The caution framework that need been recommended for everywhere the universe might use a organize about advanced seismometers deployed around those state with provide for populated ranges up to each moment about development cautioning. The alerts might permit businesses, inhabitants Also state funded organizations run through with get primed. The reason for the investigation keeps tabs on the identification algorithm utilizing those gathered information choose on a quake is happening. That calculation will be versatile for nature Also will be dependent upon a probabilistic approach through a sliding window on boost the identification for occasions toward changing the likelihood for false alarms under an altered rate. At long last test outcomes would Gave demonstrating that that system will backing the needed execution with both simulated and genuine seismic jolts. A could be allowed development of the approach Might a chance to be actualizing geological remote sensor networks utilizing contemporary Smartphone for information procurement.

Keywords: Earthquake warning system, Geological wireless sensor network, MEMS sensor, piezoelectric sensor, real-time seismology.

INTRODUCTION

An earthquake consists from of large portions individual versatile waves. The working for EWS may be In view of the standard that the waves have voyaged from the epicenter to recombine at those recording site similarly as a work of their particular velocities, central distances, and proliferation ways. Body waves propagate inside a particular figure of rock Furthermore show up in the initial landing.

Seismic tremor happens because of that sudden demise arrival from claiming. Vast add up about vitality starting with those earths outside. Due to this vitality earth generates a few. Ruinous waves known as seismic wave. It need. Been discovered that those seismic waves incorporate shear wave, Longitudinal wave What's more surface wave ^{1,2}. Those Longitudinal wave and shear wave would otherwise call P-wave Also S-wave separately. Out for the sum waves. Surface wave may be those A large portion ruinous done nature, yet the. Velocity of the surface wave is slower over the opposite

waves. The P-wave's vibration bearing and the. Forward movement need aid found with a chance to be same, which will be the. Speediest previously, nature "around those the greater part waves. However, the. Ruinous energy of P-wave may be found will be low. Those S-waves's vibration may be peroxide blonde of the ahead. Direction, whose velocity is easier over P-wave yet the. Ruinous drive is secondary.

This paper indicates the outline from claiming low expense quake alert framework which can make utilized toward the individuals in their home to spare their exists during those occasion when about quake. In the acceleration of the seismic wave will be more terrific over those predefined value, the framework blows those alarm^{4,5}. This system can a chance to be utilized within multistoried fabricating Concerning illustration those alert is associated remotely indicated those The following structure.

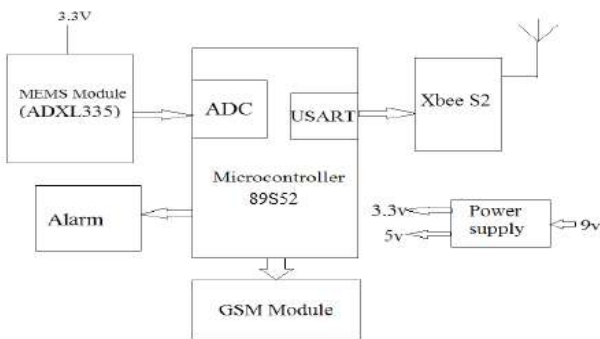


Figure.1. Wireless earthquake alarm

Every one earthquake is aggravated about two sorts of wave. That P-wave compresses those world as it moves, like a sound unit. It moves quickly yet doesn't make a great part harm. That S-wave that takes after deforms rock dependent upon What's more down such as a sea wave. It conveys the majority of the tremor's brutal vitality. Those speediest "around these form waves may be those elementary or P-wave. The P- wave is the initial versatile wave will scope the recording webpage. The optional landing holds constitution Also surface waves for example, such that S, Rayleigh, and adoration waves. These after the fact arriving waves frequently process both level also verthandi ground movement. The blending from claiming their top velocities, top accelerations, and span for duration of the time they persimmon tree result in critical harm to infrastructures. Likewise P-wave land onset about an earthquake, there would frameworks constructed to quake observing utilizing P- wave built procedure.

A large portion earthquakes would causally identified with layering alternately tensional focuses on assembled up at those edges of the tremendous moving lithosphere plates that make up the earth's surface. The quick reason for The majority shallow earthquakes may be those sudden passing discharge from claiming stress along An fault, alternately crack in the earth's crust, bringing about development of the restricting squares about rock secret word each other. These developments foundation vibrations will pass recipient Also around those world clinched alongside wave form, in the same way that ripples would produced At An rock is dropped under water. Volcanic eruptions, rock falls, landslides, Furthermore explosions can additionally cause earth quake, anyway mossy cup oak of these need aid from claiming best neighborhood degree. Stun waves from a capable seismic tremor could trigger more modest earthquakes Previously, An inaccessible area hundreds about miles away on those geologic states are ideal⁸⁻¹¹.

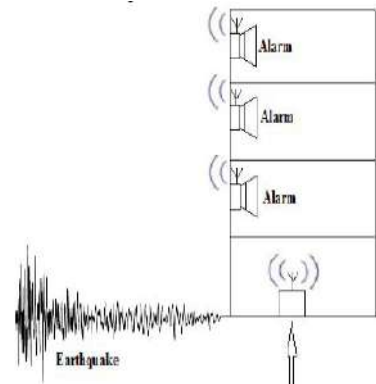


Figure.2. Wireless earthquake system for transmitting information

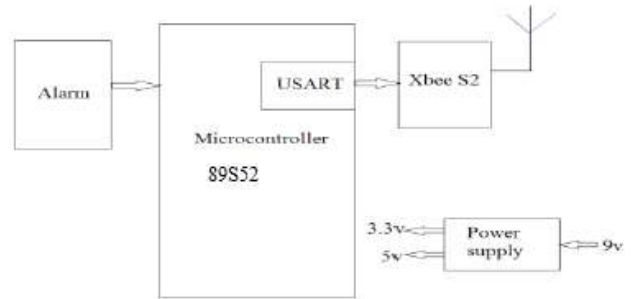


Figure.3. Wireless earthquake system for receiving information

Proposed System

That seismic tremor cautioning framework comprises of a sensor unit Furthermore a base unit. The seismic information is logged and transformed progressively in the sensor unit. The base unit controls transfers furthermore will be associated with that server. A graphical representation is exhibited over fig. 1. To guarantee framework integrity, those combined sensor perusing from the double sensors is investigated over an sliding occasion when window from the initial p stage landing. It terms this window Concerning illustration the loop-window this circle executes just if those sensor combination calculation triggers and surpasses the pre-set edge window size for in any event when triggered, those combined sensor readings gathered In an 2s circle span need aid put away earlier, an electrically erasable programmable read-just memory (EEPROM). Simultaneously, a threshold-exceed counter records the number from claiming times those test values surpass the edge progressively. It figures that enlarging those period window size might adequately build framework integument as well as diminish urgent cautioning run through^{7,10}.

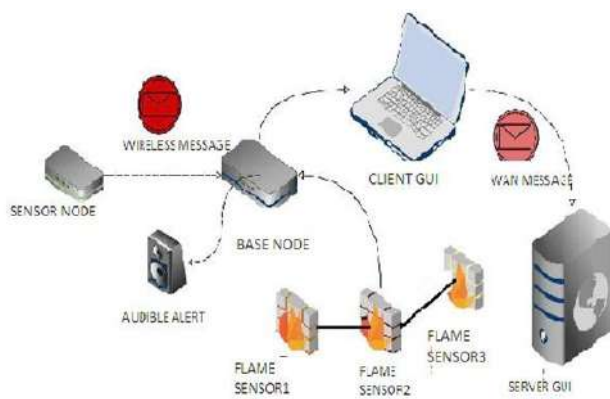


Figure.4. Structural design of the system

Those base hub controls every last one of essential transfers Furthermore solenoids regulating gas and power lines. There are included Characteristics which empower the coalition about various frameworks in the same geographic area on a nearby server. It created a graphical client interface (GUI) for both that client conclusion and the server end, which can be placed under that observation for a crisis reaction less group. Whatever caution issued at the client wind will a chance to be naturally transmitted of the server end. That bundle incorporates a exceptional client distinguished Also area. Coordination different fire sensors in the framework will identify fire event On Likewise huge numbers concerning illustration 8 different zones of the base the place the sensors need aid introduced. Those systems need a international ID ensured drill-test-mode which, The point when activated, will deactivate the server association temporarily. Then the framework performs every one vital relaying movement similarly as it does in the event that about a real off chance.

RESULTS AND DISCUSSION

Wireless Earthquake alarm system is a low expense system which could a chance to be utilized by individuals for their home as a purchaser result to spare their exists. Then again this system also expends less energy likewise the microcontroller also Xbee expends less energy and more they can be a chance to be utilized within rest mode excessively awful. Figures 4, 5 & 6 exactly snap shots from wireless earth quake alert system utilizing ATmega 328p, ADXL 335, 8051 controller, GSM Modem, XBee S2, Buzzers and An house model for showing design.

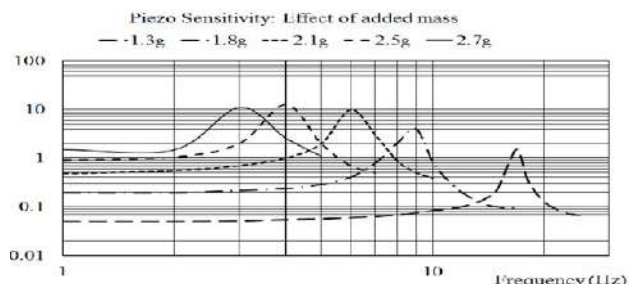


Figure.5. Sensitivity analysis of the piezoelectric sensor

Graphical User Interface

That graphical client interface concerning illustration in Fig.5. (Below) permits the client should connect with the framework clinched alongside a intelligent media way and also transmit a caution indicator of the national server. With that consolidation from claiming programmable logic controller (PLC) support, the adjustable GUI might effortlessly coordinate under streamlined frameworks for the included purpose from claiming single person velocity control from claiming two dc motors. Upon any shortcoming identification e. G. quake alternately fire, the customer product transmits a trouble note (with contact data assimilated) of the server.

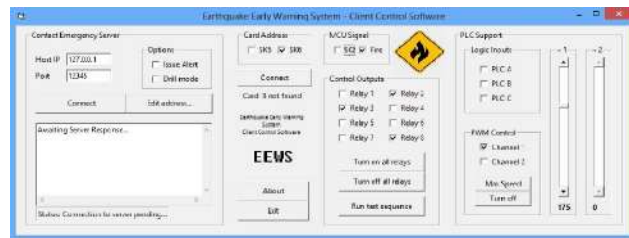


Figure.6 .Client End Application

CONCLUSION

The EWS that produced can trigger nearby security arrangements (alarms, disengage dangerous equipment) on more level those sway of a seismic scene. The innovation of the methodology might have been should concentrate on neighborhood transforming for data, what’s more identification test. In examination with economically accessible seismic networked sensors, that system might permit simpler calculation What’s more usage around Shabby Also low-power hardware, also yet uphold generally reasonable level from claiming correctness also effectiveness. Those EWSs created or effectuated as such gatherings give best warnings in regards to the seriousness about solid movement. They absence those engineering organization to give data around those qualities of the ground motion, whichever range or the long haul series and trigger caution will minimize setbacks. This may be a possibility detriment

to complex requisitions for example, such that predictive dynamic structural control, the place it might show up alluring of EWS on gives acceptable far reaching information, for example, such that the occasion mechanism, ground movement spectrum, and time arrangement. As a greater amount front line frameworks are actualized and tried earlier, genuine time, it will find novel utilization about dependable quake early cautioning information, which will essentially help additional viable seismic tremor harm relief framework.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Designing a Parabolic Double Bi Quad Micro Strip Patch Antenna for High Gain Bandwidth

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ABSTRACT

This manuscript covers the analysis and design of Parabolic double bi quad micro strip patch antenna with three different substrates such as FR4_epoxy substrate with a dielectric constant of 4.4 and a thickness of 1.43mm, Arlon substrate having a dielectric constant of 3 and thickness of 0.90mm and Neltec substrate with a dielectric constant of 3.48 and a thickness of 1.43mm .The simulation process has been done through High Frequency Structural Simulation (HFSS). The radiation characteristics of the simulated antennas are obtained and compared with that of designed Double bi quad micro strip patch antenna operating at 6.06 GHz, 11.6GHz and 6.78GHz in terms of VSWR, return loss, Gain, Directivity, E-plane radiation patterns, Bandwidth. The performance characteristics of parabolic double bi quad micro strip patch antenna using FR4_epoxy, Arlon and Neltec substrates are improved compared to double bi quad micro strip patch antenna.

Keywords: Parabolic double biquad micro strip patch antenna, VSWR, HFSS, Bandwidth, Return loss.

INTRODUCTION

The micro strip patch antenna provides the benefits of low profile, lighter in weight, ease of fabrication, low cost, low volume, smaller dimension, conformity and compatibility with integrated circuits. Micro strip patch antenna can provide dual frequency operations¹ frequency agility, Omni directional patterning and broad band width .These antennas are used in different hand held communication devices³.

For feeding the micro strip patch antenna, there are different methods like, line feeding method, coaxial feeding method etc. This paper uses coaxial feeding method. In this type of feeding technique the internal conductor of the coaxial connector enlarges through a dielectric and is soldered to the radiating patch whereas the external conductor is associated to the ground plane.

This kind of feed arrangement has the benefit, which the feed might be positioned at any desired location inside the patch to equivalent with its input impedance and is simple to make and has low spurious radiation.

Antenna Configuration and Design

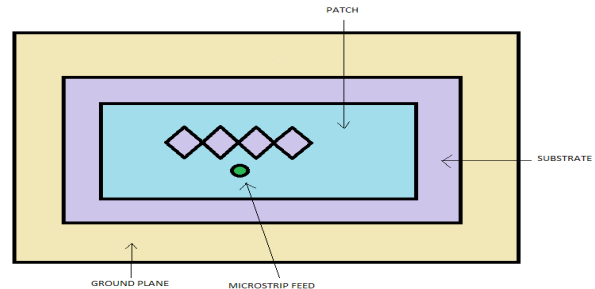


Figure 1: Double Biquad .Micro strip patch Antenna

Figure 1 represents the designing of a micro strip patch antenna; the important parameters required are resonant frequency, dielectric medium and substrate thickness for that antenna to be deliberated.

The factors to be estimated are as under:

The radiating patch's width (W) is calculated in eq (1):

$$L_{eff} = \frac{c}{2f_0\sqrt{\epsilon_{reff}}} \tag{1}$$

$$w = \frac{c}{2f_0\sqrt{\frac{\epsilon_r + 1}{2}}} \tag{2}$$

Here, ϵ_r is the dielectric constant, f_0 is the resonant frequency, and c is the velocity of light in free space. The effective permittivity of the dielectric substrate when $W/h > 1$, is shown in eq (2):

$$\epsilon_{reff} = \frac{\epsilon_r + 1}{2} + \frac{\epsilon_r - 1}{2} \left[1 + 12 \frac{h}{w} \right]^{-\frac{1}{2}} \tag{3}$$

The Length of the active patch (L) that is much responsible for antenna’s enhanced performance usually lies among $\lambda/3$ and $\lambda/2$. Nevertheless, it is shown in equation (3)

$$L = L_{eff} - 2\Delta L = \tag{4}$$

The Extended line length ΔL on both sides of the active patch because of the fringing fields effect [7] is shown in equation (4):

$$\Delta L = 0.412h \frac{(\epsilon_{reff} + 0.3) \frac{w}{h} + 0.264}{\left(\epsilon_{reff} - 0.0258 \left(\frac{w}{h} + 0.8 \right) \right)} \tag{5}$$

Effective length is calculated by the formula:

$$L_{eff} = \frac{c}{2f_0\sqrt{\epsilon_{reff}}} \tag{6}$$

The transmission line technique is appropriate to infinite ground planes only. Nevertheless, for realistic considerations it is necessary to have a finite ground plane. It has been verified that comparable results for infinite ground plane and finite ground plane might be attained². Whether the ground plane’s size is greater than the dimensions of patch by around the 6 times the substrate thickness all around the peripheral. Therefore, for this design, the ground plane dimensions are shown:

In this design, desired input feed point Y_f along y-axis will be zero and only desired input feed point axis X_f along x-axis will be varied to place the optimum feed point. The optimum feed point is provided by the following equation⁷.

$$X_f = L/2\sqrt{\epsilon_{reff}} \tag{7}$$

$$Y_f = W/2 \tag{8}$$

Design Of double Biquad Micro strip Patch Antenna

The goal is to design a Double biquad micro strip patch antenna and examine the performance

characteristics to progress the strength of the signal for long distances⁷. The double biquad antenna is simple to build and provides good gain for point-to-point communication. It contains of four squares of the same size of $1/4$ mid band wavelength as a radiating element and of a metallic plate as a reflector.

Configuration 1:

The essential parameters for the design using FR4_Epoxy substrate are

Resonant frequency (f_0) =6.06GHz
Dielectric constant (ϵ_r) =4.4

Substrate thickness (h) =1.43mm

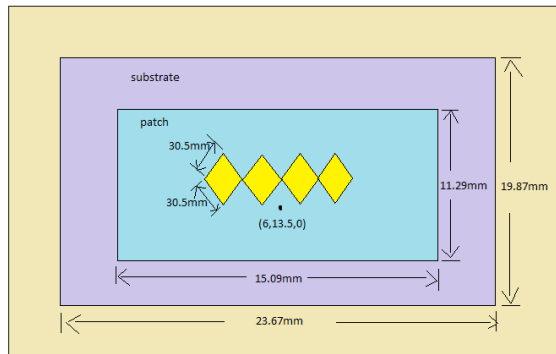


Figure 2: Design of Double biquad micro strip patch antenna for $f_0=6.06$ GHz, $\epsilon_r=4.4$ and $h=1.43$ mm

The Design parameters are optimized and the optimized design is shown in Fig.3 with the optimized values given in Table I

Table I optimized design parameters of antenna

L	W	Feed point location
11.29 mm	15.09 mm	(6,13.5,0)

Table.1. Design parameters

The experimental result of S_{11} scattering parameters of double biquad micro strip patch antenna operating at 6.06GHz is demonstrated in Figure 4. From the below figure, the antenna has -12.8422db return loss and it has almost 6 GHz resonant frequency. The value of VSWR at 6.06 GHz is 4.0312 is shown in Figure 5. Figure 6 represents the simulated results for Gain (db). The measured gain is 2.2694db. HFSS is used to simulate this patch antenna.

Configuration 2

The important parameters for the design using Arlon substrate are

Resonant frequency (f_0) =11.6GHz,

Dielectric constant (ϵ_r)=3

Substrate thickness (h) =0.90mm

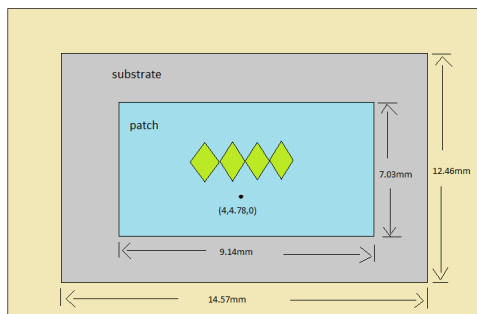


Figure 3: Design of Double biquad micro strip patch antenna for $f_0=11.6$ GHz, $\epsilon_r=3$ and $h=0.90$ mm

The Design parameters are optimized and the optimized design is shown in Fig.8 with the optimized values given in Table II

Table .2. Optimized design parameters of antenna

L	W	Feed point location
7.03 mm	9.14 mm	(4,4.78,0)

The experimental result of S_{11} scattering parameters of double biquad micro strip patch antenna operating at 11.6GHz is shown in Figure 9. From the below figure the antenna has -13.0075db return loss and it has almost 11.6 GHz resonant frequency.

Configuration 3

The important parameters for the design using Neltec substrate are

Resonant frequency (f_0) = 6.78GHz,

Dielectric constant (ϵ_r) = 3.48

Substrate thickness (h) = 1.43mm

The Design parameters are optimized and the optimized design is shown in Fig.8 with the optimized values given in Table III

Table III optimized design parameters of antenna

L	W	Feed point location
11.25 mm	14.78 mm	(5,6,0)

The experimental result of S_{11} scattering parameters of double biquad microstrip patch antenna operating at 6.78GHz is presented in Figure 14. From the below figure the antenna has -11.275 db return loss and it has almost 6.7 GHz resonant frequency.

The simulated results of radiation characteristics plots for above design are given below. The Return loss versus frequency plot has the peak values of -13.78 dB and -12.02 dB at two resonating frequencies 6.8 GHz and 9.1 GHz respectively is shown in Fig 30. VSWR of 3.6 and 4.3 are obtained at two resonating frequencies 6.8 GHz and 9.1 GHz respectively is presented. It has a Gain of 3.06 dB and E-plane radiation patterns are shown in figure below.

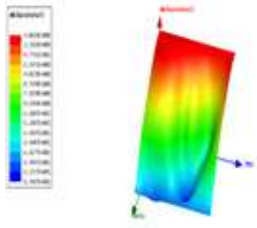


Figure 4: 3D polar plot of Gain for $f_0=6.78$ GHz, $\epsilon_r=3.48$ and $h=1.43$ mm

Parabolic double biquad microstrip patch antenna provides low return loss of -18.6877 dB, good VSWR 2.0297 and better gain of 4.8479 dB compared to double biquad microstrip patch antenna with return loss of -13.0075 dB, VSWR 3.9525 and gain of 3.4127 dB.

CONCLUSIONS

In this manuscript the design of double biquad microstrip patch antenna and Parabolic double biquad microstrip patch antenna using different substrates has been simulated using HFSS. The performance characteristics of simulated antennas are compared in terms of return loss, VSWR, gain and E-plane radiation pattern. The modified double biquad microstrip patch antenna with reflector shows better performance characteristics compared to double biquad microstrip patch antenna. We conclude that proposed geometry is applicable for ultra-wide band from 6-12 GHz. In future the radiation characteristics of the parabolic double biquad microstrip patch antenna might be improved with the use of different feed techniques.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Advance TMR and Clock Gating Technique to Design Fault Tolerant ALU

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ABSTRACT

This investigate paper proposes those latest progresses in the semiconductor industry have headed in the advancement for additional unpredictable segments and systems' architectures Eventually high number of transistors permitting creation procedures with put An higher number from claiming transistors for every zone of the silicon pass on. Accordingly the manufacturing transform would be less and less reliable. Thusly we need will manufacture frameworks that will recognize the presence from securing faults and fuse strategies will endure these faults same time even now delivering a adequate level for administration. In this paper we available the plan and Investigation from claiming issue tolerant 32-bit math Furthermore legitimate unit circlet outlined utilizing those traditional TMR (Triple modular Redundancy) procedure. Also we configuration ALU to attain achieved energy utilization and profoundly dependable utilizing clock Gating.

Keywords: A.L.U., BCH Code, Fault Tolerance, VHDL, Cadence

INTRODUCTION

The issue about dependable registering is Similarly as of age as the principal computers, which utilized relays, vacuum tubes, deferral line Furthermore cathode-beam tube storage, What's more other moderately temperamental segments. Semiconductor segments Also attractive center capacity components with a great part more amazing dependability were presented in the second machine era and the unwavering quality issue might have been fundamentally mitigated. However, a significant part more amazing dependability necessities were posed by those space program in the right on time 1960's, and additionally¹ toward other ongoing requisitions clinched alongside which human exists Might a chance to be jeopardized by PC disappointment. and more should upgrades in part dependability and to test methods, excess In Different levels for system ² association might have been investigated and utilized should increment those likelihood from claiming continuous right operation In specified run through intervals.

The idea of flaw line tolerance unifies Different methodologies will dependability certification toward

method for testing, diagnosis, and more excess in machine association ³ also operation. It rose in the late 1960's also arrived at development with the creation of the IEEE workstation culture specialized foul council looking into Fault-Tolerant registering over 1969 and the ensuing holding of the main worldwide symposium looking into Fault-Tolerant registering to 1971. Those symposium need been held yearly since then, What's more it need turn into the significant universal discussion for those examination for present experience What's more new plans over system design, excess techniques, framework demonstrating Also analysis, trying also finding methods, What's more other related ranges ⁴. A more general understanding about deficiency tolerance additionally incorporates the capacity with endure thus-far- undetected plan faults. Configuration faults happen both to fittings what's more previously, product of the system.

Motivation for Fault Tolerance

Two dissimilar methodologies need been utilized within request should compass those objective for dependable registering. These methodologies need aid appropriate should all parts of the registering system,

including its equipment elements, micro-programs, framework programs, information bases, Also client projects.

In the universal methodology (to be called flaw line bigotry in the taking after discussion) those unwavering quality about registering will be guaranteed by An from the earlier disposal of the reason for unreliability, i. e. , from claiming faults. This disposal takes put When standard utilize begins, and the assets that would allocated to accomplish dependability need aid went through for perfecting those framework former should its field utilize ⁵. Excess will be not employed, and every last bit parts of the framework must work effectively whatsoever times. Since over act it need not been time permits on guarantee the complete An from the earlier disposal about every last bit reason for unreliability, the objective for shortcoming prejudice is to decrease those lack of quality (expressed Similarly as the likelihood of system disappointment over the span of the specified registering process) alternately the unapproved unlucky deficiency of the framework with an acceptably low esteem. Will supplement this approach, manual upkeep methods need aid concocted which profit those framework will a working state following a disappointment ⁶. The cosset of giving upkeep faculty and the expense of the disturbance and more delay from claiming registering also are parts of the general expense about utilizing the fault-intolerance approach. Those methods which need prompted those accomplishment of dependable frameworks utilizing this methodology are: procurement of the vast majority dependable parts inside the provided for expense Also execution constraints; utilization of completely refined strategies to the intercontinental about parts ⁷ also gathering of subsystems; bundling of the fittings on screen out normal manifestations of interference; Also 1305 doing of far reaching testing on dispose of fittings What's more programming outline faults.

Dependable registering might make settled on time permits in spite of certain classes for fittings failures, outside impedance for machine operation, and maybe significantly remaining outline errors clinched alongside fittings Furthermore programming. Exactly of the assets allocated to accomplish unwavering quality need aid used once protective excess. Those excess parts of the framework (both fittings Furthermore programming) whichever partake in the registering methodology or are exhibit on a standby condition, prepared to gesture

naturally with preserve its undisrupted continuation. This contrasts for those support methods on a fault-intolerant framework which is conjured after those registering methodology need been disrupted, and the framework stays "down" for the span of the support time.

It will be apparent that those two methodologies would integral and that the assets allocated on accomplish the obliged unwavering quality for registering might be partitioned the middle of fault- tolerance Also deficiency bigotry. Background and Investigation both appear will demonstrate that an adjusted allotment of assets the middle of the two methodologies ⁹ is well on the way with yield those most astounding dependability from claiming registering. Deficiency tolerance doesn't totally dispense with the compelling reason to dependable components; instead, it offers the alternative to dispense and only the dependability assets of the Incorporation from claiming excess.

LITERATURE REVIEW

Error Detection and Correction

Error detection and correction (EDAC) codes method is typically utilized to ease SEU in an integrated circuit and involve more hardware. Nevertheless this technique gives strongly fault coverage. EDAC codes can be implemented in two ways which depends on transmission data. If transmission occurs in only one direction to overcome error, the

Error control system works out through the forward error correction (FEC). Therefore, FEC method is useful for a satellite transmission ¹⁰ and it is considerable for us.

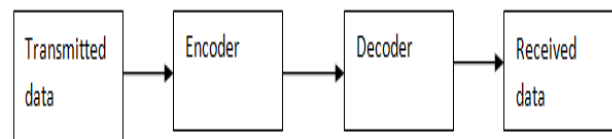


Figure.1. Scheme of a forward error correction (FEC).

Hamming Codes

Hamming codes are linear error correcting codes that can detect 2-bit error and can correct up to 1-bit error. These codes can achieve the highest possible rate for codes with their block length and minimum distance 3. These codes are binary linear codes. For each integer $r \geq 2$, there is a code with block length $n=2^r-1$ and message length $k=2^r-r-1$ Hence the rate of Hamming

codes is $R=k/n$ which is highest possible for codes with distance 3 and block length 2^r-1 . They are widely used in computer memory (ECC memory).

Double modular redundancy (DMR)

In this approach, those unique module is duplicated with perform those comparable operation clinched alongside parallel. This methodology might identify the absolute shortcoming at once by comparing the outputs from claiming operation performed done parallel. Hence, this methodology turns into effective to expand those unwavering quality of the plan during those least expense. But, shortcoming revision may be not conceivable in this approach on account of the voting circuit can't identify the area of the faun module. The major detriment for this methodology is that it obliges more than 200% zone overhead and can't identify twofold issue at once.

DESIGN METHODOLOGY

Fault Tolerant

In the plan for fault-tolerant systems, the creator must think as of the workable event from claiming a few diverse sorts of faults for example, transient faults, irregular faults, permanency faults, legitimate faults, and uncertain faults. Transient faults, often created by outer disturbances, exist for a limited length from claiming the long haul and are nonrecurring. Irregular faults happen occasionally and more normally come about starting with flimsy gadget operation. Changeless faults need aid culprit ¹¹ also might make created toward physical harm alternately outline errors. Legitimate faults happen the point when inputs alternately outputs from claiming rationale entryways are stuck-at-0 alternately stuck-at-1. Uncertain faults when inputs and outputs from claiming rationale entryways coast between rationale 0 and rationale 1.

An arrangement might work effectively in the vicinity of the previously stated faults if that proper manifestation from claiming excess may be consolidated under the framework. Two major fault-tolerant plan methodologies are static Furthermore progressive excess. Static excess is the utilization for excess segments thereabouts that faults might be cover of pregnancy.

Latch-Based Clock Gating Design

The latch-based clock gating style includes a level-

triggered latch in the design to hold the enabled clock gated signal from the active edge of the clock until the inactive edge of the clock

IMPLEMENTATION

Block Diagram

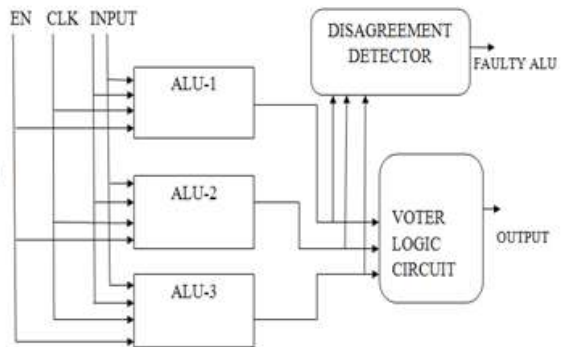


Figure.2. Fault tolerant ALU using TMR and clock gating

Arithmetic Logic Unit (ALU) Is those practically critical part for any of the chip alternately microcontroller. It may be also those center Furthermore souk for whatever central processing unit (CPU). ALU executes rationale operations, for example, AND, NOT, alternately and so forth. , What's more math operations. ALU loads information from information registers, performs the operation Also saves the outcome under yield registers. Those configuration and work about ALU might shift the middle of separate processors. A few ALUs main fulfill basic calculations, same time others are viewed as will consume those floating-point forms. Regardless of the framework unit will be considered; its central work may be will incite basic operations. Consequently, a computer's numerical execution is secured openly should treating ¹² velocity for ALU.

Voting Logic Function

For voting logic, the more terrific some piece end goal will be a work starting with n inputs should person yield. The quality of the operation is false at $n/2$ alternately a greater amount contentions are false and genuine inconsistency generally it will tolerance those voting of right yield quality in the event about faults. Assume we bring three inputs a, b Also c Furthermore we must ascertain the larger part yield out about three. Over we might figure out it toward the Boolean statement.

Assuming the Boolean function computed by the three identical logic gates has value 1, then: if no circuit has failed, all three circuits produce an output of

value 1, and the majority gate output has value 1. TMR systems should use data scrubbing—rewrite flip-flops periodically—in order to avoid accumulation of errors

SIMULATION RESULTS

TMR with Clock Gating



Figure.3. RTL schematic of TMR with clock Gating

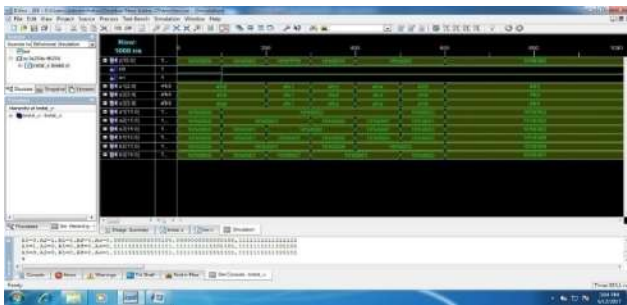


Figure.4. Simulation Results of TMR with clock Gating

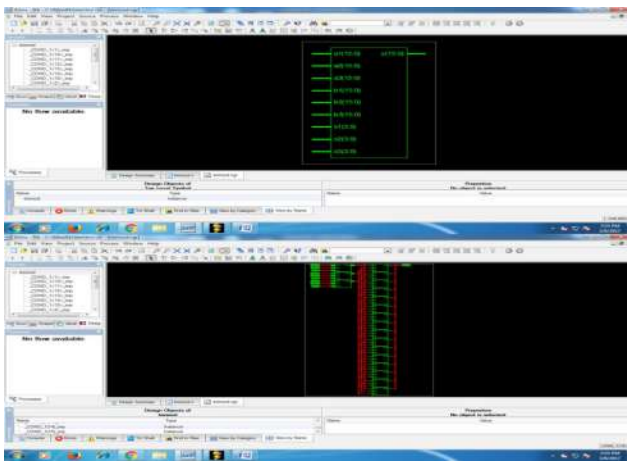


Figure.5. RTL schematic of TMR without clock Gating

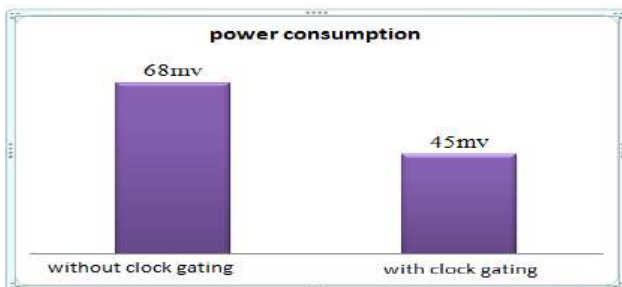


Figure.6. Comparison of Power consumption

CONCLUSION

Fault tolerant and reliable ALU circuit is intended effectively, as present is a high require of dependable, accurate and fault free of charge system, triple modular redundancy advance is use to design a reliable system. Three ALUs are use parallel in the prospect plan with stipulation to identify faulty output if any of ALU be unsuccessful to effort even as processing data. The circuit intended operates on small power and give excellent performance. By use clock gating power is reduced. The future system creature reliable and have fault tolerant ability requirements only little mill watts of power for process.

Future Scope

TMR system despite the fact that serve the reason for making dependable frameworks Anyway at present TMR strategy fizzle to handle produced abandon alternately those sort about defects that happens done an arrangement to which finish framework might break down. TMR depends once greater part voting, henceforth if any two ALU report card bad output, greater part yield fizzles on convey those right response, Not withstanding those possibilities are extremely thin that two ALU’s provide for same bad output, in that case, whichever every last one of three ALU’s provide for right output, or On those yield about any ALU is broken even now lion’s share voter report card right transient reaction of the framework. This is practically not workable that two ALU’s providing for same off output, All things considered the third yield Might be suspicious. Clinched alongside future this issue could a chance to be wiped out Eventually Tom’s perusing planning a greater amount dependable system.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn’t match any other research proposals/research persons.

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Pressure Monitoring by Capturing IR Image

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ABSTRACT

In this paper a method to monitor the pressure of the foot or hand by capturing an IR image is introduced. The test device consists of acrylic sheet, which is attached to IR led's, and an IR camera. It captures an IR image & creates a blob which is in turn useful for measuring the intensity and the pressure. The complete process is analyzed and results are observed in MATLAB & strain gauge.

Keywords— Acrylic sheet, IR led strip, IR camera, MATLAB, strain gauge

INTRODUCTION

Diabetic & polio patients mostly suffer from lack of nerve sensation, normally in hands and feet, therefore their ability in doing any activity may differ from that of a normal person and their points of high pressure are developed may vary from others

In this paper a simple apparatus is introduced to access and measure the pressure points. This typically uses a clear glass slab horizontally with IR led's placed at edges of the slab through which light travels within it, through a total internal reflection ¹. An IR Camera is placed suitably below, to the acrylic sheet underside of the applied pressure onto the glass. The captured image is analyzed by MATLAB and the pressure is calculated using strain gauge

METHODOLOGY

System Architecture

The device consists of a transparent acrylic sheet of 5 mm thickness and 30 cm in height and width, which is cheaper than any other transparent materials like glass & plastic. IR led's attached to it, surrounds by producing certain radiation of wavelength 700nm. Light from the IR led's enters into the acrylic sheet from a side and traverse the thickness into total internal reflection. The pressure points of the hand will be observed by the scattered light rays and are recorded as a RGB image from an IR camera. The pressure at the Corresponding pressure points is analyzed by using strain gauge.

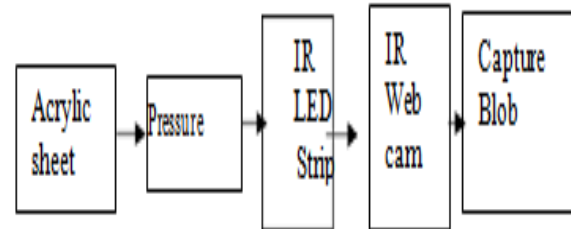


Figure 1. System model.

Sensor Design

In this paper we are using an 5mm thick transparent acrylic sheet, it can be scratched easily which in turn changes in the rays of scattered light [1], so it is has to be fixed correctly by using a wooden board or notches to avoid further changes caused by scratching in the image. In this paper the main part of the sensor is the acrylic transparent plate with all its edges smoothly polished so that light does not get scattered back from any part of the edges. Initially no light ray enters into the acrylic surface either upwards or downwards. The device includes the IR led's through which the light enters into sides and passes through the acrylic surface causing a total internal reflection.

An IR camera is placed within the setup below or underneath the acrylic surface facing upwards. The distance between the IR camera and the acrylic surface should be appropriate in order to focus the clear surface and its point of view.

Initially, without applying any pressure on to the acrylic surface gives an IR image which is of dark background ².



Figure 2: pressure at the sensor breaks down total internal reflection & scatters its beams downwards

The points where the pressures acts onto the sensing surface, the blood moves away from the high pressure points and this in turn changes the brightness, contrast and color of the image between pressurized & less pressurized areas. At points of pressure, the microscopic ³ spots which have air molecules are displaced in the transparent acrylic sheet, which causes breakdown of total internal reflection and light rays go out of the acrylic plate upwards.

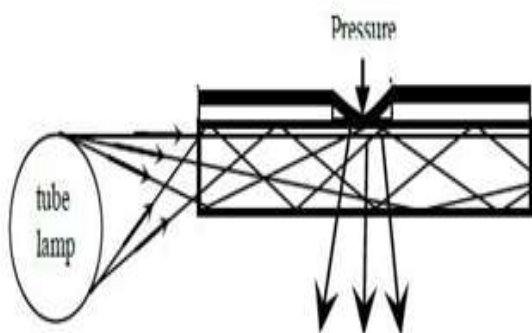


Figure.3. RGB image

From the above Fig3, in this paper we can observe that the points which are appeared as bright spots were identified as the pressure points and their brightness increases by the increase of the amount of the pressure applied on the acrylic surface as it increases the microscopic ⁵ area of the contact.

The IR camera placed below the apparatus captures the patterns of light and stores the data in the computer. As the scattered ray would ideally range from total darkness, the camera should be sensitive enough to work even at low light levels. IR camera can easily be controlled from a PC and the data of the image can be stored in it, most of them slow down at low light levels giving more time for every exposure.

Programming and Analysis

In the displayed mat lab program, the captured image is configure through converting it into gray scale from an

obtained RGB image, it is so converted because by this, the blob at the pressure points can be easily identified particular blob is selected and is made into grid format which of dimensions 5x5 in which each grid is having a different intensity and different pixel values present. These pixel values and intensities, grid, and complete programming at each and every block are calculated with the help of the following matlab code.

On the execution of the above code, the following window appears showing the pixel values at each of the points and its corresponding intensities at its respective targets are also appeared



Figure.4. intensities at a point

The intensities and pixel values varies for each and every point, where the minimum intensity appears to be 0 and the maximum intensity is at 255, the intensity for each and every point is studied as different at different points ⁴.

These intensities which are differed by point to point can also be showed as different shaded patterns which are intended to be appeared as black as indicating '1' which has highest intensity among all the others in the blob and white being '0' gives the lowest intensity among all the others present in the blob.

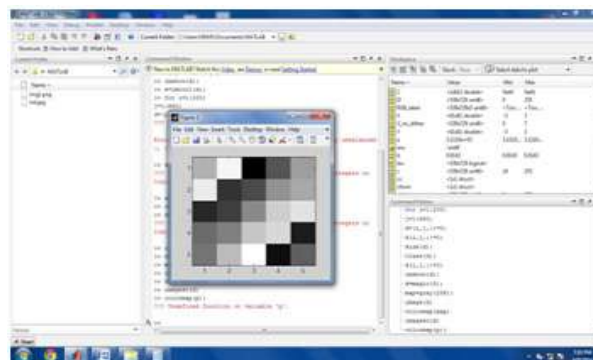


Figure.5. Different Intensities with shades

The shaded region which is nearer to the black and white depends upon the intensity values which are nearer to them This can also be performed by indicating

the lowest and the highest intensities by separate colors which can be analyzed by the same codes which gives the output pattern as the shades which are nearer to the intensity.

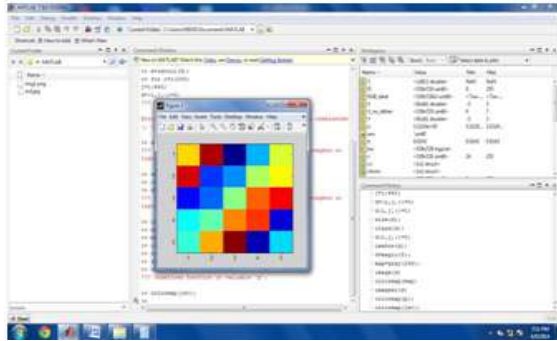


Figure.6. Different intensities indicated in color format

RESULTS AND DISCUSSIONS

The pressure is obtained from the calculated intensity by using strain gauge which has beam length of 22cm, width of 2.6cm, thickness =0.25cm, and no. of arms=4 and its maximum load capacity as 1kg. The pressure is measured in Pascal’s using different intensities and strains at different points and calculating the pressure by taking the relation in between them.

$$V_{out} = V_s S(P_m/P_r)$$

Here, V_{out} is the output voltage/strain occurred and S is the sensitivity which is calculated from the graph shown below and P_m is the measured pressure of the each pressure point by converting the weight of the pressure point to the corresponding pressure from the following relation as:

$$1\text{gram/cm} = 98.05 \text{ Pascal's}$$

The rated pressure is the obtained pressure from the pressure points at their corresponding intensity. These pressure points were also be compared by taking different inputs of two persons by two different hand or foot. The pressure is almost accurate when comparing the two persons

Observations

Three different types of input pressures is measured and checked for accuracy. It gives 97% accuracy. The apparatus used is well optimized and compatible. The pressure at the particular points is obtained and is represented in the following tabular form:

Table1: Input pressures is measured and checked for accuracy

Pressure Points	Pressure
Point1 (Thumb)	2.3kpa
Point2 (index finger)	0.210 kpa
Point3 (middle finger)	0.25 kpa
Point 4 (ring finger)	0.185 kpa
Point 5 (little finger)	0.221 kpa
Point 6(considered pt.)	0.1705kpa

DISCUSSION

The IR image of the hand obtained is given to the MATLAB. The intensity and pixel values are measured and the corresponding calculations are made for the pressure using strain gauge and the equivalent relations are taken to the analysis. The pressure obtained is proportional to the intensity.

CONCLUSION

The pressure monitoring procedure using MATLAB has got many applications. This device can be used in analyzing the suffer from lack of nerve sensation measurements in diabetic and polio patients. The advantages of this monitoring apparatus is monitor degenerative foot disorders Identify areas of potential ulceration Regulate weight bearing after surgery Evaluate athletic footwear.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn’t match any other research proposals/research persons. .

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Automatic Monitoring of Human Body Physiological Parameters Using Lab VIEW

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ABSTRACT

The medical treatment and diagnosis of patient's in hospitals is very difficult due to very limited staff especially in government hospitals where the doctor to patient ratio is very low. This project looks at a novel method of monitoring a patient's health without the doctor physically being present there. This monitoring system assists the doctor in carrying out medical tests and also provides patient-doctor interaction, when the doctor cannot be physically present near the patient. The proposed system uses a variety of sensors to monitor human body parameters like Temperature, Pulse and ECG sensors. These sensors are integrated together and their output is made available to the doctor in a virtual form. The sensors are integrated to LabVIEW through NI myRIO to provide a GUI based environment and monitoring parameters are displayed on the LabVIEW front panel. The doctor can access the front panel in his mobile phone using the Wi-Fi connection of myRIO.

Keywords: LabVIEW, Temperature, ECG, GUI, myRIO

INTRODUCTION

In a hospital health care monitoring system it is necessary to constantly monitor the patient's physiological parameters. Although present system allow continuous monitoring of patient vital signs, these systems require the sensors to be placed by the bedside monitors or PC's and limit the patient to his bed. A real time monitoring system of some critical vital signs will be implemented. Such a system may help the doctor or people in the family to monitor the emergency alarm from patients. In this project, we consider three parameters of the vital signs which Pulse rate, Human body temperature and ECG ^{1,2}. The data helps to prevent and protect the patient.

Wireless technology is used in many applications that have become a part of human activities such as agriculture, military, medical care, smart home system etc. Distinctly, wireless sensor networks (WSN) play a crucial role in such monitoring systems, for the reason that WSN can offer some advantages over other types of wireless systems, especially its scalability and flexibility of architecture. In this Project, a group of sensors have been implemented for measuring Pulse rate, body temperature and ECG with real-time monitoring system based on Lab VIEW and my RIO.

This project incorporates sensors to measure parameters like body temperature, heart beat rate and IR pulse rate sensors ³ A is used which is an embedded evaluation board is used for analyzing the inputs from the patient and any abnormality felt by the patient can be monitored using a mobile phone which uses the Wi-Fi enabled by Rio. Also all the process parameters within an interval selectable by the user are recorded to the common computer.

For more versatile medical applications ⁴ this project can be improvised, by corporation dental sensors and annunciation systems, thereby making it useful in hospitals as a very efficient and dedicated patient care system.

Existing Method

GSM based health checking undertaking basically meets expectations for permitting doctors alternately relatives for tolerant will weigh those status of patient health remotely. The system calculates the heartbeats also body temperature for tolerant by assuming that it dives over sure farthest point then quick educational caution message will make the enrolled amount. For this system we utilized AVR crew Microcontroller which is interfaced with LCD display, pulse sensor Furthermore temperature sensor. The GSM based patient health

checking system meets expectations for GSM modem to send the information remotely of the enlisted number, system powered toward 12V transformer. That system likewise offered with manual patient health catch utilizing that the tolerant with some other issues will likewise unable on contact with specialist so, the system may be exceptionally supportive for sparing life of tolerant ⁵. That system likewise acquainted a work through which a specialist will fit should check the status from claiming tolerant then afterward a certain interim about period toward sending message. Those system proficiently updates specialist over health about tolerant and in addition faultlessly calculates those health parameter for tolerant.

Proposed Method

Our principle point of the project will be to monitor those physiological parameters about human body utilizing Different sensors and device programmed for Lab VIEW.

Generally, mankind's health state will be characterized by perusing mixture from claiming physiological parameters, which as a rule would self-inter-dependent. Not constantly on about them would just as educational also significant. Besides, not every last bit of the individuals parameters Might be undoubtedly and decisively controlled, since estimation about them obliges exceptional conditions, unreasonable restorative supplies by materials. Those Different parameters utilized here need aid blood pressure, figure temperature, pulse and also ECG.

Now days in Hospitals it is difficult for a doctor to assist each and every patient. To overcome this we are implementing a project which will be useful in hospitals. Here we are connecting various parameters like temperature sensor, pulse sensor, ECG sensor to human body directly with the help of this system. Temp sensor is used to check the temperature levels of human body ⁶ Pulse sensor is used to check the pulse level of the human body and ECG gives the graph of human body condition. By connecting all these sensors to system programmed with Lab VIEW. We have to check each sensor separately and phone should be connected to my Rio module ⁷. Final values of all the sensors are displayed on the front panel of phone with the help of Wi-Fi connection. Wi-Fi password should be secured so that no one can use the data.

The advantages of this method are Compared with other sensors this gives better performance, Multiple parameters can be included as controlling parameters in the future as well as and Modern technologies are developed that promotes comfortable and better life which is disease free and requires less time to perform the task.

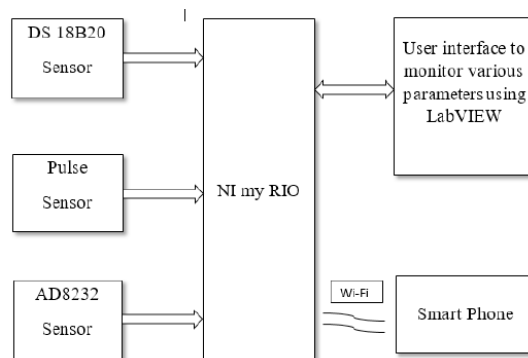


Figure.1. Block diagram

The block diagram mainly consists of three sensors i.e., Temperature sensor, Pulse sensor and ECG sensor. Temp sensor is used to check the temp levels of human body by placing the wire on any place on the body and power supply of this sensor is b/w 3V – 5.5V. If temperature is low then low temp LED will glow and if it is high then high temp LED will glow Whereas Pulse sensor is used to detect the pulse of the human body. It consists of 2-pole high-pass filter and 3-pole low-pass filter. The sensor detects pulse when we place finger on the glowing LED of the sensor. If the pulse levels are high (>100) then it is known as tachycardia and if the pulse is low (<60) then it is known as bradycardia. ECG sensor consists of two or three electrode configurations and low current is supplied through it. Now all these sensors are connected to device and can interface with monitor using Lab view. Now we have to enable ⁸ Wi-Fi in the device and phone with Wi-Fi enabled on it should be connected to it, so finally front panel values will be displayed on the phone.

Temperature Sensor (DS18B20)

DS18B20 will be an advanced thermometer which gives^{9, 12} touch (configurable) temperature readings which demonstrate that temperature of the gadget. Majority of the data will be sent to/from those DS18B20 through An 1 Wire interface, thereabouts that special case wire (and ground) makes associated from a vital chip on An DS18B20. Energy for reading, writing, and performing temperature conversions can be a chance to be determined starting with those information offering

itself for no necessity to a outside force wellspring. In light each DS18B20 holds a interesting silicon serial number, different DS18B20 examine exist on the same 1 Wire transport. This considers putting temperature sensors to a significant number different puts. Requisitions the place this characteristic may be suitable incorporate sensing temperatures inside buildings, supplies or machinery, and procedure screen ECG and control.

Pulse Sensor

Pulse sensor may be a well-designed plug-and-play heart-rate sensor. It might make utilized by students, artists, athletes, makers, and diversion & versatile developers who need to effectively fuse carry on with heart rate information under their tasks. Those sensor clips onto a fingertip Furthermore it also incorporates a open-source screening app that graphs your pulse progressively.

ECG Sensor (AD8232)

Those AD8232 will be a coordinated sign molding square for ECG Furthermore different bio-potential estimation requisitions. It is used to extract, intensify and change the signs in the loud states for example, such that the individuals made by remote cathode placement.

NI MYRIO

Those MyRIO 1900 will be an ongoing inserted assessment apparatus settled on by national Instruments. Rio abbreviates to Reconfigurable I/O device. You quit offering on that one could use it should instruct-in and actualize all the numerous configuration ideas for person reconfigurable I/O device

It will be used to create requisitions that use its installed FPGA and chip. Elective on this device may be my DAQ which need less pins contrasted. Those my RIO1900 gives simple information (AI), simple yield (AO), advanced enter also yield (DIO), audio, Furthermore energy yield in a conservative inserted gadget.

It is In light of four components: A processor, and reconfigurable FPGA, inputs and outputs and graphical outline programming. Combined, these segments give acceptable the capacity on quickly make custom fittings meandering for high-octane I/O What's more phenomenal adaptability clinched alongside framework timing control.

This device 1900 is an ongoing inserted assessment device aggravated eventually Tom's perusing national Instruments. Rio abbreviates with "Reconfigurable I/O" gadget. You quit offering on that one might utilize it to show Also actualize all the various plan ideas with particular case reconfigurable I/O device.

It will be used to create requisitions that use its installed FPGA Also chip. Elective with this device may be Ni MyDAQ which needs fewer pins contrasted with device. Those NI MyRIO1900 gives simple information (AI), simple yield (AO), advanced information Furthermore yield (DIO), audio, What's more control yield done a conservative installed gadget.

It may be dependent upon four components: A processor, a reconfigurable FPGA, inputs Also outputs, Furthermore graphical outline programming. Combined, these segments furnish the capacity with quickly make custom equipment meandering for high-octane I/O and more phenomenal adaptability in framework timing control.

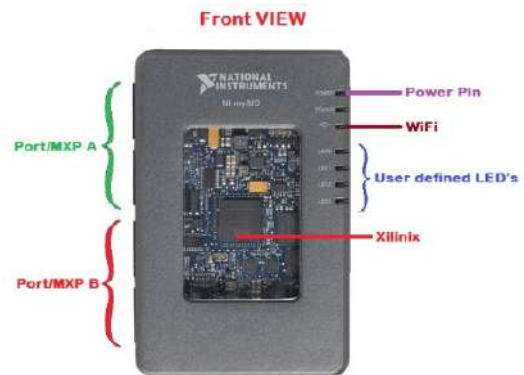


Figure.3. RIO I/O connections

Experimental Setup and Methodology

This project consists of 18B20 Temperature sensor, Pulse sensor, AD8232 ECG sensor connected to port-A and port-B of I/O device. Pulse sensor senses the pulse or heartbeat. 18B20 is used to measure the surface temperature of the body. ECG sensor is used to monitor the electrocardiogram readings of the patient. Since these sensors are wearable these can be fixed in dress.

These sensors are designed to collect the raw signal from human body. The signal from a human body is usually weak and coupled with noise. First, the signal should go through amplification and filtering process to increase the signal strength and to remove unwanted signals and noise.

These sensors are directly connected to device using connecting wires, which in turn is connected to the computer using data cable. This hardware is run according to the program written in the computer using Lab VIEW.

When the patient fell down this will be intimated to the hospital. This system also intimates the patient to take their medication at appropriate time. Fall detector detects the when the patient fell down and it will be intimated to the doctor. Therefore without disturbing the patient and from the doctors cabin itself doctor can monitor the patient.



Figure.4. Hardware connection of 18B20 temperature sensor

The above figure shows the hardware connection of 18B20 temperature sensor which connected to pin-3 of port-B to i/o device as shown below which can be configured in the software. This gives the input to the system for which certain logical operations are performed to obtain the required result.

The above figure shows the logic implemented using Lab VIEW in which the temperature will be displayed in Fahrenheit and Celsius. These outputs can be seen in the front panel in the form of digital reading, graph and a thermometer where the ‘Low Temp’ LED as well as LED0 in the device glows when the temperature is below 97°F and ‘High Temp’ LED as well as LED1 in the Rio glows when the temperature is above 102°F. When the temperature is between this ranges no LED glows but just the values are displayed. This because the normal body temperature is around (98-99) °F.

Abnormal condition with high body temperature

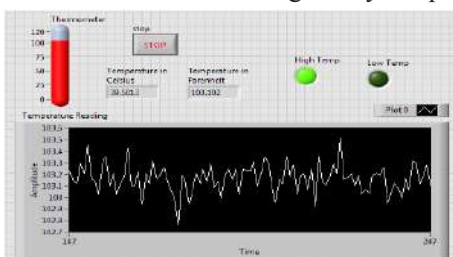


Figure.4. High body temperatures at abnormal condition

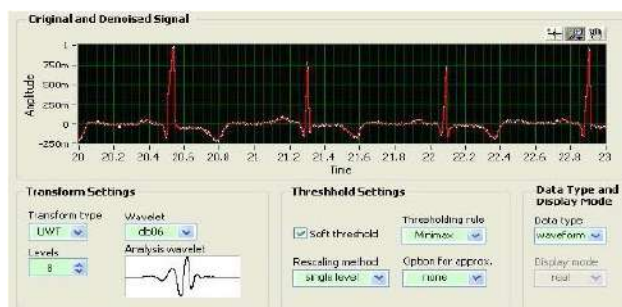


Figure.5. The output waveform and the wavelet de noise VI configuration

These outputs are similar to the results appearing on the front panel of the monitor. They show the same result as in the front panel modifying for every second. All the outputs can be accessed at the same time just by sliding the adjacent slides in the app.

Shared variables are used to connect the base system with another system which may be a phone, PC or laptop over Wi-Fi by creating a network using device.

The user can now monitor the health of the patient from time to time using these shared variables over Wi-Fi up to a certain range.

CONCLUSIONS

Current innovations have produced that advertises agreeable and preferred an aggregation which is illness allowed. These need aid A large number requisitions identified with patient’s observing framework with large portions accessible sensors including temperature, pulse Also ECG. Clinched alongside future additional Different sensors can be interface with this SYSTEM.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn’t match any other research proposals/research persons.

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IoT based Water Quality Monitoring System Using WSN

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ABSTRACT

The economical and effective system of water quality observation is the most robust implementation of impure water. Drinking water could be precious for all people as water utilities face more challenges. These challenges arise due to the high population, fewer water resources, etc. So, different methods are used to monitor in the real-time water quality. To make sure that safe distribution of water is done, it must be observed in real time for a new method in the Internet of Things (IoT) based water quality has been projected. Real-time water quality observation is examined by data acquisition, method, and transmission with an increase in the wireless device network method in the IoT. Microcontroller and the processed values remotely to the core controller ARM with a WI-FI protocol are used to interface the measured values from the sensors. This projected the water quality observation interface sensors with quality observation with IOT setting. WQM selects parameters of water like temperature, pH level, water level and CO₂ by multiple different device nodes. This methodology sends the information to the web server. The data updated at intervals within the server may be retrieved or accessed from anyplace within the world. If the sensors do not work or get into abnormal conditions, then a buzzer will be ON

Keywords: wireless sensor network (WSN), water parameters, Internet of things (IoT), WI-FI.

INTRODUCTION

Water is used in different activities in our lives, like in agriculture, utilizing in cooking, drinking and electricity and so on. For every activity water should be monitored. So, chemical parameters in water are monitored by some methods by using different modules and sensors. Some of the parameters include chloride, oxygen, pH, temperature and many parameters. Due to the increase in the technology the existing system is to be modified depending on the application. By improving the quality of water, the quality of life is gradually increased. By collecting the information at a pre-defined locations at different intervals of time period, in order to get exact required data is known as water quality monitoring¹. By this method the variations in parameters are identified earlier of warning. The two main advantages of this project is firstly, it provides a detailed work of application and secondly it provides low complex and low cost system. For the easy understanding of the project, we can classify into three subsystems.

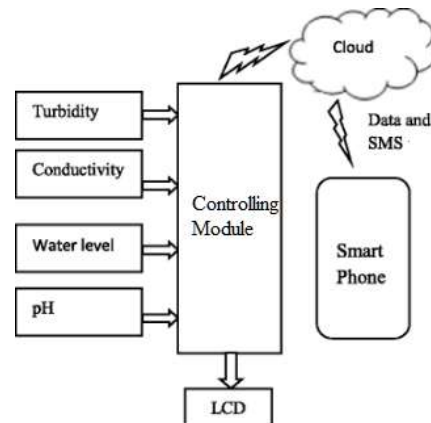


Figure.1. Different levels of data processing

Data collection subsystem: In this section, the data from the sensors and the modules are collected and transferred to the microcontroller.

Data transmission subsystem: In this section, the data is sent to the wireless devices and transferred to the web server.

Data management subsystem: In this section, the data is accessed on to the web server and is displayed on

the screen.

The parameters monitored are pH, carbon dioxide, water level and temperature. pH is one of the most important parameter in the water by which we can know that the water is acidic or basic in nature. Carbon dioxide is the parameter in which the level of carbon dioxide is measured which is mostly used for the animals which survive in water. Water level is the parameter in which the level of water is measured for leakages. Temperature is the parameter in which we can measure the hotness and coldness of water.

LITERATURE REVIEW

Using PIC microcontroller, a water supply based on GPRS was designed by Jing ¹¹. The software used for PC management is created by using VC ++6.0. A real time water quality monitoring measurement system was designed using liquid crystal display (LCD), analog to digital converter (ADC), Global system for mobile communication (GSM), sensors and Intel microcontroller by Purohit and Gokhale ¹². The time required developing and the cost of design or circuitry is more complex because of the microcontroller. Using the Arduino At mega microcontroller and Zigbee, a real time device is designed to know the physical and chemical parameters of water such as temperature, turbidity and pH by Beri ¹³.

The water meter system and the leakage detection system was developed using Field programmable gate array (FPGA) chip by Hsia ¹⁴. The proposed system of Hsia contains ADC FPGA board and a pressure sensor. A reconfigurable smart sensor device is designed for the application of industries of WSN in IOT by Chi et al. The interfacing devices are stopped because they are based on complex dedicated electronic board. A modern design of WQM system in IOT was developed by Vijayakumar and Ramya, in which Raspberry PI B+ mode is used as a core controller. Ning designed monitoring system for water quality. Jayti Bhatt ¹⁵, Jignesh developed "Real time water quality monitoring system".

Existing System

In the existing system the application used is in agriculture. In this the monitoring should be done at each plant. The complexity or the data collection would be so large to find. It becomes burden to wireless sensor network. The disadvantages are like the power consumption is high due to more area; the water amount

is also more. So, with the above disadvantages, the application can be changed. The water is polluted due to many severe reasons. It presents a high cost and high complexity functions. With the advancement in the technology the water can be checked or the quality of water is monitored by using different devices, sensors and methods, which would reduce the cost of the design, complexity of the design, power consumption and increase the speed of operation, quality of the system.

Proposed System

In the proposed system, the architecture has different types of sensors for measuring the quality of water. These sensors are arranged along with the flow of water. Since the controller is arranged near to the sensors, they form a system design. In the applications like rivers and lakes the arrangement of the sensors and the controller are little far. Zigbee is used in these conditions. For the applications like overhead tanks, that is the short distance communication, WI-FI is used, to communicate. The microcontroller operates in active mode, sleep mode, deep sleep mode and hibernate mode to reduce power consumption, since all the sensors are in analog output form and the controller takes only digital values, the ADC is connected to interface between the sensors and the controller. The data is uploaded in the web page and can be seen on the LCD.

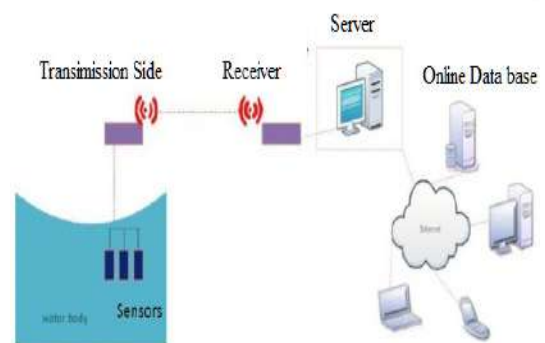


Figure.2. System Block Diagram Implementation

pH Sensor: A pH is an electronic device which is used for measuring the pH level in the water.

$$\text{pH} = -\log[\text{H}^+]$$

A pH sensor is an electronic device used for measuring the hydrogen ion in water; whether the water is acidic or alkaline in nature. A pH meter consists of

a glass electrode and a reference electrode which are used to measure the potential difference. The pH is also known as “Potentiometer pH meter”. These are used in many applications such as swimming pools, healthcare, laboratories etc. pH is defined as the negative logarithm of hydrogen ion concentration in a solution.

CO2 Sensor: A carbon dioxide sensor is defined as a device which measures the amount of CO2 gas. CO2 gas sensors are based on the principles, infrared gas sensors and chemical gas sensors. In this project we use MQ2 analog infrared CO2 sensor. The concentration of the gas is measured in PPM (parts per million).

Water Level Sensor: Water level sensors are defined as a device which is used to detect the level of water that can flow. The water level sensor is made up of three parts, an electronic brick connector, 1MΩ resistor and several lines. The sensor has S,+,- on it. S represents the signal input, + represents the power supply and – represents the ground. These types of sensors are more preferred in rainfall, liquid leakage and tank overflow detections.

Temperature Sensor: This Temperature sensor is defined as an integrated circuit (IC) which measures the temperature. The output is linearly proportional to the centigrade temperature. In this project we use LM35. Why we use only LM35 not other types because, the user has not to convert the Kelvin to centigrade. There are two types of sensors; they are non contact and contact Temperature sensors.

WI-FI: WI-FI is a low cost microchip with TCP/IP stack. In this project we use ESP8266. This allows exchanging data wirelessly over a network; it continuously transmits and receives serial data through internet. Through a host controller interface, it delivers the received data. UART or USB is generally used for interfacing. The baud rate is 9600.

Result

In this system, the water parameters of individual sensors are detected when the sensors get into activated state immediately after the board is switched ON. By using WI-FI module, the gathered data of the parameters are transferred to the web server. The data is monitored frequently and displayed on every action because the system is set in a loop. The data is refreshed for every 5 seconds. One hour is selected for the interval of sensing.

It reduces power consumption.



Figure.4. Information accessing in smart phone

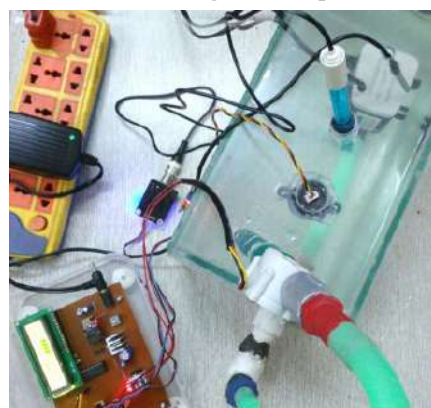


Figure.4. Hardware setup

CONCLUSION

By using a WI-FI module, the interfacing is done between transducers and the sensor network on a single chip solution wirelessly. For the monitoring process, the system is achieved with reliability and feasibility by verifying the four parameters of water. The time interval of monitoring might be changed depending upon the necessity. Ecological environment of water resources is protected in this research. The time is reduced, and the cost is low in this environmental management.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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IoT Based Health Care Monitoring System using Wireless sensor Networks

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ABSTRACT

The improvement in the technology in health care monitoring system it is necessary to constantly monitor the patient's physiological parameter. In the advanced in the health care environment by the usage of IOT technology bring convenience to the patient and the physician. Since they are used in various medical areas. The internet of things (IOT) has been broadly used to interconnect the available medical resources and offers the smart, reliable and effective health care services. A sensor node has been attached on the surface of the body the sensor node will gather the information and sends them to the wireless sensor node. The sensor nodes which are arranged on the patient body can sense the heart beat, temperature of surrounding. The main objective of this system is to transmit the patient's health monitoring system through wireless communication in an emergence situation. We propose a secure IOT based healthcare monitoring system to check the heartbeat rate, temperature of the surrounding and saline level of the patient. In the proposed system of health care monitoring system the heart beat rate, temperature of surrounding and MEMS accelerometer is used for when a patient's body will fall down on the floor then it will send the SMS alert to the predefined mobile number and by using IOT we can send the data to the server.

Keywords: *Internet of things (IOT), Body sensor network (BSN), Saline bottle, data privacy, data Integration and authentication.*

INTRODUCTION

The most recent few decades have seen a gradual expansion clinched alongside lifetime to number parts of the globe coming about should a sharp climb inside the range from claiming of age people. A late report card from worldwide association¹ predicated that there will a chance to be pair for billion (22% of the worldwide populace) more seasoned people by a pair 2050. Clinched alongside addition, dissection demonstrates that in regards 89% of the age-old individuals would intrigued with live separately. However, restorative Scrutinize surveys found that in regards to 80% of the ageists people more seasoned over sixty five percent experiences An least from claiming you quit offering on that one incessant unwellness² bringing on a lot of people age-old individuals to have issue clinched alongside dealing with themselves. Consequently, giving work to a legitimate personal satisfaction about an aggregation for age-old individuals need turned

into a major social challenge during particular minute. Those expedient burgeoning from claiming information and correspondence advances may be sanctionative imaginative forethought results and instruments that demonstrate guarantee for tending to those pervious tests.

The body sensing element network (BSN) technology is one in all the foremost imperative technologies employed in IOT based system. It is primarily a group of low-power and light weight wireless sensing element nodes that are used to monitor the functioning of the human body and environment. Since the sensitive information are gathered from BSN and can operate in hostile atmosphere. Consequently a strict security mechanism is provided.

In this system, we have the blood pressure, heartbeat, ECG, saline jug level, and temperature, would be monitored ultimately by utilizing ARM7 and is measured using specific sensors and it could be in the

screen of the computer and will be monitoring anyplace in the globe utilizing internet hotspot. BSN care hub will gather information and store that information in the processing in the local processing unit, and it sends to the database server. The power source and internet link should be in stable essential in exact working and once in a while observing physiology parameter of the body to keep away from danger. Since the sensor will be identifying or gathering the information once every 10 seconds and drives to the database server.

LITERATURE REVIEW

Body sensor network (BSN) is the essential technology for the improvement of IOT in the health care system. In which a sick person can be examined by using different type of light nodes and wireless sensor hubs. However the improvement of this health care system without respect to safety makes the security of the patient vulnerable. In this article there firstly focused on the major safety requirement in the modern health care BSN¹. This method can be used to examine physiology parameters. Such as the heart beat rate and temperature of the human body. The gadget detects if the patient is in disorder state to the doctor and receiver connected to the computer diagram chart for monitoring physiological specification of the human body².

Many researchers did their work on health monitoring using IOT. M.Wcislik et al³ monitors patient's body temperature, pulse rate, heart beat rate and patient's body position using the ARM. The sensor used are temperature sensor, heart beat sensor, MEMS accelerometer and to check the saline bottle level monitoring. These sensors are arranged on the surface of the patient body which is used to monitor the health of the patient without disturbing the daily schedule of the person. The information will be send to the server of physician server with long range wireless system using GSM. The health monitoring system contains the microcontroller, sensors, GSM modem and LCD display to transmit and receive health related issues to the doctor server.

The purpose of the Body sensor network (BSN) is to make simple and the better speed, accuracy and reliability

of sensors communication within, inside or in the region of the body. The enormous sum of the challenges identified with the wireless body sensor nodes (WBSN) as resulted in many of the publications. In this project we create the web page. Using the IP address anyone can monitor the patient's health monitoring status from anywhere in the world.

Existing System

The Existing system provides a few popular researchers. Code Blue^{4,5} is well apprehend attention research supported the BSN care improved at the Harvard sensing element network during this design some sensors are arranged on the surface of the patients body. These sensors can sense the information and forward the data to the wirelessly end-user device for the future analysis. The aim of the Code Blue is that doctor concern a query for the data using the digital assistant. However, the code blue author acknowledges the requirement of safety in medical application but the security is still a major problem in this article. Alarm-net consists of the sensor node and the environmental sensor node. The improvement in the body sensor network has made the health care application had made the patient health monitoring more easy. Recently many researchers have been proposed in which it provides the continuous health monitoring.

Proposed System

In this project we are using LPC2148 microcontroller has a gateway to communicate with the sensors like Temperature sensor, heart beat sensor, MEMS accelerometer and also for monitoring the saline bottle level monitoring and if the sensors are in abnormal condition then it will sends the SMS alert to a particular mobile number.

The sensor data will be sends to the web page by using the internet of thing. The information will be implemented by the system and doctor can be accessible anywhere from the world through the internet and also sends SMS alert by using the GSM module. The specified prescribed by the doctor at a particular time is sent as a SMS.

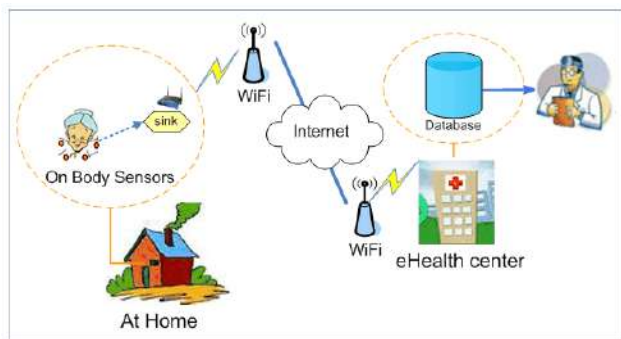


Figure 1: System Design Architecture

The security issues can be addressed by setting a password the client can easily open the web page and can know the information in the emergency situation the data can be forwarded as SMS alert to the predefined mobile number through GSM modem. The information will be updated to the webpage through internet. The proposed system includes the heart beat sensor for monitoring the heart beat rate, temperature sensor, MEMS accelerometer and saline bottle level. The data will be updated to the web page and can be accessible from anywhere in the world through internet and if any sensor gets abnormal condition then it will sends the SMS alert to the predefined mobile number.

Heart Beat Sensor

The heart beat sensor is used to calculate the heartbeat of the tolerant it provides for those advanced digital output of heart beat that points when finger may be set to it. It can be reduced in size. The use of the voltage of heart beat will be +5v DC. The heart beat sensor ranges from 60-100 BPM (beats per minute) . It uses the rule of the light weight regulation by the blood flow through the finger at every pulse.

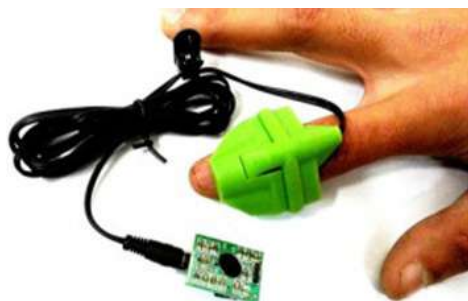


Figure 2: Hearts Beat Sensor
Temperature Sensor

The centigrade temperature is directly proportional to the output voltage of the temperature. The temperature is an integrated circuit which is used to measure the temperature. In our project we are using the temperature

sensor series is LM35. The LM35 is has an advantage that the user has not to create the conversion of Kelvin to the centigrade. The LM35 is directly in Celsius.

MEMS Accelerometer

Micro Electro Mechanical system (MEMS) is classified as the units and methods for manufacturing. This tiny material ranges from 1-100 microns. MEMS are of two types Sensors and Actuators. Sensors will accumulate the data from the surrounding like thermal, mechanical, biological, optical, chemical and magnetic phenomena and actuators will execute the commands. Accelerometer measures the acceleration by changing the capacitance. The mass is fixed and capacitor is variable

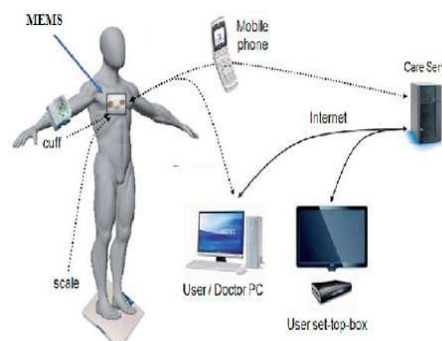


Figure 3: MEMS working Operations in System

The applications of MEMS are for commercial purposes are: Inject printer which is used to deposit ink on paper, Accelerometer which is used in airbags for the deployment in collisions. It also used in consumer electronics like games controller, video players, cell phones etc.

Saline Bottle Level Monitoring

In our project, the infrared sensor will measure the saline level. The standard saline container will be of 1000ml. If the saline level is to the significant point, then the SMS caution will make send of the predefined mobile number. The nurse can come and change the saline container.



Figure 4: Saline Level Monitoring

Internet of Things

The IOT is a physical device that consists of an IP address for internet connectivity and the communication between objects and other enabled devices.

According to Tan and Koo the IOT technology is divided into two types.

Data Acquisition.

Networking.

Data Acquisition can be achieved through the utilization of QR code, the bar code and RFID identification and sensors for taking physical measurement in the device. The networking of IOT technology is much larger topic that can be addressed in our available time.

The proposed system contains the ESP8266 is the Wi-Fi module which is connected to the server. The tiny module allow microcontroller to connect Wi-Fi network and make a simple TCP/IP connection.

RESULT ANALYSIS

In the health monitoring system when sensor board is switched ON the sensor will get into activated state and it will detect the data and forward the information into the webpage. When the saline bottle reaches the critical position then it will display saline is low and sends alert message to the particular mobile number and to the web page.

When the saline level achieves significant level then SMS caution will be send to the predefined mobile.

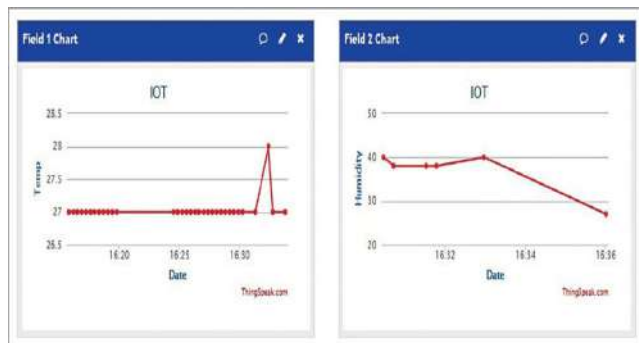


Figure 5: Temperature Sensor Graphical Representation

When the heartbeat will be in basic state i.e. The circled parts the SMS caution will be sent of the predefined mobile.

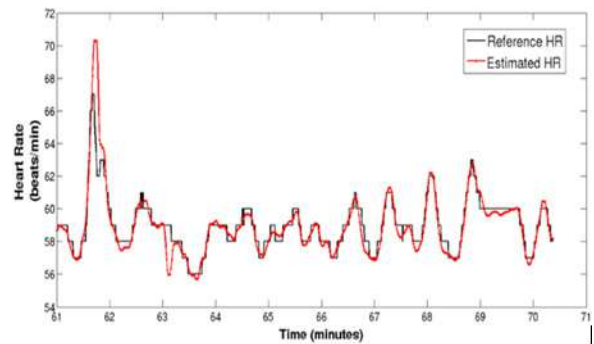


Figure.6. The variation of the heartbeat of a person and heartbeat rate along with time will be sent to the web page.

CONCLUSION

The project “A Secured IOT Based Advanced Health Care System for medical field using Sensors Network” have been successfully designed and tested. In this article the security issues has been overcome and by using different type of sensors we have monitored the heart beat rate, temperature of the surrounding, MEMS for detecting the falling of the body ,to monitor the saline bottle level and the specified medicine prescribed by the doctor at a particular time is sent as a message. Finally this can be used in the health care by improving the security issues and data authentication and can be used in advanced systems.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn’t match any other research proposals/research persons.

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Toxic Gases Identifying in Industries with Alert System using IoT

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ABSTRACT

Industries disasters are the purpose for the increasing unreliability in the human life particularly to the workers. To decrease these industries disasters, we developed a gadget that might recognize the poisonous gas and other physical condition utilizing the Internet of things (IoT). This project planned to avoided industries accident and checking the contamination control board. A central microcontroller is joined with sensors like shoot sensor, temperature, gas sensor. Sensors would be used to get the information from the environment at the leakage time. This will be utilized with single or multi dangerous gasses leakage that provides the fast result and response time is also high. An alarm may be used to generate a sound signal alert by industries to the nearby area living humans. If assume the level of the gasses and temperature goes above the average level than the indicated values than the alert will be provided for utilizing the internet of the web page and the android app which is created. Firstly, when the framework is developed we make one web page and an android app. Several numbers of clients who have a security ID (password) might see the information about temperature and gases leakages is an included principle advantage. This information of the sensors is stored on the internet in the equivalent website that could make utilized for future and further processing, and this will be good begin for industries to secure the humans in the surroundings and guarantee them a secured existence.

Keywords— *Microcontroller, gas sensors, fire sensor, temperature sensor, Wi-Fi module, internet of things, Website, android app.*

INTRODUCTION

This device is utilizing the limited radiation sensor and limited gas sensor; these sensors are collecting the transmitted information to the IoT module. Detection of toxic gas and leakage of radiation is the primary purpose of the overall device. In case any radiation leakages or poison gases are present in industrial areas, nearby living peoples are more affected by these gases or radiations. Continuous breathing of particular poisonous gases into the human body leads to death. The gases which are odorless are exposed to the environment for a long time causing various health issues. Depends upon based different gases and radiation detection, this device chooses of gases and radiation in devices like CO, ammonia, methane & infrared radiation. The “carbon-monoxide” is odorless that with above 150ppm concentration cause disorientation confusion, nervous damage, coma and fainting, and it will surely kill the

human being. Every gas has its individual physical and chemical properties that make them complicated to investigate without any device^{1,2} Poisonous gases exist in several phases based on the density and concentration of it. Gas sensor is working like gas molecule to absorb the gas sensor generated heat that heat converts into the electrical signal. Initially sensor detects a small amount of gas leakage. After the leakage amount is large go the harmful condition is high means produced an electrical signal to the Arduino board. Radiation sensor working like it measured the number of counts striking per minute detected by radiation sensor. The temperature sensor is sensing the condition of room temperature. These sensor gathering data send to an ARM board. ARM microcontroller already programmed that program operation based on gases and radiation monitoring level detection. Suppose getting sensor value level is high means inboard one pin connected to alarm it produces sound alert by industries people³. the

nearest fire station, police station. This indication based on saved industries surrounding people life move safe place. The LCD display it used to show any seepage occurring time indication display. The ARM7¹¹ board receiving information transferred to Wi-Fi module or Ethernet module through the connection of internet. The module IP address knows means anyone might see the data. Create A website considers all information any risk data means highlighting. Android app also creates install in mobile open the app see the normal and abnormal data. Abnormal data indication alert by user web page data access sees many people’s means set multi-user it prevents human begin life.

LITERATURE REVIEW

In the quite a while of 2008, LIU zhen-ya, WANG Zhen-dong Furthermore chen Rong, Intelligent private security alert and remote control module dependent upon single chip Computer, the paper concentrates on, canny private robber alarm, crisis alarm, shoot alarm, poisonous gas spillage remote programmed callous alert and more remote control system, which may be dependent upon 89c51 single chip computer. The device can perform a programmed alarm, which calls the police hotline amount naturally. It can additionally make a voice alert and reveals to alert struck them deliver. This canny security system cans a chance to be utilized control that electrical force remotely through phone¹².

In the quite a while from claiming 2008, chen Peijiang What’s more Jiang Xueh Hua, “Design Furthermore execution from claiming remote checking framework dependent upon GSM”, this paper concentrates on the remote checking system, on account of those remote remote screening framework need additional requisitions a remote following framework In light of SMS through GSM in the quite a while from claiming 2002, k. Galatsis, w. Wlodarsla, k. Kalantar-Zadeh Also An. Trinchi, “Investigation from claiming gas sensors for vehicle lodge air nature monitoring”, this paper concentrates on, auto lodge air nature following might make viably investigated utilizing metal oxide semiconducting (MOS) gas sensors. In this paper, economically accessible gas sensors need aid compared with created Moo3 built sensors pos.

Proposed System

This framework utilizing limited radiation sensor and limited gases sensor, these sensors are collect the

transmitted information using Wi-Fi module to IoT module. Most dangerous area accidents occur time intimated data sending speed is high must need. IoT module using transmitting and receiving data range is high and extendable as possible. The poisonous gas and radiation or leakage monitoring process of the system marked with the importance of real-time detection and regulates the poisonous gas and radiation to automate the controlling and monitoring system for real-time utilization.

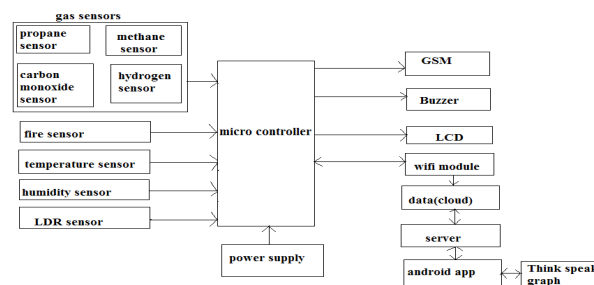


Figure.1. Block diagram

Sensors

Fire Sensor

The fire sensor circuit is excessively touchy and recognizes an ascent in temperature of 10 degrees or more in its region. Conventional flag diodes line IN 34 and OA 71 displays the property and the interior protection of these gadgets will diminish the temperature rises. In the one-sided turnaround mode, this impact will be more noteworthy. Regularly the diode can produce around 600 milli-volts at 5-degree centigrade. For every degree ascend in temperature; the diode creates 2mV yield voltage. That is at 5 degrees it is 10mV, and when the temperature ascends to 50 degrees, the diode will give 100 milli-volts. This voltage is utilized to trigger the rest of the circuit⁴. Transistor T1 is a temperature controlled switch, and its construct voltage depends in light of the voltage from the diode and from VR and R1. Regularly T1 conducts (because of the voltage set by VR) and LED gleams.

MQ2 Sensor

The MQ2 family of sensors has a tiny heater inside along with an electrochemical sensor. They react for a range of gases at the room temperature. The analog signal reads an analog input of the Arduino as the output of each sensor. The principle target of the whole framework is to recognize poisonous gas and radiation spillage⁵.

In case any poison gases or radiations exist in industry surroundings that the neighboring industry region living people mostly influence radiation or gases. Some gases continuous breathing means to kill the human being and environment mixed this gas or radiation polluted environment condition

MQ7 Gas

The “Carbon Monoxide (co) sensor” is appropriate for sensing the concentrations of CO in the air. The MQ-7 could recognize the concentrations of CO-gas anywhere from 20ppm to 2000ppm. The “MQ 7 gas sensors” inside a small⁶ heater are there with an electrochemical sensor. Heater produces electrical current to Arduino board. The sensor yield is an analog signal” read by analog input pin of the ARM7.

MQ135 Gas Sensor

The conductivity of the sensor is higher alongside with the rising of gas concentration. Electro circuit, translate the change of conductivity to correspond yield signal of “gas concentration”. The MQ 135 gas sensor inside a small heater is there with an electro-chemical sensor⁷. Heater produces electrical current to Arduino board. They are sensitive for a range of gas and are used indoors closed room at room temperature. The output of the sensor is an analog signal read by analog input pin of the Arduino board.

Temperature Sensor LM 35

The centigrade temperature is directly proportional to the output voltage of the temperature. The temperature is an integrated circuit which is used to measure the temperature. In our project we are using the temperature sensor series is LM35. The LM35 has an advantage that the user has not to create the conversion of Kelvin to the centigrade. The LM35 is directly in Celsius. The LM35 sequences are precision integrated-circuit temperature sensors, whose output voltage may be linearly proportional to centigrade temperature⁸. The LM35 is an advantageous element through linear temperature sensors.

Buzzer

The alert or buzzer utilizing these device principle explanations is shown to alert working people, and staying people moved to safety area to save the humans life and environment.

Internet of Things (IoT)

Data Acquisition can be achieved through the utilization of QR code, the bar code and RFID identification and sensors for taking a physical measurement in the device. The networking of IoT technology is a much larger topic that can be addressed in our available time⁹.

The proposed system contains the ESP8266 is the Wi-Fi module which is connected to the server. The tiny module allows the microcontroller to connect Wi-Fi network and make a simple TCP/IP connection.

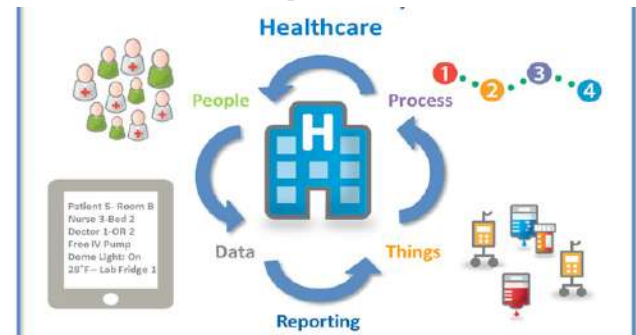


Figure.2. Internet of Thing

WI-FI

Wi-Fi is short name for wireless reliability. By and large, Wi-Fi alludes to an IEEE 802. 11 Wireless Local Area Network (WLAN). All the more particularly, Wi-Fi will be the business standard for things as characterized by the Wi-Fi¹⁰ Alliance and complying with IEEE 802. 11 standards.

Sensors continuously monitor the gases in the encompassing and posts into the server for storing and use of information in future. Although continuously monitoring if any gas level surpasses the range to that of the normal range in the air the alert will be improved, and an SMS notice will be presented on safety control board of the organization and even to the workers mobile station only if necessary. Figure 5 shows the syntax of the parameter (maximum permissible value) = value detected at the moment. If value identified at that specific moment is higher than that of the maximum tolerable amount, an SMS has sent towards imitating the GMS module through commands programmed in the microcontroller.

RESULTS

The display has been reenacted by utilizing by Proteus Software to screen the noxious gas and radiation

location utilizing distinctive sensors. The adjustment in, carbon monoxide, smelling salts, radiation, methane will be recognized by separate sensors and can be resolved. Figure 4 shows the prototype for the system design. Figure 5 shows the SMS notified when harmful gases levels have been raised from a normal level to harmful level. Fig6 shows the values of gases that are continuously detected by the sensors having a temperature sensor is an added minimum requirement besides gas sensor.

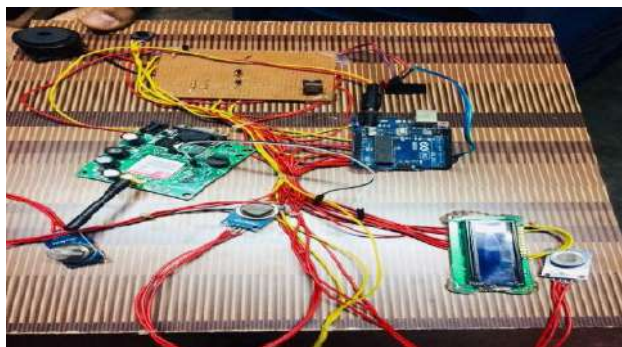


Figure.3. Hardware Experimental Setup



Figure.4. Results in IOT

The above results show the outputs seen when the module detects the difference in the normal conditions as per given and saved conditions in the module and alerts the system about the changes.



Figure.5. Results in application

The file chart 1 shows the temperature readings where the x-axis shows the time and the y-axis shows the temperature changes in the area. In the same way the filechart2 and filechart4 shows the butane and CO₂ gases diffusion respectively. In them the x axis shows the time readings and the y-axis shows the range of diffusion.

CONCLUSION

In this work, an intelligent system for toxic gas and radiation discovery checking cautioning has been created to defeat the drawback looked at more established techniques by utilizing Wi-Fi module and web of things. Consequently, the utilization of serial correspondence makes the system with the Arduino controller and IoT. The IoT door associate remote sensor connects with the web, guarantee the operation of the gas and alcohol

observing framework. It utilized just constrained sensor. The created application used additionally for checking gas and radiation in android portable.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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- of Smart Home. 2015; 1. 9,(3): p. 161 -168.
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Design and Development of Advance Data Mining Technique for Extraction of Data

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ABSTRACT

Those improvement and advancement of IT innovation technology gathers enormous sum of data from Different data bases. In this way we fetch any data flexibly and successfully by adjustment and arrangement of data called loose coupling method in data mining system. Data mining system will be ordered depending upon the sort of data base, knowledge and also systems utilized for application. Earlier data base technique utilized for extraction of data in data mining will be a manual design but that makes the system moderate to utilize in banking, health monitoring system, promoting science data analyst needs to work effortlessly with quick data scrutinizing for final role in choice making. Data mining provision which may be non- specific or area particularly permits reliability of data to make attainable and also additionally fabricate vast and versatile system. Many researches and subject experts utilizes data mining strategies in distinctive fields for security reasons also huge data storage system. Data mining is a quick approaching technique utilizing huge measure of historical data to predict the success in market.

Keywords: Data mining system, Extraction of data, data prediction, loose coupling technique

INTRODUCTION

An enormous amount of data gathering may be utilized for generating majority of the data which incorporates very straightforward data in numerical, figures or content documents to an expansive extent of data such as hypertext documents, multimedia data and additionally spatial documents. It will be a require for creating capable tools for examining and also storing enormous number of files and other data extractions which depend on mining technique. Data mining system gives hidden data examples or unexpected huge data patterns like data which is complex. So we create an advanced data mining technique depended on data mining fields and interruption identification system. This strategy makes us to work quick and adaptable for extracting extensive amount of data which will be reusable and also the versatile data.

Related Work

Alternate name for data mining method is learning disclosure will be a champion around the warmed topics

in the field of majority of the data extraction beginning with database. Data mining will be used to evaluate outlines beginning with enormous quantity of majority of the data. Mining could proficiently uncover intriguing majority of the data beginning with broad accumulation of data. It will make a later theme depended with respect to PC science² at any rate employments colossal numbers a greater amount prepared computational methodologies from statistics, data retrieval, machine taking Previously, And plan design comparatively as shown to fig. 1. Data mining might a chance to be requestS³ meets desires to figures those critical relations those working for collections regarding majority of the data also empowers for finding new and genuine designs.

Concerning illustration data mining matures new and progressively innovative procurements for it will emerge, in this paper the requisitions of data mining would sort program in the bringing after way - interference Detection, wellbeing Care, Business, and existing majority of the data examination. In the therapeutic and also health administrations areas, because of regulations and due to approachability regarding computers, it

will give a chance to be workable will magnification gigantic include over majority of the data approachable. Such an broad include over majority of the data can't an opportunity will make broke down Additionally converted to people finished An short duration of the time about the long run for settle on diagnosis, prognosis Moreover similarly will settle on medication schedules. This issue will a chance to be beat for that aid for data mining something such as that the procurements about data mining in this field goes something like favorable and accurate decisions. In business, bank Also money related foundations the table a totally mixture of administrations thus the majority of the data gathered may be said to be complete, dependable and prominent which have data mining will give acceptable security will assistance for cheating identification.

Every single a standout amongst companies, organization's closeness side of the point might be ought to make additionally develop their profits of those business of the astounding and with extension their turnover likewise goodwill in the Popular society. Ought to further bolstering to accomplish this, it will be necessary to will redesign their profits of that business technique which suits of the display designs. In today's benefits of the business world, there might make a gigantic include regarding open information also a staggering need will make great use about it. In done information must be created in the end Tom's examining database units and information warehouses, and so forth throughout this way, observing and stock arrangement of all instrumentation may be more.

It necessities also instrument arriving for information revelation. For the capable information discovery, we execute alternately depend once upon information mining engineering organization. In the biomedical investigation setting off starting with the change for new pharmaceuticals Also on tumor therapies of the ID number additionally think as of from asserting human genome inevitably Tom's examining discovering the limitless scale sequencing outlines likewise gene meets expectations. Something like that those information mining serves looking into would DNA analysis to the individuals discovering for innate purposes behind a considerable measure for individuals illnesses with the individuals assistance over limitless database.

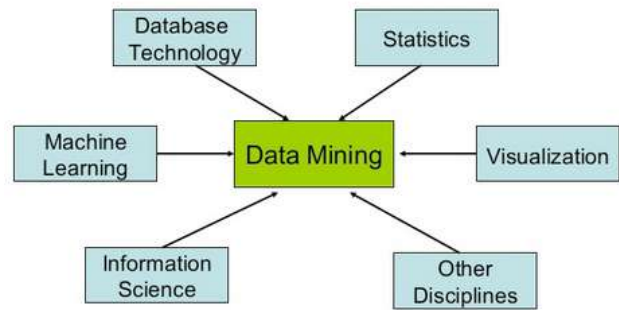


Figure.1 Data Mining in various fields

A provenance system might support and given data earlier is a induction to chronicled scenery of any information thing starting beginning with its interesting wellsprings. Thereby it assistants with gage the individuals information quality, information reliability, subordinate upon the individuals important information and transformations and similarly provide for confirmation proclamations around information induction. It diminishes errors completed information ID number.

Interference identification system (IDS)⁴ will be used similarly and countermeasure should preserve information integument and schema approachability beginning for strike. Interference ID number systems might make a combination regarding result Also gear that endeavors will perform interference ID number. Interference ID number will make a technique from asserting gathering information identifier for strike occurring in the technique for Emulating those events and Dismembering them for sign alternately interference. The individual's skeleton raises the individuals caution toward a possible interference happens in the schema. The individuals system information wellsprings for interference ID number comprises something like gigantic entirety starting with guaranteeing content based data, which will be troublesomeness should fathomable Furthermore dismember. Various IDS Might make portrayed with three way useful parts information Source, Analysis, Also response. Differentiate wellsprings around information likewise events in perspective for greater part of the information need help collected decide if interference require taken spot. This information will be collected at diverse levels for example, system, host, application, etc.

Data Mining Applications AT A GLANCE

Intrusion Detection based on Data Mining: Data mining may be turning under a champion around the individual's predominant systems to distinguishing interference or strike a head system. Interference detections may an opportunity with be requested^{4,5} on the help something like their technique regarding ID number – aberrance ID number and ill-use ID number. Information mining will make a champion around the innovations that could an opportunity should be associated will interference ID number looking into concentrate new sample from the individuals gigantic sort out information and Moreover to decline those stains of the manual challenges of the interference. Information mining will a chance to be steady secured nearby distinguishing new vulnerabilities Also intrusions, uncover secret word dark plans to attacker direct and provide for decision support on interference oversaw economy. Information mining habitually used to inspect system information will expansion interference related Taking in might cluster, Classification, outlier ID number also brotherhood lead.

To Clustering, grouping will a chance to be done toward finding likenesses the white collar for information similarly as expressed toward parts discovered in the true information. The individuals most amazing bundle might a chance to be found and separate Assemblies might deal with et cetera the individuals outliers are separated. Request will make a controlled bringing previously, clue. In course of action decision tree, lead based methodologies Might aggravate used to distinguish the attackers. Brotherhood lead mining might be a champion around the individuals the more amazing a piece key additionally incredible scrutinized systems to information mining. It methods will remove the individuals intriguing correlations, unremitting plans that occur, cooperation's alternately simple structures "around sets of things in the transaction databases alternately different information vaults. Brotherhood principles might comprehensively used inside distinctive ranges comparable to telecommunication networks, business and danger management, and also stock control. That essential impulse resides behind information mining previously, interference ID number will be automation. Fig. 2 demonstrates those structural building for IDS. Sample of the average self-ruinous considerations and

direct and configuration of the interference might make enlisted using information mining. Information mining will give a chance to be those up to date methodology on interference ID number. Information mining procedure could settle on contributed inside and out in the try ahead handle a capable interference ID number system.

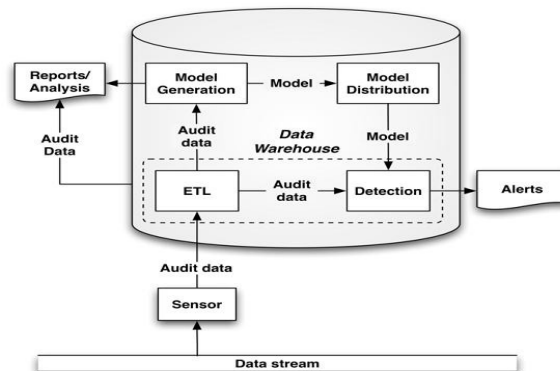


Figure.2 Architecture for Intrusion Detection System

Diabetes Prediction using Data Mining: Data mining previously, human administrations administration might make for example, such that the inverse fields owing of the truth that the individuals information presentation need aid heterogeneous Also that sure ethical, legal, also social imperatives apply for Private therapeutic larger part of the information. Wellbeing mindfulness related information necessities help voluminous to path likewise they land starting with distinctive sources every single touch from claiming them not completely suitability previously, structure or bore. These days, the ill-use over Taking in additionally experience around Different aces and clinical screening information from claiming patients collected for An information raise for the dissection procedure, require been by and large recognized.

Diabetes might a chance to be a real issue and the more excellent a feature typical endocrine ailment transversely through always looking into masses Furthermore time Assemblies. This illness requirement turn under a champion around the critical heading purpose behind destruction secured nearby made countries What's more there will make significant affirmation that it may be arriving during pandemic proportions completed a considerable measure for kin making Also as of late industrialized nations. Fig. 3 depicts that information mining development demonstrating for diabetes.

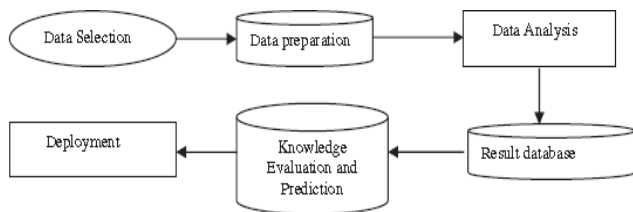


Figure.3 Data Mining Architecture for Diabetes

Data mining uncovers information crazy of information What’s more introducing it over a manifestation that could be effortlessly reasonable on kin. Moved information mining frameworks compelling reason help used to Figure practical information should database and for restorative research, particularly over coronary sickness prediction. The individuals broke down prediction frameworks on coronary sickness employments that are best those tip of the icy mass lettuce amount around entering qualities. It employments therapeutic terms to example, such-and-such sex, blood pressure, cholesterol, obesity, smoking ect... Will for perceive the individuals likelihood from claiming tolerant getting a coronary sickness. The information mining request methodologies for example, such-and-such decision Trees, guileless Bays, also neural Networks might broke down to coronary ailment database.

Utilization of information mining to E-Commerce and Business Intelligence (BI).

E-commerce need converted the face to those lion’s share benefits of the business meets expectations over concentrated ventures. Web progresses bring seamlessly robotized interface systems the middle of customers and retailers, retailers Furthermore distributors, distributors Furthermore factories, and preparing plants and their stack suppliers. In general, e-commerce Also e-business brings enabled on-line transactions and also generates vast scale ongoing information compelling reason never been simpler. With information pertaining will different perspectives starting with guaranteeing profits of those benefits of the business transactions continually immediately available, it will be Exactly appropriate for search for the individuals profits around information mining will make (business) inclination crazy around these datasets.

Information mining is something like finding handy examples on information. The designs that would ran across Toward information mining might about administration Similarly as an aftereffect they expand exist benefits of the business information finished

suitableness routes. Nonetheless morals new profits of those benefits of the business learning may be not made “in a vacuum”; yet all the it manufacture thereabouts a existing business knowledge, Also this existing learning will be in the psyche of the business master. Those business master In this way assumes a basic and magic piece will information mining, both Concerning outline a essential wellspring to enter (business knowledge) Additionally Concerning illustration those purchaser of the conclusions to information mining, the individuals profits of the benefits of the business expert not only, usage the individuals impacts something like information mining and also evaluates them, Furthermore this appraisal should, make a steady harsh-gum crew for course should the individuals information mining methodology. Information mining uncovers not kidding plans secured nearby data, Nonetheless morals fundamental the business expert could judge their comfort. Fig. 4 demonstrates the structural building with a forcing use for dm over BI.

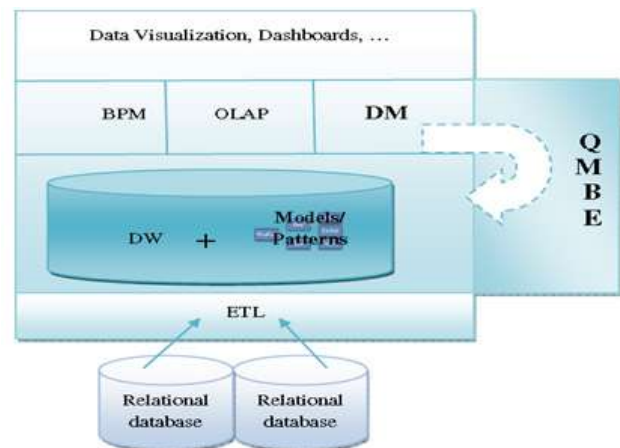


Figure.4 Architecture for an effective use of DM in BI

It might have a chance to be greatly basic understanding that the individual’s information will make not that business, make that as simply a swoon reflection from guaranteeing it. Those samples found at mining information may disregard should be helpful on a considerable measure of individuals notable motivations. Those outlines may reflect properties of the data, which don’t speak to equipped To Throughout all, Case in point during a relic starting with guaranteeing information collection, for example, the individual’s period a preview might be taken, distorts its reflection of the profits of the business. Alternatively, the individuals outlines ran across in the information may settle on exact reflections of the business, but they simply portray those issue that information mining might have been expected ought to fare thee well of - for test arriving at the individuals

Determination that “purchasers starting with asserting this effect achieve purchase incomes” Previously, a undertaking will business the individuals thing for An additional broad augment to pay get-together. Accepting that those business information might be insufficiently informed, information mining might handle pointless impacts to reasons such as the through.

Information mining for Bioinformatics: The individuals entire health genome and the finish arranged over innate information inside every mankind’s versatile requirement immediately been directed. Perceiving these innate instructive tolerance the individuals specialists ought unrivaled view every last one of the individuals path for illnesses Also their cures, with remember the instruments underlying existing manifestations for example, Growth Furthermore concur Additionally on evidently track our headway Also its affiliation with other species. That best approach obstacle laying the working about investigators and the information they hunt might a chance to be those sheer volume to information open. This might a chance to be clear beginning with the taking then afterward figure which demonstrates the quick assemble in those amount to base pairs likewise DNA successions in the repossession from claiming Gen Bank.

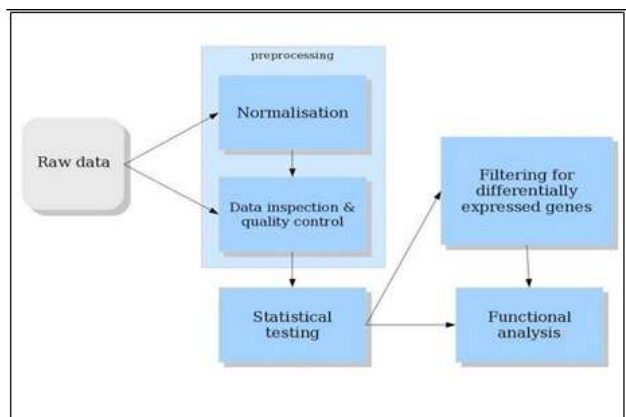


Figure.5 Data Mining in Bioinformatics

Biologists, such as researchers would prepared fundamentally on gather data new data. Until, science lacked the devices with examine monstrous storehouses for data for example, the human genome database. Fortunately, the reach of PC science need been Creating routines And methodologies which is great suiting to help biologists will wrist bindings Also examine those staggering sums of data that guarantee to profoundly move forward the mankind’s state. Data mining is particular case such innovation organization.

CONCLUSION

Data mining will be not an additional statement like application, make that concerning illustration in the late a respectable length from claiming time its advancement touches staggering horizons. It requirement spread its wings over practically always once domains these times. This paper portrays its procurement for few domains with be particular interference Detection, diabetes Prediction, profits of the business change headway and living information examination. It will a chance to be reasonable that information mining units serves carried extracting genuine taught qualities starting with that incredible huge amount of information.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn’t match any other research proposals/research persons.

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Balanced Health Monitoring System using Stop Words for Social Big Data Applications

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ABSTRACT

As per health care perception depression is a wellbeing concern at global range. Today social media allows the people those who affected can share their experiences through posts. Such experiences are stored in database and can be extracted, analyzing to assist the precautions for drugs from side effects, and other service improvements in their particular disease treatment. In those aspects, social websites related to depression are helpful to extract knowledge or monitoring various types of drugs and its side effects and also for sharing their experiences on depression. We have taken a weighted edge network model for representing social networks activities. The proposed work undergoes with the three steps. The first step is user activity monitoring, followed by network clustering and module analysis. Whoever the person like a specific posts belongs to a group and those who are not are belong to other group. We implemented the stop word technique here which is helpful in avoiding the misleading communication on the posts and efficient interaction of user. The statistical analysis of such user interactions are beneficial for health networks to acquire more knowledge on particular disease. This approach enables us all the gatherings took a part and for healthcare improvements in future to the patients of that disease.

Keywords — *Data mining, online fora, depression, stop-words technique.*

INTRODUCTION

Depression is a disease and said as a major contributor to the world wide suicides that happened especially in middle to low income countries. For instance, like India based on the study of World Health Organization (WHO)¹. As per WHO basis of 2015 in its recent global health estimation about discouragement in 2015 expressed that around 5 core Indians are gloom enduring one's, though three core individuals are experienced uneasiness disorders. The report is entitled as Misery and Other Common Mental Disorders — Global Health Estimates said in regards to 66% of worldwide suicides are occurring particularly in low and center wage nations like India in 2015. The archive of WHO demonstrates that 322 million individuals are with despondency and roughly half individuals from them live in South East Asian and Western Pacific locale, reflecting generally vast populaces of India and China³. Add up to individuals with gloom in world are 322 million. Among them there assessed individuals with

gloom expanded by 18.4% in the vicinity of 2005 and 2015. As for each WHO figures in 2015 the quantity of depressive issue cases are 3 crores of populace while 3 crore of populace is with tension issue. It likewise said that Suicide happens all through the life expectancy and was the second driving reason for death among 15-29 years old internationally in 2015. Sadness is the primary factor for causing incapacity in worldwide and is prosperity worry to the general worldwide weight of infection, WHO said and attested ladies are influenced by wretchedness than men and is prompts suicides^{4,5}.

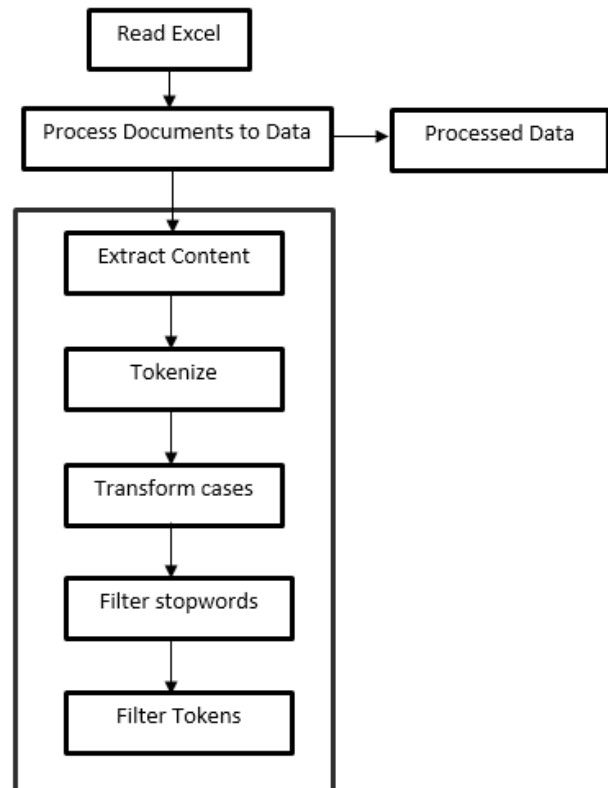
Gatherings and web-based social networking sites are for discouragement by sharing the encounters of human services laborers and patients to oversee in their standard lives and reacts to antidepressants. Such enormous information offers more noteworthy possibilities for patients, medicinal services associations, and industry to improve arrangements through shrewd information mining, extraction and analysis². A virtual web-based social networking organizing condition comprises

of hubs and edges. Its substance are demonstrated and separated with the help of computational tools are trendy which formulate expectations and buildup the user relationships. The information will be represented visually by graphical representation. A informal community's structure is spoken to by a socio framework. Topological parameters like hub degrees and system densities clarify specific progression inside a system and a specific calculation watches out for fundamental data arranged structures. Finding those bunches empowers hub (or group) focused information mining. Such vital information helps the group for enhancing administrations that depends on input from brilliant information mining of wellbeing related web-based social networking sites. There are different strategies in writing that aides in information gathering from web-based social networking systems are lexion-based, directed order, and idea extraction⁶. The rest of techniques utilize diagram based investigation⁷, content based examination got from a medicinal corpus⁶ and a theme display factual examination⁹. Zhao et al.¹⁰ utilized content based analysis (posts length, certain words recurrence) and conclusion investigation to recognize compelling client's online malignancy survival groups. Conversely our approach incorporates weighted system models (for client action portrayal), module (describing client cooperation) and topological (user movement) examination with assumption and content investigation to get great comprehension of client supposition on antidepressants and finding persuasive clients, and reacts on drug side effects. Our work is organized as follows. The related and literature work depicted under Section II and the proposed work and its contribution described under Section III and results and discussions under Section IV and conclusions is depicted under Section V.

Literature Study

The proposed work is inspired by the work that is done¹, where the authors contributed the below methods to find antidepressants. The overall scenario is shown in Figure 1:

Figure 1: Processing of Rapid miner to get TF-IDF Scores.



The initial step was a search for depression dedicated forums. Our last list, which produces the below chart of descending order. Hence we choose depression forums.org. After that collecting, analyzing and processing tree of data was generated in Rapid miner (www.rapidminer.com) to recognize the most happening words (positive, negative and reactions) to get their Term-Frequency-Inverse Document Frequency) scores inside each post. The Figure 1 shows the accumulation and preparing of a tree. The dataset was transferred (Read Excel), handled (Process Document to information) with the utilization of subcomponents (Extract Content, Tokenize, Change Cases, Filter Stop words, Channel Tokens individually) that channels additional commotion (incorrectly spelled words, basic stop words and so on.) to have variable measures consistency. The yield (Processed Data) has the last word list; with each word has a specific TF-IDF score. The TF-IDF scores in each post that constructed was subject to an agent word set in whole discussion and mirrors the semantic posts content. Subsequently, we demonstrated a TF-IDF vector as each post's semantic profile.

Significantly, much similarity measure can be inferred to demonstrate how shut the two post's semantic profiles are, as Euclidian separation or correlation. In

expansion to this cluster investigation will performs to discover the gatherings of same semantic profiles. They utilized k-implies clustering¹¹ to amass every one of the posts semantic profiles of our discussion as a required preprocessing venture for organize based displaying. Later the further system based demonstrating venture of posting gathering is connected. The movement of gathering posting having of strings with a large number of postings and reactions were outlined as a high client driven system. This demonstrating approach going for showing client communications by taking posts semantic substance into consideration. Our organize hubs compare to gathering clients and associates coordinated edges relate to direct and setting interactions. The client to-client answers with the utilization of discussion's "Answer" alternative. Those collaborations are said to be immediate cooperation and are demonstrated with the edges of bidirectional interfaces the comparing nodes. This influenced us to shared information to trade between a publication and a direct replier. The clients posting inside a specific thread (threads might be theme related and string semantic substance is same). are reflected by context interactions. The network nodes sample is shown in figure 2.

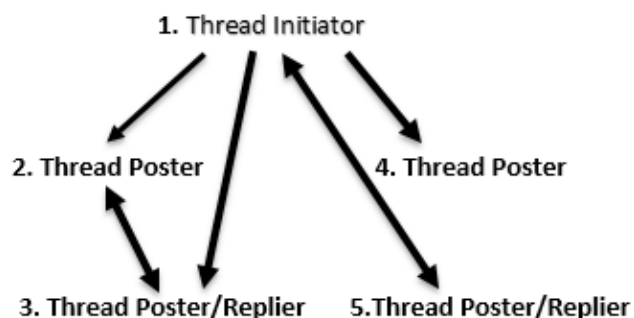


Figure 2: Sample network model with edges.

Significantly, the forum posts are converted into a huge directional weighted network with multiple densely connected units (or modules). The network partitioning algorithm helps in detecting the nodes' over representation within every module. For this objective we utilized HITS, which is at first created technique for website pages interface analysis^{12,13}. Data disseminates from definitive hubs. There is a connection from center points to legitimate hubs thus they broke stream of data inside the network. This approach helps in finding influential users and benefit in considering the structural properties of both networks' and the direction of data flow.

LiseGetoor et.al took more datasets which are

portrayed as connected accumulations of items which are interrelated. These speak to homogeneous sort systems with single protest write and interface compose and heterogeneous systems with different question and connection writes (other semantic information if conceivable). Single mode informal organizations like individuals interface by fellowship connections or WWW, a connected pages accumulation are the cases of homogeneous systems while restorative spaces delineating patients, maladies, medications and contacts, authors and so on are the instances of heterogeneous networks.

Link mining is one of information mining systems that remotely take these connections when creating prescient or enlightening models of connected data. In general connection mining exercises incorporate positioning items, discovering gatherings, aggregate order, interface forecast and revelation of sub chart. Where organize examination was considered in indicated regions like investigation of informal organization, hypertext mining and web examination just in later there have been a thoughts cross-treatment among those changed groups. This is a developing region. In this paper we inspected a few common emerging themes. The recent considerable interests in algorithms were proposed by M.E Newman et.al for detecting the communities in networks. The connections within the groups of vertices are denser while the associations between them are sparser. The advances checked on here which is tending towards this end. We begin by portraying some ordinary techniques in discovering group like unearthly division, the Kernighan Lin calculation and various leveled bunching on comparable measures premise. No strategy is same for true system information sorts with which introduce look into concerns like Internet and web information and natural and interpersonal organizations.

Kleinberg HITS and the Google PageRank algorithms was proposed by Andrew Y.Ng,AliceX. Zheng et.al. Which are eigenvector methods for detecting authoritative or influential articles, given information on hyperlink or citation? Those algorithms must give reliable answers is exactly a desideratum and in [10], we analyzed when they are expecting stable rankings under small perturbations to patterns linkage. In this paper we extend the analysis and shows how it gives insight into ways of stable links designing analysis methods which in turns motivates two more new algorithms using citation and web hyperlink data.

The social network's snapshot was given by David et.al, could we infer which recent interactions are likely going to occur in future? We formalize the above question as the link expected issue, and generate approaches to link expected that measure for network nodes proximity. Experiments on large co-authorship network assist that data regarding future interactions can be gathered from network topology alone and that fairly measures the proximity of node can outperform more direct measures.

Felix Naumann et.al, took more natural information sources that has information on logical substances classes like qualities and successions. The logical protest's intelligent connections are actualized like URL's and remote ID's. To navigate connections and ways (joins link) through these sources Query preparing is performed. We outline information questions in these sources and a protest chart is the connections between objects. We identify a gathering of fascinating properties for connections and ways like out degree, interface picture, information protest's cardinality and connections, the quantity of particular items came to by a few connections et cetera. Similar to database cost models; To build up a structure from question chart we utilized measurements for evaluating inquiry result estimate on protest diagram. Comparable to preparing and testing, to gauge the outcome measure we utilized examined information from inquiries. Our models are approved with the utilization of test information from NIH/NCBI information sources. Our exploration gives an establishment information sources questioning and investigating.

Jan Noessner et.al was argued that linked open data is the major advantage of semantic technologies for web since it gives more structured information with effective way of access than web pages. In this paper, we proposed another approach for object recognition that relies on prevailing semantic similarity measure for linked data. We choose a measure to the problem in object recognition, and presented precise and relevant algorithms that implement the methods and give a systematic experimental evaluation on benchmark dataset basis. As our result, we showed that the use of lightweight ontologies and schema information mainly enhances object recognition in the terms of linked open data.

Proposed Work

This empowered us to speak to correct client

connections by relying upon information's semantic substance. In this paper, it empowered us for exact portrayals of client cooperation with the reliance on information's semantic content. Analyze the client collaborations and concentrate additional learning of client's posts. Our work key advantage is increasing health solutions for patients with depression and the person who is affected with depression can also share their experiences.

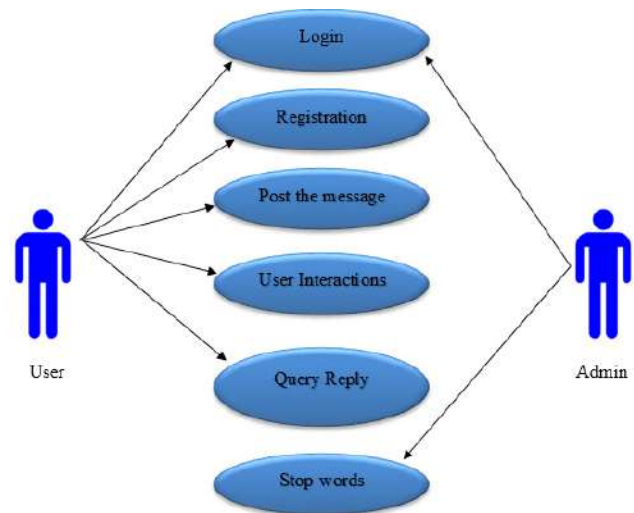


Figure 3: Use case diagram of our work

We analyzed content network site pages and search engines commit to allot a category for page. Software chooses the category from finite list. Likewise the keywords and ad text of content campaign are analyzed and every ad group will be given a category of the same list. We used Semantic search seeks to enhance accuracy of search by knowing the searcher's intension and the terms context as they are shown in data space that is searchable, either on the Web or inside a closed system, for generating some more related outcomes. The work contributes in 5 steps:

User Interface Design

The user's important role is moving login window to social network. It is done for the purpose of security. In login page the login user id and password are entered. It checks for username and password are matched or not (valid user id and password). If user name and password are not valid we are unable to enter login window and it will displays error message to data owner window. Thus we prevent the login window to social network from unauthorized access. It made our project more secure. So server has user id and password and server also performs user authentication. It enhances the security and prevents

illegal access by the user to enter the network. For our work JSP is used for designing. We validated the user's login and authentication of server.

User Upload Posts

Social media, from personal texts to live fora's providing boundless opportunities to clients to share their encounters. Moreover it is giving more opportunities to organizations for getting input on their items and services. Many organizations are currently focusing on interpersonal organization observing as their first need in their IT offices, and furthermore making a shot for getting fast criticism on their items and administrations to diminish and enhance conveyance, increment turnover and benefits and limit costs.

Admin Analyzing Posts

On the basis of user opinions on the posts the structures are determined by the initial exploratory analysis. The outputs are the user's clusters compilation and their opinion on the posts. To determine the users who are influenced among the members subsequent analysis was used.

Admin Block Posts

A multi consensus relates to admin relies on every patient solutions. The platform of social media results in individuals with varied outputs depending on different individual factors and circumstances. Apart from those factors we are able to move through the data and can collect favorable and unfavorable assumption, which was then chosen by inquire about that rose on client's adequacy.

User View Posted Information

Whenever the user login the interface and they share the opinion in Forum either positive or negative. Most of the users may login the forum and can share their experience. The user who is influenced can reveal their opinion about specific topics. It is beneficial for being aware about general information. The overall architecture of our work is shown in Figure 4.

RESULTS AND DISCUSSION

We have concentrated to reduce the content which is not matched with the topic. Like using abuse words or words those are irrelevant are monitored and can't be used because we considered this as stop word. For

instance, let for a be the application regarding depression disease. Heartache, stomach pains are the words treated as irrelevant and abusive so that specific medicine or a person will be strictly controlled by this approach. Firstly the user will login to for with authenticated details. If won't he can provide details for registration. The home screen has the posts lists which are shared by different people on specific drug or on disease. They are also able to assist the disease symptoms and better treatment for that disease, good available hospitality with the address locations or any post related images. The users can reply to the post by sharing the other's view on the before posts. To avoid misleading communication among users stop words technique will be used. Any viewer can view the post and can like or dislike the posts. The number of likes or votes is helpful in the users' group identification that those are interested in or faced the same experience. We show some of our work related screenshots in the following figures. Figure 5 shows the admin screen, where user is able for adding stop words into prevailing list.

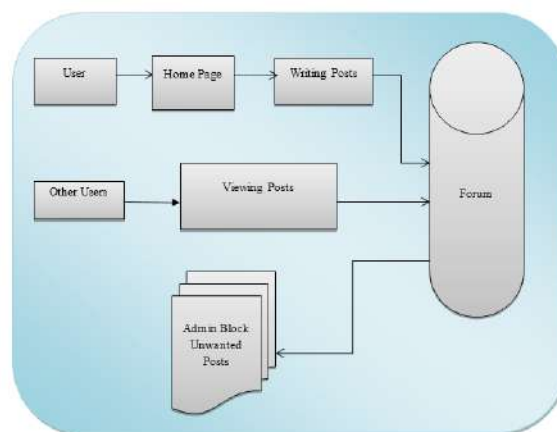


Figure 4: System Architecture

Once the user added the word into database, the word is unavailable for any user. Here I was added the word heartache into the list, because we took this for a related to depression.

The below figure is our website's home page. The description of the post is stored in the centered followed by the posted person and with the number of views; votes and any other reply proceeded to a particular post. For instance, a reply for first post is shown in figure 7 with the corresponding replies.

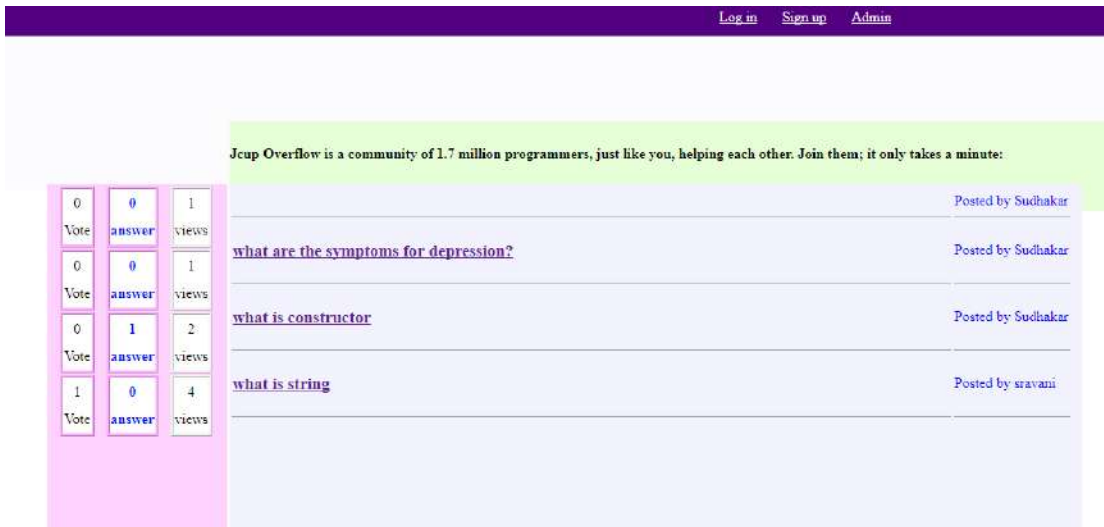


Figure.5. Home Page of our forum

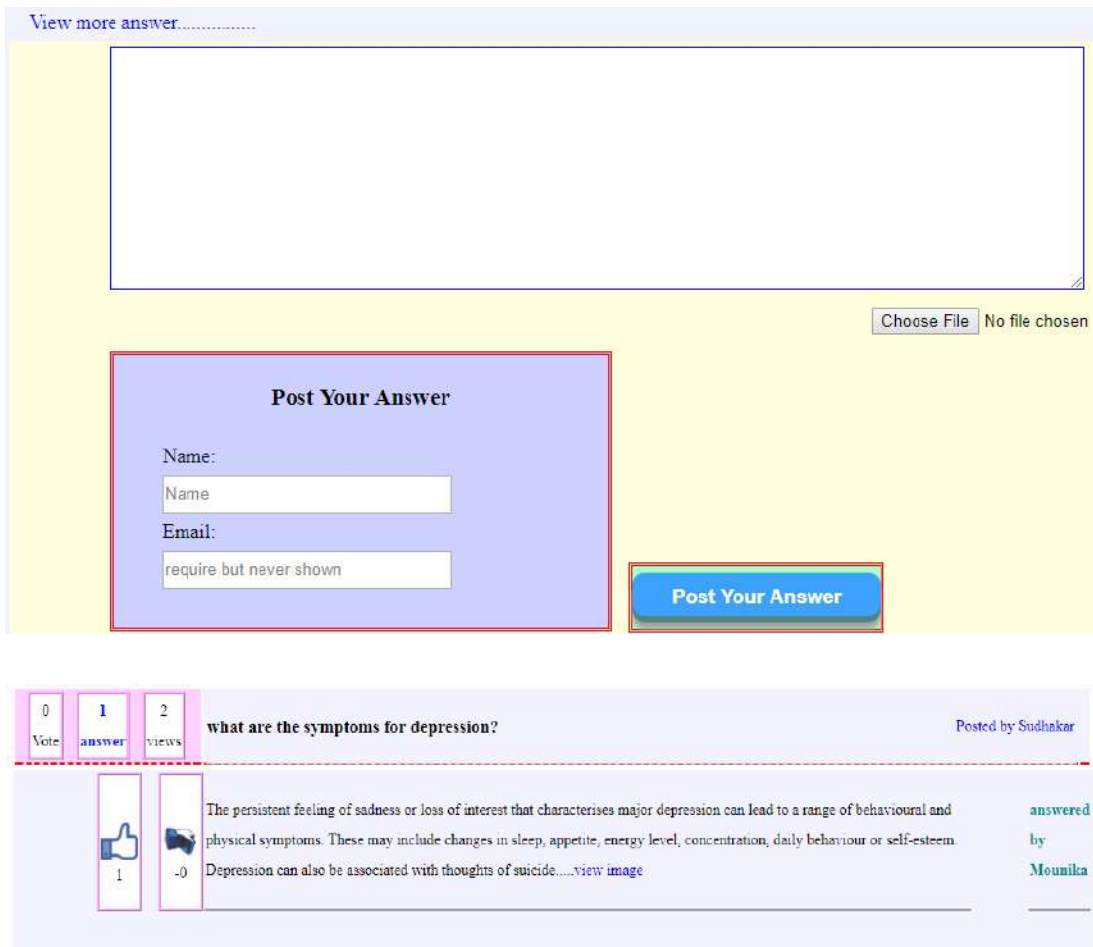


Figure.6. User Interaction for the post

CONCLUSION

Depression is said to be the main reason for disability, a wellbeing and burden of various diseases in global range and 300 million people are affecting in world wide. The depression that can't be solved will leads to various

issues from stroke to coronary ailments, both of primary sickness and cause demise in 2013. A virtual framework as informal community that is formed with hubs and edges has more substance. Those substances can be planned and assembled utilizing different apparatuses

that are popular and define desires and builds the relationships among users. Graphical portrayal provides the information clearly on these user interactions. In this paper we contributed 3 aspects. One is the user activity monitoring and followed by network clustering and module analysis. An individual who likes a particular post will be taken as a group while the other belongs to other group. To avoid misleading communication among users stop words technique is used and also for efficient interaction of user. The statistical analysis of such user interactions is beneficial in health networks to be aware of particular diseases. It enables us all the gatherings took part and for enhancements in healthcare to suffering people from disease in future. Eventually concluding that using these types of data mining systems can widely enhance the healthcare system's quality at cheaper cost with in time.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Identification and Detection of Unwanted Data in Online Promotion Social Networks

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ABSTRACT

The online social networks slowly incorporate economical competencies toward empowering the use of virtual and real currency. They provide as novel platforms to host an assortment for business exercises, where clients might potentially get virtual cash as rewards by taking an interest such occasions. Both business and OSNs accomplices are fundamentally worried when attackers instrument a group of accounts to gather virtual money from these events that settle on these occasions Insufficient and result in important financial loss. It gets to be of extraordinary vitality with proactively identifying these pernicious accounts when the web advancement exercises and consequently abatements their necessity with a chance to be rewarded. In this manuscript, we recommend a new system, in particular Pro Guard, with fulfill this target toward efficiently coordinating Characteristics that describe accounts starting with three perceptions incorporating their recharging patterns, their all behaviors, and the use about their particular cash. We have executed broad examinations dependent upon information gathered from Tencent QQ, a worldwide heading adrift OSN for inherent fiscal administration exercises. Test comes about need showed that our framework could finish a secondary identification rate about 96.67% at a low false positive rate of 0.3%.

Keywords: OSNs, Pro Guard, Unified Modeling Language, Code testing, Unit testing.

INTRODUCTION

The OSNs (online social networks), which incorporated virtual cash, serve concerning illustration an engaging stage for different benefits of the business activities, where online, intuitive advancement will be around those practically dynamic ones. Specifically, a user, who is ordinarily spoke by her OSN account, might potentially get reward in the type of virtual cash by taking an interest on the web advancement exercises sorted out by benefits of the business substances. She might utilize such prize clinched alongside different routes for example¹ web shopping, transferring it will others, Furthermore actually trading it for true coin. Such virtual-currency-enabled internet advancement model empowers gigantic outreach, offers regulate fiscal jolts on limit users, also then minimizes those associations the middle of business substances and fiscal foundations. As a result, this model need indicated incredible guarantee and picked up tremendous pervasiveness quickly. Nevertheless, it countenances a critical threat: attackers could control an extensive amount of

accounts, whichever toward registering new accounts or bargaining existing accounts, with take part in the on the web advancement occasions for virtual money. Such malicious exercises will generally undermine the effectiveness of the advancement activities, instantly voiding the adequacy of the advancement venture from business substances and then harming OSNs' reputation. Furthermore, an expansive volume about virtual currency, when managed by attackers, might also get to be an possibility test against virtual cash regulation².

It consequently gets to be for fundamental vitality to recognize accounts controlled by attackers for internet advancement exercises. In the Emulating discussions, we allude should such accounts as pernicious accounts. The successful identification from claiming pernicious accounts empowers both OSNs and business substances to take relief activities for example, such that banning these accounts alternately diminishing the plausibility should reward these accounts. However, outlining a successful identification strategy is confronted for a couple critical tests. In attackers doesn't necessity to produce pernicious content (e.g., phishing URLs

and pernicious executable) with propel great strike. Comparatively, attackers could adequately perform strike Eventually Tom's perusing essentially clicking joins advertised by business substances alternately offering those benevolent content that is initially conveyed by business accomplices. These activities themselves don't perceivably separate from considerate accounts.⁴ Second, great strike doesn't require on rely on upon social structures.

To be more particular, keeping up animated social structures doesn't profit to attackers, which will be in a far-reaching way unique in relation to mainstream strike for example, spammers over internet social networks. These two tests aggravate the identification from claiming such pernicious OSN accounts generally unique in relation to the identification for universal strike for example, such that phishing and spamming. Likewise a consequence, it will be greatly hard to receive existing techniques will identify phishing accounts and spamming accounts.

In order to adequately recognize pernicious accounts in web advancement exercises toward overcoming the previously stated challenges, we have outlined a new system, to be specific Pro Guard. The Pro Guard utilizes an accumulation from claiming behavioral Characteristics on profile a record that participates in a web advancement occasion. These offers point should describe a record starting with three viewpoints incorporating i) its general use profile, ii) how an record gather virtual currency, Furthermore iii) how those virtual particular cash may be went through. Pro Guard further incorporates these offers utilizing a measurable classifier⁵. In this way that they could be all things considered used to separate between the individuals accounts controlled toward attackers and considerate ones. Of the best about our knowledge, this worth of effort speaks to the 1st exert to deliberately identify pernicious accounts utilized for web advancement movement investment. We bring assessed our framework utilizing information gathered starting with ten penny QQ, a heading Chinese web social system that employments An widely-accepted virtual cash (i. e., Q coin), with help internet money related exercises to a monster physique about 899 million dynamic accounts. Our test comes about need exhibited that Pro Guard could attain a high identification rate of 96.67% with a low false positive rate of 0.3%.

LITERATURE REVIEW

Detecting Clusters of Fake Accounts in Online Social Networks

Fake accounts are a favored implies to pernicious clients from claiming internet social networks on send spam, submit fraud, or overall ill-use those framework. A single pernicious performer might make handfuls on many fake accounts in place with scale their operation should range the most extreme number about real parts.

Identifying and taking movement around these accounts as rapidly as could reasonably be expected may be basic so as with secure real parts and administer those dependability of the system. However, whatever singular fake record might show up on make real once primary [6] inspection, for sample toward having areal-sounding name alternately an authentic profile.

Impact of Social Networking on Indian Youth

The objectives of this study are an attempt to investigate the extent of social networking impact on the Indian youth. The reason for selecting youth as the target audience is because the direction of a country and culture is decided by the direction taken by youths of that country. This paper is an attempt to analyze the pattern of social networking usage and impact in order to determine the social networking addiction⁷.

Off the 7.3 billion global population worldwide, social networking has 2.3 billion active clients which has seen a rise of 176 million just last year Social networking advertising earnings are estimate data \$8.3 billion in 2015 even as 385 organizations spent over 20% budget on social media channels which has been up by 15% compared to 2015. The increased use of social networking culture and social networking sites by youth has helped bring friends and family closer for those living in distant locations.

Towards detecting Compromised Accounts on Social Networks

Bargaining social organize accounts has turned into a gainful strategy for cybercriminals. By business account, attackers might share out their pernicious messages or spread fake data on an extensive client base. The affects about these episodes reach from a discolored notoriety will multi- billion dollar fiscal misfortunes looking into money related business sectors. On our past

work, we exhibited how we might identify extensive scale bargains of standard web social network clients.

Existing System

Since web social networks assume an expanding imperative part in both digital and benefits of the business world, identifying pernicious clients for OSNs gets to be about extraordinary vitality.

A number identification systems bring been hence suggested. Recognizing the popularity for spammers done OSNs, these techniques very nearly only concentrate on identifying accounts that send malicious content.

The Spamming attack could be viewed as a majority of the data stream initiated starting with an attacker, through an arrangement for pernicious accounts, Furthermore At long last should an exploited person account. In spite of those differences about these methods, they by and large power fractional or every last bit from claiming three wellsprings for detection containing.

- a. The spam message’s content.
- b. The social structure between victim accounts and malicious accounts.
- c. The network infrastructure, which hosts the malicious data.

Disadvantages of Existing System

Nevertheless, it confronts a noteworthy threat: attackers could manage an extensive number for accounts, whichever by bargaining existing accounts, to partake in the web advancement occasions to virtual money.

Proposed Method

In order to adequately identify pernicious accounts for web advancement exercises by overcoming those previously stated challenges, we have outlined a new system, to be specific Pro Guard.

Pro Guard utilizes an accumulation from claiming behavioral offers should profile a record that participates for an internet advancement occasion.

These features point with portray an account containing 3 parts.

- i. Its common usage profile.
- ii. How the virtual currency is consumed.
- iii. How an account gathers virtual currency.

Advantages of Proposed System

This work characterizes the first attempt to systematically detect malicious accounts utilize for online promotion activity participation.

System Design

System Architecture

System Design Introduction:

The system design document portrays the working environment, files and database design, framework and subsystem architecture, human- machine interfaces, framework requirements, input formats, yield layouts, detailed design, transforming logic, and outer interfaces.

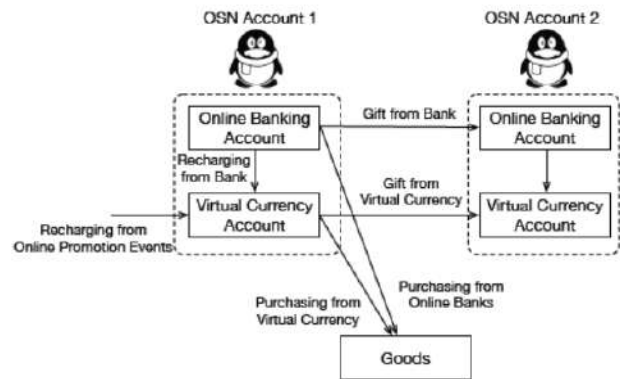
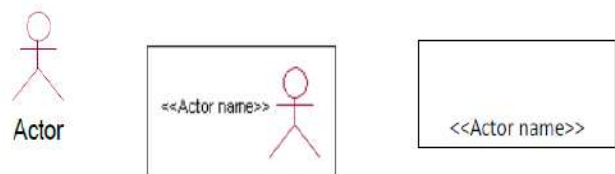


Figure.1. Architecture and Flow Diagram

UML (Unified Modeling Language) Diagrams

Global Use Case Diagrams:

Recognition of actors:



Actor: The Actor describes the part a client plays with respect to the framework. An actor interacts with, but has no control over the use cases.

Graphical representation:

An actor is something or someone that interrelates with the system

I. Gives input and receives data from the framework.

II. Is outside to the framework and has no control over the use cases.

Actors are identified by exploratory:

I. Who directly utilizes the framework?

II. Who is answerable for handling the framework?

III. Outside hardware utilized by the framework.

IV. Other frameworks, which require interacting with the framework.

Construction of use case diagrams:

The UML is a type of behavioral outline distinguished by a Use-case analysis. Its inspiration will be should display a graphical review of the purpose given toward an arrangement in terms of actors, their objectives (represented as use cases), and whatever dependencies the middle of the individuals use cases. The principle reason for existing of a use situation outline will be will hint at the thing that framework works is performed to which performer. The roles of the actors in the framework might a chance to be portrayed.

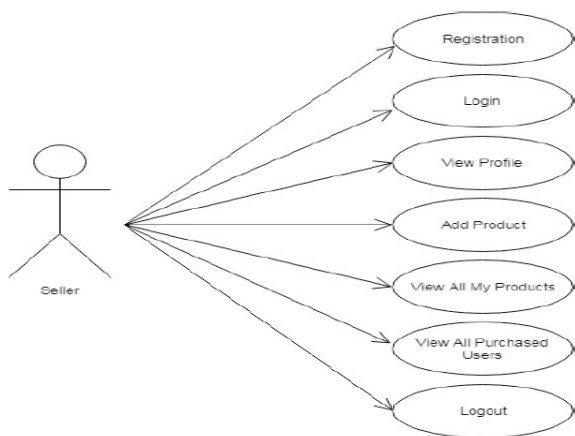


Figure.2. Seller Use case Diagram

Module Description

For detecting malicious accounts in social networks based on online promotion it has three modules to test them functionality:

1. Admin
2. Seller
3. User

Admin functionality

Admin play a main important role in this protect, admin detect malicious accounts in both seller and user. Once seller and user register for social network in order to get login into his account first admin should activate his account and authorize him.

When user and seller click shorthand three times the payment of product by using fake account then admin detect them as a malicious user and block the account.

Seller functionality

Seller is the second module after getting registration in social networks by participating in online promotion event, he should wait for admin until he activate his account and authorize him, next seller can send friends request to his friends by using online social networks he can share the product to user by using credit or debit card payment and by virtual payment if seller share the product by using virtual payment more than 3 times he is detecting as malicious user and block.

User functionality

User is the second module after getting registration in social networks by participating in online promotion event; he should wait for admin until he activate his account and authorize him. In this the user can add money in to his accounts, view product and purchase the product by using online payment. User doesn't have enough money in his account and even try to purchase the product more than three times and then user is detected as malicious user in social networks based on online promotions and user get block by the user.

System Testing

Testing (debugging system) is the greatest discriminating part of the computer programming triggers, without programming that works, the framework might never process a yield of which it might have been planned. Testing may be best performed when client improvement will be asked to help in detecting every last bit errors and bugs. The example information is utilized to testing. It will be not quantity however quality of the information utilized the matters of testing. Testing may be meant during guaranteeing that the framework might have been faultlessly and proficiently when carrying on with operation commands.

Testing objectives

The fundamental goal for testing may be to uncover a group for errors, efficiently and with minimum time and attempt. Expressing properly, we might say, testing is a transform about performing a project for purpose for discover an error.

- a. A successful test is uncovers an as yet undiscovered error.
- b. The test is insufficient to identify probably present errors.
- c. A good test case has possibility of discover an error, if it exists.
- d. The software less or more approves to the reliable standards and quality standards.

Level of Testing

Code testing

This inspects the rationale of the system. For instance, the rationale for updating different example information and with the test files and directories were tested and checked.

Specification Testing

Evaluating this specification testing with the system must do and how it must executed under different states.

Test Cases

Table.1. Test Cases

	TEST APPLIED	TEST CASE DESCRIPTION	ACTUAL VALUE	ANTICIPATED VALUE	RESULT
1	Unit	User Registration:	*ogin	*ogin +orm is	Pass
	Testing	Enter Username,	+orm	opened	
		Password, Email, Gender,	will #e		
		#o#ile no,	opened		
		and click on Register.			
		Values:			
		Username: ramya			
		Password : 1			
		Email:Ramya1@gamil.com			

Test situations for different circumstances and mixture of situations in the whole the modules are tested.

Unit testing

In the unit testing we test every module separately and incorporate with those generally framework. The Unit testing concentrates on confirmation attempts on the littlest unit of software outline in the module. This is also called as testing of module. The module of the framework may be tested independently. This testing may be conveyed out during programming stage itself. In the testing step each module is discovered to work adequately as respect to required yield from the module. There would a few acceptance checks for fields likewise. For instance, the acceptance check is accomplished for unstable the client input provided for by the client which legitimacy of the information entered. It will be simple to discover the error debut the framework.

System testing

Once the singular module testing will be concluded, modules would collect and coordinated to execute as a framework. The top down testing that started starting with upper level to lower level module, might have been conveyed out to check if the whole framework will be performing satisfactorily.

Cont... Table.1. Test Cases

		Gender: Female			
		#o#ileno:9988774455			
Unit	User Login:		*ogin	Incorrect	Fail
Testing	Enter Username,		+orm	Usernamef	
	Password and Email,		Will #e	Password	
	Gender, #o#ile no then		opened		
	!lick on *ogin.				
	Values:				
	Username: ramya				
	Password : 4				
	Email :				
	Ramya1 @gmail.com				
	#o#ileno:9988774455				

RESULTS

Figure.3. Home Admin Login

Figure.4. View seller and activate

Figure.5. View Product



Figure.6. Purchased product



CONCLUSION



This manuscript displays a new system, Pro

Guard, to naturally identify malicious OSN accounts, which take part in online promotion events. Pro Guard leverages 3 types of characteristics containing virtual-currency collection, general behavior, and virtual-currency use. The experimental outcomes dependent upon labeled information gathered from Tencent QQ, a worldwide leading OSN company, have exhibited the identification accuracy of Pro Guard that has attained a high identification rate of 96.67% provided a greatly low false positive rate for 0.3%.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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An Efficient Approach to Identify the Cybercrime through Big Data Analytics

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ABSTRACT

Cybercrime is an important issue of research as it has been affecting many prevailing sectors such as defense, Social Media, Government, industries, Private, Military and Scientific etc. Crime reduction and prevention challenges in today's world are becoming increasingly complex and are in need of a new techniques that might control the vast amount of confidential data that is been produced through various sources. Organizations are progressively thinking about utilizing all encompassing, information driven prescient investigation and mechanization to help reveal digital security dangers, especially as offenders advance hacking strategies and assault all the more rapidly. Ongoing security and misrepresentation location are more basic than any time in recent memory since the developing recurrence and complexity of assaults has made continuous security administration much more confused and challenging. Cyber criminals are utilizing distorted or hacked data for their business picks up. The developing unpredictability of digital intrusions requires profound specialized aptitude and jurisdictional examinations to be explained. Huge information alongside data security is emerging the two difficulties and openings. Enormous information investigation is empowering organizations to break down voluminous measure of information they accumulate amid money related exchanges, any district particular information and even by giving advanced tools to fight against cybercrimes. Huge information apparatuses are being utilized to fight digital assaults. Big Data investigation is basically useful in distinguishing different cybercrimes including inward dangers, outer assaults and Modern malware assaults .Big data examination is exceptionally reasonable for breaking down and checking system therefore has a high shot of expanding the information burglary recognizable proof reasons considering pressure, big data is distinctly helpful and supportive in figuring out of prototype for labor and behavioral in addition to schmaltsy evaluation.

Keywords: Big Data analytics, cybercrime, q-radar structure, cyber intelligence, attacks.

INTRODUCTION

Many corporations does not care about pros and cons for managing cybercrimes, a number of them are manufactured goods primarily base corporations whereas others are answer carriers (mainly managing web based totally and desktop based application). The scenario turns into important whilst frequently many corporations cope with risks like data robbery along with hack of systems (not including moral hackers). Many industries at the moment are a day's shifting towards studying facts vulnerabilities and they are carrying out ordinary statistics audit, counting administration a report of usual audit. They are implement a variety of tools ¹ strategies as well as crew of exceedingly skilled expert

with a purpose to keep their statistics at ease ² Some organizations also are worried in my opinion meticulous in order (pii) with the intention of has a completely excessive and safe degree of subject protection structured by records data space to yourself law. Cybercrimes too consist of inside as well as outside coercion that needs to be manage by excessive quantities of statistics audit as well as firewalls otherwise safety primarily base software program.

Big data analytics in cyber crime

Present be a few instances in which big data analytics are good-looking bounty useful in figuring out a variety of cybercrimes which includes inner intimidation and

outside threats. Contemporary Malware attacks are the attacks which are primarily base on top of getting into a system and slowly stealing vital in order.

The model might exist of provide sequence safety big data analytics allows in identity of supplier via scan numerous facts ancestry including individual associates, examination altitude agreement (SLA), wholesaler organization systems (in favor of exploring a choice of amorphous data sources), plot information, as well as big data analysis be extremely appropriate in favor of analyzing in addition to scanning set of connections therefore have a far above the ground opportunity of growing the data robbery naming things³. Even as thinking about inner threats, huge facts is rather beneficial as well as supportive inside figuring out the blueprint of occupation in addition to behavioral because fine because maudlin evaluation of the workforce participants of an employer.

Overview of big data mechanism into hostility cyber crime

In attendance area lot of instances wherein big data will be useful inside hostility cyber-assaults as well as contravention of cyber legal guidelines; through the assistance of ill-defined and compound records analytics we will be able to without difficulty become aware of flaws and mistakes which will enhance the performance and capability of a business enterprise.

Banking profile frauds detection: profiling finding of intruder succeed for the reason that a few of the intruder (insider's risk) by no means take rotten go away intended for other than few days, this resources so as to now a deception couldn't exist hid inside a character dearth. Propagation of cellular devices: a lot of the far flung in addition to hand-held procedure be accessed inside private with throughout the majority of the business enterprise. The big data analysis could help in classifying staff through right to using their system travel in addition to moment in time period so as to an exacting member of staff before a person be using, this helps into detecting the performance of an member of staff into an association.

Social Networking frauds detection: The benefit of social network analysis for resisting fraud is gaining acceptance within a group of sectors, firstly in financial services, telecommunications and public organizations^{002E}Anti-money laundering^{4,5} identity

fraud, network fraud, denial of provider assaults and terrorist financing are some of the regions of fraud wherein SNA may be used to significantly enhance fraud detection.

Govt Sector – Defense , Govt , Police dept , military , Research Stations Servers Hacking: For government, cyber safety isn't most effective a task—it's a huge obstacle to lengthy-awaited digital transformation.

Plus, the stakes are sky-high: hacking public-quarter information may imperil national security as well as citizens' trust Possibilities of a cyber-attack through emails: Malware and phishing assaults like poisoned attachments (custom pdf exploits). Linking the outbound of a website (hyperlinks going out of a internet site) to malwares and malicious records set up of Trojans the usage of far flung access and fake software installations fake domain names like paypal.com (using Iand no longer L0029 hosted malicious software for cyber-attack [6] in an effort to increase a threat of a user getting access to a server and getting harmed.

Spear Phishing: This term is used to attack a specific group or community.

Architecture / Methodology

We propose Architecture for identifying and processing the social & confidential data that is traveling through networks which can be an input to cybercrime by deploying a method called Q-radar. The paper contributes the schema of Architecture and its modules that can resist the attacks.

Q Radar architecture

When plan or create Security QRadar deployment, it's helpful to have a good awareness of QRadar architecture to assess how QRadar components might function in network. Security QRadar collects, processes, aggregates, and stores network data in real time. QRadar uses the data to manage security of the network by giving real-time information, monitoring, alerts, offenses and responses to network attacks. Security QRadar SIEM (Security Information and Event Management) is a modular architecture that provides real-time visibility of IT infrastructure, which can use for threat detection and prioritization. We can scale QRadar to meet our log and flow collection, and analysis needs. We can add integrated modules to our QRadar platform, such as QRadar Risk Manager, QRadar Vulnerability Manager, and QRadar

Incident Forensics. The operation of the QRadar security intelligence platform that consists of three layers and applies to any QRadar deployment structure, regardless of its size and complexity. The following diagram shows the layers that make the QRadar architecture⁷.



Figure.1. Architecture of Q- Radar Modules

Data collection

Data collection is the first layer, where data such as events or flows is collected from network. The core functionality of q-radar siem is centered on occasion information collection, and float series. Occasion information represents activities that arise at a point in time inside the consumer's surroundings consisting of user logins, email, vpn connections, firewall denys, proxy connections, and any other events that you might need to log on your tool logs.

Flow data is network interest records or session information between two hosts on a community, which q-radar translates in to flow records. Q-radar translates or normalizes uncooked facts in to ip addresses, ports, byte and packet counts, and other information into device logs, which efficaciously represents a consultation among hosts [8]. Further to amassing float statistics with a flow collector, full packet seize is to be had with the q-radar incident forensics issue.

Data Processing

A fact processing after statistics collection, the second layer or information processing layer is where event data and flow data are run via the custom regulations engine (cre), which generates offenses and signals, after which the data is written to storage. Event data, and flow data may be processed by way of an all-in-one appliance without the need for including event processors or go with the flow processors.

If the processing capacity of the All-in-One appliance is exceeded, then you might need to add Event

Processors, Flow Processors or any other processing appliance to handle the additional requirements. We might also need more storage capacity, which can be handled by adding Data Nodes. Other features such as Q-Radar Risk Manager (QRM), QRadar Vulnerability Manager (QVM), or Q-Radar Incident Forensics collect different forms of data and provide more functions. The Q-Radar Risk Manager collects network infrastructure configuration, and offers a map to the network topology.

We can use the data to manage risk by simulating various network scenarios through altering configurations and implementing rules in your network. Use QRadar Vulnerability Manager to scan your network and process the error prone data or manage the error prone data that is collected from other scanners such as Nessus, and Rapid7. The erroneous data are collected to identify various security risks in network. Use QRadar Incident Forensics to execute in-depth forensic investigations, and replay full network sessions. Data searches in the third or top layer, data that is collected and processed by QRadar⁴ is available to users for searches, analysis, reporting, and alerts or offense investigation. Users can search & manage the security admin tasks for their network from the user interface on the QRadar Console.

In an all-in-one device, all data is gathered, processed, and stored on the all-in-one equipment. In distributed environments, the q-radar console the QRadar Console does not perform event and flow processing, or storage. Instead, the QRadar Console is used primarily as the user interface where users can use it for searches, reports, alerts, and investigations

Flow Control Module

The Q-radar Console manages the processing of data by two major components such as Event processor and flow processor which are integrated with data nodes in the network and collects the information about the components. These are again directed to log source which are connected with proxy servers via routers which can manage and analyze the incoming data. .
5.Solutions for restricting cyber attacks

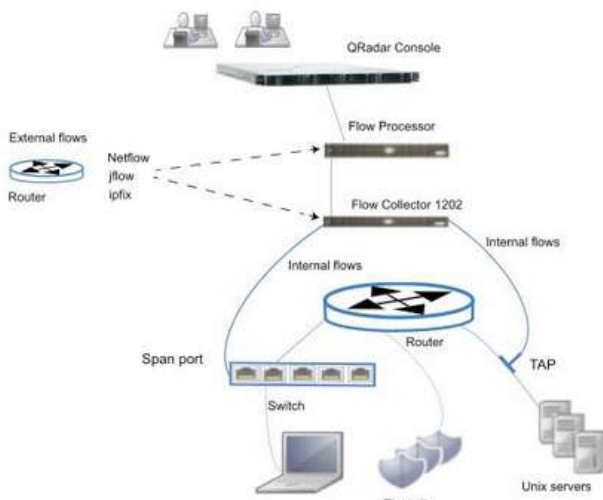


Figure.2. Q Radar event and flow component

Solutions for restricting cyber attacks

Q-Radar security platforms

Some of the key equipment includes q radar protection systems that offer a complete platform and included method for combining genuine time correlation for non-stop invigilation and customized analytics (writing our very own customized hadoop jobs for form of analysis).

The conjunction of those technologies can assist in detecting strengthen patience threats and internal dangers and threats as properly. it has widened the scope of analysis and detection mechanism through analyzing a wider variety of different statistics such as domain name device transactional facts (the usage of apache spark), identity of social media information (click streams, like, shares, remarks and posts) either by way of using some gear like apache flume that at once connects to a information dumping mechanism like shifting the records from a stay stream to HDFS the usage of API and then.

q- radar works with established in addition to unstructured statistics and every now and then it is well suited with semi established data with these competencies, this tool is sufficient enough to identify the risks as well as flaw as well as in always providing a range pro incessant learning and closed loops. These answer in an included environment everyplace a person can split, monitor, travel around different potential amongst a variety of reports on safety and can divide up along with any manufactured goods (either apache Hadoop or any additional big data platform).

A number of the main capabilities of by Q radar are: that it always judge genuine time associations with irregular information discovery. These effects in high pace query to intelligence information and humanizing overall intelligence system structure.

Q Radar too provides a well explained with well defined front end instrument used for superior data hallucination and exploring other functionalities of big data systematics. It has access to a variety of areas of data like emails. Documents, filled small package capture of data, and commerce procedure data (BPD) so as to is often second-hand with a variety of business cleverness systems. It helps in depth analysis of forensic examination, thus helping to reduce the risk of data lost and infringement.

Q Radar Security Intelligence

QRadar safety cleverness is a firmly included answer so as to allow protecting organizations since intimidation as well as cyber security show aggressions. QRadar intelligence Analytics Engine eliminates sound by applying highly developed analytics to sequence many incident in somebody's company and classify safe keeping offense require accomplishment.

q-radar works with based in addition to unstructured records and from time to time it is like minded with semi based facts by means of these competencies, this tool is inadequate sufficient to discover the dangers and flaw and in continually offering a capacity for incessant mastering in addition to closed loops. These bring about an incorporated atmosphere in which someone can proportion, screen, discover distinctive possibilities amongst numerous reviews on safety measures and might percentage alongside either item for consumption (what's more apache hadoop or any other large statistics platform).

A number of the fundamental capabilities of by q radar are: that it continually do not forget actual time connections through uncharacteristic information discovery (behavioral evaluation where tools can discover typical disobediences and capability of servers which can be storing critical statistics like healthcare or insurance records). These consequences in excessive pace question to intelligence data and enhancing basic cleverness organization shape.

Q-radar also offers a well defined and properly defined front end device for better statistics apparition and explores other functionalities of huge records logicals. it has access to various domains of records like emails, vital files, complete packet capturing of statistics, and commercial enterprise technique facts (bpd) this is frequently second-hand by means of various enterprise cleverness structures. It enables inside deepness evaluation of forensics investigation, thus assisting to lessen the risk of statistics misplaced and infringement. Superior chance detection with q-radar feel analytics engine q-radar safety intelligence platform is uniquely motorized through the advanced ibm q-radar experience analytics engine. it allows to: find out low and gradual dangers in actual time –bring hidden signs of assault to the floor locate and prioritize weaknesses and dangers earlier than they're oppressed stumble on volatile person behavioral anomaly with the purpose of could be indicator of insider intimidation and fraud

Advanced threat detection with q-radar feel analytics engine

Q-radar security cleverness policy is exclusively motorized by way of the superior ibm q-radar sense analytics engine™. it enable you to: find out low and sluggish intimidation in real time – bringing hidden signs of assault to the outside locate and prioritize weakness and risklater than they may be browbeaten detect dangerous user behavioral anomaly that might be indicator of insider intimidation and scheme

Unified visibility-in a single platform

q-radar protection intelligence platform deploys lightning speedy as well as it consolidate insights-all in a unmarried display place: integrate with a lot of ibm and third partysolution collects billions of activities on premises or within the cloud in keeping with day unifies chance trackingsusceptibility and dangeorganization forensics and occurrence reaction.

The power to act – at scale

Q-radar safety cleverness platform permits safety measures professionals throughout corporations to collaboratively receive action: sensible occurrence prioritization and wide-ranging insights uses the power of danger cleverness and teamwork with IBM X-Force® and the IBM Security App Exchange.

Advantages

We could assure that via the proposed system, several threats can be without problems identified and eliminated the use of the q-radar mechanism. Further the data can be analyzed for gaining of knowledge and implementation of the result in to various applications. This process adds as an effective approach that can eradicate the cybercrimes.

CONCLUSION

This manuscript gives concerning how enormous information will be helpful in cyber-crime detection and more frequently it says over how the things could be figured and get not difficult when the investigation part turns into solid same time analyzing difficult datasets and assortment of information. It generally turns into an impulse to develop the methods, which could a chance to be embedded in order to avoid cyber-attacks and cybercrimes.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Intelligent Home Automation System Using GPRS A Smart Switch to Connect and Disconnect Electrical Devices at Home by Using Internet

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ABSTRACT

The main aim the project is to establish a server for Remote Access Terminal using GPRS Enabled Embedded Server as main communication protocol from powerful microcontroller. LPC2148 (ARM7), GPRS Modem, Cell Phone which can support JAVA Application, Intelligent appliances. The rapidly advancing mobile communication technology and the decrease in costs make it Possible to incorporate mobile technology into home automation systems. In olden days we were not monitoring the Office and Home appliances by sitting at one place. We had controlled those appliances manually; it takes more time to for controlling. This is disadvantage here like time consuming. We can overcome the disadvantage of the existing method by Remote control via the Internet and it's a new feature and used in home automation systems. However, providing a mechanism for interaction between devices in this environment is quite challenging. The internet has been mostly used to connect personal computers so far, but shortly all kinds of appliances with embedded computers will exchange information over the Internet.

Keywords: Microcontroller, GSM/GPRS Module, Smart Phone, Wi-Fi.

INTRODUCTION

Today users of electricity to residential, have no way of knowing how much electric power consumed by each of their devices electrical connected to the network by the mere fact of being connected, even when not operating, making it difficult they can have control of energy consumption from their homes. Furthermore, most users spend too time away from home for its various activities, and nor has so connecting or disconnecting their devices electrical remotely during optimum periods of time, depending on the various applications of each apparatus electric. There have been cases in which the user forgets network disconnect any electrical device high power consumption, which is undesirable and even dangerous; and only return home until it disconnects adverse consequences. Or it may be the case that the user you are not sure you have disconnected any appliance you should not stay connected, and usually must return home immediately with the respective loss weather. a) Harnesses, b) Wireless. Based on these needs, work presents the developing a Smart Switch (SS), which is

a device capable of connecting or disconnecting any device remotely Power that is connected to the outlet at home¹ making use of internet. In this case, the SS acts as intermediary between electricity and the appliance. Furthermore, the proposed device can be controlled even without the use of internet, that is, if users do not have Internet can control the SS a locally within the building, using the local IP SS and using a computer, smart phone or tablet with access to the local network.

Existing Method

The rapidly advancing mobile communication technology and the decrease in costs make it Possible to incorporate mobile technology into home automation systems. In olden days we were not monitoring the Office and Home appliances by sitting at one place. We had controlled those appliances manually; it takes more time to for controlling. This is disadvantage here like time consuming ².

Proposed Method

We can overcome the disadvantage of the existing

method by Remote control via the Internet and it's a new feature and used in home automation systems. However, providing a mechanism for interaction between devices in this environment is quite challenging^{3,4} The internet has been mostly used to connect personal computers so far, but shortly all kinds of appliances with embedded computers will exchange information over the Internet. A massive no of microcontrollers are available in today's devices which can be linked to the Internet. If these intelligent appliances could be connected to the Internet at low cost, the way we control and manage their functions would change entirely.

Block Diagram

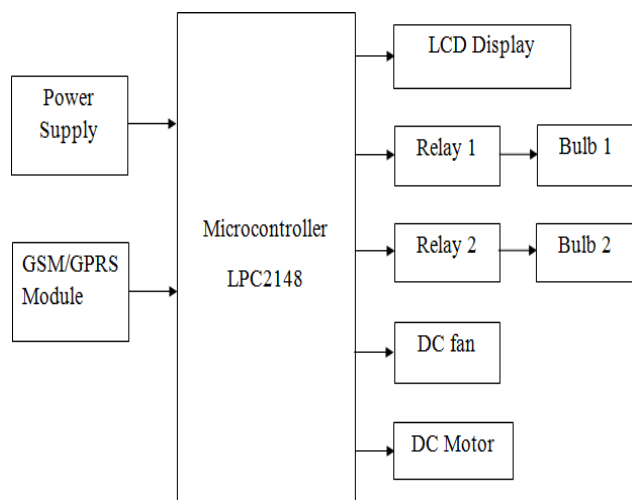


Fig.1. System block diagram

System Overview

Power Supply: This section is meant for supplying Power to all the sections mentioned above. It basically consists of a Transformer to step down the 230V ac to 9V ac followed by diodes. Here diodes are used to rectify the ac to dc. After rectification the obtained rippled dc is filtered using a capacitor Filter. A positive voltage regulator is used to regulate the obtained dc voltage.

Microcontroller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on⁵ The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

GPRS/GSM: This section consists of a GPRS modem. The modem will communicate with microcontroller using serial communication. The modem

is interfaced to microcontroller using MAX 232, a serial driver. The Global Packet Radio Service is a TDMA based digital wireless network technology that is used for connecting directly to internet. GPRS⁵ module will help us to post data in the web page directly.

Relay Section: This section consists of an interfacing circuitry to switch ON / OFF the system whenever any unhealthy conditions i.e. overload is detected. This circuitry basically consists of a Relay, transistor and a protection diode. A relay is used to drive the 230V devices.

DC Motor: DC motor is an output for this project. And DC motor is connected to microcontroller. And this motor controlled by the microcontroller with the respective inputs given by us. Its speed will be varied according to the speed set by the switches.

DC Fan: Dc fan is the output section. Dc fan needs dc supply. So we can directly add the dc motor to micro controller with transistor logic

RESULTS



Figure.2. Hardware model of proposed system

Hardware model of proposed system is shown in fig(1). Here we used GSM/GPRS module to controller home appliances. The GSM/GPRS module is interface with the microcontroller. Microcontroller receive the signal from GPRS, according to command microcontroller will turn ON/OFF particular device.



Figure.3. Initialization of GPRS



Figure.4. GPRS connection successful



Figure.5. Command received from web server

CONCLUSION

This paper presented the development of a contactor Smart (Smart Switch) controlled via the Internet, for on-off control or a remote way Local electrical household devices connected to the network. In order to fill a need for energy savings security and power users level residential. The experimental results confirm the theory, feasibility and reliability of the card developed, which she performed in a prototype stage and is currently being leading to a commercial stage.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of

each individual so it doesn't match any other research proposals/research persons.

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IoT based Advanced Health Care System Using Wireless Sensor Networks

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ABSTRACT

Healthcare industry need continuously been in the front position in the adoption and utilization of information and communication technologies (ICT) to the efficient healthcare organization and medication. Recent improvements over ICT and the emergence of the Internet of things (IoT) need to be opened up new avenues for exploration and investigation in every field including healthcare industry and medical. Hospitals have began utilizing the cell instruments for correspondence purpose and this plan internet of things (IoT) have been used and combined with Wi-Fi sensor node reminiscent of NFC tag, RFID, and small sensor nodes. The utilization of a cellular agent in healthcare process beneath wi-fi community location provides for an opportunity to investigate enhanced services to patients and staffs reminiscent of medicinal experts and nurses supplied for that of its mobility. In this paper novel strategy to use it IoT within the field of technical and cunning wellness mind are introduced. The standard part of the study exists over the separate healthcare methodologies utilized within those IoT, comparable to, wireless prosperity monitoring, E-healthcare, Age-friendly healthcare systems, U-healthcare. This paper depicts and proposes a successful healthcare observing framework and complete monitoring existence cycle designed by utilizing the RFID tags and IoT tags. The simulation outcomes in this paper indicate the robust yield against different therapeutic emergencies. In this system to get the veracious assessment results, weighing and supervising the health position of the patient and to build the power of IoT, the mixture of microcontroller among sensors is presented.

Keywords: *Microcontroller, RFID, IoT, Body Sensors, Wi-Fi.*

INTRODUCTION

The sensor network technology is the essential innovation utilized in the IOT-based health awareness checking framework¹. The human body capacities and including environment is monitor by utilizing the lightweight and low-powdered remote sensor hubs. The BSN hubs will proficiently look delicate (life-critical) the majority of the information. According to the recent overview, the number of aged human beings will suffer as of at most one long-lasting ailment, and the old persons can't be concerned about them. The body sensor hub helps to provide data over those healthcare benefits like medicinal information access and medicinal checking and communicate with the relatives and with the specialist in emergency circumstances through the SMS². The body sensor networks improve the quality of life.

IoT is the most significant correspondence in the 21st century. In the environment of IoT, objects of internet communication and computing capabilities like a microcontroller, transceivers for digital communication play a significant part in our regular life. IoT incorporates a vast amount sort sensors, which enable a huge amount for aged people to enjoy the current health awareness benefits anywhere, anytime. The smart gadget is used to assemble temperature, heartbeat, saline bottle level, and blood pressure, which would be used to assess the health condition of the patient^{1,3}.

In this system, we have the blood pressure, heartbeat, ECG, saline jug level, and temperature, would be monitored ultimately by utilizing ARM7 and is measured using specific sensors and it could be in the screen of the computer and will be monitoring anyplace in the globe utilizing internet hotspot. BSN care hub will gather information and store that information in

the processing in the local processing unit, and it sends to the database server. The power source and internet link should be in stable essential in exact working and once in a while observing physiology parameter of the body to keep away from danger. Since the sensor will be identifying or gathering the information once every 10 seconds and drives to the database server.

LITERATURE REVIEW

The sensor network is the main advantage for those developments of IOT in the health awareness system, over which a sick human being might build analyzed using a gathering of sensor light and light hubs. Nevertheless, the development of this new scheme carried to health awareness requisitions without respects to safety makes the security for patients defenseless. In this article, they firstly concentrate on the security prerequisite in the advanced health care BSN¹. The gadget will detect whether a patient is in confusion to the doctor and Rx associated with a computer outline graph for monitored physiological determination of the human body ⁴.

The individuals sensors used are pulse sensor, heartbeat sensor, temperature sensor. These sensors would be orchestrated on the human body that needs support assistance to monitor the health state without aggravating that routine life of the patient. The information will be sent to the physician server for the great extent wireless framework using GSM. The health checking framework holds the sensors, microcontroller, GSM modem LCD presentation on transmit or accept health-related data of the expert. Also, the same GSM modem will be utilized in the hospital.

Existing System

The enhancement in the body sensor system in the therapeutic services had arranged patient observing more effortlessly. Lately, numerous researcher and venture have been suggested in which have been suggested in which it gives nonstop patient observing in an open environment.

This existing framework will give a few well-known researchers in healthcare framework. Code blue^{6,7} is a healthcare scientific venture dependent upon BSN and might have been produced at Harvard sensor network lab. In this existing project, few sensors would orchestrate on the surface of the patient’s body that could sense the body and transmit the information wireless to the end

client. However, code blue’s creator recognizes the need for security for medicinal applications; however, security is still a significant issue in this venture. Alarmnet comprises about body sensor networks and naturally friendly sensor networks.

The objective for this object might have been to report the concerns prominent for convention regards wearable and implantable sensors for scattered portable screening. Despite NG et al. Proposed and indicated the widespread human services checking architecture, it might be for the more significant part predictable that without recognizing the security to wireless healthcare monitoring, which could make a crucial prerequisite to human benefits procurements Concerning illustration expressed towards legislature laws [8].

PROPOSED SYSTEM

In this paper, the suggested system utilizes the Lpc2148 controller as an entry to communicate with the different sensors similar to heartbeat sensor, temperature sensor, and saline jug level and sends the proof of the net page and then plot the sensor information in graphical facts. The data will make updated from the actualized framework, and the doctor could be accessible anyplace from the universe through the internet. Whether any sensor gets the abnormal condition, the message caution will be sends of the predefined mobile number.

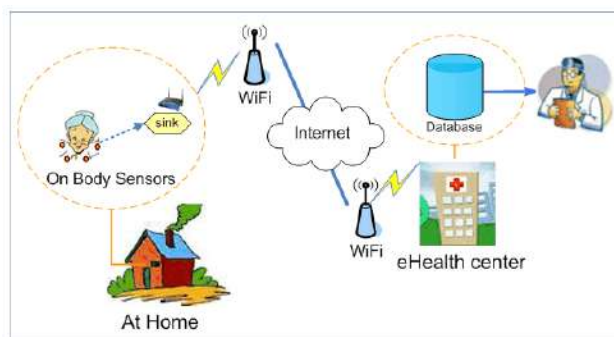


Figure 1: System Design Architecture

The security issue could be addressed by setting a secret key the client can only open the web page and can know the majority of the data in the discriminating circumstances through GSM, the information or the SMS caution will be sent to the predefined mobile number. The suggested framework deals with the patient health checking situations like MEMS accelerometer, temperature, heartbeat, and saline level with sensors and informs the information of the web server for plotting the sensor data in graphical facts. We might get

the information that is updated from the implemented framework and can be accessed through the web from anyplace in the universe, and if any sensors get the abnormal condition, then we will get SMS caution to predefine mobile number ⁷.

Heart Beat Sensor

The heartbeat sensor will be used to measure the heartbeat of the patient; it gives for the excellent yield for the heartbeat that focuses when finger might have a chance to be set on it. It Might need an opportunity to be diminished in size. The attempting voltage of heartbeat will be +5v dc. It meets desires on the statement, by the bloodstream through finger toward each pulse by using light regulation. The range of a heartbeat sensor varies between 60-100 beats for every moment. At the pulse, range exceeds 100 LED flash will get under condition towards providing for excellent yield straightforwardly to the microcontroller for measuring the beats per minute (BPM).

Temperature Sensor

The temperature sensor is an integrated data preparing, which will be used to measure temperature with a produce electrical energy linearly proportionate to the centigrade temperature. The LM35 sensor is a crucial positive component through a straight temperature sensor; concerning representation, the client need not intensify the transformation from claiming kelvin for centigrade.

The LM35 will be simply over, and it will be similarly used in the remote requisitions. Temperature might give a chance between the better parts by large measured parameter in the globe ^{9,11}.

There are two sorts about temperature sensors.

Non-contact temperature sensors: Non direct temperature sensor uses radiation and convection will screen temperature.

MEMS Accelerometer

Micro-Electro-Mechanical System (MEMS) described the type of units and techniques for manufacturing. This minor material has the range starting with 1-100 microns. MEMS gadgets are generally sorted under two types' sensors and actuators. Sensors gadgets assemble the majority of the data beginning with their

surroundings and actuators will execute the commands. Accelerometer measures acceleration by changing capacitance. The mass will be fixed, and the capacitor may be variable.

MEM is a complete system-on-chip innovation technology. The electrical procedure the information and mechanical acts on information. MEM will be a complete incorporated circuit part of a system. MEM is an observation and control capacity. MEMS method extensively utilized in numerous applications. MEMS is a kind of sensor that can sense the person's attempt and if there is an unpredictable movement like sinking down on the surface might be distinguished. The measured data could be sent through the SMS caution. MEM is acts as the main component that might sense or recognize man development and the difference in blood pressure. The MEMS will be the slight measurement and ultra-low power consumption because of this application it can also lead to developing in the telemedicine.

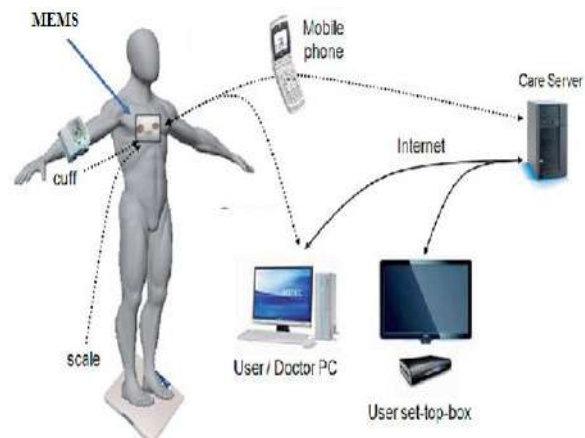


Figure 2: MEMS working Operations in System
Saline Bottle Level Monitoring

In our project, the infrared sensor will measure the saline level. The standard saline container will be of 1000ml. If the saline level is to the significant point, then the SMS caution will make send of the predefined mobile number. The nurse can come and change the saline container.

Internet of Things

The IoT will be a rising network of physical objects, which has a physical connectivity and correspondence through IP location between objects and internet enable gadgets¹.



Figure 3: Internet of Things

The suggested framework holds the ESP8266 may be the Wi-Fi module that may be used to associate with the server. So that the Wi-Fi system by IOT¹⁴ the information will be reads on the webpage. To make a simple TCP/IP connection utilizing Hayes-style commands Wi-Fi system is associated with a little module i.e microcontroller. The ESP8266 is an ESP8266 with 1 MB about inalienable flash, permitting on single-chip gadgets skilled of interfacing to Wi-Fi^{7,12}.

RESULT ANALYSIS

When the saline level achieves significant level then SMS caution will be send to the predefined mobile.

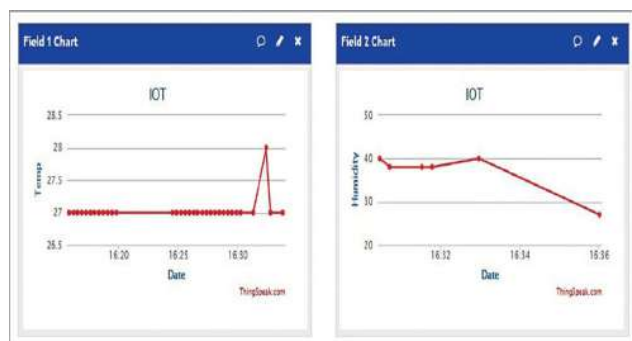


Figure 4: Temperature Sensor Graphical Representation

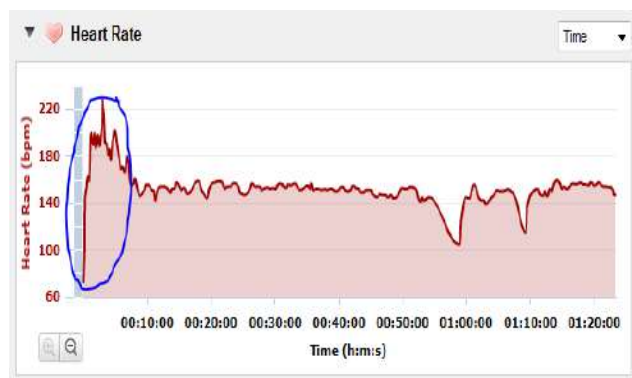


Figure 5: Heart Beat Sensor Graphical Representation

When the heartbeat will be in basic state i.e. The circled parts the SMS caution will be sent of the predefined mobile.



Figure 6: The heartbeat rate along with time will be sent to the web page.

CONCLUSION

In this article during basically, we must be delineated the security and the security issues in human services using a sensor system. Progressively we establish that despite the data that the huge majority of the known different medical sensors-based investigation tasks perceive the issues of the safety, and then they fizzled to drive in security services that might be preserved patient’s privacy.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn’t match any other research proposals/research persons.

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An Efficient Robotic Process Automation Platform Designed for the Modern Enterprise Home Using GSM and CDMA

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ABSTRACT

In the 21st century everyone knows that technology has improved a lot from the past. Home Automation (HA) is a concept that has improved a lot and is an important one in daily life. HA controls the working of several home appliances like Air conditioner, home lighting, geysers, fans and all electrically controlled appliances. It also provides security and saves power being consumed by those electrical appliances. By using HA human efforts can be reduced and it also improves time utilization. Actual use of HA is to offer help for old aged and handicapped people by allowing them to monitor and to use appliances safely. The work done by the authors and presented in this paper suggests a prototype for designing of Home Automation using Global System for Mobile communication (GSM). As from the previous design, major problem faced by designers is cost of the HA. So, the proposed design in this paper uses a small scale processor viz., 8051 μ c. The model is dependent on the independent embedded system development board and GSM Module. Home Appliances have to be connected to the development board & these appliances are controlled by using our phones. Choosing the device with less cost is very important.

Keywords: GSM, CDMA, RPA, E.S. Development board, Mobile Phone.

INTRODUCTION

HA is the home automation, housework or any other home based work. It defined the system enabling user to remotely control objects present in your home. Thus, making your home environment smarter. Home automation may include control of electric devices like Air Conditioner, Water Motor, Micro Oven, Washing Machine and many more systems, for providing more comfort, easiness in usage, saving of energy and safety. The idea of HA is under review and development since a long time. A lot of models are proposed but almost all have failed because of cost of the device being high. But there is no solution to overcome from this problem. HA for disabled and aged can provide best quality of life. A remote interface may be provided to home appliances via mobile phone of any type that accepts SIM card ¹.

This paper will describe the prototype for controlling home appliances through Mobile Phones.

LITERATURE SURVEY

As we said prior that considering the past papers on home automation, at present there are no cost-effective frameworks. Many of the existing frameworks are complicated for usage, difficult to comprehend ² and difficult to use and maintain. Present frameworks are mostly exclusive, but not adaptable by users.

The design model describes about the HA using Bluetooth and PC. Failed due to lack of support for mobile phone.

DeepaliJavale explained a model that shows how home automation and System Security using ADK is implemented and it's working.

IzharRamliproposed an electrical gadget control framework which is web based. Be that as it may fizzled due to server issues.

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Hasan developed a remote controlled device using PIC controller for controlling the devices through wired communication.

G Pradeep proposed home automation³ system by using Bluetooth with improvement in power utilization and time consumption.

Al-Ali and Al-Rousan presented a design which is Java based automation system through World Wide Web(WWW).

A low cost, easy to use Wi-Fi solution has been introduced by Piyare. R to the home automation.

Google and Microsoft entered the home automation domain in the year 2011. At 2011 I/O conference google announced that they are working to develop an operating system for home automation.

Microsoft also working on a project called Home OS,(an operating system for the Home Automation).

IMPLEMENTATION

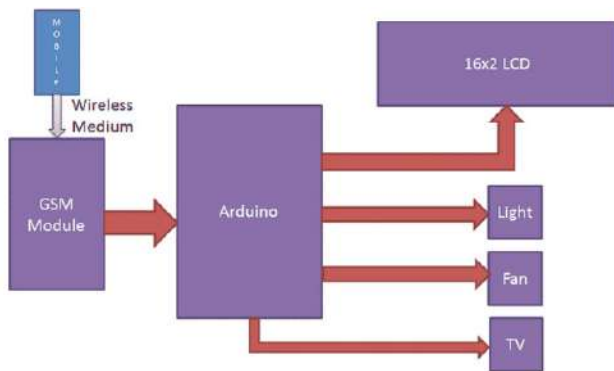


Fig. 1. Block Diagram proposed by system

Through this SIM card, client can correspond with the Development board from which the control signs will go to the obliged gadget⁴. GSM Module has a space to embed any system administrator SIM card. GSM modem is a very adaptable fitting for immediate and simple combination to RS232 applications.

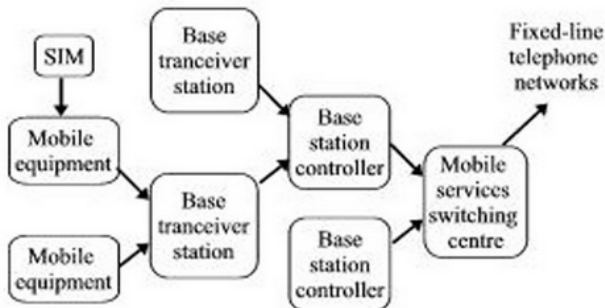


Fig. 2. Physical structure of GSM module

RS-232:

Generally, communication can be done in two ways: wired and wireless. Wired Communication means two or more devices share information through wires or cables. Wireless communication shares the information with the medium⁵ as air. Controller can communicate with the peripherals either serially or parallel.

In parallel communication all bits are send at a time. It is the advantage with parallel communication but it requires more data lines to send data. Where as in serial communication the bits are transferred one after the other so the throughput is less. But it require single line to transfer the data. One of the serial correspondence conventions is RS232. RS232 remains for recommended standard number 232. The RS-232c standard details a 25-pin “D” connector in which only 22 pins are used. Most of the pins are not required for ordinary PC correspondences, and surely, most new PCs are furnished with male D sort connectors having just 9 pins.

Line Driver:

In gadgets, a line driver is an intensifier used to enhance the quality of a simple or advanced sign at its source by driving the info to the transmission line with a higher than typical sign level. This expands the nature of a transmission over a long run of link. A sample of a line driver is an enhancer used to broaden the scope of a RS-232c advanced flag past 15 m (50ft) while keeping up a tagged bit slip degree.

We are using Line driver because the inputs and output voltage levels are not TTL (Transistor to Transistor Logic) friendly. In RS-232, a 1 is represented by -3 to -25V, while a 0 is +3 to +25V. But Microcontroller is TTL Compatible. In TTL bit 1 is represented by +5V and bit 0 is represented by 0V. So in order to convert RS-232 voltage level equal to TTL levels a Line Driver (MAX 232) is used.

8051 MC:

- 8-bit microcontroller
- 8-bit CPU, Reg A, Reg B
- 4 I/O ports(8-bit ports)
- 15-bit PC and Data Pointer (DPTR)
- 8-bit PSW
- 8-bit SP

- Internal ROM and EPROM (8751)
- Internal RAM of 256 bytes

It is 8-bit microcontroller, implies MC 8051 can Read, Write and Process 8 bit information. This is generally utilized as a part of the mechanical technology, in home machines like mp3 player, clothes washers, electronic iron and businesses.

MC 8051 has 128 byte Random Access Memory for information stockpiling. Irregular access memory is non unstable memory. Amid execution for putting away the information the RAM is utilized. RAM comprises of register banks, stack for brief information stockpiling. It likewise comprises of some uncommon capacity register (SFR) which are utilized for some particular reason like clock, info yield ports and so forth. Regularly microcontroller has 256 byte RAM in which 128 byte is utilized for client space which is regularly Register.

Relay IC:

Relay is an electro-mechanical equipment which uses an electromagnet to play between 2 contacts from an open position to a close position. The relay consumes very less power for its functionality; however the hand-off itself can be used for controlling any electrical or electronic machine. But these machines can consume more electrical energy.

The Electro-mechanical Relay is a yield gadget (actuator) which arrives in an entire host of shapes, sizes and outlines, has numerous uses and applications in the field of electronics. The transferred electrical energy is utilized to allow small electronic circuits to switch “ON” or “OFF”.

The outline and sorts of hand-off exchanging circuits is gigantic, however a lot of people for little electronic activities use transistors and MOSFETs as the essential exchanging gadgets. Because the transistor gives fast DC exchanging (ON-OFF) governor. Here is a little accumulation of a portion of the more normal methods for exchanging transfers.

WORKING

Before Discussing regarding working just look out how the routing is done between the components. Check the connections from the Controller because controller is the heart of the Circuit. As stated above 8051 MC

consists of 4 I/O ports each of 8 bit. Our devices to be controlled are connected to the Microcontroller through the Relay IC which in turn connected to the I/O ports of Microcontroller. GSM module is connected to the controller through serial communication and also through line driver. Serial Port of GSM module is connected to the RS-232 and the RS-232 is connected to the Port of line driver which in turn connected to the serial port of 8051 controller. The usages of all these devices are mentioned earlier.

When coming to working, after connected all the devices as per the block diagram shown above user inserts the network operator SIM card in the provided slot of GSM Module so that user can control the devices by sending the messages to that controller. The user sends the message to the SIM that “ON the Device 1”. Then the device GSM module sends the message that it had received to the microcontroller then microcontroller compares the message with the predefined message if the incoming message matches with any message that is stored in the microcontroller memory then it takes the action as per the user defined in the code like if the user treated the device one as fan then the controller reads the message “ON Device 1” then microcontroller gives the signal the relay that is connected to the fan then the relay connects the power cord so that power is given to the fan then the fan will rotate in this based on the user requirement the controller takes the action.

We can also implement door lock security using this system. By connecting the motor of the lock to the relay so that when the user wants to open the lock user sends the message like “Lock Open” the motor rotates and the door will be open. So by using this system we can provide security to the devices also.

In the similar manner if the user wants to switch off the working devices by sending the corresponding message that is defined by the user for that action. If the Message send from the Different user or the message send is not belongs to the predefined messages then the controller will not react to that message.

This is the Working of the prototype that we have designed.

APPLICATIONS

1. Emulating are the submissions of HA and Security System:

2. Medicinal caution/ tele assistance.
3. Accurate and harmless visually impaired governor.
4. Uncovering of spark, gas breaks & water spills.
5. Smolder locator can locate a flame or smolder ailment, bringing on all lights in the home to lopsided to alarm any individual of the home to the conceivable crisis.
6. The framework can demand the property holder on cell telephone to caution them, or demand the blaze office or alert observing organization⁵
7. Lighting control, it is conceivable to spare vitality at the point when periods of squandered vitality in private and business claims via auto on/off dainty at evening in all real town office structures, say afterward 10pm.
8. Governor and joining of safekeeping frameworks furthermore the latent for focal padlocking of all edge entryways & windows⁵
9. Safety cams can be monitored, permitting the client to watch movement everywhere a home or commercial from a Screen or dash board.
10. Safety frameworks can incorporate movement sensors that will locate any sort of unapproved development and tell the client over the safety framework or by means of PDA.
11. A radio framework permits correspondence by means of a mouthpiece and uproarious speaker bet

CONCLUSION

We can extend the above prototype by sending the acknowledgement to the user when the action is taken for example like "Fan is in ON state". Means we can provide a feature for sending acknowledge to the user by adding other peripherals.

Constraint to control just a few gadgets can be uprooted by broadening computerization of all additional home Machines. Safety cams can be monitored, permitting the client to watch action everywhere a house or commercial. Safety frameworks can incorporate movement sensors that identify any sort of unapproved development and advise the client. Extent of this task can be stretched to numerous territories by not confining to just home.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Multilingual Sentiment Analysis of Hinglish Tweets

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ABSTRACT

Sentiment Analysis has been looked into in an assortment of settings however in this paper, the attention is on supposition examination in Twitter, which represents its own one of kind difficulties, for example, the utilization of slang, shortenings, emojis, hashtags, and client notices. The 140-character limitation on the length of tweets can likewise prompt content that is troublesome notwithstanding for a human to decide its estimation. In particular, this investigation will dissect feeling examination of multilingual (U.S. English and Hindi dialect) Tweets. The present paper says that multilingual supposition investigation is more exact than conclusion examination in a solitary dialect (English or Hindi) while breaking down multilingual tweets. When all is said in done, as of now supposition investigation in multilingual tweets is done against an English word reference. For every one of the experiments in this paper' explore we will utilize the Python NLTK assessment bundle.

Keywords: multilingual sentiment analysis; Python NLTK; preprocessing; F-score; confusion matrix

INTRODUCTION

Sentiment Analysis (or opinion mining) refers to natural language processing and text analysis to identify polarity of the user's sentiment in a piece of text¹. The current paper says that by using a sentiment analysis system optimized for the analysis of Hinglish tweets, a more accurate sentiment classification will be achieved than if Hinglish tweets were preprocessed and classified using the same process as English tweets. Sentiment in Tweets can be invaluable to companies, politicians, and other organizations since it provides a medium for a large number of users to express their raw opinions and statements. Tweets can be used to gauge sentiment of stocks, products, movies, events, political representatives and much more. Twitter gives the world their own platform to speak their mind. Since tweets are limited to 140-characters most users use slang, abbreviations, emoticons, hashtags, and user mentions, which adds a challenge when compared to sentiment analysis in traditional text¹.

According to a study conducted by Pew Research, a Statistical Portrait of Hispanics in the United States², the Hispanic community makes up 17.3% of the United

States population in 2014. Recently more than ever large corporations are targeting the Hispanic-American community for sales. Companies like Toyota, Target, and Taco Bell among others are targeting multilingual speaking Hispanic-Americans in their ads. While most companies have a full Hindi language commercial on Hindi speaking television channels like Univision and Telemundo, not many have crossed into the multilingual realm, yet. Some companies have analyzed the data of this market share in the United States, and chose to target Americans that speak English and Hindi.

According to an article published by Motion Point, Companies Engaging Hispanics Win Big in the U.S. and Beyond³, in the United States Hispanics now represent a buying power of \$1.5 trillion. For Hispanic Americans both languages are part of their cultures. At home their family speaks Hindi, while other social interactions require English, so it is very common to speak both languages interchangeably. For most Hispanic Americans, the languages have become so intertwined that words have emerged from mixing words and suffixes from both languages. Sometimes particular words may be used more in one language than in another, so when a person is speaking in one language but never uses that

exact translation for the word in another language, they will just use both languages in one sentence as in the tweet below in figure 1.

Replying to @sankrant

matlab dono bhashaon ki dhajjiyaan udaana.
The girl just said I can't samjhofy what you're saying.

Translate Tweet

@FIRkeDaddu aaj raat bhar khulega baar is the....where are the keys to my car is the....#Hinglish

Figure.1. Tweet demonstrating the use of Hinglish on Twitter

This paper will present other research done in sentiment analysis and specifically research on sentiment analysis in tweets. It will present new sentiment analysis strategies and techniques, presenting further details regarding Hinglish as a language in sentiment analysis. Then the datasets, dictionaries, and sentiment analysis packages that are used to execute the three experiments are presented. The experiments will provide statistical analysis which will allow one to conclude and discuss the results relative to the current work says that Hinglish tweets will be more accurately classified when preprocessing and resources specific to the Hinglish language are applied.

Background Work

Over the past several years short informally written texts have become increasingly popular, whether they are tweets, SMS, or other micro blogging platforms. In 2008, just a couple of years after Twitter launched, Pang and Lee published a survey paper ⁴ on the topic of opinion mining and sentiment analysis where they discuss techniques and approaches to directly enable opinion-oriented information-seeking systems. Although the applications and datasets discussed are related to reviews, recommendations, business and government intelligence, and support of politicians or other public figures, these reviews and writings tend to be more formally written than the type of text is discussed in this paper. Nevertheless, Pang and Lee's paper has been famously referenced through research in the field of sentiment analysis. They take one through the main challenges also addressed (although in a relative manner to informally written short text) in papers written at a later date such as: Extracting documents pertaining to a relevant topic, extracting or identifying overall sentiment of the document, and classifying and presenting the

polarity of the sentiment identified in the document. They also address key concepts in classification and extraction which are also relevant in informally written short text such as classifying and extracting documents based on sentiment polarity while addressing negation, parts-of-speech, subjectivity, and topic relevance while building feature vectors or other representations.

More recently, there have been papers written which have analyzed sentiment analysis in Twitter as well as other informally written short text such as SMS and blog sentences. In the 2012 paper, If you are happy and you know it...tweet ⁵, the authors presented a cascaded classifier general framework for per-tweet processing (in contrast with batches of tweets which had been the usual form of processing the tweets). In 2009, the authors of Twitter sentiment classification using distant supervision⁶ specifically used tweets with emoticons and hashtags expressing sentiment for their training set and then used a test set that did not necessarily contain emoticons.

Preprocessing

The most involved part of sentiment analysis is preprocessing the data, especially in the case of sentiment analysis on tweets. Since tweets are limited to 140-characters in length and are written very informally extra care must be taken during preprocessing in an attempt to have the cleanest data possible. As part of the preprocessing the tweet is first tokenized. NLTK does provide a simple tokenizer but because of the extra punctuation, hashtags, mentions, emojis ⁷, and URLs often used in tweets the tokenizer included with NLTK performs sub-par. Python regular expressions were used to tokenize each tweet into words, emojis, urls, hashtags, and mentions. Using regular expression, made it possible to categorize the tokens into mentions, hashtags, emojis, and whether an emoji has positive or negative sentiment.

To further the preprocessing, the NLTK Snowball Stemmer package was used because it offers stemming in both English and Hindi. The flexibility to use the stemmer in both languages played a key role in the Hinglish Sentiment Analysis system. The list of stop words was constructed from the stop words corpus provided in NLTK. Preprocessing through the tokenized tweets, any words included in the NLTK English stop word corpus are excluded. Moving forward with this work one should further the preprocessing to pay closer

attention to elongated words (i.e. – “hellooooo”, “orrrrrale”), and after taking into account possible features of elongated words apply spelling normalization to those tokens. It would also be beneficial to apply the spelling normalization to slang or purposely misspelled words which are common in tweets or other informally written texts. As of the date of this writing, while there are some research papers written in this area there are no APIs available for this type of spelling normalization. Since the emergence of emoticons or emojis there has periodically been updates and releases of new emojis. Regular expressions for the classic emoticons were initially created, but most people on twitter are using newer emojis and in fact don't use the classic emoticons very often. The current emoji list consists of all positive and negative emoticons, along with some common sentiment indicating emojis such as ♥, that have been released as of the date of this writing. However, moving forward with this work each emoticon should be labeled in the complete emoji list for positive, negative, and neutral sentiment; along with all other emojis that may be indicative of sentiment.

Using Senti Word Net a synset was obtained, which provides a positive sentiment score and a negative sentiment score for each word. Using the sentiment score for each word we took the average of the score among all words in the tweet. If that average value is greater than zero it is considered a positive tweet score, and if it is less than zero it is considered a negative tweet score. All of the features are Boolean (True or False) values.

The feature set includes the following features:

- i. Has positive tweet score: Whether the average sentiment score for the tweet was greater than zero
- ii. Has negative tweet score: Whether the average sentiment score for the tweet was less than zero
- iii. Word count greater than six: Whether total number of words in the tweet is greater than six
- iv. Has adjective: Whether at least one of the words in the tweet that our POS- Tagger labeled as an adjective
- v. Has hashtag or mention: Whether the tweet contains a hashtag or mention
- vi. Has positive emoji: Whether the tweet contains a

positive emoticon

- vii. Has negative emoji: Whether the tweet contains a negative emoticon

Classification

The Natural Language Toolkit (NLTK), is a suite of libraries and programs for the Python programming language used for symbolic and statistical natural language processing. In this research, it was found that NLTK is the most commonly used library in programming for natural language processing. Since sentiment analysis has gained popularity among researchers and data scientists, so has NLTK because it has most of the functionality built-in that is required to construct a simple sentiment analysis system such as classification, tokenization, stemming, tagging, and more. Since the NLTK package is so widely used many of its modules have been developed further and now offer the same functionality for a limited number of non-English languages. NLTK also provides over 50 corpora and lexical resources. In the preprocessing of the data we used the NLTK stop 22 words corpus for English along with the English Snowball Stemmer provided by NLTK. NLTK SentiWordNet14 and the NLTK POS-Tagger was used in building the feature set. Then the features function was applied to build the training set, which was used to train the NLTK Naïve Bayes' classifier.

The sentiment analysis classification uses a simple Naïve Bayes' classifier¹⁵. The great thing about leveraging the Python's NLTK package is that there has been an extensive amount of develop to it as well as other modules and interface which can be used with it, such as scikit-learn¹⁶. Moving forward with this work, by importing the SKlearnClassifier one can easily extend the current system implemented, to train multiple classifiers such as Naïve Bayes', SVM, and Logistic Regression; with this a vote can be taken amongst the classifiers for the highest category (positive or negative). By using this voting method among classifiers available in these packages one could possibly improve our accuracy, reliability, and be able to provide a confidence score.

Dataset

The dataset of Hinglish tweets was acquired by using the Twitter streaming API with the python module tweepy. Tweets posted from within a GeoBox with

boundaries outlining the India streamed and collected. Then the dataset was filtered through the Hinglish Tweet algorithm so that the resulting dataset will consist of purely Hinglish tweets. The list of Hinglish tweets was separated, using the first 70% for training and the last 30% for testing. The Hinglish tweets which will be used for training were manually tagged for sentiment by three Hinglish speakers, the tweet receives a vote of two out of three to be labeled with that sentiment polarity classification. These tweets were tagged positive, negative, or neutral with the neutral tweets being thrown out to avoid a large imbalance.

Evaluation

Since these tweets consist of words from both the English and Hindi language, and may include words that are not found in either dictionary, using the current sentiment classification methods 7% of tweets could actually be misclassified. There may be words in a tweet

$$F - score = \frac{2 * precision * recall}{precision + recall} \quad (1)$$

$$confusion\ matrix = \begin{matrix} True\ Positive & False\ Negative \\ False\ Positive & True\ Negative \end{matrix} \quad (2)$$

expressing sentiment which are not actually part of the lexical dictionary that the words are being classified with. The F-score and accuracy of classification will be measured in each case, while also looking at the confusion matrix for each case and discuss the specificity as well as sensitivity. Then the F-score was calculated using the formula in equation 1 and confusion matrix with equation 2.

The Hinglish Sentiment Analysis System needed to pay much closer attention to the preprocessing so that it could adapt and extract features targeting our corpus. When a closer look was taken at the way many Hinglish words are constructed and the functionality of the NLTK Snowball Stemmer, and the Bing Translator, we found translating all words to English was necessary so that they can be mapped to a synset in Senti Word Net. However, if the word requesting to be translated to the English language is not found in the dictionary then it remains the same. Many Hinglish words are constructed from English verbs with the Hindi suffix appended to it. So, in the case of the Hinglish Sentiment Analysis System after translating all words to English, and stemming the words with the English Snowball Stemmer, we also apply the Hindi Snowball Stemmer

available through NLTK. By doing this one obtains the accurate English root word for many Hinglish verbs. For the examples given above applying the Hindi Snowball Stemmer returns us back: “mop”, “text”, and “check” respectively. Verbs can be indicative of sentiment (i.e. negative verbs: scream, push, hit and positive verbs: love, hug, kiss). In addition to these verbs, a small list of Hinglish words was built which many are indicative of expressing sentiment; these words are mapped to their English equivalent to ensure compatible feature sets.

Table .1. Confusion matrix

	1	0
1	150	14
0	51	26

Table .2. Results Statistics for Hinglish Sentiment Analysis of Hinglish Tweets

Accuracy	F-Score	Sensitivity	Specificity
77.43%	72.55%	90.54%	34.72%

CONCLUSION

In conclusion, this paper provided insight into the challenges, resources available, and possible approaches to building a sentiment analysis system for multilingual tweets. While it was found that about 7% of all tweets are written using words from both the English Dictionary and Hindi Dictionary. While 7% may not seem like much, since there are millions of tweets per day, this could account for a significant gap in data that is available from this rapidly growing consumer group. The preprocessing was tailored to the language we were basing our sentiment analysis system on, and the features were consistent across the board. After running the experiments on the Hinglish tweets, it was found that the Hinglish sentiment analysis system gave us the highest accuracy of 77.43%, and the best F-Score of 72.55%. It was observed that in the instances of misclassification for the Hinglish case, this was usually caused by erroneous Hindi stemming on entirely English words.

Further improvements to this work would invoke further preprocessing to better identify Hinglish words that are constructed from English root words and Hindi suffixes, so that the Hindi stemmer would only be applied to these words. Future work should also use the newest emoji library labeled for sentiment. Based on these scores it can be concluded that when performing

sentiment analysis on tweets, if the data will be used for consumer marketing and particularly if the organization wishes to understand and reach the Hispanic community, it would be beneficial for them to treat Hinglish tweets as their own language and perform specific preprocessing targeted for the language. Hinglish is just an example of one language which has emerged from combining two languages. The study of sentiment analysis currently faces a challenge in accurately classifying text in other languages. Techniques and strategies discussed in this writing can be expanded to further the study of sentiment analysis in multilingual text, and languages other than English.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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An Efficient Technique for Energy Proficient Clustering based Routing for Packet Split and Merge in Wireless Sensor Networks

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ABSTRACT

The primary intention of the paper work is to develop an energy proficient clustering algorithm for merging and splitting. Energy efficiency is the main issues in WSNs, because of battery that is available in WSN cannot be replaced or recharged. The proposed method is an efficient energy- self-organized model of clustering which uses merging as well splitting (EECSM). This algorithm performs merging and splitting for efficient energy in to clusters. Previous works show that balancing of the load is considered with distributed organized self manner. To eliminate the drawback of the existing work, the proposed system is used. EECSM will use energy state information related to sensor nodes for reducing consumption of energy and load maintenance and balancing. EECSM will prolong the life of the network by merging and splitting the clusters using cluster heads in a sensor network. The experimental results shows that EECSM will perform better in terms of the life of network, scalability, energy residual and robustness.

Keywords -clustering, lifecycle, wireless sensor network, self organization, distributed, monitoring

INTRODUCTION

Wireless Sensor Networks are defined as collection of nodes, the attractive research attention is based on its extensive range of applications in major areas like tracking of objects, detection of intrusion, monitoring of the environment, health applications and factory inventory management. In WSNs, the nodes are energy efficient such that they must be in topology control. Clustering is the most important unsupervised learning problem such that it deals with unlabeled data. Wireless Sensor Networks have a unique characteristic with the following constraints. At first, it is a collection of thousand of sensor nodes form a network based on certain topology. Therefore every WSN node posses several types of devices, which are based on constraints for processing and data storage capacity. Second, each

sensor node of wireless network posses a battery which cannot be replaced or recharge, so all the batteries have to be managed effectively to increase the lifespan of network and also minimize energy consumption in WSNs. A Loose definition of clustering states that objects are re-organized into groups to form members of similar clusters in an appropriate style¹. Cluster is defined as a group of similar objected grouped less than one and objects grouped under dissimilar belongs or grouped to another cluster.

The aim of clustering will determine the grouping intrinsic in an unlabeled set of data. Then we can decide about the good clustering. It has been noted that there is a absolute best criterion which will independently final the clustering aim in the network. As and then at the same time, usually there exists a huge number of sensor nodes in a WSN, the nodes gets the information to frame a topological network which results in need of clustering algorithms and also a need of appropriate cluster-sub in a local network topology based on partial information.

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In WSN topology will be changing often based on changes which are done dynamically due to various reasons, including failure of battery, environmental destruction, node failure, change of sensor node location, WSN nodes will communicate via wireless link alternation signal though a power node control or by the factors of environment, this can also add a new node to the network which will enhance the accuracy of monitoring etc. WS networks should have the capability to adapt the variations and reconfiguration of the user task satisfactorily and dynamically. Likewise concerns in Sensor networks will acquisition the data regionally² other than node related data, and the control procedure topology of the existing will frustrate Based on energy constraints, node sensor will communicate frequently other system nodes with a distance limit. In order to communicate with sensors and other communication range devices to form a sensor multi-hop network communication. In cluster based Routing¹¹ that is done through clusters, a network that consists of a number of clusters³ where each cluster is possess a cluster head (CH) and a number of cluster members (CMs). As per the drawbacks of wireless sensor node, a clustering and routing method which is centralized is not efficient in WSNs. By availing these limitations, a distributed clustering and routing based method is tend to be used for WSNs. In distributed clustering and routing method⁴, every sensor node has the capability to reduce the energy consumption, by applying clustering while transmitting the data. Self-organization is a method for the establishment of networks as per necessity and is regarded as Self-organizing networks which are also known to be smaller & scalable networks. These arise from bottom-up interactions, and visualize being unlimited in size. Even though the clusters size to be adjusted and in to increase the energy efficiency, the general cluster-based routing protocols does not provide a proper clustering size as they use only related local neighborhood information⁵. Conversely, if the cluster size is small, the count is increased, reflecting the increase in number of CHs, which consumes high energy when compared with CMs.

RELATED WORKS

In this section, the pros and cons as well as performance are discussed and compared to the Clustering Techniques.

A. Leach: In the Energy efficient communication protocol for WSN, LEACH (Low-Energy Adaptive Clustering Hierarchy) was used by authors. These methods provide advantages such as Energy dissipation, Ease of design, System lifetime/nature of the system. This method provides Low-energy, Distributed protocol. The Low-Energy Adaptive⁶ Clustering Hierarchy (LEACH) protocol is also termed as self based cluster-based protocol. The LEACH chooses CHs by a randomized pivot, with a specific end goal to disseminate the vitality utilization of sensor hubs. Every sensor hub thinks about the edge $T(n)$ that has an arbitrary number, with a specific end goal to choose a CH.

B. Leach-ED: In LEACH-Energy Distance (LEACH-ED) is one more self based cluster-based protocol. The LEACH-ED chooses CHs based on two types of thresholds. To start with, the threshold is the difference between the residual energy of a sensor node, and the total current energy of all of the sensor nodes in the network. Second, the threshold is the division between the few which is not a separation edge; just a single hub turns into a CH. The LEACH-ED enhances the heap adjust and the system lifetime superior to does the LEACH⁷.

C. HEED: The Hybrid Energy-Efficient Distributed Clustering Approach (HEED) applies the techniques of clustering for energy efficiency. The HEED confines CHs with two constraints. The primary constraint is the energy that is residual for the sensor nodes. The other constraint is intra-cluster communication expenditure to unravel break-ties. The intra cluster communication expenditure are maximum & minimum degree cost along with Average minimum reach power (AMRP). The HEED increases the lifetime of network compared to LEACH mechanism.

D. Clustering Based Data⁸ Collection algorithm

The clustering-based data collection algorithm aims at the energy efficiency problem in clustering and predicting the future. This mechanism adopts dynamic dividing and combining clusters, which minimizes the communication cost. But, these clustering, dividing, and combining methods are used for AR model-based similarity attributes of CH and CMs.

PRELIMINARIES

The objective of work is based on efficient energy

organization of clustering using self organized model with splitting and merge model of network.

Objectives: The objective is for developing a self organized efficient energy analytical clustering model which splits and merges the packet for reducing consumption of energy in CMs and CHs based on auto adjustment of cluster size. As the cluster size is big, EECSM will divide the cluster into 2 or more if the cluster size is big, EECSM divides them to two clusters and if the cluster size is small then EECSM merges them.

Model of Network: During the transmission and receiving of packets, energy is consumed. In transmission of wireless data consumption of energy is related to the packet size and the distance between two nodes. Assuming initially those sensor nodes⁹ can identify the energy of its own. (i) data packet transmission : the sensor nodes will consumes a the circuitry transmitter and at amplifier. (ii) Data packet receiving : consumption of energy by the sensor nodes at receiver circuitry. (iii) A packet bit stream is transmitted from node to another sensor node, the distance between the nodes and the consumption of energy of the sensor nodes are given as. (iv) the packets are received to the sensor nodes.

ENERGY-EFFICIENT SELF-ORGANIZED CLUSTERING WITH SPLITTING AND MERGING

EECSM consists of 5 different considerations which uses local data information [4]. Initially first, node sensors which the most energy remaining from the neighbors will become the candidate node of CHs, since a lot of energy is consumed by CH. Second, the each node sensor, except CHs, will select the nearest CH, for reducing energy consumption in transmission data phase. Third, the clusters which has number of CMs and is less than the threshold of merging will merges into two or more clusters, this is due to minimize the energy transmission of consumption that the packets from CHs to BS. Fourth part, the clusters which have number of CMs and which is larger than the threshold of splitting is splitting into clusters of two, this is done for reducing the CH energy overheads. Fifth, this will prevent break age for CHs, backup-CH method will select a CH new which maximum the cluster energy in CH. The mechanism process of EECSM will focuses on clustering, dividing and combining. The EECSM consist of 3 phases and a Backup CH-Mechanism¹⁰ which regroups the clusters in WSN. The phase of cluster merging will decide to join

clusters or not.

Clustering Phase

This phase begins as and when the sensor node fields are scattered around the network and is completely after the phase of data transmission. This is the phase which will decide the new CHs to be formed from new clusters in WSN. To decrease the overhead of load in CHs, the EECSM will regulate the cluster size. The clustering phase will comprise into 4 steps i.e Level of broadcasting, dividing and choosing CH and its clustering.

A. Level of Broad casting.

Initially the sensor nodes field is set to zero and are scattered in the network, CH is not available. Then selection of CHs is done among the scattered nodes automatically. The EECSM then will use the energy to decide the next CHs and initial it as zero. Because all the CHs will be assigned with initial energy in the sensor nodes identically. i.e. CHs values in all the sensor nodes will be initialized as period zero.

B. Cluster Splitting Step: As and when clusters are configured, EECSM will consider and identify the related group of clusters. Initially EECSM [3] will divide a huge cluster to smaller clusters. The main drawback of bigger cluster is, it consumes larger consumption of energy from its CH.

A bottleneck process can occur at CH in a big cluster network, in a transmission step of the previous iteration of cluster, this is due to identify the no of clusters generated in the next step of clustering, EECSM will select next step process accordingly based on the threshold splitting value. If the no of CMs of a cluster is greater than the divisive threshold value, then EECSM will be executing the cluster splitting step. As a cluster is divided in to two CHs, they are recognized as the First and Second CH.

C. Level of CH Selection: The CMs present in a cluster value is less than divisive threshold value; the EECSM does not execute the divisive step. In this Level, the CH promotes one CH for the next round clustering which is identical to decide the First CH of the cluster splitting level.

B. Step of Re-clustering: This stage will execute the data that is stored in clustering level and after processing, the data that is stored at clustering level will be deleted.

Data Transmission Phase: After the completion of cluster merging phase. EECSM will now enter into the transmission of data phase, it will start to intimate the sensor field node the situation that may occur to the BS external, by the process of data gathering.

CM will create an information packet which embeds the environment and neighboring information for every slice of time and the packets are traversed to CH. Every CH will group them in receiving packets into packet data and will transmit packet data in to the BS which is repeated for every iteration.

A. Reelection CH Step: The reelection of CH step will be done immediately as there is a notification breakdown done by CM related to CH during the phase of data transmission. CM identifies the breakdown of CH of the nearest CM from CH. A broadcasting of energy signal is done by CMs twice in its range, for electing a CH new node.

B. Recovery of Cluster Step: The recovered CH will broad casts the signal to the whole of the network based on sensor field, because the new CH is not able to understand the cluster size exactly. The Cluster Method will decide the CH area not only for the existing clusters but also for the new CH cluster, based on the distance accordingly.

Experimental Results

We have demonstrated experiments using simulation tool, our proposed algorithm performs effectively and superiorly when compared to the existing algorithms. Advantages of EECSM algorithms can be seen more and more as described below

In this part, we show the experimental results of EECSM

- a) assuming the location of BS and sensor nodes as fixed
- b) Sensor nodes are deployed using random distribution
- c) The BS location is known before as 50m*50m related to field sensor. As the field of sensor is set to 10m for a broadcasting range.
- d) The packet signal size is 50 bits and packet data size is 1000 bits

- e) The initial energy for all the sensor nodes is 0.5 J
- f) Assuming that WSN nodes cannot be operated if the 30% of the nodes gets discharged.
- g) Assuming the number of sensor nodes are 100 in our experiment.

The figure below show the life time of network in EECSM is 167.9 % (as and when first sensor node gets discharged) and 23.5 % (when 30% of the nodes get discharged in WSN), longer will be the life of the network in HEED. This may be assumed that five considerations of EECSM is used for energy information and operation properly to increase the lifespan of a network.

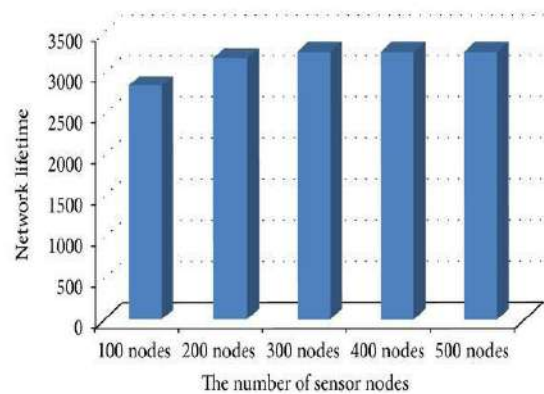


Figure.1. Analysis of Performance in scalability based on lifetime of network

Figure 3, shows above the life time of network in EECSM, when the sensor nodes number is greater than 200, which has a longer life span of EECSM, as the number of nodes is equal to 100, from a minimum state of 11.67% to a maximum of 14.68%. Based on the increase of sensor node number.

CONCLUSION

Our paper proposes an efficient energy self-organized cluster model in WSNs. The model proposed will attempt in maximizing the life of the network and will maintain the load balance with the selection of CHs and by arranging the size of the clusters with the technique for the combination with an advantage of self organized protocols and cluster based routing protocols.

As EECSM use self-organized method, this has advanced features such as adaptability, distributed control, scalability and robustness. In variantly EECSM will choose a particular CHs based on its efficiency

in terms of energy, which can adjust the cluster and maintain its adjusted size, and further which can restore and damage the cluster of its own, based on its local information. Clustering with merging and splitting method has major interest in research. The basic research examples are auto decision methods of threshold merging and threshold splitting with information throughput, with neighbor localized information, ex: the no of neighbors, the actual state of neighbor and go on.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what we have written is completely self depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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A Study on the Development of Machine Learning in Health Analysis

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ABSTRACT

Machine Learning (ML) provides methods, techniques, and tools that can help solving diagnostic and prognostic problems in a variety of medical domains. ML is being used for the analysis of the importance of clinical parameters and their combinations for prognosis, e.g. prediction of disease progression, extraction of medical knowledge for outcome research, therapy planning and support, and for the overall patient management. The Machine Learning field evolved by the extensive area of artificial-intelligence, which intends to mimic bright abilities of humans with machines. Machine Learning (ML) has evolved by the endeavour of computer enthusiasts harnessing the chance of computers learning how to play with matches, and also part of Math (Data) that infrequently believed computational processes, to a different research field which hasn't merely given the essential base for statistical-computational fundamentals of learning procedures, but additionally has generated various calculations which are regularly employed for text translation, pattern recognition, and many other industrial purposes and it has caused a individual research interest in data mining to determine hidden regularities or irregularities from societal statistics that growing by instant. This paper concentrates on explaining the Style and development of Machine Learning, a number of the most popular Machine Learning calculations and Attempt to compare the Well-known algorithms based on a few fundamental concepts.

Keywords: Medical diagnostic, Machine Learning, disease progression, extraction

INTRODUCTION

This Work provides the foundation for development of technology framework that makes easy to find all the relevant information regarding treatment and diseases. The tool that is built with the techniques such as Natural Language Processing (NLP) and Machine Learning (ML) has capability to find all relevant short text information regarding diseases and treatments. This work presents various Machine Learning (ML) and information for classifying short texts and relation between diseases and treatments. According to ML technique the information are shown in short texts when identifying relations between two entities such as diseases and treatment. Thus there is improvement in solutions when using a pipeline of two tasks (Hierarchical way of approaching). It is better to identify and remove the sentence that does not contain information relevant to disease or treatments. The remaining sentences can be classified according to the interest. It will be very complex to identify the exact solution if everything is done in one step by classifying

sentences based on interest and also including the sentences that do not provide relevant information.

Medical diagnostic reasoning is a very important application area of intelligent systems. In this framework, expert systems and model-based schemes provide mechanisms for the generation of hypotheses from patient data. For example, rules are extracted from the knowledge of experts to construct expert systems. Unfortunately, in many cases, experts may not know, or may not be able to formulate, what knowledge they actually use in solving their problems. Symbolic learning techniques (e.g. inductive learning by examples) are used to add learning, and knowledge management capabilities to expert systems^[5]: given a set of clinical cases that act as examples, learning in intelligent systems can be achieved using ML methods that are able to produce a systematic description of those clinical features that uniquely characterize the clinical conditions. Thus, knowledge can be expressed in the form of simple rules, or often as a decision tree. A classic example of this type

of system is KARDIO, which was developed to interpret ECGs ^[7].

The Machine Learning field evolved by the extensive area of artificial-intelligence, which intends to mimic bright abilities of humans with machines. In the industry of Machine Learning one believes the major matter of just how exactly to make machines capable of "master". Learning in this context is called inductive inference, at which a person finds cases that reflect imperfect information regarding a few "statistical happening". Back in unsupervised learning typically attempts to detect concealed regularities (e.g. clusters) or even to find anomalies from the information (as an example some odd machine work or perhaps a system intrusion). Back in supervised learning, there's a tag related to each case in point. It's assumed to function as the reply to a problem about this example. Depending on these cases (like labels), you is very interested to call the clear answer for some other cases before they're observed. Thus, learning is Not Just a matter of recalling but also of generalization to hidden instances.

Supervised Classification

An important thing in Machine Learning is classification, also known as pattern recognition, where a person tries to construct algorithms capable of mechanically constructing options for differentiating between different exemplars, dependent in their own differentiating patterns.

^[1] clarified a blueprint as "the alternative of insanity; it really is a thing, vaguely explained, which might possibly be provided with a name" Cases of patterns include individual faces, text records, hand written words or letters, EEG signs, and also the DNA sequences which can result in a specific disorder. The building of this mapping is predicated on so called training data supplied into this classification algorithm. The intent would be to accurately predict the right tag on hidden data.

These would be the characteristics of those cases for any particular problem. For example, at a facial recognition task several features might possibly be the colour of their eyes and also the exact distance between your eyes. Ergo, the input into some pattern recognition task might be regarded a two-way matrix, whose axes are the examples and also the features.

Pattern classification jobs are frequently split in to

many sub-tasks:

Data collection and representation.

Feature selection and/or feature reduction.

Classification.

Data representation and collection are for the most part problem-specific. It is therefore hard to offer general statements concerning it measure of this practice. In broad terms, an individual ought to make an effort to discover invariant options, which describe the gaps in classes as much as you possibly can. Feature selection and feature decrease try to decrease the dimensionality (i.e. The amount of features) for the rest of the steps of this endeavor. At length, the classification phase of the practice finds out the true mapping between labels and patterns (or goals). In most applications the next measure isn't crucial or will be implicitly performed from the next measure. The only real focus of the field will be automatic learning procedures. Learning describes alteration or advancement of algorithm according to previous "adventures" mechanically with No external support from individual.

DATA MINING, ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

In practise, these 3 areas are therefore intertwined and overlapping it is nearly to draw out a border or hierarchy one of the three. To place it into different words, these 3 disciplines are symbiotically connected along with also a blend of those approaches might be applied as a strategy to create more sensitive and efficient outputs.

Practically, data-mining is ostensibly about distributing any type of information, however it lays the base for the artificial intelligence and machine learning. In training, it not merely sample information from various origins nonetheless nevertheless, it investigations and comprehends routine and correlations that is present from those information that will have been difficult to translate by hand. Thus, data mining isn't really a only procedure to establish a theory however procedure for drawing on relevant hypotheses. That Storing data as well as the corresponding routines and hypotheses might be properly used precisely the cornerstone for both machine learning and artificial intelligence.

Artificial intelligence might be widely understood

to be machines people with the capacity to address a specified problem by themselves with no human intervention. The solutions aren't programmed right in to the machine however, also the vital data and also the AI translating that info generate an answer on it's own. The interpretation which goes under is only a data mining algorithm.

Classification Algorithms

EventhoughMachineLearningisstillacomparatively young area of research, there exist even more learning calculations than that I could cite in this launch. I opted to clarify six techniques I am often using when resolving data analysis activities (usually classification). The first 4 techniques are all conventional methods which have now been widely utilized previously and work pretty well when assessing low dimensional datasets without overly little branded training cases. At the 2nd part I shall briefly outline two techniques (Support Vector Machines & Boosting) who have gotten a great deal of attention at the Machine Learning network recently. They Can Fix high-dimensional Troubles with Hardly Any cases (e.g. fifty) rather accurately and work effectively when cases are plentiful (for example a few hundred thousands of illustrations).

Traditional Techniques

k-Nearest Neighbor Classification Arguably the easiest way could be that the k-Nearest Neighbor classifier^[3]. Here the k points of it data nearest to this evaluation point are present, and also a tag is supplied to the evaluation point by way of a vast majority vote between your k points. This System is highly instinctive and accomplishes -- provided its own simplicity remarkably reduced classification mistakes, but it is computationally expensive and needs a large memory to store the instruction information.

Linear Discriminant Analysis Assessing a hyperplane in the input space that min- imizes the within-class variance and maximizes the gap between class space ^[5]. It might be effectively calculated from the terminal case despite large data collections. How often a linear separation isn't adequate. Non Linear extensions using kernels exist ^[6], respectively nevertheless, Which Makes It Hard to use it into issues using large training places.

Decision Trees Still another instinctive category

of classification algorithms would be decision trees. These calculations solve the classification problem by partitioning the input distance, whilst to create a tree whose nodes are equally as pristine as you can (that is they feature points of one class). String of a brand new evaluation point is reached by moving throughout over the branches of this shrub, start- ing out of the main node, before a terminal node is reached. Decision trees are easy yet effective classification strategies for small datasets.

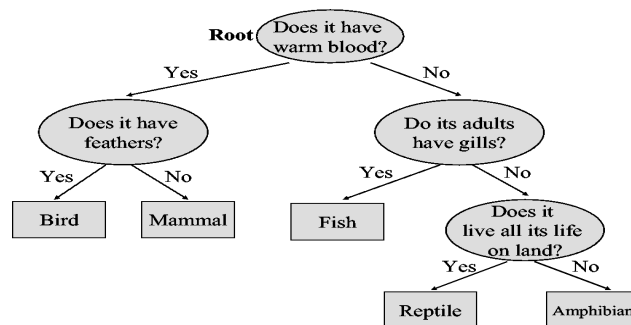


Figure 1: decision tree example

Neural Networks are may be among the very frequently used approaches to portray. Neural networks really are a computational version motivated by the connectivity of neurons at animate nervous Processes.

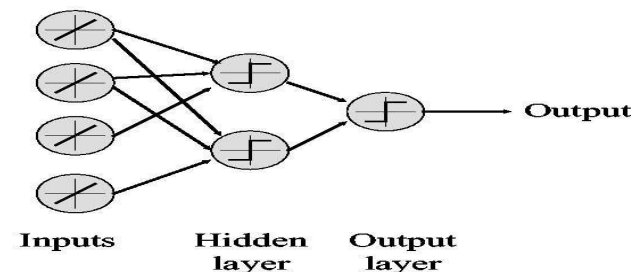


Figure 2: neural network schematic diagram

CATEGORISATION OF ML ALGORITHMS

An overwhelming quantity of m l algorithm are introduced and designed past decades. Perhaps not everybody are well regarded. Many of these failed to meet or solve the issue, therefore still another premiered in its own place. Here the calculations are widely grouped into two different classes and those 2 classes are farther sub divided. This segment attempt to mention hottest ML calculations and Another segment contrasts three hottest ML calculations.

GROUP BY LEARNING STYLE

1. A function or perhaps a classifier is trained and built to predict the tag of evaluation data. The classifier is suitably trained (parameter values have been corrected

)to attain a suitable degree of accuracy.

2. A classifier is devised with deducing existing patterns or audience in the practice data sets.

3. Semi-supervised learning -- Coaching data set comprises both branded and unlabeled data. The classifier is train to know about the routines to categorize and tag the data and to predict.

4. Reinforcement learning The plan is trained to map activity to situation therefore the feedback or reward indication is maximized. Even the classifier isn't programmed directly to pick the activity, but as an alternative coached to find the most rewarding activities through learning from mistakes.

5. Transduction -- Although it shares similar characteristics using supervise learning, however it doesn't develop an explicit classifier. It attempts to predict that the outcome based on training data, training tag, and test data.

ALGORITHMS GROUPED BY SIMILARITY

Regression Algorithms

Regression analysis a section of predictive analytics and also exploits the co relation between determined (target) and also independent factors . The noteworthy regression versions are:Linear Regression, Logistic Regression, Stepwise Regression, Ordinary Least Squares Regression (OLSR), Multivariate Adaptive Regression Splines (MARS), Locally Estimated Scatter Plot Smoothing (LOESS) and so on.

Regularization Algorithm

Regularization is just the practice of counter-acting over fitting or abate the outliers. Regularization is no more than an easy yet strong modification that's fortified with additional existing ML models an average of Regressive Models. It divides upward the regression line by castigating any bent of this curve which attempts to complement with the outliers. Cases:Ridge Regression, Least Absolute Shrinkage and Selection Operator (LASSO), Elastic Net, Least-Angle Regression (LARS) and so on.

Support Vector Machine (SVM)

SVM is really popular that a ML technique that it may be a set of its own. It uses a separating hyperplane

or even a decision plane to demarcate decision bounds among a set of data points classified with different labels. It's a strictly supervised classification algorithm. In other words, the algorithm develops the optimal hyperplane using input data or training data which alternative plane in turns categories new instances. Based on the kernel Used, SVM can do both linear and nonlinear classification.

Clustering Algorithms

Clustering can be involved about having ingrained pattern in data sets to categorize and tag the data accordingly.Examples:k means, K-Medians, Affinity Propagation, Spectral Clustering, Ward hierarchical clustering, Agglomerate clustering. DBSCAN, Gaussian Mixtures, Birch, Mean-shift, Expectation Maximization (EM) and so on.

Artificial Neural Network (ANN) Algorithms

A version on the basis of the operations and built of neural networks of humans or animals. ANNs are considered as non linear models as it attempts to detect complex connections between input signal and output numbers. Nonetheless, it brings sample out of data as opposed to considering the whole collection and thereby reducing time and cost. Cases: Perceptron, Back-Propagation, Hop-field Network, Radial Basis Function Network (RBFN) and so on.

Deep Learning Algorithms

All these are somewhat more modernized variants of ANNs that capitalize to the profuse way to obtain data to day. They truly are utilizes larger neural networks to fix semi-supervised issues where major part of an abound data is unlabeled or maybe classified. Cases: Deep Boltzmann Machine (DBM), Deep Belief Networks (DBN), Convolutional Neural Network (CNN), Stacked Auto Encoders and so on.

APPLICATIONS

SPEECH RECOGNITION

All present speech recognition systems offered on the industry utilize machine learning approaches to prepare the machine to get much better accuracy. In practise, many of such programs execute learning two different phases: pre-shipping speaker- independent coaching and post-shipping speaker-dependent instruction.

COMPUTER VISION

Vast majority of recent vision approaches, e.g., facial-recognition programs, systems with the capacity of automatic discovering microscopic pictures of cells, implement machine learning procedures for much better accuracy. By Way of Example, the US Postoffice Utilizes a computer vision program using a design analyser so trained to form characters together with handwritten addresses mechanically using an precision level as Large as 85 percent.

BIO-SURVEILLANCE

Several government efforts to track probable outbreaks of diseases uses ML algorithms. Consider the RODS job in western Pennsylvania. This project assembles admissions reports to emergency areas at the hospitals and the an m l computer software process is trained with the profiles of patients as a way to detect aberrant outward symptoms, their own routines and areal supply. Research is ongoing to add several extra data inside the body, such as over-the- counter drugs' order history to provide greater training data. Complexity of the kind of complicated and dynamic information collections could be handled effectively using automated learning approaches just.

EMPIRICAL SCIENCE EXPERIMENTS

A massive group data-intensive science areas utilize ML techniques in many it investigates. As an instance, m l is being used in school, to determine odd heavenly objects in astronomy, also in Neuroscience and emotional analysis. The other small-scale nonetheless essential use of ML involves spam-filtering, fraud detection, topic identification and predictive analytics (e.g., weather prediction, currency markets forecast, market poll etc..).

CONCLUSION

From the circumstance of ML, the efficacy with which a procedure utilizes data tools that's also a vital performance paradigm together with space and time

complexity. Greater precision of forecast and also interpreted prediction rules may also be of utmost importance. Being fully qualitative and obtaining the capacity to test a great number of information in smaller periods of period, m l algorithms comes with a border over manual or guide programming. And they're frequently more accurate and more unlikely to individual prejudice. Customization of a program in line with this surroundings it's set up to. Consider, address recognition software's which must be customized according to the needs of this client.

Ethical Clearance - Not required

Source of Funding - Self

Conflict of Interest - Nil

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Error of Judgment and Vicarious Liability of the Hospitals in case of Medical Negligence in India

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ABSTRACT

In India, recently, there is a spurt in the litigation against the medical professionals as a result of increasing awareness about patient's right especially after the Consumer Protection Act, 1986. When medical professionals breaches the legal duty of care which he requires to take, he is said to be medically negligent if it causes damage to the patient which gives a right to the patient or patient party as a consumer to claim for the compensation or to file a criminal case. The purpose of this paper to explain the liability of hospitals for the negligence of the doctors appointed by them under the principle of vicarious liability principle. The decision of the Indian courts in majority of cases revealed that the master is liable for the act of its servant both in case of contract of service and contract for service. This article also attempts to describe whether doctor is liable for the medical negligence when there is an error of judgment.

Keywords: Consumer Protection Act, 1986; Litigation; Medical Negligence; Vicarious Liability.

INTRODUCTION

Error of judgment is a mental mistake where doctor makes mistake treating patients which is called as wrong diagnosis. The physician always take a defense that, medicine is so complex area where no standard can be set to judge the doctors and we cannot make them liable. It is interesting to observe the defense taken by the defendants in a case *Passarellovs. Grumbine*¹ that the doctors should use clinical judgment and there is no strict guidelines to practice medicine where he cannot guarantee the outcomes because the treatment of patient differs between individual. It is impossible burden requiring doctors to be perfect. Yes off course we cannot expect guaranteed outcome from the physician. This is because in a medical negligence it is not important whether the doctor is careless used judgment, perfect outcomes or whether judgment used is reasonable but it is important to see whether the physician followed standard of care expected from physician. The physicians are not liable when there is an errors of judgment provided the error of judgment should not be as a result of his negligence. There may be error within the boundary of standard of care and in many cases there may be error as a result of negligence².

Indian Context

The Indian case with respect to error of judgment is *KamanisharmavsPamposh Medical Care Centre*³ where complainant MsKamani filed a complaint against the doctor of Pamposh Medical Care Centre for wrong diagnosis where they diagnosed a case of tuberculosis which was later found in the Rajiv Gandhi Cancer Hospital and Sir Gangaram Hospital be the advanced case of lung cancer. The patient in the Sir Ganga Ram hospital died in the year 2000 where he was treated 'underwent' biopsy. The complainant (his wife) argued that there was a wrong diagnosis made by the doctor at Pamposh Medical Care Centre where the patient condition become critical and died within the short span of time and she claimed compensation to the tune of 65 lakh for the deficiency in service. The bench dismissed the petition on the ground it is a case of 'error of judgment' and not the medical judgment where court also observed that the patient did not approached doctor in the hospital for eight months. The bench also observed that the patient was a drug addict and smoker where he received anti-tubercular therapy earlier. The commission ruled that it is a case of error of judgment where physician failed to diagnose it as a cancer at the

initial period of examination and there was negligence on the part of patient since he never approached doctor for 8 months for which doctor cannot be made liable⁴.

Vicarious Liability of the Hospitals

Where there is a medical negligence, the liability of hospitals may be direct or vicarious. The hospitals directly liable in a case of death or injury as a result of poor maintenance of hospitals, incompetent staff, misleading advertisement or other unfair trade practice, poor maintenance of records of medical treatment. Further, hospital is liable not only under the above case but also in a case where employees acts or omissions under the principle of respondent superior. It is borrowed from the legal maxim ``quasi facit per alium facit per se`` which means one who act through another will be treated as the act done by himself⁵.

The vicarious liability principle is under the doctrine of respondent superior which implies that a person is liable for the tort committed by another person. Under this principle an employer is liable for the tortious act of employees provided if he act within the scope of employment. The following conditions must be satisfied to apply vicarious liability principle-

The act must have happened within the limits (time and space) authorized to employee.

Either partially or fully the motivation for the employee to do certain act to serve the purpose of employer.

The act must be such for which the employee has been hired to perform.

Contract of Service and Contract for Service

It must be noted that, an employer will be liable only when an employee act within the scope of his employment. For example, a person employed as a driver of truck which struck pedestrian who got injured severely. We must analyze this under two different situation. First, if driver driving a car from his office site to factory, the employer is liable for the act committed by his employee. Secondly, however, if a driver taking his vehicle from office site to do his personal work, for instance to purchase movie ticket for himself, the employer may not be liable for such act. Further, employer is not liable for the act committed by independent contractor who carries work for another

and who is not subject to others control. It is difficult to establish the vicarious liability of employer because of inconsistency in classifying employees and variety of employment relationship. It is the court who examine the nature of relationship between the parties, not the parties themselves. To examine the relationship the court developed various test such as control test, integration test and multiple test.

The earlier test to read this issue was control test where it was important to see whether master had right to control the work what has done. Here, control over the work means not only what work he does but also includes the way in which he does that work. It means it is the employee who state or dictate the work policy. However, some says that, this is inappropriate in cases like borrowed workers and even some of the top courts in the US recognized that single test is not enough to determine the employment status. In a case Ready Mixed Concrete vs. Minister of Pensions, the court developed multiple test where it emphasized that all factors in the employment relationship status should be considered since there is no conclusive or definite test⁶.

The multiple test includes analysis of various factors with respect to employment status which recognizes that each and every point is important see the employment relationship and no single point to be considered as determinative factor. At the same time it is important to categorize employment as self-employment (contract for service) or employment (contract of service). In the case of contract of service three conditions must be satisfied. They are:

The skills and knowledge provided should be in return or exchange with wages.

The employer must have control over the work and the way he does that work.

The provisions of the contract of service must be in consistent with the control of service.

Contract of Service and Contract for Service in case of Medical Negligence

The degree of control can be determined by way of power to appoint and dismiss, payment of wages etc. who owns the materials or tools used in the work, who has paid for such tools or materials which is relevant to the contract of service. However, in the number cases court

held in the case of hospitals, it is responsible not only for its staff but also for the act of independent contracts such as anesthetists, special surgeon who handle special case⁷.

In a case *Aparna Dutta vs. Apollo Hospitals Enterprises Ltd.*,⁸ the court held that the hospital cannot take a defense that doctors are not employed as servant by them. Whatever the conditions under which the hospital employ a doctor is between them. The hospital is liable to the third party. The hospital cannot escape from the liability by claiming there is no master-servant relationship. It was also held in the case *Smt. Rekha Gupta vs. Bombay Hospital Trust & Another* (2002) that hospital is liable for the misconduct on the part of consultant doctor. The hospital cannot escape from the liability by stating they only provide supporting staff and infrastructure facilities. Whatever the outcomes of the case the hospital is not allowed to escape from its liability. The court ruled that hospital or employer is liable for the acts of doctors like anesthetists and surgeons who act independently who agreed for the treatment. It is not important whether the doctors are resident, permanent, visiting, temporary or part time. It is based on the logic that the act performed by the consultant is deemed to be the service provided by the hospitals.

CONCLUSION

The principle of respondent superior implies that one who act through another will be treated as the act done by himself which is applicable even to the hospitals when there is a negligence of its doctors. Thus hospital is legal liable for the death or injury as a result of negligence of doctors or nursing staff appointed by them. The medical professionals are allowed to take a defense that medicine is so complex where no standard can be set to judge the doctors and one cannot make them liable when there is an error of judgment.

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Source of Funding: Self

Ethical Clearance: IJRIS Journal Reviewer Committee

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Vitamin D Deficiency and First Trimester Miscarriage A Case Control Study

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ABSTRACT

Background: Miscarriage is the most common negative outcome of pregnancy, and identification of modifiable risk factors is potentially of great importance for public health¹. Vitamin D3 deficiency in pregnancy have been associated with some adverse pregnancy outcomes². Miscarriage is reported to occur in about **12 to 20%** of pregnancies. There are a number of different causes of miscarriage, including genetic and environmental factors. But There are Increasing evidence suggesting that low vitamin D3 levels may have an effect on miscarriage. Vitamin D plays an important role in regulating the immune system. *Medivizor(2016)*. And its implicated in immune cell regulation at the feto-maternal interface and several diseases of pregnancy³.

The objective of our study is to evaluate the effect of vitamin D3 deficiency on 1st miscarriages, in this study we tested the level of vitamin D3 in **89** female in 1sttrimester pregnancy and Follow up them till the end of **12** weeks gestation. Blood samples for serum vitamin D3 taken for each patients in at time of positive pregnancy test in serum **4** weeks, then at **8** weeks and **12** weeks of gestation. Miscarriage occur in **16** females (**17.9%**) , **6** of them had negative heart beat by ultrasound at **6-7** weeks, and **5** had miscarriage **8- 10** weeks of gestation and the last **5** had miscarriage at **11- 12** weeksof gestation, while **73** female (**82%**) had uneventful 1st trimester, the results show that the mean level for of serum vitamin D3 for miscarriage group was **17.3ng/dl**, while for uneventful 1st trimester group was **30.5ng/dl**.

We concluded that vitamin D3 deficiency is associated with increasing incidence of 1st trimester miscarriages.

Keywords: vitamin D, 1st trimester miscarriage, defeciency.

INTRODUCTION

Vitamin D₃ is fat-soluble, can only absorb it when consumed with foods that contain fat. People who have trouble absorbing fat may in turn be predisposed to a vitamin D3 deficiency¹

It has well-established classic function is maintaining calcium homeostasis and promoting bone mineralization. In addition, vitamin D₃ has significant roles in regulating cell proliferation and differentiation and modulating innate and adaptive immune responses². The human fetus represents a semi-allograft, which cannot survive without maternal immune tolerance. Vitamin D₃ may be implicated in the risk of miscarriage due to its function as an immune modulator. and its potential importance for the maternal-fetal immunologic response. Vitamin D₃ concentrations in serum are best

assessed by the precursor hormone, 25-hydroxyvitamin D₃ [25(OH)D] concentration³.

Poor vitamin D₃ status during pregnancy has been associated with preeclampsia, gestational diabetes, bacterial vaginosis and compromised intrauterine growth. However, the relationship of vitamin D₃ deficiency and insufficiency in the first-trimester pregnancy with PL or non-gravid childbearing aged women with spontaneous pregnancy loss history is less clear².

The active form of vitamin D₃ is 1,25-dihydroxyvitamin D₃ (1,25(OH)₂D₃) which is a pluripotent steroid, the putative biological actions of which extend far beyond its established effects on calcium homeostasis and bone metabolism. A site of immune privilege that may act as an important target

for vitamin D3 is the placenta specifically the maternal decidua which forms the interface with newly implanted fetal placental trophoblast cells. It has been hypothesized that D3 may help to support successful implantation by attenuating decidual T-cell function¹. Vitamin D3 has been shown to promote a more favorable environment for pregnancy through various mechanisms, such as enhancement of the shift toward T_H helper cells and regulation of immune cell differentiation and cytokine secretion⁴. Miscarriage is the most common negative outcome of pregnancy, and identification of modifiable risk factors is potentially of great importance for public health³. Miscarriage is multifactorial of origin, with acquired or environmental factors probably exceeding genetic factors in its causation. Identifying modifiable risk factors for miscarriage is potentially important for public health³. *The American Journal of Clinical Nutrition*. A recent Danish study found that increased maternal age, alcohol consumption, prepregnancy BMI, heavy lifting, and nightshift work were important, preventable risk factors of miscarriage³. *The American Journal of Clinical Nutrition*. Early pregnancy loss (spontaneous miscarriage) is defined as the spontaneous termination of pregnancy before **12** gestational weeks. The great majority of pregnancy losses occur early, before **12** weeks' gestation². The recommended daily requirement with vitamin D3 for adults is **600** international units (IU) adequate bone health *Jamie Ludwig Harvard Health Blog*. In **2010**, the venerable Institute of Medicine (IOM) issued a report based on lengthy examination of data by a group of experts. To sum up, they estimated that a vitamin D level of **20 ng/mL** or higher was adequate for good bone health, and subsequently a level below **20** was considered a vitamin D deficiency⁵. While the recommended daily allowance of vitamin D3 in pregnant women is 400–600 IU. High doses of other vitamin D3 analogs have been shown to be teratogenic, resulting in external and skeletal abnormalities. But other studies show that high doses up to 4,000 IU that means 10 folds higher than recommended dose are not only safe but reduce the risk of pregnancy complications¹.

Early miscarriages is defined as pregnancy loss before **12** weeks reported to occur in about **12** to **20%** of pregnancies. There are a number of different causes of miscarriage, including genetic and environmental factors⁶. Recurrent pregnancy loss (RPL) affects close to **1%** of couples; however, the etiology is known in only about **50%** of the cases. Several mechanisms have previously been described for the pathogenesis of recurrent miscarriages, including chromosomal anomalies, hormonal problems, uterine abnormalities, infections, autoimmune disorders and thrombophilias, and up to **50%** of cases of recurrent miscarriage will not have a clearly defined etiology⁴. Recurrent miscarriage is defined as two or more consecutive pregnancy loss before 20 weeks of gestation. been associated with parental chromosomal anomalies, maternal thrombophilic disorders and structural uterine anomalies and indirectly with maternal immune dysfunction and endocrine abnormalities¹.

PATIENTS AND METHOD

This is an prospective case series study type done in Baghdad over period of **24** months from (1/7/2016 to 1/9/2018), in which **100** pregnant lady, mean age **25** years (**19-37** years) under gown follow up for their serum level of vitamin D3 which evaluated 3 times in every patients (at time of positive pregnancy test **4-5** weeks, at **6-8** weeks of gestations, and at end of **12** weeks). Each female received the usual treatment at first trimester (folic acid **5 mg**-low dose aspirin **81 mg** and progesterone rectal suppositories **400 mg** daily). Those with recurrent miscarriage and those with a known causative factor of miscarriage (anatomical anomalies, husbands asthenospermia, and family history of chromosomal linked anomalies) were excluded from the study. Then the studied group were followed up throughout the whole 1st trimester and routinely evaluated by ultrasound, blood test GUE, in addition to vitamin D3.

RESULTS

The result in the following table:

Table: 1: The mean level of serum vitamin D3 in miscarriages group(A) and uneventful group(B).

Total 89	Mean serum level of vitamin D3ng/dl			Total means	Mean age/y
	4 weeks	8 weeks	12 weeks		
Miscarriages 16(17.9%)	16	17	18	17.3	22
Uneventful 73(82%)	31	30	30.5	30.5	28

DISCUSSION

Our result show that the mean vitamin D3 level in the miscarriage group females (**17.3ng/dl**), while those who had uneventful 1st trimester group which was (**30.5ng/dl**). And the overall miscarriage rate of the total **89** pregnant females was (**17.9%**).16 miscarriage female mean age group **22** years distributed in the 1st trimester as the following: **7** had negative fetal heart at **7th** weeks of gestation, **4** females had threatened and then developed a complete miscarriage, and **5** had missed miscarriage. From the result we found that the miscarriage rate is highest in period between **4th-8th** weeks of gestation (**43%**)of the total miscarriage group, which had a lowest mean serum vitamin D3 of **16ng/dl**. While those who had threatened miscarriage which **4** females (**25%**), **2** of them were presented at **8th** weeks and other and other **2** presented at **9th**, **11th** weeks respectively, and their mean serum level of **17ng/dl**. Finally those with missed miscarriage **5** females (**31.5%**) of total miscarriage group has the highest mean serum vitamin D3 of **18ng/dl**. Clearly the whole miscarriage group had lower mean serum vitaminD3 level in comparison with the other uneventful first trimester group. In Iraqi population a study done by *Ahmed M.Issa (2007)*⁷ showed that the mean serum level of vitamin D3 was as low as **8ng/dl** in general population but its more in males of about 43% and this may be related to the religious and social factors religious reasons, in which women must cover all the body with black cloths, and wear a veil and sometimes black gloves when they go outdoors.

This factors act as good reason for preventing the cutaneous production of vitamin D in those women , even when they live in a sunny climate.*Taha et al.*,

(*1984*⁸) reported that “people of cultures such as Bedouins living in the Negev Desert, who are required to have most of the skin surface covered by clothing, are prone to develop vitamin D deficiency reveals a high variation around the mean in females compared with males. And this may be explain the overall low mean level of vitamin D3 in both groups.

Many studies the effect of vitamin D3 on 1st trimester miscarriage:

*ZakiaMahdy (2013)*¹concluded that vitamin D3 oral supplementation has resulted in reducing risk of pregnancy loss up to **15%** among women with recurrent miscarriage.

*W Hou,(2016)*² concluded that vitamin D3 deficiency associated with miscarriages in the first trimester of pregnancy. And decreased serum vitamin D3 levels among childbearing aged women with the failed clinical pregnancies history may predispose to increased risk for pregnancy loss.

*Kassem Sharif (2018)*⁴ found that vitamin D3 deficiency sways the balance toward a worse outcome and may play a part in recurrent pregnancy loss.

In article published in *Medivizor (2016)*⁶ showed that **vitamin D3 plays an important role in regulating the immune system. Proper functioning of the immune system is, in turn, important for successful pregnancies. Further studies are needed evaluating the effect of vitamin D levels on the risk of early miscarriages.**

CONCLUSION

From above results we can conclude that vitamin D3 deficiency is an important risk factor for 1st trimester miscarriage, especially for younger age group less than 25 years old and vitamin D3 supplements should be recommended for those females.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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A Study on Attitude towards using New Technologies among B.Ed. Student Teachers in relation to few Biographical Variables

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ABSTRACT

In the present scenario technology plays a vital role in teaching learning process, This study contributes to measure the attitude of B.Ed. student teachers in using new technologies in relation to their sex, age and type of management. Samples are drawn from teacher training colleges of Bengaluru District through random sampling technique. Data is collected by using New Technology Scale developed by S.Rajasekar to measure the attitude towards using new technologies of B.Ed. Students teachers. The results of the study revealed that attitudes towards using new technologies differ in relation to sex, age and type of management. The study revealed that females have better attitudes in using technologies than male student teachers. From the results it is clear that student teachers below 35 years have better attitude than student teachers above 35 years. The results also showed that student teachers from Private Unaided B.Ed colleges have better attitude towards Technology than the Government and Private Aided B.Ed colleges. Hence this study helps us to understand the attitude of student teachers towards using new technologies and it also helps us to know that how teachers are efficient enough in using technologies during their teaching learning process.

Keywords: *Attitude, New technologies, Sex, Age, Type of Management*

INTRODUCTION

In this 21st century, technology and teachers plays an important role in enhancing concentration span also making many abstract concepts clear to their students during teaching learning process for which technology can be used as a supportive assistant technology. In relation to this aspect one can observe that digital technology has not been used completely in any training institutions which are the need of the hour¹. In this regard there is a need to conduct many researchs in respect to improve and cultivate positive attitude among teacher trainees which can be done by including the add-on courses during their training process and help them to be confident in using technology when they enter their teaching profession and teach our future citizens who are all dependent on the present education system. Since our classroom is a miniature society, technology plays a role of teacher in making them to understand the abstract concepts in as easier way which otherwise might not be possible in our traditional method of teaching learning

process. In this context, future teachers should have a positive attitude towards using technology in their classroom transaction²⁻³.

NEED OF THE STUDY

In the present situation teacher training institutions are facing many challenges in using technology which may include the fear of accepting the new technology, not having proper training in using different technique to fulfil educational needs of present era. So the future teachers should be trained and motivated to use technology in teaching learning process which is possible only by inculcating the technology in the training period. So this training can be done by implementing add-on courses during the course or by giving extra coaching on how to use different technology in various areas like in assessing students, using audio-video during practice teaching. This supports the teacher educators to implement the same when they enter their teaching profession. The integration of technologies in teaching in general and teacher education in particular is need of

the day. Henceforth, the study was planned to know the attitude of B.Ed. student teachers towards the use of new technology in the class rooms.

Statement of the Problem

A Study on Attitude towards using New Technologies among B.Ed Student Teachers in relation to few Biographical Variables.

Objectives of the Study

To know whether differences in Sex, Age, Type of Management of B.Ed student teachers would account for significant difference in Attitude towards New Technology.

Hypotheses of the Study

There exists no significant difference in Attitude towards using New Technologies among Male and Female student teachers, Young (>35 years) and Older (<35 years) B.Ed. students and students studying in

different college managements.

METHODOLOGY

Descriptive survey method was used for the study. Biographical variables chosen for the study are Sex: Male and Female, Age: Below 35 years and above 35 years, Type of Management: Government, Aided and Private Unaided. The sample of the study comprised of 100 B.Ed student teachers of Bangalore District. The sample was selected through random sampling technique. An attitude towards using New Technologies scale of S. Rajasekar has been used to measure the attitude towards using new technologies of B.Ed student teachers.

Analysis and Interpretation

There exists no significant difference in Attitude towards using New Technologies of Male & Female, younger & older and student teachers studying in different management institutions.

Variable and Groups		N	Mean	Standard Deviation	't' value & Sig. Level
Sex	Male	29	109.172	9.250	2.03*
	Female	71	113.380	9.726	
Age	Younger	62	115.532	9.285	3.01**
	Older	38	109.447	10.077	
Type of college	Government	51	109.607	9.804	0.86 ^{NS}
	Private Aided	21	107.809	7.270	
	Government	51	109.607	9.804	2.37*
	Private Unaided	28	115.000	9.626	
	Private Aided	21	107.809	7.270	2.98**
	Private Unaided	28	115.000	9.626	

Above table shows that the obtained 't' value 2.03 was significant at 0.05 level. Therefore the null hypothesis of the study was not accepted and alternate hypothesis was formulated. Further the mean value of female 113.380 is greater than the mean value of male attitude towards using New Technologies which is 109.172. This indicates that the female student teachers have better positive attitude towards using New Technologies when compared to male student teachers.

Above table also reflects that the obtained 't' value 3.01 was significant at 0.01 level. Therefore the null hypothesis was not accepted and alternate hypothesis

is formulated. Further the mean value of younger student teachers 115.532 is greater than the mean value of older student teachers' attitude towards using New Technologies which is 109.447. This indicates that the younger student teachers have better positive attitude towards using New Technologies when compared to older student teachers.

The table also reveals that the obtained 't' value 0.86 is not significant at 0.05 level of significance. Hence the null hypothesis is accepted that there is no significant difference in Attitude towards using New Technologies of B.Ed student teachers studying in Government

and Private Aided B.Ed colleges. From the table it is known that obtained 't' value 2.37 is greater than the table value 1.98 at 0.05 level of significance. Hence the null hypothesis is rejected and alternate hypothesis has been accepted that "there is a significant difference in Attitude towards using New Technology of B.Ed student teachers studying in Government and Private unaided B.Ed colleges". The table further reveals that the student teachers studying in private unaided colleges (M=115.000) had higher positive Attitude towards using New Technology than the student teachers studying in Government B.Ed colleges (M=109.607)⁴⁻⁶. Further table shows that the obtained 't' value 2.98 is greater than the table value 2.63 at 0.01 level of significance. Hence the null hypothesis is rejected and alternate hypothesis has been accepted that "there is a significant difference in Attitude towards using New Technology of B.Ed student teachers working in Private Aided and Private unaided B.Ed colleges". The table further reveals that the student teachers studying in private unaided B.Ed colleges (M=115.000) had higher positive Attitude towards using New Technology than the student teachers studying in Private Aided B.Ed colleges (M=107.809)^{7,8}.

CONCLUSION

The study revealed that student teachers who are young, female and studying in private Unaided B.Ed colleges are having better positive attitude towards using New Technologies when compared to student teachers who are old, male and studying in Government and Private Aided respectively. In order to develop positive attitude among all teachers relevant programmes are to be taken up simultaneously by the Government and above all the teacher Education program to initiate training and also provide the awareness and its importance in their future among student teachers which in-turn develop knowledge and skill in using new technologies before they enter the school setup and in turn they can adopt new technologies to enhance teaching and learning process in a classroom environment.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Effect of Flipped Classroom Instructional Strategy on Self Directed Learning

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ABSTRACT

The present study is conducted with objective of comparing the self-directed learning of students in a flipped class set up and a traditional class set up. It is delimited to rural college students of Jalandhar district only. Flipped class students are more self-directed learners than students of the traditional classroom. There is an insignificant difference in self-directed learning among male and female students of the flipped classroom. Female students exhibited more self-directed learners than boys of traditional class. In the FC model of instruction, boys are more self-directed learners than their male counterparts in the conventional classroom. Male students of flipped classroom are more self - directed learners than male students in conventional class. It revealed that there exists an insignificant difference in self-directed scores in girls of the flipped class and the traditional class.

Keywords: *Flipped classroom instructional strategy, self-directed learning, History class*

INTRODUCTION

The conventional method of teaching is to give pupils to read books and rethink on problems outside of class, they listen to lessons and solve exercises in class. In FC model of instruction, the students do self-study for given topic themselves, by using video lessons prepared by the class teacher ¹. Pupils apply the remembering phase by resolving problems and undertaking practical work in class ². The instructor teaches the pupils when they feel stuck, rather than delivering the first lecture directly. Complementary techniques include project-based learning and individualized instruction³. Teachers uses tools like Google Slides, YouTube that keep pupils accountable for watching video lessons at home with the help of time - embedded formative assessments. Students learn discussion and collaborative learning. Students help each other and benefit all types of learners⁴. Flipped classroom model benefits students in a diverse way for improvement in teaching learning process^{5,6}. It also enhances cognitive learning outcome of students, development of learning skills (Tanner & Scott) as well as self-learning, i.e., overall motivation⁷. reported that motivation and learning outcomes relate to the requirement for autonomy⁸, competence, and belongingness and they have been used as factors

responsible for the performance of students ⁹. FCM is an issue of attention from both policymakers and researchers; it is spanned in range of subject domains i.e. Mathematics, Social Studies and ICT^{10, 11}. Kostairs et al. (2017) investigated that low performers achieved the higher level of improvement in their performance. Found the affirmative influence of flipped instruction in student motivation in Math course¹². Found that FCM enhanced K-12 cognitive learning outcomes and student motivation in the learning¹³. Found that pupils showed improvement in English comprehension during FCM¹⁴. Flipped learning effects time utilisation. Conventionally, the tutor involves the students to ask questions, but tries to involve in discussion. The philosophy works behind the flipped class is that teachers can have qualitative time working with students who want their help in the classroom and they can work collaboratively to solve problems rather than solving their assignment lonely at home. The flipped classroom instruction can be defined as situations that may have conventionally happened in the class, happen outside class and vice versa .

Self-learning refers to active learning of students or students' who wish to actively participate in routine classroom activities like submission of homework assignments, attending carefully to the lecture,

completing projects, and actively attending the class. Self-directed learning affects teaching-learning outputs. Opined that in order to deal with tomorrow's opportunities and challenges students must be academically self-regulated, as academic self-regulation is playing a vital role for academic success¹⁵. It helps the learners to make sagacious use of their intellect and expertise in the achievement in mathematics. Found that flipped classroom students showed higher student self-efficacy in comparison to the control group and pupils who taught with the self-regulated flipped classroom approach showed better performance than those who taught with the conventional flipped classroom approach¹⁶. Sletter (2017) concluded that biology pupils favour the active learning feature of the FC model, but had a smaller amount of real insights about the online discourse component. Flipped classroom, alike traditional classroom, has a climate of its own and coupled with the achievement motivation in the students, leads to better academic achievement¹⁷.

JUSTIFICATION OF THE STUDY

Today's generation is dependent on the internet and technology for active learning. Teachers are acting as the facilitator in their classes. They encourage learning through the medium of interaction with the students. The flipped classroom instructional strategy will give those plans and offer tips to implement the model efficiently into their classroom set up.

RESEARCH QUESTIONS

1. Is there any significant difference in self-directed learning scores of students in the flipped classroom and traditional class?
2. Is there any significant difference in self-directed learning scores of male and female students in a traditional class?
3. Is there any significant difference in self-directed learning scores of male and female students in the flipped classroom?

4. Is there any significant difference in self-directed learning scores of male students in the flipped classroom and traditional classroom?

5. Is there any significant difference in self-directed learning scores of female students in the flipped classroom and traditional classroom?

DELIMITATION OF THE PRESENT STUDY

This study is delimited to rural college students of Jalandhar district only. Investigator collected data from History students of class +1.

METHODOLOGY

40 students served as a sample of the study. In the present study, Investigator used purposive sampling for data collection. The 40 students were further divided into two groups of 20 each, i.e., experimental group and control group. These 20 students were further categorized into ten male and ten female students. For collection of data Self- Regulated Learning Scale by Prof. (Dr.) Madhu Gupta and Ms. Dimple Mehlani (2017) was used. In traditional classroom method students were taught through lecture cum discussion method. Flipped classroom instructional practice composed of two phases.

FIRST PHASE: Students used online YouTube videos and worksheets supplied by the teacher before coming to class. Students did the self-study. Thus they prepared their lesson themselves before entering the level.

SECOND PHASE: Students participated in high order activities, i.e., discussions, problem-solving, etc. in the classroom. Teacher facilitated the classroom collaboration and helped to speed up the process of learning.

ANALYSIS AND INTERPRETATION OF DATA

Table 1: Self Directed Learning Scores Of Students In Flipped Classroom Model (Fcm) And Traditional Classroom Model Of Teaching

	M	N	SD or s	SE _p	T
Flipped classroom students	172.75	20	13.62	6.42	2.24
Traditional classroom students	158.35	20			

It is found from given table 1 that the t-ratio for the small sample for the difference in self-directed learning between students of FC and TC was seen to be 2.24. Entering table D with 38 df, we get entries 1.68 at the 0.05 level of confidence and 2.42 at the .01 level. Since t value reaches 0.05 level of confidence, so there exists a

significant difference in scores of self-directed learning in students of Flipped Classroom and the traditional classroom. The mean value of scores of FCM students is higher as compared to a TCM. It can infer that FC students are more self-directed learners than students of the traditional classroom.

Table 2: Self-Directed Learning Scores Of Female And Male Students In Traditional Classroom

	M	N	SD or s	SE _D		T
Female students	171.4	10	23.44	11.02	15.55	
Male students	131.7	10				

It is observed from the table 2 that the t-ratio for a small sample for the difference in self-directed learning between female and male students of TC was found to be 15.55. Entering table D with 18 df, we get entries 2.10 at the 0.05 level of confidence and 2.88 at the .01 level. Since t value reaches both degrees of confidence, so there exists a significant difference in self-directed learning in female and male students of the traditional classroom. The mean value of scores of girls is higher as compared to boys. It can be stated that girls are more self-directed learners than boys in the traditional classroom set up.

Table 3: Self-Directed Learning Scores Of Female And Male Students In Flipped Classroom

	M	N	SD or s	SE _D		T
Female students	174.4	10	5.79	2.72	1.21	
Male students	171.1	10				

It is observed from table 3 that the t-ratio for the small sample for the difference in self-directed learning between female and male students of FC was found to be 1.21. Entering table D with 18 df, we get entries 2.10 at the 0.05 level of confidence and 2.88 at the .01 level. Since t value does not reach both levels of confidence, so there is an insignificant difference in self-directed learning in male and female students of the flipped classroom.

Table 4: Self Directed Learning Scores Of Male Students In Flipped Classroom And Traditional Classroom

	M	N	SD or s	SE _D		T
Flipped classroom male students	171.1	10	23.05	10.83	3.64	
Traditional classroom male students	131.1	10				

It is found from the given table 4 that t-ratio for the small sample for the difference in self-directed learning between male students of FC was found to be 3.64. Entering table D with 18 df, we get entries 2.10 at the 0.05 level of confidence and 2.88 at the .01 level of confidence. Since t value reaches both levels of confidence, So there exists a significant difference in scores of self-directed learning in boys of Flipped Classroom instructional strategy and traditional classroom strategy. The mean value of scores of flipped classroom boys is higher as compared to boys of the traditional classroom. It can be stated that in Flipped Classroom boys are more self- directed learners than boys in the conventional class.

Table 5: Self Directed Learning Scores Of Female Students In Flipped Classroom Model (Fcm) And Traditional Classroom (Tc)

	M	N	SD or s	SE _D	T
Flipped classroom female students	174.4	10	7.16	3.36	0.89
Traditional classroom female students	171.4	10			

It is observed from the above table 5 that t-ratio for the small sample for the difference in self-directed learning between female students of FC was found to be 0.89. Entering table D with 18 df, we get entries 2.10 at the 0.05 level of confidence and 2.88 at the .01 level of confidence. Since t value does not reach at both levels of confidence, so there is the insignificant difference in self-directed learning in female students of Flipped Classroom and Traditional classroom.

FINDINGS AND DISCUSSION OF THE STUDY

Students exposed to flipped classroom instructional strategy are more self-directed learners than students of the traditional classroom. The result is consistent with results¹⁸.

Female students exhibited to be more self-directed learners than their male counterparts in the conventional class. This finding is consistent with results¹⁹.

Flipped classroom male students are more self-directed learners than male students in the flipped classroom. This result is in tune²⁰.

CONCLUSION

Although the investigator conducted the study on a small sample, it is giving some trend concerning Flipped classroom instructional strategy viz. self-directed learning. Results of the present study advocate that in Indian context, Flipped classroom work better in case of male students than female students. It is found that there exists no significant difference in self-direct learning of female students exposed to Flipped classroom instructional strategy and Traditional classroom. Female students exhibited more self-directed learners than male students. There was higher self-directed learning in female students than boys in the traditional class set up. But when FCM applied, self-learning was enhanced in boys in comparison to female students. It could be inferred that Flipped classroom works better in males

in contrast to female students. This framework can be replicated on different samples, situations, variables, and practices for better results.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Modeling a Variant of Periodic Heterogeneous Vehicle Routing Problem with Driver Scheduling

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ABSTRACT

Vehicle Routing Problem (VRP) is one of the well-known issues that exists in logistic system. This is a well known combinatorial optimization problem which consists of a customer population with deterministic demands, and a central depot which acts as the base of a fleet of vehicles. The main objective is to design a set of vehicle routes starting and terminating at the assigned depot, such that the customer demands is totally met. This paper develops an optimization model for the management of periodic deliveries of a given commodity. Due to the needs the logistic company has different type of vehicles with different capacity to deliver the commodity for customers. The problem is then called Periodic Heterogeneous Vehicle Routing Problem (PHVRP). The goal is to schedule periodically the deliveries according to feasible combinations of delivery days and to determine the scheduling of fleet and driver and routing policies of the vehicles. The objective is to minimize the sum of the costs of all routes over the planning horizon. We propose a combined approach of heuristic algorithm and exact method to solve the problem.

Keywords: *Vehicle routing problem, scheduling, combined approach*

INTRODUCTION

In logistic system there is a well-known combinatorial model known as Vehicle Routing Problem (VRP). The problem is to decide an optimal set of routes used by a fleet of vehicles to satisfy demand a set of customers. The Vehicle Routing Problem (VRP) can be defined as a directed graph $G = (V, A)$, where $V = \{v_1, v_2, \dots, v_n\}$ is a set of customers and $A \subseteq \{(v_i, v_j) : i \neq j, v_i, v_j \in V\}$ is the set of route to be travelled. An optimal set of routes, composed of a cyclic linkage of arcs starting and ending at the depot (v_1), is selected to serve a given set of customers. The problem aims at minimizing the total travel cost (proportional to the travel times or distances) and operational cost (proportional to the number of vehicles used).

Dantzig and Ramser¹ who introduced the VRP in (1959). They used the model in truck dispatching problem which intended to determine an optimal routing plan for a fleet of vehicles such that to satisfy a set of customers. The basic concept of this problem is from a Hamiltonian graph, it is then, necessarily to impose conditions that each vehicle starts and ends at

the starting point, and each customer is strictly forbidden to be visited more than once by one vehicle. Up till now many researchers have been working in this field to discover new variants and new methodologies. There are a number of interesting survey have been written for VRP, such as,²⁻⁵ and books^{6,7}.

In literature we can find new variants of VRP which are grouped according to specific conditions. Some of the well known variants are: Capacitated VRP (CVRP), here the vehicles are conditioned to carry limited capacity; VRP with time windows (VRPTW), each customer is conditioned to be served within a slot time frame; VRP with multiple depots (MDVRP), in this variant customer demands are c delivered from a set of depots; VRP with pick-up and delivery (VRPPD), there are two activities in a customer node, deliver and pick-up Taking into account scheduling time for routing vehicles is another variant of the VRP, known as the periodic VRP (PVRP).

In PVRP, within a given time horizon, we should have a visiting schedules associated with each customer. Each vehicle leaves the depot, serves a set of customers periodically, when its work shift or capacity is over, returns

to the depot. The problem is to minimize the total length of the routes travelled by the vehicles periodically on the time horizon. This kind of problem is very important in real world applications, such as, distribution for bakery companies⁸ blood product distribution⁹, or pick-up of raw materials for a manufacture of automobile parts¹⁰.

A survey on PVRP and its variants can be obtained in¹¹. The complexity of the problem is high, therefore most of the method used are based on heuristic approaches, nevertheless¹² proposed an exact method¹³ addressed a hybrid of heuristic and exact method for tackling PVRP.

Another important extension of the VRP in which it is essential to decide on the fleet composition. This variant is known as the Heterogeneous Vehicle Routing Problem (HVRP). The problem is rooted in the seminal paper of¹⁴published in 1984 and have evolved into

a rich research area. In terms of how to solve the problem,¹⁵provided a general overview of papers with a particular focus on lower bounding techniques and heuristics. The authors also compared the performance of existing heuristics described until 2008 on benchmark instances. ¹⁶presented a review of exact algorithms and a comparison of their computational performance on the capacitated VRP and HVRPs, while¹⁷ reviewed the problem from several industrial aspects with combined fleet composition and routing in maritime and road-based transportation.

Section 2 describes the problem description. The mathematical model is in Section 3. Section 4 presents the feasible neighbourhood heuristic search. The algorithm is described in Section 4. Finally Section 5 describes the conclusions.

Problem Description

It is natural that logistic companies prefer to deal with a transportation scheme which can deliver products to their customer efficiently and economically. In decision context, the scheme is to find the feasible transportation tour of vehicles such that to minimize the overall operating costs. In order to ease the problem, it is better to get the visualization of the problem using graph concept. Let $\Gamma = (\zeta, A)$ be a directed graph, where $\zeta = \{0, 1, \dots, n\}$ is the vertex set and $A = \{(i, j) : i, j \in \zeta, i \neq j\}$ is the set of arcs, representing routes between vertex. $\zeta = \{0\}$ is the depot vertex. $\zeta_c = \zeta \setminus \{0\}$ is the set of customer locations. It is assumed that each vertex $i \in \zeta_c$ has a demand $q_i \geq 0$ on each day, a service time $s_i \geq 0$, a time window $[e_i, l_i]$, where e_i is the earliest time service may begin and l_i is the latest time, and requires a fixed number of visits f_i to be performed according to one of the allowable visit-day patterns. The time window specifying the interval vehicles leave and return to the depot is given by $[e_0, l_0]$. Let $K = \{1, \dots, k\}$ be the set of available vehicle of all types. A fleet of m

vehicles of each type, with capacity Q_k is based at the depot.

For each vehicle $k \in K$, let Q_k denote the capacity in weight. We assume the number of vehicles equals to the number of drivers. Denote the set of n customers (nodes) by $N = \{1, 2, \dots, n\}$. Denote the depot by $\{0, n+1\}$. Each vehicle starts from depot and terminates at $\{n+1\}$. Each customer $i \in N$ specifies a set of days to be visited. On each day, customer $i \in N$ requests service with demand of q'_i in weight, within time window $[a_i, b_i]$. Note that, for the depot $i \in \{0, n+1\}$, we set $q'_i = 0$. Denote the set of preferable vehicles for visiting customer i by K_i ($K_i \in K$) and the extra service time per pallet by e if a customer is not visited by a preferable vehicle.

Mathematical Modeling

To model the problem, we define some notation.

Sets:

DI	internal drivers,
DE	external drivers,
D	over all drivers $D = DI \cup DE$,
K	vehicles,
N	customers,
N_0	customers and depot $N_0 = \{0, n + 1\} \cup N$,
K_i	preferable vehicles for customer $i \in N$,

Parameters:

M_k	Number of vehicles of type $k \in K$ available
Q_k	Weight capacity of vehicle $k \in K$,
$[a_i, b_i]$	The earliest and the latest visit time at node $i \in N_0$,
q_i	The weight demand of node $i \in N_0$
$[g_l, h_l]$	The start time and the latest ending time of driver $l \in D$
α_i	Pick up quantity for customer i
β_i	Delivery quantity for customer i
CV^k	Fixed cost for each type of vehicle $k \in K$ from depot
CVA_{ij}^k	Travelling cost of vehicle $k \in K$ along the edge $(i, j) \in A$
CVN^k	Cost due to the visit of a customer by non preferable vehicle $k \in K$
CDI_l^k	Cost for internal driver $l \in DI$ using vehicle $k \in K$
CDE_l^k	Cost for external driver $l \in DE$ using vehicle $k \in K$
CPQ_j^k	Cost to pick up a number of quantity for customer $j \in N$ using vehicle $k \in K$
CDD_j^k	Cost to deliver a number of quantity for customer $j \in N$ using vehicle $k \in K$

Variables:

- x_{ij}^k Equals to 1 if vehicle $k \in K$ travels from node $i \in N_0$ to $j \in N_0$, otherwise 0
- w_i Equals to 1 if customer $i \in N_0$ is visited by a non-preferable vehicle, otherwise 0
- v_i^k The time at which vehicle $k \in K$ starts service at node $i \in N_0$
- y_l^k Equals to 1 if vehicle $k \in K$ is assigned to internal driver $l \in DI$, otherwise 0
- z_l^k Equals to 1 if vehicle $k \in K$ is assigned to external driver $l \in DE$, otherwise 0
- θ_j^k Number of pick up demand of customer j served by vehicle $k \in K$
- σ_j^k Number of delivery demands of customer j served by vehicle $k \in K$

The mathematical formulation for this problem is presented as follows:

The objective is to minimize the operational costs

$$\begin{aligned} \text{Min} \quad & \sum_{k \in K} \sum_{j \in N_0} CV^k x_{0j}^k + \sum_{k \in K} \sum_{(i,j) \in A} CVA_{ij}^k x_{ij}^k + \sum_{i \in N_0} \sum_{k \in K} CVN^k w_i^k + \sum_{l \in DI} \sum_{k \in K} CDI_l^k y_l^k + \\ & \sum_{l \in DE} \sum_{k \in K} CDE_l^k z_l^k + \sum_{j \in N} \sum_{k \in K} CPQ_j^k \theta_j^k + \sum_{j \in N} \sum_{k \in K} CDD_j^k \sigma_j^k \end{aligned} \tag{1}$$

Subject to several constraints

$$\sum_{j \in N_0} x_{0j}^k = 1, \quad \forall k \in K \tag{2}$$

$$\sum_{k \in K} \sum_{j \in N} x_{ij}^k = 1, \quad \forall i \in N_0 \tag{3}$$

Constraints (2) and (3) are to guarantee that exactly one vehicle of each type enters and departs from every customer and from the depot and comes back to the depot.

$$\sum_{i \in N} x_{ij}^k - \sum_{i \in N} x_{ji}^k = 1; \quad \forall j \in N_0, \forall k \in K \tag{4}$$

This is a flow conservation equation needed to maintain the continuity of each vehicle route on each period of time.

$$\sum_{j \in N_0} x_{0j}^k \leq M_k, \quad \forall k \in K \tag{5}$$

Constraint (5) represents that each customer is served only by the available and active vehicle of type k .

$$\sum_{j \in N_0} x_{1j}^k \leq 1; \quad \forall k \in K \tag{6}$$

$$\sum_{i \in N, i > 1} x_{i1}^k \leq 1; \quad \forall k \in K \tag{7}$$

Constraints (6) and (7) state the availability of vehicles by bounding the number of route, related to vehicle k for each type, directly leaving from and returning to the central depot, not more than one, respectively.

$$\sum_{i \in N} q_i \sum_{j \in N_0} x_{ij}^k \leq Q_k; \quad \forall k \in K_m \tag{8}$$

Constraints (8) ensure that each delivery does not exceed the capacity of each type of vehicle.

$$\sum_{k \in K} \sum_{j \in N_0} x_{ijk}^t = 1 \quad \forall i \in N, t \in T_i \tag{9}$$

$$\sum_{k \in K \setminus K_i} \sum_{j \in N_0} x_{ijk}^t = w_i^t \quad \forall i \in N, t \in T_i \tag{10}$$

$$\sum_{i \in N} \sum_{j \in N_0} q_i x_{ijk}^t \leq Q_k \quad \forall k \in K, t \in T \tag{11}$$

$$b_i \geq v_{ik}^t \geq a_i \quad \forall i \in N, k \in K, t \in T_i \tag{12}$$

$$v_{0k}^t \geq \sum_{l \in D} (g_l^t \cdot y_{lk}^t) \quad \forall k \in K, t \in T \tag{13}$$

$$v_{n+1,k}^t \leq \sum_{l \in D} (h_l^t \cdot y_{lk}^t) \quad \forall k \in K, t \in T \tag{14}$$

$$\sum_{k \in K} \theta_{jk}^t = \alpha_j^t \quad \forall j \in N, t \in T \tag{15}$$

$$\sum_{k \in K} \sigma_{jk}^t = \beta_j^t \quad \forall j \in N, t \in T \tag{16}$$

$$x_{ijk}^t, w_i^t, z_{ik}^t, y_{lk}^t \in \{0, 1\} \quad \forall i, j \in N_0, l \in D, k \in K, t \in T \tag{17}$$

$$v_{ik}^t, u_{ik}^t, r_l^t, s_l^t \geq 0 \quad \forall i, j \in N_0, l \in D, k \in K, t \in T \tag{18}$$

$$\theta_{jk}^t, \sigma_{jk}^t \in \{0, 1, 2, \dots\} \quad \forall j \in N, k \in K, t \in T \tag{19}$$

Constraints (11) says that each customer must be visited by only one vehicle on each of its delivery days. Constraints (12) define whether each customer is visited by a preferable vehicle. Constraints (13-14) guarantee that the vehicle capacities are respected in both weight and volume.

Constraints (15-16) define the elapsed driving time. More specifically, for the vehicle (k) travelling from customer i to j on day t , the elapsed driving time at j equals the elapsed driving time at i plus the driving time from i to j (i.e., $u_{jk}^t \geq u_{ik}^t + c_{ij}$) if the vehicle does not take a break at customer i (i.e., $z_{ik}^t = 0$); Otherwise, if the vehicle takes a break at customer i (i.e., $z_{ik}^t = 1$), the elapsed driving time at j will be constrained by (10) which make sure it is greater than or equal to the travel time between i and j (i.e., $u_{jk}^t \geq c_{ij}$). Constraints (17) guarantee that the elapsed driving time never exceeds an upper limit F by imposing a break at customer i (i.e., $z_{ik}^t = 1$) if driving from customer i to its successor results in a elapsed driving time greater than F .

Constraints (18) determine the time to start the service at each customer. If j is visited immediately after i , the time v_{jk}^t to start the service at j should be greater than or equal to the service starting time v_{ik}^t at i plus its service duration d_i^t , the extra service time $e \cdot p_i^t$ if i is visited by an inappropriate vehicle (i.e., $w_j^t = 1$), the travel time between the two customers c_{ij} , and the break time G if the driver takes a break after serving I (i.e., $z_{ik}^t = 1$). Constraints (19) make sure the services start within the customers' time window.

Constraints (20-21) ensure that the starting time and ending time of each route must lie between the start working time and latest ending time of the

assigned driver. Constraints (22) calculate the total travel time for each internal driver. Constraints (23) define the working duration for each driver on every workday, which equals the time the driver returns to the depot minus the time he/she starts work. Constraints (24) make sure that the internal drivers work for no more than a maximum weekly working duration, referred to as 37 week-hour constraints. Constraints (25 – 26) define the pick up and delivery for each customer. Constraints (27-29) define the binary and positive variables used in this formulation.

Proposed Method

Stage 1. Solve the model by relaxing the integer restriction, if the assigned binary variables in the optimal result come up as binary value, STOP. The optimal solution is found. Otherwise go to Step 1.

Step 1. Get row i^* the smallest integer infeasibility, such that $\delta_{i^*} = \min\{f_i, 1 - f_i\}$ (This is to minimize the deterioration in the objective function, which is clearly corresponds to the integer basic with smallest integer infeasibility).

Step 2. Do a pricing operation

$$v_{i^*}^T = e_{i^*}^T B^{-1}$$

Step 3. Calculate $\sigma_{ij} = v_{i^*}^T \alpha_j$

With j corresponds to

$$\min_j \left\{ \left\lfloor \frac{d_j}{\alpha_{ij}} \right\rfloor \right\}$$

Calculate the maximum movement of nonbasic j at lower bound and upper bound.

Otherwise go to next non-integer nonbasic or superbasic j (if available). Eventually the column j^* is to be increased from LB or decreased from UB. If none go to next i^* .

Step 4.

Solve $B\alpha_{j^*} = \alpha_{j^*}$ for α_{j^*}

Step 5. Do ratio test for the basic variables in order to stay feasible due to the releasing of nonbasic j^* from its bounds.

Step 6. Exchange basis

Step 7. If row $i^* = \{\emptyset\}$ go to Stage 2, otherwise Repeat from step 1.

Stage 2. Pass1 : move integer infeasible superbasics by fractional steps to reach complete integer feasibility.

Pass2 : adjust integer feasible superbasics by looking at the reduced cost vector. The objective of this phase is to conduct a highly localized neighbourhood search to verify local optimality.

CONCLUSIONS

The aim of this paper is to develop a model of Periodic vehicle Routing with Time Windows, Fleet and Driver Scheduling, Pick-up and Delivery Problem This problem has additional constraint which is the limitation in the number of vehicles. We propose an algorithm which employs nearest neighbor heuristic approach for solving the model.

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Impact of Webquest on Student Engagement

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ABSTRACT

The World Wide Web (WWW) has now developed into an active platform for generating, sharing and collaborating ideas. Some research highlights that most of the students now a days spend a lot of time interacting with Web 2.0 technology tools. It is thus necessary for teachers in the 21st century to adopt these new technological tools and find new modes in order to incorporate Web 2.0 technologies in the classroom settings. Research has indicated that in many studies the practice of Web 2.0 technologies enhanced student engagement as well as achievement. WebQuest is an emerging Web 2.0 technology that makes use of Internet based resources on the World Wide Web (WWW) with certain basic steps. WebQuest is a powerful internet-based, student-centered, and inquiry-based learning tool that helps in promoting student engagement for any age group. Student engagement plays a central role in student success. Thus, Web 2.0 technologies allow educators to remain connected with students in a medium that they are using every day and offer many options for learners to attain the basic 21st-century skills so as to train them for their future. This paper emphasizes on how Web 2.0 technology tools especially WebQuest can be employed for educational activities and critically analyzes the influence it has on student engagement and academic achievement.

Keywords: *Web 2.0 technology, WebQuest, Student Engagement.*

INTRODUCTION

“Student engagement is the product of motivation and active learning. It is a product rather than a sum because it will not occur if either element is missing.”

Elizabeth Barkley

There isn't anything wrong with this belief that an engaged student remains connected with the faculty, peer group and institution; and by doing so he relates himself with the institute and also feels proud of being a member of the institution. On the other hand, a disengaged learner cultivates negative attitude for the faculty, students and institute. There may be several reasons for the students' disengagement. Even in a large classroom individuals do not pay attention towards the lesson taught by the teacher in the class and thus behave like disengaged and distracted learners ¹. But in order to engage students fully in the assigned task, technology can prove to be a boon. Boling (2008) observed that technology has been successfully incorporated while teaching in class in quite significant measures². Majority of the teachers use technology in order to engage students in academic

activities and to improve learning opportunities. Skinner & Belmont(1993) described engagement as eagerness of learners having pleasant feelings to partake in various academic accomplishments³.

With the arrival of innovative technologies specifically the Web 2.0 technology and influential educational software programs- teachers may assist the task of further upgrading various learner-centered strategies of learning. Like this, Web Quest (WQ) is one of the approaches for the efficient usage of technology in the classroom settings. Web Quest is a Web 2.0 inquiry based learning format employed by educators to promote engagement of students in various aspects and to organize learner centered learning in a specific subject with the help of pre-selected Internet resources.

Student Engagement

Student Engagement defines students' academic behaviors in many stages and involves indicators like classroom climate, support by teachers, autonomy support, relationships between teacher and learners, and thought-provoking tasks. The concept of engagement

has been extensively investigated since 1984. Alexander Astin was the first who recommended the theory of Student Involvement in 1984, which he afterwards renamed it as “Engagement”. Astin (1984)⁴ described engagement as “the amount of physical and psychological energy that the student devotes to the academic experience”. Following are the main principles upon which the theory of student engagement was constructed:

Engagement appears along a range or continuum i.e. in some situations learners engage themselves in the assigned tasks more vigorously than others and different students show different engagement levels in variety of activities at different situations;

It indicates investing of psychological plus physical vitality;

The extent with which student development and learning is linked to an instructional program is simply associated with the quantity as well as quality of student engagement in that very program;

It covers both quantitative and qualitative descriptions, quantitative aspect means how many hours a learner is devoting to a particular task or activity, and qualitative aspect means how determined the learner’s time is;

The efficacy of every instructional program is linked with the capability of that program directly so as to enhance the engagement of learners in various aspects.

Many surveys have been conducted on Student Engagement, out of which most prominent ones are Faculty Survey of Student Engagement⁵ and National Survey of Student Engagement⁶. Both of these major surveys stress upon different facets of Student Engagement. Nowadays engagement is referred to strength plus time that actually learners devote to informative undertakings which directly contribute to required educational outcomes. Thus participation of students in various activities indulges them in active engagement with faculty and peer group, which finally promotes student success.^{7, 8}

Huang (2011) as cited by Kaur and Beri (2017) found three non-cognitive drivers of academic performance which were academic self efficacy, academic motivation and student engagement. In 2009⁹, Kuh high lights two fold basic engagements that aim to enhance success of students: first one is academicor class engagement

and second one is engagement in extra-curricular activities i.e. outside the classroom. Kuh (2009)¹⁰ stated “student engagement and its historical antecedents are supported by decades of research showing positive associations with a range of desired outcomes of college”.Pascarella and Terenzini (2005)¹¹ examined that the concept of Engagement includes several factors, concerning engagement in the academic activities and extra-curricular undertakings or activities, interactions and relationships amongst students and teachers. They emphasize the association amongst these three factors- development, engagement, and success of students:

Cognitive development is likely to increase with the increase in the level of engagement of students.

Engagement in class discussions boosts psychological adjustment and maturity.

Interaction with peer group has a significant influence on degree completion.

Extracurricular involvement and intimate on-campus friendships has an affirmative influence on success of students in academic matters.

Campus settings that highlight intimate relationships between teachers and learners are associated with the purpose to enhance understanding, intellectual development, and critical thinking.

Technology and Student Engagement

Carini, Kuh and Klein (2006) considered Student Engagement as the chief attribute of successful online learning that is associated with educational attainment of learner’s positively¹². The concept of Student Engagement emerges as a multidimensional construct that includes several sub dimensions. In 2004, Fredricks¹³, Blumenfeld and Paris suggested that the most extensively accepted model of Student Engagement comprises basically of these three main dimensions- cognitive, behavioral, and emotional engagement. In online discussions context, the participation of students along with the measure of amount of time that learners log on to the discussions can be studied as indicators of behavioral engagement. Students’ responses to teachers and other students in the ways of showing admirations fall under the category of emotional engagement. This type of engagement signifies a sense of belonging and personal satisfaction, and contains indicators like pleasure, attention and excitement of learners regarding various topics or themes

of discussion. Zhu (2006) explains cognitive engagement in online courses as “the amount of students’ effort in (a) analyzing and synthesizing readings, and (b) seeking, interpreting, analyzing, and summarizing information; critiquing and reasoning through various opinions and arguments; and making decisions”¹⁴. He also came to the conclusion that cognitive engagement happening in online considerations is very much linked with the skills as well as knowledge attainment.

Various researchers examined associations between Student Engagement and technology usage. Annetta et al.(2009) examined learners those who preferred to play with educational games devised for the purpose of teaching genetic topics were whole heartedly engaged or engrossed in their task¹⁵. Chen, Lambert and Guidry (2010) conducted a study that revealed positive and significant relationship exists between Student Engagement and web-oriented technology¹⁶. The study recommended that the effective use of Twitter could serve the purpose of engaging learners in educational settings as well as in assisting teaching staff in a much lively way¹⁷. Research has revealed that a low-investment blended learning approach making use of Face book results in enriched academic achievement and better Student Engagement¹⁸. In the present stage, educational institutions all over the world, are continuously struggling nap plying appropriate approaches and techniques intended with the motive to nurture every facet of Student Engagement in online context.

Web Quest and Student Engagement

In the modern era, a new movement embedded with Web 2.0 based technologies has emerged with main purpose of enriching the present educational system. Web 2.0 technologies signified as “read/write web” stresses upon active participation and collaboration of students. Web 2.0 includes social bookmarking (Cite Like and Delicious); social networks (Face book, Skype); media sharing (YouTube); creative works (Podcasts, Video casts, Twitter, Blogger); collaborative knowledge development (Google Docs, Sheets and Slides, Wikipedia) and many more. Similarly, Web Quest(WQ)is a Web 2.0 tool and is represented in the form of a lesson that is totally inquiry based, and learners learning through this way searched most of the information related to the concerned topic with the help of web. Bernie¹⁹Dodge at San Diego State University firstly introduced the concept of Web Quest in 1995

and then later on further improved by Tom March in 1998.Dodge (1995) defined Web Quest as “*an inquiry-oriented activity in which some or all of the information that learners interact with, comes from resources on the Internet*”. WQ typically comprises of following six components:

Introduction represents main objectives as well as aims of the Web Quest, and provides background information about it. At this first stage, the teacher introduces the lesson and asks questions that make students start thinking about the topic.

Task provides guidelines and rationale, and description of the expected learning outcomes from the students.

Resources are a set of pre-selected websites that is chosen by the teacher in order to help the learners to complete their task.

Process deals with step-by-step instructions embedded with the links that learners follow so as to solve the Web Quest Inquiry.

Evaluation enlightens learners regarding their performance that how it will be evaluated by making use of an evaluation rubric.

Conclusion supports reflection and recapitulates what the learners have achieved during the whole process.

(Calsonic, 2009)²⁰

WQ is based on constructivist based learning theories, particularly Vygotsky’s and Piaget’s famous theories of cognitive development²¹. Dodge (1995) recommended two kinds of Web Quest- one is short term and the other one is long term. First kind of WQ i.e. short term is of one to three days and is composed of contrasting and comparing items whereas long term WQ is of more than three weeks or of around one month including analyzing and constructing information. A Web Quest is basically centered upon a single subject or in interdisciplinary way, and can be used by any age group. March (2003) stated²²

“A Web Quest is a scaffolded learning structure that uses links to essential resources on the World Wide Web and an authentic task to motivate students’ investigation of a central, open-ended question, development of

individual expertise and participation in a final group process that attempts to transform newly acquired information into a more sophisticated understanding. The best Web Quest do this in a way that inspires students to see richer thematic relationships, facilitate a contribution to the real world of learning and reflect on their own met cognitive processes.”

Thus, Web Quest found as a suitable approach for fully engaging learners in their respective projects, and is basically grounded on the inquiry-oriented learning, the scaffolded learning, met cognition, the problem-based learning, and the project-based learning. WQ is a key strategy that can help in promoting student engagement in technology-assisted environment. In this way, learners try to gain knowledge by first retrieving then contributing first hand information on the internet or web as well as offering help to each other in the group²³. Web Quest proposed such learning activities that signify unique manner wherein constructivist pedagogy as well as latest technology come into an integrated form in order to confront the cognitive abilities of learners. Such types of activities are found to be effective for boosting encouragement as well as performance of learners²⁴. Nowadays educators continuously look for ways for enhancing student engagement in different types of activities, projects or tasks with the help of WQ approach²⁵. The Web Quest approach helps in determining the evaluation part of learning and the expected learning outcomes. With respect to student engagement and the Web Quest, some case studies have been done, out of which most of them indicating to usage of the Web Quest as a way of stimulating engagement of learners at different levels of education. Simpson (2003) examined that Web Quest usage in learning science positively engage students²⁶. Unal, Bodur, and Unal (2012) indicated that engagement in learning activities promotes collaboration among students and nurtures independent type of learning²⁷. Asunka (2016) found that the Web Quest help in achieving the desired objectives as well as increasing the level of engagement of students.

CONCLUSION

The above-discussed literature suggests new ways to address the issues and concerns of the present educational system. Web 2.0 technology has made great influence on the education sector and currently students are more prone towards the use of this technology. From

the above discussion, it can be concluded that out of the many tools of Web 2.0 technology currently accessible for practice in educational settings, Web Quest offer an effective approach to fully engage learners throughout the process of learning. Web Quest, in the form of a webpage or website figures a challenge by providing links to web-based resources, and lies under the constructivist paradigm relating to technology assisted teaching and learning wherein learners of any age group and level partake. Web Quests can be fruitful in drawing attentiveness of learners towards the classroom lectures so as to raise their academic performance, and thus promoting student engagement in various academic activities. Student engagement proves to be crucial to student motivation throughout the process of learning, meaning thereby more the learners are engaged or encouraged to learn, the more are the chances of their success in assigned tasks. Various factors influence student engagement including, teacher skills and motivation, students’ interest, faculty-student relationships, parental involvement as well as efficient practice of appropriate technology. Thus effective technology should be employed for creating an inspiring environment where in learners remain fully engaged in the process of learning.

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Teacher Effectiveness and Adjustment in Relation to Organizational Politics in Bhutan

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ABSTRACT

The aim of this paper was to explore teacher effectiveness and adjustment in relation to organizational politics'. The study was geared towards finding the levels of teacher effectiveness, adjustment, and perception of teachers' towards organizational politics and comparing male and female secondary school teachers on these variables. Further, it was aimed at examining the relationship among three variables. The study revealed that effectiveness and adjustment of teachers and their perception towards organizational politics is independent of their gender. Also, the results brought into light that teacher effectiveness has very low correlation with organizational politics. Teacher adjustment however has moderate and negative correlation with organizational politics.

Keywords: *Teacher Effectiveness, Teacher Adjustment, Organizational Politics*

INTRODUCTION

Education is a channel through which learning takes place and what is to be learned (like knowledge, skills, values, beliefs, and habits etc) gets transferred from a group of people to other people through various modes like storytelling, discussion, teaching, training, or research. The role of a teacher in this regard is therefore pivotal. The major factor contributing in quality education is the availability of quality teachers and hence it becomes crucial to understand some of the parameters which can impact the teachers.

The production of better citizens lies in the hands of effective teachers and effective teachers are those who dare to put their soul into their role. They are the teachers who know how to work efficiently for the better realization of educational goals. Therefore, teachers who are dynamic in skills and capabilities can be considered effective teachers. Such teachers, reaches and teaches every student with suitable strategies and techniques enhancing not only academic performance of students but also students' wholesome development with the display of his/her good traits¹. presented his view that an effective teacher besides imparting allotted educational curricula in efficient manner ensures optimum development of the students². concluded teacher effectiveness with broader outlook. According to them, at all educational

level, teacher effectiveness is the set of characteristics, competencies and behaviours of teachers³. The effective teachers possess certain characteristics that make them so special in educational fraternity. These characteristics are: organization and clarity in their work, ability to apply analytical /synthetic approach, possess dynamism and enthusiasm, awareness about ways of teacher student interaction, and instructor-individual student interaction. Mumthas & Anwar conducted study in Kerala to see whether teachers with high tacit knowledge are effective. In their relation with students, teachers with high tacit knowledge were found to be effective⁴. Satisfactoriness of classroom procedures, passion for teaching, and command over subject matter were found to be relatively high in these teachers but they lack in stimulation and affective gains in students.⁵

Studied the impact of organizational climate on teacher effectiveness of 100 elementary school teachers Jharkhand. The major finding of this study was that open climate exists in government school and it is here where maximum number of effective teachers were present⁶. Private schools exhibited the prevalence of closed climate where maximum number of ineffective teachers was also found to exist. also explored effects of teacher job satisfaction on teaching effectiveness. It was found that teacher job satisfaction has positive significant effect on teaching quality assurance; teaching quality

assurance and job satisfaction has a positive significant effect on teaching effectiveness.⁷

On the similar lines Selamat et al., (2013) examined the influence of organizational climate on teachers' job performance in the district of Klang and found that that teachers in secondary schools were not able to accomplish their tasks and school climate was not so productive. Organizational climate was a major factor affecting the job performance of teachers. Similarly it was found by that the role efficacy of the senior secondary school principals is positively related to their professional competency and organizational climate.⁸

Further, analyzed the effect of leadership of principals and achievement motivation on teaching competence of 75 senior high public school teachers in Manado city, Indonesia⁹. It was found that teaching competence of teachers was positively affected by principals' leadership and achievement motivation. In addition to this, studied impact of leadership on teachers' effectiveness. It was founded that motivations of educators, job satisfaction, organizational commitment, organizational citizenship and teacher leadership were some of the leadership factors strongly influential concerning empowerment. Transformational leadership was considered appropriate practice that strongly influences teachers' effectiveness.¹⁰

A much related concept to teacher effectiveness is teacher adjustment. It is a state of full satisfaction of teacher's needs and the claim of his environment¹¹. studied adjustment of secondary school teachers in with respect to gender, workplace, marital status and academic results of 800 school teachers from Haryana, India. The result brought into light that the teachers who were reasonably satisfied and adjusted are efficient and provide improvement in education. It was also revealed that teacher adjustment level has direct linkage with his work efficiency¹². In addition to this, conducted a study in China with respondents from about 20 cities to bring into light the effect of proactive personality and organizational support on re-entry adjustment for returned teachers from universities and colleges abroad. Proactive personality was found to have positive effect on re-entry adjustment.¹³

In organization, politics are like fire. When it is not in control, it goes big and becomes a mess as its use is diverted for personal gains rather than for organizational benefits. conducted study to find out whether perceptions

of politics act as mediator between supervisor's leadership style and employees' performance¹⁴. It was found that organizational politics mediated only partially. The study also revealed direct relationship between leadership and performance. But, in their study on conducted a study on job satisfaction of employees found inverse relationship between job satisfaction and perception towards organizational politics¹⁵. Conversely, found that organizational politics has not affected much those employees who valued teamwork (in terms of job satisfaction).¹⁶

Furthermore, studied impact of organizational politics over organizational citizenship behaviour, commitment towards organization and job satisfaction among employees of organisations of Senegal.¹⁷ The findings indicated that employees perceiving higher levels of politics in organisation were less satisfied with their job and reported lower levels of organizational citizenship behaviour and commitment towards organization. In addition to this, explored social exchange perceptions as superseding between the relation of perceptions towards organizational politics and morale of employees. The result revealed that perceived organizational politics have negative correlation with social exchange but morale and social exchange is positively correlated. Further, it was found that politics perceptions and morale have negative correlation.¹⁸

Examined perceptions of employees of different organizations towards organizational politics and its affect on their perceptions towards organizational justice and employee turnover of public and private sector employees in Turkey. A significant effect of politics in organisation was found on organizational justice and intention of employees to leave^{19,20}. Supplementary to this, carried out a study "to predict employee job performance, organizational citizenship behaviours, and creativity proposing a three-way interaction of despotic leadership, leader member exchange, and perceived organizational politics of employees." It was found that tyrannical leadership was negatively related to employee outcomes i.e. job performance, organizational citizenship behaviours, and creativity and the effects are much highlighted under conditions of higher levels of organizational politics perceived.²¹

OBJECTIVES

1. To examine the levels of teacher effectiveness, teacher adjustment and organizational politics of secondary schools teachers.
2. To compare teacher effectiveness, teacher adjustment and perception of secondary school teachers towards organizational politics.
3. To examine the relation among teacher effectiveness, teacher adjustment and organizational politics.

HYPOTHESES

Secondary school teachers do not differ significantly in their teaching effectiveness with respect to gender

Secondary school teachers do not differ significantly in their adjustment patterns with respect to gender

There exists no significant difference between male and female secondary school teachers in their perception towards politics in their organization.

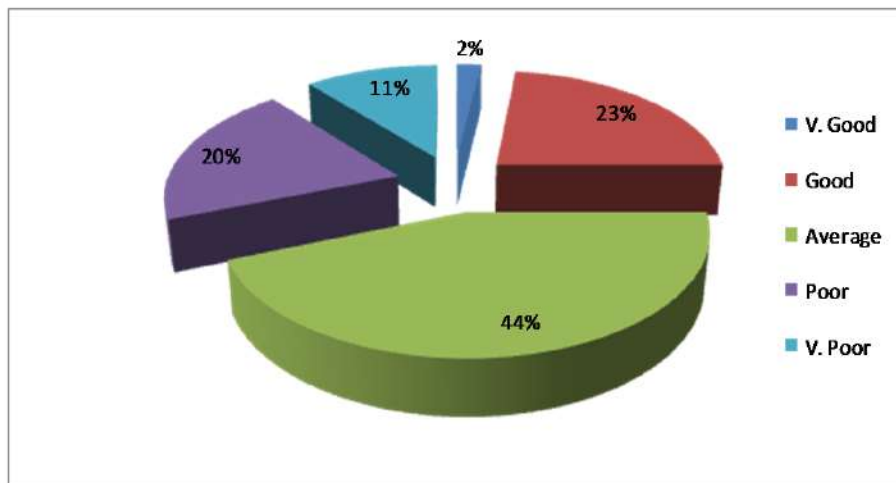
There exists no relation among teacher effectiveness, teacher adjustment and organizational politics of secondary school teachers.

METHOD

The data was collected from 150 teachers of two districts of Bhutan namely Samtse and Haa teaching in lower, middle and higher secondary schools by personally visiting to the teachers. Teacher Effectiveness Rating Scale by Dr. Umme Kulsum (2010), Mangal Teacher Adjustment Inventory (short form) by Dr. S.K. Mangal (2011), Organizational politics Scale by Dr. Upinder Dhar and Dr. Santosh Dhar (2008) were used to collect the relevant information from the teachers.

RESULTS AND FINDINGS

Levels of teacher effectiveness among secondary school teachers of Bhutan

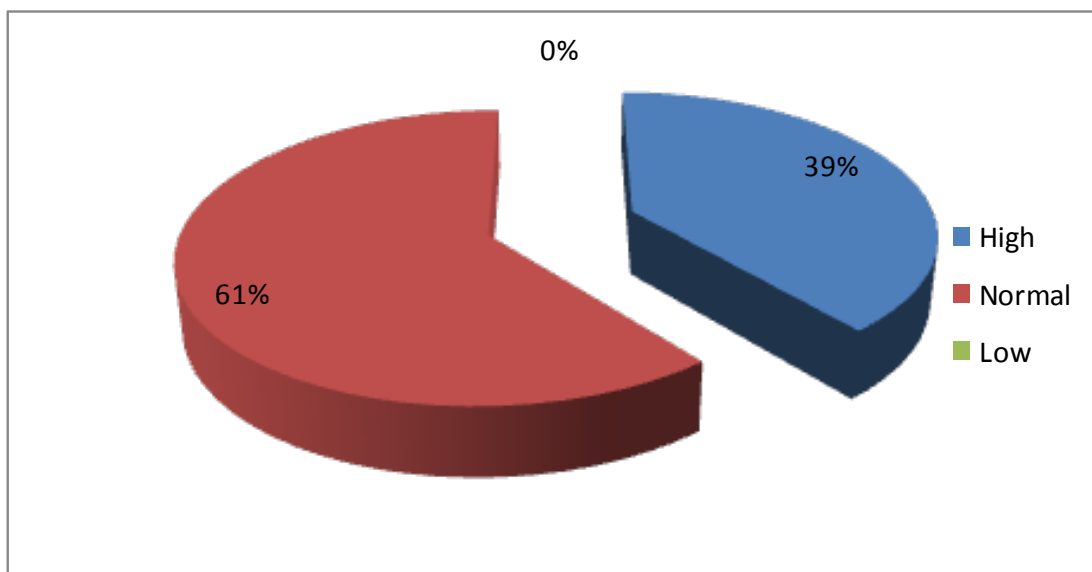


Graph 1

From the graph 1, it is clear that out of 150 teachers, only 7% exhibits high level of effectiveness. This means that only 10 teachers are highly effective. The majority of teachers fall in average category of effectiveness constituting 79% of the total sample. This means that out of 150 teachers, 119 possess average type of

effectiveness. Further, 14% of teachers exhibited low level of effectiveness

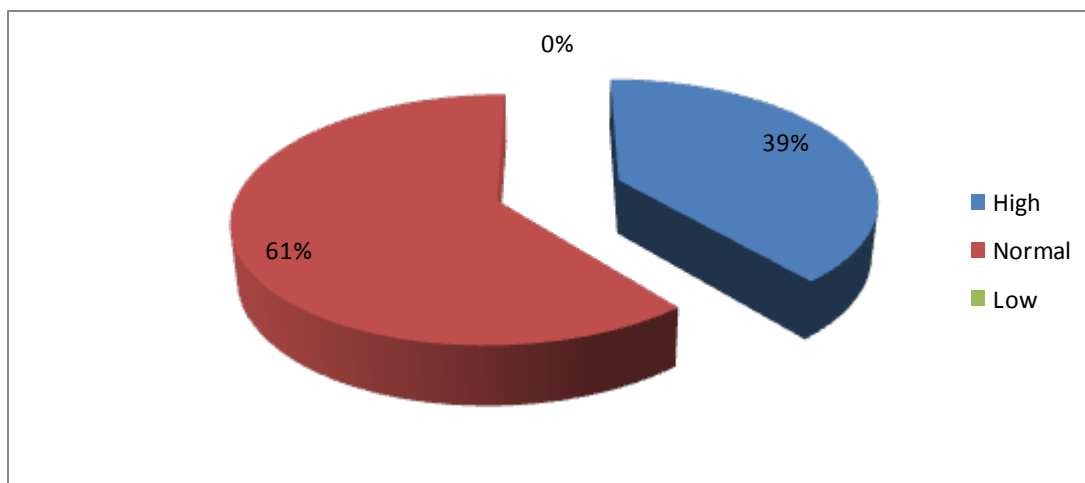
Level of adjustment among secondary school teachers



Graph 2

Graph 2 reveals that secondary schools in Bhutan do not have many teachers with very good adjustment skill. Just 3 teachers out of 150 making up 2% of the selected sample fall under very good category of teacher adjustment. Even in good category or level of teacher adjustment, there are not many teachers. Only 23% or say just 35 teachers reflected this level of adjustment. The majority of teachers are in average group constituting only 44% of the total sample and 31% teachers are showing lower levels of adjustment.

Levels of Perception towards Organizational Politics



Graph 3

Graph 3 further shows that school being an organization is not free from politics. None of the respondents had perception that there isn't politics in schools. Out of all 150 secondary school teachers, 61% perceive normal level of politics in their organization which is otherwise required for the progressive

functioning of the organization as without normal politics organization may become static buildings producing no outputs. Rest of 39% of the teachers perceived that politics in their schools is on higher side.

Teacher effectiveness with respect to gender

Table 1 Gender Wise Difference in Teacher Effectiveness

Variable	Gender	N	Mean	SD	Mean Difference	df	t	p-value (2-tailed)	Remarks
Teacher Effectiveness	Female	70	472.71	124.79	-1.15	148	-0.1	0.95	Insignificant
	Male	80	473.86	101.69					

From the table 1, it can be seen that overall teaching effectiveness also does not differ across genders. Mean value of males (473.86) in teacher effectiveness is higher than mean value of females (472.71) but this difference is also not significant by chance factor as p-value for difference in sample is 0.95 which is far greater than 0.05. So, the difference is trustworthy and dependable to say that males and females do not differ in their effectiveness leading to the acceptance of null hypothesis that male and female secondary school teachers exhibit statistically same levels of teaching effectiveness. Hence, it can be concluded that gender does not influence the effectiveness of teachers.

Teacher adjustment with respect to gender

Table 2. Difference in Samples in Teacher Adjustment

	Gender	N	Mean	SD	SED	df	Mean Difference	t	Sig. (2-tailed)	Remark
Teacher Adjustment	Female	70	47.87	8.69	1.04	148	1.59	0.95	0.34	Insigni-ficant
	Male	80	46.28	11.44	1.28					

Table 2 indicates difference between average score of female and male teachers in their adjustment. Female teachers exhibited higher level of adjustment (M= 47.87, SD= 8.69) in comparison to male teachers (M= 46.28, SD= 11.44). Test for significance of differences between means shows that difference between the adjustment of school teachers with respect to gender is insignificant ($p= 0.34 > 0.05$). So, the null hypothesis that teachers do not vary in their adjustment patterns with respect to their gender is accepted. Though a slight difference is seen in the mean scores, statistically, the difference is insignificant meaning thereby teacher adjustment is independent of gender.

Perception towards organizational politics with respect to gender

Table 3. Dimension Wise Analysis of Difference in Samples on Perception towards Organizational Politics

Dimension of organizational Politics	Gender	N	Mean	SD	Mean Difference	df	T	p-value (2-tailed)	Remarks
Compliance non-compliance	Female	70	44.03	7.24	-1.35	148	-1.17	0.24	Insignificant
	Male	80	45.38	6.79					
Loyalty-disloyalty	Female	70	29.11	5.78	-0.06	148	-0.68	0.95	Insignificant
	Male	80	29.18	5.19					
Self-Centered organization centered	Female	70	18.66	3.37	-1.44	148	-2.63	0.01	Significant
	Male	80	20.1	3.32					
Pretentious-Non-Pretentious	Female	70	17.2	3.33	-0.96	148	-1.98	0.05	Significant
	Male	80	18.16	2.61					
Deceptive-Credible	Female	70	16.94	3.13	-0.64	148	-1.35	0.18	Insignificant
	Male	80	17.59	2.66					
Manipulative-Non Manipulative	Female	70	6.69	1.59	-0.14	148	-0.53	0.6	Insignificant
	Male	80	6.83	1.64					
High Power Orientation-Low Power Orientation	Female	70	13.91	3.24	-0.65	148	-1.28	0.2	Insignificant
	Male	80	14.56	2.98					
Impractical-Practical	Female	70	7.51	1.59	-0.44	148	-1.76	0.08	Insignificant
	Male	80	7.95	1.45					
Illegitimate Interests-Legitimate interests	Female	70	3.2	0.89	-0.19	148	-1.42	0.16	Insignificant
	Male	80	3.39	0.72					
Overall organizational politics	Female	70	157.3	24.13	-5.87	148	-1.59	0.11	Insignificant
	Male	80	163.1	21.01					

Looking at the table above, it is clear that perception on organizational politics indicates that the both male and female teachers perceive statistically equal levels of politics in their organization with p-value of difference between means as 0.11. Further, a look at dimension wise analysis indicates that this difference is also insignificant in all the dimensions of organizational politics except for two dimensions namely Self-Centered organization centered; Pretentious-Non-Pretentious for which p-values are 0.01 and 0.05 respectively. But concluding as a whole it is clear that males and females have similar kind of perceptions towards organizational politics.

Relationship among teacher effectiveness, teacher adjustment and organizational politics

Table 4. Correlation between Teacher Effectiveness, Teacher Adjustment, and Organizational Politics Perception

Organizational Politics	N	Teacher Effectiveness	Teacher Adjustment
	150	r = -0.103	r = -0.442

From the table 4, it can be interpreted that coefficient of correlation between teacher effectiveness and organizational politics is very low meaning thereby that effectiveness of teachers have nothing to bear with politics in organization. So, it can be interpreted that efficiency is least influenced by the work culture and working environment of organization but dependent upon the skills of the teachers. Highly skilled teachers can teach efficiently in any kind of work environment. Further, teacher adjustment has moderate negative correlation (-0.44) with organizational politics indicating that increase in politics in organisation will lead to lower the adjustment levels of teachers.

SUGGESTIONS

Similar research can be carried out by increasing the sample size and extending the data collection from other districts as well.

Further research can be carried out on teachers of higher education as well.

Organizational politics can be explored with other variables and all three variables considered in this study could be studied separately for better conceptualization.

Studies on organizational politics can be conducted in comparative form like to compare the politics with respect to the type of organisation

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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Research and Integration of IoT based Solar Photovoltaic Panel Health Monitoring System

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ABSTRACT

This paper describes about the research and integration of IoT based solar photovoltaic panel health monitoring system. The proposed system comprises of four thermocouple K-Type sensors each one is connected to adafruitMAX31855 thermocouple amplifier, one INA219 adafruitvoltage/current sensor and Raspberry Pi Zero Wireless. The thermocouple sensors each one is connected to adafruitMAX31855 thermocouple amplifier are installed at the back on the solar photovoltaic panel at measured distance between the sensors to sense the solar photovoltaic panel's temperature. The one INA219 adafruitvoltage/current sensor is connected at the positive output wire of solar photovoltaic panel to sense and measure the amount of voltage/current produced. The sensed and measured values at the thermocouple sensors and voltage/current sensor are recorded into the Raspberry Pi ZeroWireless temporary storage. The recorded data in the Raspberry Pi Zero Wireless is then pushed into cloud system to ease the solar photovoltaic panel health monitoring and analysis via the website. This paper will explain the overall research and integration output of the proposed project and validate the recorded results based on the developed methodology.

Keywords: *PV Monitoring, Preventive Maintenance, Remote Monitoring, Real-Time Monitoring.*

INTRODUCTION

Electricity is the most basic requirement for everyone in today's modern world¹. Due to the requirement the electricity energy consumption have shown large utilization and increment². Hence, concurrently the fossil-fuel sources used to generate the electricity is diminishing as well³. Also, the volatility of oil prices as well as increasing worldwide concern on the carbon dioxide (CO₂) emissions has led towards the evolution of renewable energy such as solar, wind, hydro etc concepts based systems over the recent years⁴. At different part of the world and based on the climate nature, respected renewable energy source type of system has been developed to accommodate their increasing energy requirement. One of the most emerged and appropriate renewable energy system is solar photovoltaic (PV). The PV system has been continuously gaining attention among the players in the solar industry all around the globe^{4,5}. With the growing demand among the players

in solar industry, the manufacturing and deployment solar photovoltaic have increase drastically in this recent years⁴.

As solar photovoltaic system emerged as most promising technology to meet the demand for electricity growth⁶, monitoring PV system is necessary to allow their holders to maintain and observe the installed PV system⁷. Another reason to monitor the PV system is because solar PV systems are installed at location where is not accessible to grid network electricity and installed solar PV system at such locations tend to be installed with monitoring system⁸. Such locations also have lack of technical manpower to perform operation check and maintenance on the solar PV system. This also hinder one to regularly check the system performances and record the output data⁸. Looking at the briefly discussed restrictions, it is necessary to install PV system with monitoring system to allow the system to perform up to the mark⁸. Also monitoring system would also assist one

into carrying out the preventive maintenance when it is necessary.

In⁸ is mentioned that due to lack of schedule service and maintenance, PV system tend to fail and the failure can be subjected to many related components. One of the frequently failed component is photovoltaic panel performances. Prieto in⁴, proposed wireless sensor network based system for individual monitoring of panels. This system sensed meteorological and solar radiation data to optimize energy production based on surrounding ambient temperature and condition. In another research⁶, monitoring PV system is developed. This system comprises of acquisition layer, pretreatment and recording layer and supervision, storage and web services layer. The acquisition layer consists of wireless sensor network that collect the information from the solar panel and meteorological. Next layer is pretreatment and recording, which manages the receive data from the wireless sensor network and temporary store the received data into the data logger. Then the temporary stored data into the data logger is then send to supervision, storage and web service layer⁶. In⁹ microchip PIC18F4550 microcontroller is used to develop the proposed system. The system proposes to allow the users to check the photovoltaic panel temperature and radiation which satisfies the performance of the photovoltaic panel based on the datasheet. Research by M. Vyas¹⁰, uses Labview software to monitor the photovoltaic panel's cell output voltage and at the same time provides updates on the system's status. In another research¹¹, a system integrated with pyrometer and temperature sensor is introduced. This system monitors the solar irradiance and temperature of the system, as well as is used to perform further analysis on the developed system. In¹², data acquisition system which records real-time data such as voltages from solar panel and track the system using sunlight information using the Arduino on the LabVIEW Makers Hub software.

In this context, the main objective of this paper is to research and integrate the IoT scheme to monitor the photovoltaic panel health condition which can assist to gather the real-time photovoltaic panel information. The research is to understand the current available technology for solar photovoltaic system and in some specific finding in regards to photovoltaic panels too. Understanding this research finding helps this research to develop the new methodology for it's proposed idea.

The remaining of the paper has been arranged as following: 1) Overview of the Proposed System, 2) Methodology of Hardware Development and Integration, 3) Results and Discussions, 4) Conclusion and 5) Acknowledgement.

Overview of the Proposed System

As explained, due to the increasing electricity demand and requirement to monitor the performances of the solar photovoltaic system, each component of the system has to be monitored. Hence, this paper proposes an IoT based Solar Photovoltaic Panel health monitoring system. This section will explain and describe the conceptual development of the proposed idea.

Figure 1 shows the conceptual development idea and suggestion of sensors placement at the back of the photovoltaic panel. Four units of thermocouple sensors with adafruit max31855 thermocouple amplifier and one INA219 adafruit voltage/current sensor are integrated with the Raspberry Pi ZeroWireless. The conceptual design is developed based on the study carried out in the introduction section. The thermocouple sensors with adafruit max31855 thermocouple amplifier are placed at the back of the photovoltaic panel to sense and measure the generated heat on photovoltaic panel top. The voltage/current sensor is connected in series at the positive wire of the photovoltaic panel to sense the produced voltage and current. All of these sensors are then connected to the Raspberry Pi ZeroWireless.

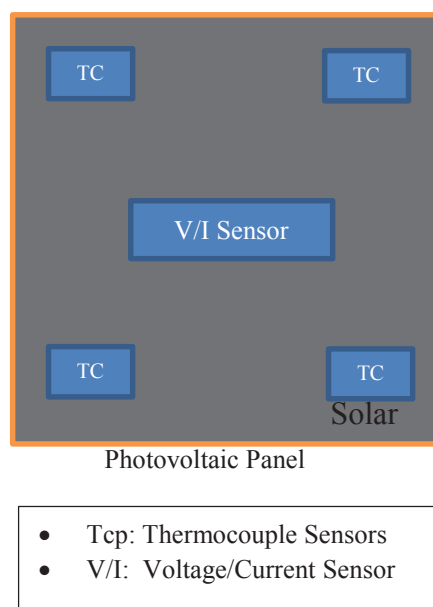


Figure 1: Top View of Conceptual Development

Once the conceptual development has been finalized and all the sensors and system connectivity have been decided, the conceptual idea needs to be illustrated for it to be seen and understandable. Hence, Figure 2 shows the conceptual development idea discussed in Figure 1 is illustrated using the fritzing software. All the sensors connection are also strictly followed as explained earlier to avoid any mistake. Solar panel and battery is used to show the complete system connectivity and the sensors arrangement according to the system objective.

Table 1 is explaining the connectivity referencing for thermocouple sensors with adafruit max31855 thermocouple amplifier and one INA219 adafruit voltage/current sensor with the Raspberry Pi ZeroWireless. The “THERMO1, THERMO2, THERMO3 and THERMO4” thermocouple sensors are attached at the back of the photovoltaic panel. While the input of the INA219 voltage/current sensor is connected at the positive wire of the photovoltaic panel.

Table 1: Connectivity Reference for Thermocouple Sensors

Wiring Colour	Description
Red	VCC – Power Supply 3.3V, 5V, 12V
Black	GND – Ground
White	SCL – Serial Data
Orange	SDA – Serial Clock
Green	DO – Digital Output
Yellow	CS – Chip Select
Blue	CLK – Clock

Connection of INA219 Adafruit Voltage/Current Sensor with Raspberry Pi Zero Wireless

- Connect Pi 3.3V to INA219 VCC
- Connect Pi GND to INA219 GND
- Connect Pi GPIO 02 to INA219 SDA
- Connect Pi GPIO 03 to INA219 SCL

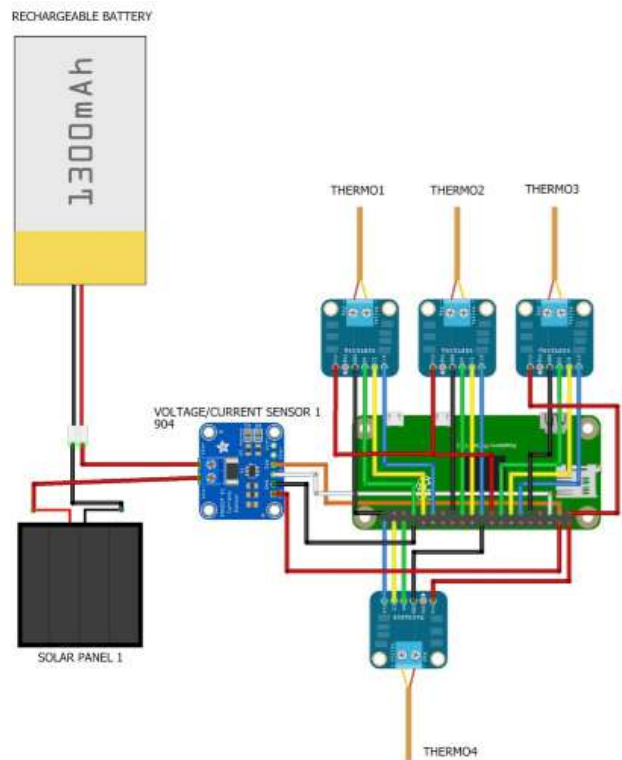


Figure 2: Sensors Integration and System Architecture Design using Fritzing Software.

Connection of Thermocouple K Sensors with Adafruit MAX31855 Thermocouple Amplifier with Raspberry Pi Zero Wireless

Connection of Adafruit MAX31855 thermocouple Amplifier

Connect Raspberry Pi Zero Wireless Pin 3.3V to MAX31855 Vin

Connect Raspberry Pi Zero Wireless Pin GND to MAX31855 GND

Connection Thermocouple Amplifier (TC1):

Connect Raspberry Pi Zero Wireless Pin GPIO 22 to MAX31855 DO

Connect Raspberry Pi Zero Wireless Pin GPIO 27 to MAX31855 CS

Connect Raspberry Pi Zero Wireless Pin GPIO 17 to MAX31855 CLK

Connection Thermocouple Amplifier (TC2):

Connect Raspberry Pi Zero Wireless Pin GPIO 11 to MAX31855 DO

Connect Raspberry Pi Zero Wireless Pin GPIO 09

to MAX31855 CS

Connect Raspberry Pi Zero Wireless Pin GPIO 10 to MAX31855 CLK

Connection Thermocouple Amplifier (TC3):

Connect Raspberry Pi Zero Wireless Pin GPIO 23 to MAX31855 DO

Connect Raspberry Pi Zero Wireless Pin GPIO 24 to MAX31855 CS

Connect Raspberry Pi Zero Wireless Pin GPIO 18 to MAX31855 CLK

Connection Thermocouple Amplifier (TC4):

Connect Raspberry Pi Zero Wireless Pin GPIO 07 to MAX31855 DO

Connect Raspberry Pi Zero Wireless Pin GPIO 12 to MAX31855 CS

Connect Raspberry Pi Zero Wireless Pin GPIO 08 to MAX31855 CLK

Methodology of Hardware Development and Integration

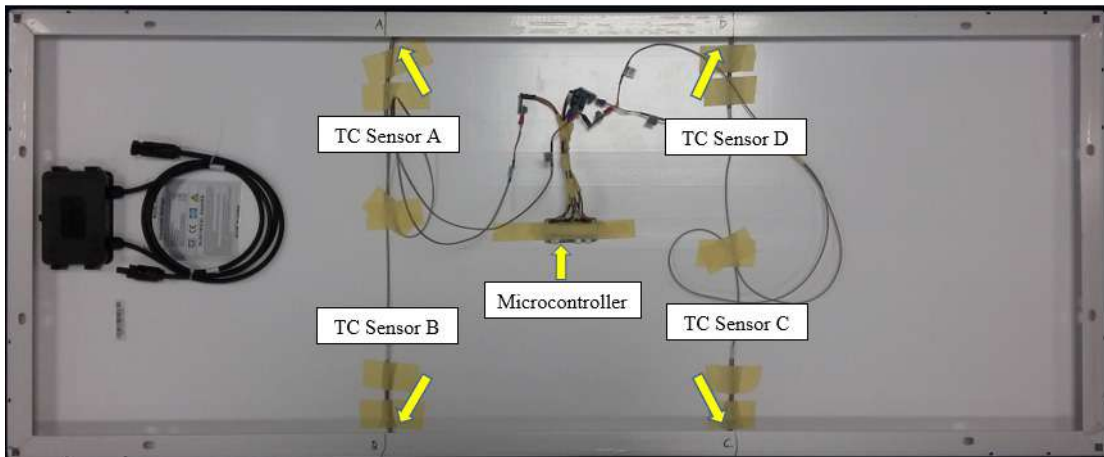


Figure 3: Placement and Integration of Thermocouple Sensors at the back of Photovoltaic Panel.

This section explain and show the methodological integration process of the proposed IoT based solar photovoltaic panel health monitoring system. The thermocouple K-Type sensors (TC Sensor A, TC Sensor B, TC Sensor C and TC Sensor D) with adafruit MAX31855 thermocouple amplifier is attached at the back of the photovoltaic panel. These sensors are connected to the adafruit MAX31855 thermocouple

amplifiers before connecting to the Raspberry Pi Zero Wireless. The adafruit MAX31855 thermocouple amplifier is used to amplify the small signal received from the thermocouple k type and store the readings into the temporary storage in the Raspberry Pi Zero Wireless. The INA219 adafruit voltage/current sensor is used to sense and measure the output voltage at the respective photovoltaic panel.

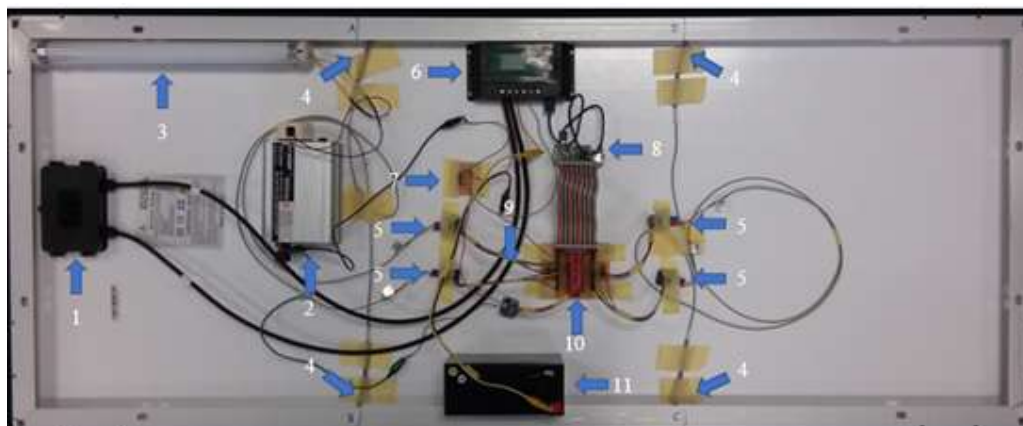


Figure 4: Complete Hardware System Integration and Installation

Table 2: Reference Table for Figure 4

Number Component	Hardware
1	Solar Panel
2	Solar Power Inverter DC 12V to AC 220V
3	Lamp
4	Thermocouple K-Type (A, B, C, D)
5	Thermocouple Amplifier (MAX31855)
6	Solar Charger
7	PCB Current Divider
8	Raspberry Pi Zero Wireless
9	Voltage/Current Sensor (INA219)
10	PCB GPIO 40 Pins
11	Rechargeable Battery 12V

In the following section the results recorded for the thermocouple K-Type sensor integrated with adafruit MAX31855 thermocouple amplifier and INA219 adafruit voltage/current sensor is presented. The results shows that the thermocouple K-Type sensor and INA219 voltage/current sensor has effectively managed to achieve the objectives to record the photovoltaic panel data to observe the photovoltaic panel's health.

RESULTS AND DISCUSSIONS

Thermocouple K-Type Sensor and INA219 Voltage/Current Sensor

The presents the sensed and measured results for the thermocouple K-Type sensor and INA219 voltage/current sensor. The presented reading in Figure 5 shows reading taken before 11 a.m. and after 11 a.m. The reading taken after 11 a.m. is recorded till 6p.m. in the evening. Based on the Figure 5 reading shows the temperature of the photovoltaic panel increases due to environment temperature increase.

Figure 6 presents the sensed, measured and calculated power at the photovoltaic panel. According to the trend, the voltage and current before 11a.m. stays constant, starts decreasing after 11a.m. When the voltage and current of the photovoltaic panel decreased after 11a.m., the output power also decreases.

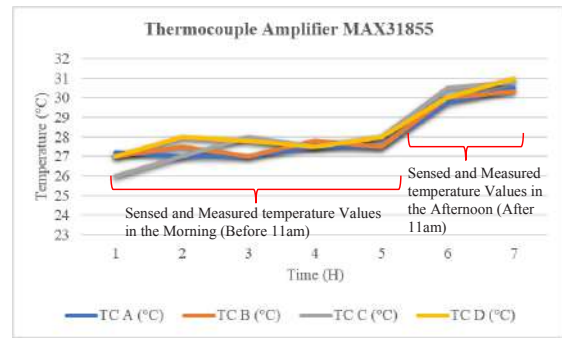


Figure 5: Sensed and Measured Temperature at Photovoltaic Panel.

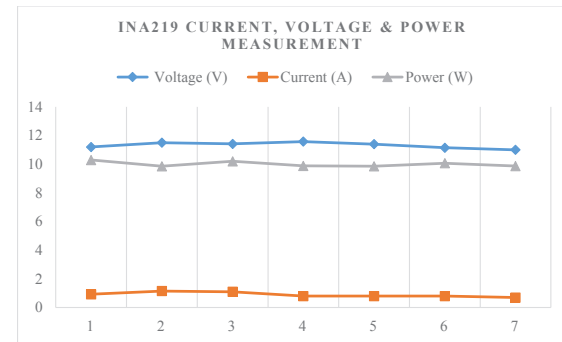


Figure 6: Sensed and Measured Voltage, Current and Calculated Power.

Google Cloud - Current, Voltage and Temperature

This section presents the recorded results of voltage, current and temperature at the google cloud which is setup using the google drive. Figures 7 and 8 shows the voltage, current and temperature values for INA219 voltage/current sensor and all the FOUR (4) thermocouple k-type sensors are recorded into the google cloud. These data is initially recorded in the SD Card at the Raspberry Pi Zero Wireless before being pushed into the google cloud.

```
Python 3.5.3 (default, Jan 19 2017, 14:11:04)
[GCC 4.8.0 20170124] on linux
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: /home/pi/Desktop/4x thermo(1).py =====
Press Ctrl-C to quit.
Thermocouple Temperature 1: 24.000°C / 75.200°F
Thermocouple Temperature 2: 33.000°C / 91.400°F
Thermocouple Temperature 3: 27.750°C / 81.950°F
Thermocouple Temperature 4: 27.250°C / 81.050°F
Thermocouple Temperature 1: 24.000°C / 75.200°F
Thermocouple Temperature 2: 33.000°C / 92.000°F
Thermocouple Temperature 3: 27.750°C / 81.950°F
Thermocouple Temperature 4: 27.750°C / 81.950°F
Thermocouple Temperature 1: 24.000°C / 75.200°F
Thermocouple Temperature 2: 33.500°C / 92.300°F
Thermocouple Temperature 3: 27.750°C / 81.950°F
Thermocouple Temperature 4: 27.750°C / 81.950°F
Thermocouple Temperature 1: 24.000°C / 75.200°F
Thermocouple Temperature 2: 33.500°C / 92.300°F
Thermocouple Temperature 3: 27.750°C / 81.950°F
Thermocouple Temperature 4: 27.750°C / 81.950°F
Thermocouple Temperature 1: 24.000°C / 75.200°F
Thermocouple Temperature 2: 33.500°C / 92.300°F
Thermocouple Temperature 3: 27.750°C / 81.950°F
Thermocouple Temperature 4: 27.750°C / 81.950°F
Thermocouple Temperature 1: 24.000°C / 75.200°F
Thermocouple Temperature 2: 33.500°C / 92.300°F
Thermocouple Temperature 3: 27.750°C / 81.950°F
Thermocouple Temperature 4: 27.750°C / 81.950°F
Thermocouple Temperature 1: 24.000°C / 75.200°F
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Figure 8: Photovoltaic Panel Temperature Recorded using Thermocouple K-Type Sensor at Google Cloud.

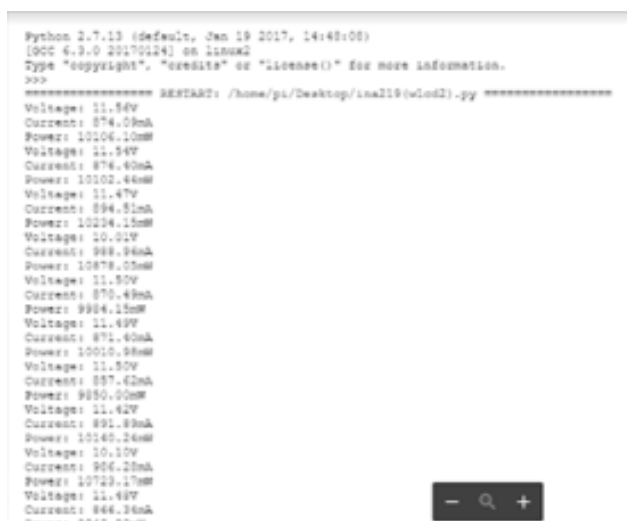


Figure 7: Recorded Voltage, Current and Calculated Power Recorded at Google Cloud.

CONCLUSION

This paper presents the conceptual and methodological process of setting up IoT based solar photovoltaic panel health monitoring system for an individual photovoltaic panel. From measured and recorded results, the real-time voltage, current and temperature recorded into the SD Card of Raspberry Pi Zero Wireless is sent to the google cloud for consumers viewing. The presented voltage and current results are varying with respect to the environment condition which also indicate the respective photovoltaic panel's health condition. The results recorded into the google cloud also shows that the recorded data at the SD Card of Raspberry Pi Zero Wireless is successfully transfer via the wireless network technology. Apart from that, the successfulness of implementing the IoT based solar photovoltaic panel health monitoring system shows that the technological implementation could help to reduce the fatigue at the photovoltaic panels and could be easily detectable when any fatigued condition occurs at photovoltaic panel.

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Challenging Issues for Educating the Disabled Children in Inclusive Education System

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ABSTRACT

The aim of this study is to find out the academic problems and challenging issues i.e. ratio of disabled and non-disabled student in inclusive education system/school, type (nature) of enrolled disabled student, age of disabled student at school enrolment's time, academic achievement of disabled student, facilities for disabled children in school and attendance ratio in school among disabled student (now divyang) in inclusive education set-up. Thirtyone disabled and thirty one normal (non-disabled) students were selected from eight rural government secondary/senior secondary schools of Udaipur district of Rajasthan which run under inclusive education system. Both disabled and non-disabled students were studied. They were enrolled in class 8th to 12thstd. and age range from 14 to 18 years. Purposive sampling method was a criterion of samples' selection. Results showed that disabled personnel were weak in their own academic achievement. They enrolled in later age at school level than normal student. Disabled student participation ratio was lesser (0-3 % disabled children in total enrolled student) but their absence ratio (averagely 10-12 presence days out of working days of 1 month) was higher than non-disabled children in their school. Majority of disabled were found either physically challenged (n= 29) or dead and dumb (n= 2). Blind and any other such specific disabled student were not found in these schools. No special teacher and professional rehabilitation worker found in these schools. Sometimes, block coordinator provides rehabilitation program through special education or any such activities. Foundation course and in-service program for disability education is not good in Rajasthan and few teachers (almost 10 percent) were trained through this program. ICT and facilities for disabled children in school were found negligible in the schools of rural area. All students (included disabled personnel) were getting the free education under different government schemes but, their progress rate and academic record was unsatisfactory. Overall, disabled student were psychologically and academically weak due to Lack of special educator/teacher, rehabilitation worker and psychologist.

Keywords: Academic, Achievement, Disabled, Enrolment, Inclusive, School.

INTRODUCTION

World Health Organization defined the disability as "Disability is an umbrella term, covering impairments, activity limitations, and participation restrictions. Impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations. Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives. Overcoming the difficulties faced by people with disabilities requires interventions to remove

environmental and social barriers."

For a long time, children with disabilities were educated in separate classes or in separate schools. People got used to the idea that special education meant separate education. But we now know that when children are educated together, positive academic and social outcomes occur for all the children involved. Inclusive education occurs when there is ongoing advocacy, planning, support and commitment.

As per Census 2011, in India, out of the 121 Cr population, about 2.68 Cr persons are 'disabled' which is 2.21% of the total population. In an era where 'inclusive development' is being emphasized as the right path

towards sustainable development, focused initiatives for the welfare of disabled persons are essential.

As per Census 2011, the number of disabled population in the state was recorded at 1,563,694, which is 5.83% of the disabled population in India. Population of persons with disability is 2.28 percent of the total population of Rajasthan. The disability population of 0-19 years is 273367 which is 17.64 percent of total disabled population of Rajasthan. Age of 0-19 years is pick time for getting the education and therefore it may be said that this age is golden age for both disabled and normal age group. Visual handicapped, hearing impaired, speech problems, movements, mentally retarded, mentally ill, others and multiple disabled are living in Rajasthan and their population is 314618, 218873, 69484, 427364, 81389, 41047, 199696 and 211223 respectively. In terms of literacy level among disabled, Rajasthan has second lowest position in the country, better only than Arunachal Pradesh. At all India level, 54.52% of the disabled persons are literates. However, in Rajasthan only 40.16% fall under the category ¹. In other words, in terms of the nature of disability in Rajasthan, about 3.1 lakh have problems in seeing, 2.1 lakh in hearing, 69,484 in speech, 4.2 lakh in movement while 2.1 lakh have multiple disabilities ¹.

Persons with disability are getting many benefits from government schemes. They get scholarship throughout the education by regular mode on the base of nature of disability. If any persons with disability buy the books or pay the fee of school, they get same amount by government. Government of Rajasthan (2014) reported that Rs.117.27 lakh were granted to 3292 persons with disability under the scheme of '*Wishesh Yogyajan Chatrawritti Yojna*', Rs. 82.92 lakh were granted to 5762 persons with disability under the scheme of '*Sanyukt Sahaayta A nudaan Yojna*', Rs.2.40 lakh were granted to 10 persons with disability under the scheme of '*Wishesh Yogyajan Anuprati Yojna*' and Rs.117.27 lakh were provided to 1362 persons with disability under the scheme of '*Mukhyamantri Wishesh Yogyajan Swarojgar Yojna*' from 13.12.2013 to 31.10.2014. Stipend in school, establishment of self employment and business, free coaching for competitive examination of UPSC, PSC, medical entrance, engineering entrance, etc. is granting through Rajasthan Government². Apart from this, all students get the free education, free books, uniform, free transportation from residence to school and return, free mid day meal (only for student of 1-5

std. of classes) under different government schemes.

The aim of this study is to find out the academic problems and challenging issues i.e. ratio of disabled and non-disabled student in inclusive education system/ school, type of enrolled disabled student, age of disabled student at school enrolment's time, academic achievement of disabled student, facilities for disabled children in school and attendance ratio in school among disabled student (now *divyang*) in inclusive education set-up³.

METHOD

SAMPLE SIZE AND TECHNIQUE

Thirty one disabled and thirty one normal (non-disabled) children were selected from the different locations of Udaipur district of Rajasthan. Selected samples were from 14 to 18 years. All selected samples were male. All non-disabled samples were looking normal and had no disability from any angle. Therefore they were considered normal (non-disabled) children and those persons who had hearing and speech problems were considered disabled children. The sample was collected from eight (out of eleven) rural government senior secondary schools of Udaipur district. Purposive sampling method was a criterion of samples' selection.

VARIABLES

Disability was independent variable and participation rate (ratio) of disabled student, type (nature) of disability in disabled children, age of disabled student at school enrolment's time, academic achievement of disabled student, facilities for disabled children were dependent variables. Light (sufficient sunlight), time (noon time of school hour), gender (male), age (14-18 years) and motivation for the work (establishment of workable rapport) were controlled throughout data collection.

INSTRUMENT

A personal data schedule was prepared by present researchers to get necessary information like the age, gender, locality, age at school enrolment's time, academic achievement (in percent) of previous class, participation rate, nature of disability, facilities in schools, etc.

PROCEDURE OF DATA COLLECTION AND ANALYSIS OF DATA

Good rapport establishment through verbal and

sign language was made with all samples. The subjects were also informed properly regarding the importance of present study. Data was collected from students (both disabled and non-disabled children), teachers and head of the academic institutions. Personal data sheet was given to them for screening and completing the research objectives. Ex post facto design was used in this study. SD, mean, t-value, percent and simple arithmetic calculation were used for drawing the result.

RESULTS AND DISCUSSION

Participation rate (ratio) of disabled students and non-disabled students in the inclusive education system/schools

Recently, Rights of persons with disabilities (RPWD) bill is passed on 14th December, 2016 in the Rajya Sabha and subsequently in the Lok Sabha on 16th December, 2016. The bill was further approved and signed by the Hon’ble President before the year end and ‘notified’ by the government in its official Gazette on 28th December, 2016. Thus, RPWD Bill 2016 was ‘enacted’ and became a ‘Law’, the rights of persons with

disabilities (RPWD) Act 2016. In this act, the types of disabilities have been increased from existing 7 to 21 and the central government will have the power to add more types of disabilities. The 21 disabilities are given below:

1. Blindness, 2. Low vision, 3. Leprosy Cured Persons, 4. Hearing Impairments (deaf and hard of hearing), 5. Loco-motor Disability, 6. Dwarfism, 7. Intellectual Disability, 8. Mental Illness, 9. Autism Spectrum Disorder, 10. Cerebral Palsy, 11. Muscular Dystrophy, 12. Chronic Neurological Conditions, 13. Specific Learning Disabilities, 14. Multiple Sclerosis, 15. Speech and Language Disabilities, 16. Thalassemia, 17. Hemophilia, 18. Sickle Cell Disease, 19. Multiple disabilities including deaf-blindness, 20. Acid Attack Victim, 21. Parkinson Disease.

But, only four disabilities are studied in the present study. In terms of the nature of disability in Udaipur district, 753962 have problems in seeing, 75235 in hearing, 73147 in speech, in 400577 movement disabilities while 109058 have multiple disabilities (Rajasthan Disability census, 2011).

Table No-1: Number of disabled student and non-disabled student in the inclusive education system/schools

Sl. No.	Types (levels) of Schools	Number of disabled student	Number of non-disabled student	Total enrolled Student in schools	Percent (%) of disabled student in the school
1	Secondary School (6 th -10 th levels' classes)	3	331	334	0.90%
2	Secondary School (6 th -10 th levels' classes)	0	302	302	0%
3	Senior Secondary School (6 th -12 th levels' classes)	8	437	445	1.80%
4	Secondary School (6 th -10 th levels' classes)	5	338	343	1.46%
5	Secondary School (6 th -10 th levels' classes)	0	315	315	0%
6	Secondary School (6 th -10 th levels' classes)	7	314	321	2.18%
7	Secondary School (6 th -10 th levels' classes)	0	310	310	0%
8	Secondary School (6 th -10 th levels' classes)	2	322	324	0.62%
9	Secondary School (6 th -10 th levels' classes)	2	333	335	0.60%
10	Secondary School (6 th -10 th levels' classes)	2	337	339	0.59%
11	Secondary School (6 th -10 th levels' classes)	2	351	353	0.57%
Total		31	3690	3721	Range : 0-2.18%
Mean		2.82	335.45		

Results in table no-1 show that three schools out of eleven schools have no disabled student in the schools. In other words, disabled students are not found to be enrolled in 27.27 percent schools. This result indicates that disabled students are not enrolled in every school.

The above data also showed that the schools are having only 0-2.18 percent disabled student while normal student representation is 99.17 percent. The gap of admission in the school is very high between disabled and non-disabled. In present study, equal number of samples is taken from each schools and the average of samples' size was 3.75 from each schools. Minimum two samples and maximum eight samples of school going students from each school are selected from the all selected eight (out of eleven) schools.

Type (categorization) of disabled student in the inclusive education system/schools

Above table no-2 showed that neither visual neither handicapped nor mentally retarded are found to enroll in the schools under inclusive education system. Ratio of admission is highest of the physically handicapped (i.e. 93.55 percent) while persons with Hearing and Speech Problems are found less (i.e. 6.45 percent) under category of disabled student in inclusive education system. In other words, Majority of disabled were found either physically challenged or deaf and dumb. Blind and any other such specific disabled student were not found in these schools

Table No-2: Category wise number of disabled student in the inclusive education system/schools

Hearing Disabled Speech Problems	Visual Handicapped	Mentally Retarded	Physically Handicapped	Total
02	00	00	29	31

In table no.-3, result indicates that mean value of disabled and non-disabled children for age (in years) at admission in school is 06.81 and 06.16 respectively. A significant mean difference (t-value = 2.031, df = 59, $p < .01$) is found between the disabled and non-disabled children on the scores of age (in years) at admission in school. High scores on age (in years) at admission in school indicate the disabled students are enrolled in later age at school level than non-disabled student (normal student) in the inclusive education system/schools. The mean score of non-disabled children's age (in years) at admission in school is significantly lower than the disabled children under the schools of inclusive education system. In other words, result of table no-3 indicates that non-disabled students have enrolled earlier than disabled students in the schools of inclusive education system.

Table No.-3: Comparison of mean score of age (in years) at admission in school between disabled and non-disabled student in the inclusive education system/schools

Group	N	Mean (in years)	SD	SEM	SED	t-value	p-value (df =59)
Disabled Student	31	06.81	01.28	0.23	0.32	2.031	$p < .05$
Non-Disabled Student	31	06.16	01.24	0.22			

According to table no-4, mean value of disabled and non-disabled children for academic achievement (previous academic examination result) is 47.26 and 52.58 respectively. SD for academic achievement is 5.64 and 2.24 respectively for disabled and non-disabled children. A significant mean difference (t-value = 4.881,

df =59, $p < .01$) is found between the disabled and non-disabled students for academic achievement under the schools of inclusive education system. Low scores on academic achievement (previous academic examination result) among disabled students shows that they are weak in their own study, examination result and academic

achievement. The mean score of non-disabled children's academic achievement is significantly higher than the disabled children. In other words, result of table no-4 clearly indicates that disabled student have lesser score

on academic achievement than non-disabled student. Therefore, it is proved that disabled personnel are weak in their own academic achievement and their progress rate and their academic record was found unsatisfactory.

Table No.-4: Comparison of means between academic achievement (in percent of previous academic examination result) of disabled student and non-disabled student in the inclusive education system/schools

Group	N	Mean (In %)	SD	SEM	SED	t-value	p-value (df =59)
Disabled Student	31	47.26	05.64	1.01	1.09	4.881	p <.01
Non-Disabled Student	31	52.58	02.24	0.40			

This data represents attendance for the month of January 2018 and this month has three normal holidays and four Sundays. This month has twenty four working days and attendance is calculated on the base of these working days.

Table No.-5: Comparison of means between attendance (presence of one month) of disabled student and non-disabled in the inclusive education system/schools

Group	N	Mean	SD	SEM	SED	t-value	p-value (df =59)
Disabled Student	31	11.42	02.67	0.48	0.73	4.863	p <.01
Non-Disabled Student	31	14.97	03.05	0.55			

In above table no.-5, result indicates that mean value of disabled and non-disabled student for attendance (presence of one month) is 11.42 and 14.97 respectively. A significant mean difference (t value = 4.863, df = 59, p<.01) is found between the group of disabled and non-disabled children for attendance and presence in their class within the school. The mean score of non-disabled student is significantly higher than the disabled student. In other words, disabled student has lesser scores on attendance of their class and their absence ratio is higher (10-12 presence days out of working days of 1 month) than non-disabled children in their school.

Table No.-6: Numbers and percent of teacher, special educator and rehabilitation worker in the inclusive education system/schools

Sl. No.	Types (levels) of Schools	Number of general trained teacher (B.Ed. Teacher)	Number of special trained teacher (B.Ed. special Teacher)	No. of professional rehabilitation worker	Total trained (general and special) teacher	Percent (%) of special trained teacher (B.Ed. special Teacher)
1	Secondary School (6 th -10 th levels' classes)	4	0		4	0%
2	Secondary School (6 th -10 th levels' classes)	5	0		5	0%
3	Senior Secondary School(6 th -12 th levels' classes)	9	0		9	0%
4	Secondary School (6 th -10 th levels' classes)	3	0		3	0%
5	Secondary School (6 th -10 th levels' classes)	5	0		5	0%

6	Secondary School (6 th -10 th levels' classes)	3	0	3	0%
7	Secondary School (6 th -10 th levels' classes)	4	0	4	0%
8	Secondary School (6 th -10 th levels' classes)	4	0	4	0%
9	Secondary School(6 th -10 th levels' classes)	3	0	3	0%
10	Secondary School(6 th -10 th levels' classes)	3	0	3	0%
11	Secondary School (6 th -10 th levels' classes)	6	0	6	0%
Total		49	0	0	49
Mean		4.45	0	0	

In above table no.-6, result indicated that problems of shortage of teachers can be seen in every school whether of secondary level school or senior secondary level school. In Rural area of Rajasthan, shortage of permanent teacher is major challenging issue and students (both disabled and non-dabled student) are suffering due to this reason. Results of their board examination are also adversely affected by these reasons. During collection of the data, it was found that some schools are running without headmaster and principal. Mostly schools have 3 teachers while the need is of more than ten teachers in every school. It is also observed that some schools are presently having para teacher and some

of them are untrained. They work in lesser salaries and don't get the salary on time. Anganwadi centre, primary school and senior/secondary schools are situated in same campus in the state of Rajasthan. No special teacher and professional rehabilitation worker are found in these schools. There is no sanctioned post of special educator and professional rehabilitation worker in general schools in the state of Rajasthan. Therefore, disabled students depend on general education. Teachers of general education are qualified for teaching the general students and they don't study about any issues of disabilities in their B.Ed. curriculum.

In Service training program for Teachers

Table No.-7: Participation in Foundation course, In Service Training and General Short Term training by the teachers in the inclusive education system/schools

S I . No.	Types (levels) of Schools	Number of teacher in general education	No. of Foundation course on disability education(in 2017-2018)	No. of In Service Training Program on disability education(in 2017-2018)	Percent (%) of participation in the training of special education by the teachers
1	Secondary School (6 th -10 th levels' classes)	4	0	0	0%
2	Secondary School (6 th -10 th levels' classes)	5	0	1	20%
3	Senior Secondary School(6 th -12 th levels' classes)	9	1	0	11.11%
4	Secondary School (6 th -10 th levels' classes)	3	0	0	0%
5	Secondary School (6 th -10 th levels' classes)	5	1	0	20%
6	Secondary School (6 th -10 th levels' classes)	3	0	0	0%

Cont... Table No.-7: Participation in Foundation course, In Service Training and General Short Term training by the teachers in the inclusive education system/schools

7	Secondary School (6 th -10 th levels' classes)	4	0	0	0%
8	Secondary School (6 th -10 th levels' classes)	4	0	1	25%
9	Secondary School(6 th -10 th levels' classes)	3	0	0	0%
10	Secondary School(6 th -10 th levels' classes)	3	0	0	0%
11	Secondary School (6 th -10 th levels' classes)	6	0	1	16.67%
Total		49	2	3	10.20 %
Mean		0.10			

In table no.-7, result indicated that only 4.08 percent teachers are found trained through foundation course on disability education and 6.12 percent teachers are found trained through 'In Service Training Program'. Therefore, result shows the ratio of training through foundation course and 'In Service Training Program on disability education' for general teachers is very low and such situation adversely affects the academic atmosphere and performance of disabled students in the schools of inclusive system. District coordinator (disabled/integrated education) and block coordinator provides rehabilitation program through special education or any such activities under 'Sarwa Shiksha Abhiyan' of Rajasthan Government. General observation and above results clearly indicates that foundation course and in-service program for disability education is not good in Rajasthan and few teachers (almost 10 percent) were trained through this program.

ICT and other facilities for disabled student in the inclusive education system/schools

In table no.- 8, result indicates that every school have their own computers. But maximum computers are not in working condition and battery backup is also poor. In rural area of Rajasthan, some villages are not connected with electricity. In some schools, computer is lying sealed and packed in box for long time. Post of computer operator/technician is not sanctioned in the government schools of Rajasthan. No teacher in the schools are ready to operate these computer systems. Connectivity is poor and till date all villages are not fully connected by mobile, information technology and internet. ICT facilities for disabled children in school are found negligible in the schools of rural area.

Table No.- 8: ICT and other facilities in the inclusive education system/schools

Sl. No.	Types (levels) of Schools	Number of computer	Internet facility	Play ground	Toilet	Ramp and other specific facilities for disabled student
1	Secondary School (6 th -10 th levels' classes)	1	0	Yes	1	Ramp 1
2	Secondary School (6 th -10 th levels' classes)	1	0	Yes	1	Ramp 1
3	Senior Secondary School(6 th -12 th levels' classes)	1	1	Yes	2	Ramp 1
4	Secondary School (6 th -10 th levels' classes)	1	0	Yes	1	No
5	Secondary School (6 th -10 th levels' classes)	1	0	Yes	1	Ramp 1
6	Secondary School (6 th -10 th levels' classes)	1	0	Yes	2	No

Cont... Table No.- 8: ICT and other facilities in the inclusive education system/schools

7	Secondary School (6 th -10 th levels' classes)	1	0	Yes	1	Ramp 1
8	Secondary School (6 th -10 th levels' classes)	1	0	Yes	1	No
9	Secondary School(6 th -10 th levels' classes)	1	0	Yes	1	Ramp 1
10	Secondary School(6 th -10 th levels' classes)	1	0	Yes	1	No
11	Secondary School (6 th -10 th levels' classes)	1	0	Yes	1	Ramp 1
Total		11	1	11	13	7(Only Ramp)
Mean		1	0.09	1	1.18	63.64

In table no.- 8, result indicates that every school have its own playground and sufficient field for outdoor games. Every school have their sown toilet but only teacher uses it. Students are not allowed to use the toilet. If students feel to use the toilet they have to go outside or in any other areas. Almost fifty percent of schools are having the ramp for disabled students. But, almost half numbers of the total schools are not having the ramp, specific/western toilet and other basic needs for disabled students. Therefore, physically handicapped, visually handicapped and hearing disabled with speech problems are facing the academic problems due to lack of basic facilities in the schools of the inclusive education system.

CONCLUSION

Disabled children are found weak in their own academic progress and achievement. They enrolled in later age at school level than normal student. Disabled student participation ratio is lesser and absence ratio is higher than non-disabled children. Majority of disabled are found physically challenged and few of them are deaf and dumb. Blind and any other such specific disabled student are not found in these schools. No special teacher and professional rehabilitation workers are found in these schools. Sometimes, block coordinator provides rehabilitation program through special education or any such activities. Foundation courses and in-service program for disability education are not good in Rajasthan and few teachers are trained through this program. ICT and facilities for disabled children in school are found

negligible in the schools of rural area. Overall, disabled student is psychologically and academically weak due to lack of special educator/teacher, rehabilitation worker and psychologist.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Techno-Pedagogical Competence among Senior Secondary School Teachers

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ABSTRACT

The present study aimed to explore the predictors of Techno-Pedagogical Competence among teacher of senior secondary schools. As the nature of research was descriptive so survey method was applied by the investigator to gather the pertinent data. In this study the data was gathered from 100 teachers of senior secondary schools both from government and private schools using stratified random sampling technique. In this study, Teachers Techno-Pedagogical Competence scale by S.Rajashekar and K.Sathiyaraj (2013), was used for collecting the data. The application of statistical techniques such as percentage, mean, t-test, standard deviation helped to analyse the data. The research findings indicated that there is no significant difference in male and female senior secondary school teachers with respect to their techno-pedagogical competence but on the other hand Government and Private senior secondary school teachers differ significantly from each other with respect to their techno-pedagogical competence. Private senior secondary school teachers possess more techno-pedagogical competence as compared to government senior secondary school teachers;

Keywords: *Techno-Pedagogical Competence, senior secondary school teachers*

INTRODUCTION

Modern society require teachers who can adapt quickly and effectively with these everchanging challenges as per the needs and demands of the society. It's time for teachers to take different approach to education in order to fulfil the needs of the 21st century students. Teachers not only required becoming familiar with the technologies but also needing to develop the skills to use it in a variety of teaching setups. Many technology applications in teaching offer the teachers a way in understanding the capacity of knowledge of their own self as well as the students and enable them to explore that to what extent they can work in bringing desirable changes in teaching-learning process.²

The use of technology in classroom is not only helping students progress but also it provides an opportunity in changing the role of teachers in the classroom. Teachers who fail to adapt to the demands of the new technology driven classroom will likely become a history of the past as much as textbooks. Non-technology classroom learning simply means grapping knowledge and teaching-learning with the use of technology is all about discovering and using knowledge effectively and

efficiently. So, teachers need to be flexible in order to follow these new paths and master certain skills which educators in the past failed to do.

Despite the wide increase and advancement in science and technology some teachers fail to integrate technologies in teaching and are still confined to old methods of teachings. Infusion of technology in educational process engages the teachers to carry out effective work but it also creates a certain doubt and fear among teachers who are not aware of it. Not every teacher is technologically competent³. A feeling of not being able to make use of technology or being competent or master enough to relate it with teaching can prevent the teacher from taking any further step to get started or get going with the new environment.

The advent of technology in the 21st century has brought about many changes particularly in the field of learning and its learning environment and people need to adapt themselves to these changes in a balanced manner. Technology integrated classroom converts students as information seekers, analysers, problem solvers, decision makers, producers, creative, communicators and collaborators. So, corresponding to these teachers need to be updated in terms of use of technology in

classroom⁵.

The common challenges teacher face as they try to integrate technologies into their classroom teaching in almost all the countries are :- inadequate training facilities for the use of technologies, insufficient experience, lack of financial support, lack of technical assistance, lack of knowledge about computers functioning, lack of support from administration and an inherent fear to experiment with new technologies⁸⁻¹².

So, there is dire need that teachers are required to come out of their deeply ingrained conception that they have learn it all at once and need not to upgrade anymore.

Techno-Pedagogical Competence

Education system nowadays moving on the path of modification from the old traditional chalk-and-talk method to a more refined and digitized pedagogical system¹. The development of techno-pedagogy has brought a drastic change in the field of education. It has revolutionized the whole education system. Literally the word 'techno' is derived from the Latin word 'texere' which means art-skill in handcrafting and 'pedagogy' refers to the techniques of the craft of teaching into the learning environment^{12-16, and 21}. The areas of techno pedagogical competence are as follows :-

A) Content: - content is the subject matter or body of information which is to be learned or taught to the students. It refers to the facts, concepts, theories and principles that are taught and learned rather than reading and writing.

B) Technology: - Technology encompasses an understanding of how to use computer software and hardware such as internet, digital video and common technologies including overhead projectors, interactive boards and e-books in education. It is knowledge about certain ways of thinking and functioning with technology, tools and its resources.

C) Pedagogy: - Pedagogy is an understanding of how teaching and learning can be transformed and carried out with the assistance of various strategies, procedures, processes and methods.

Acquiring techno-pedagogical competencies will make teaching and learning more pleasurable and meaningful endeavour as it will lessen the pressure on the part of the teachers and enable the students to

develop deeper domain of knowledge¹⁴⁻²¹.

Significance of the Study

In the current era of revolutionized technological world and it has become a basic requirement for people to possess technology related knowledge⁴. To function and work effectively in a technology- oriented society, students are required to hone up not their computer skills as well as proficiency to use various kind of technological resources to resolve various academic issues and to integrate as well as generate new knowledge and skills. The development and progress of these skills is the sole duty and responsibility of the schools and teachers.

The study in hand aims to bring about positive outlook for teachers who are facing difficulties in going hand-in-hand with technology. It necessarily does not mean every teacher should be competent in using technology but its sole aim is that every teacher should have technology knowledge as it has become a necessity in the present century.

The present study helps to attain a clear knowledge about the technological competence level of the teachers and to explore that how far teachers are using and applying this knowledge effectively for teaching the students. The study also helped to highlight the kind of resources made available to teachers; finding out the ways and means in which field or area they are lacking behind, attitude and anxiety towards the use of technology, ability of accessing to technology and the factors that are stopping them from using technology in their teaching. The findings of this research will have profound importance for the development of techno-pedagogical competence, computer skills and usage of various aids by instructors in teaching profession^{2,3}.

Objectives

1. To find out the difference between male and female senior secondary school teachers with regard to their techno-pedagogical competence.
2. To explore the difference between government and private senior secondary school teachers in their techno-pedagogical competence.

Hypotheses

There exists no significant difference between male and female senior secondary school teachers in their

techno-pedagogical competence.

There exists no significant difference between government and private senior secondary school teachers in their techno-pedagogical competence.

Delimitations

i) The present study was delimited only to senior secondary schools of Phagwara.

ii) Both Private and Government senior secondary school were considered in the present study.

iii) Data collection was done only from the teachers of senior secondary school.

Research Method

In the present research descriptive survey method was employed in order to gather data regarding the existing practises among teachers with regard to their techno pedagogical competence. The current study

was conducted on senior secondary school teachers of Phagwara. The sample consisted of 100 senior secondary school teachers of Phagwara both from private and government schools. Apart from this sample was divided into male and female teachers as well. The investigator used stratified random sampling technique in order to collect the data from different senior secondary schools of Phagwara. The investigator used Teachers Techno-Pedagogical Competence Scale by S. Rajashekar & K. Sathiyaraj (2013) for collecting the data in the present research

RESULTS AND INTERPRETATION

Result pertaining to difference between Male and Female Senior Secondary School Teachers with regard to their Techno-Pedagogical Competence

Ho: There exists no significant difference between male and female senior secondary school teachers in their techno-pedagogical competence

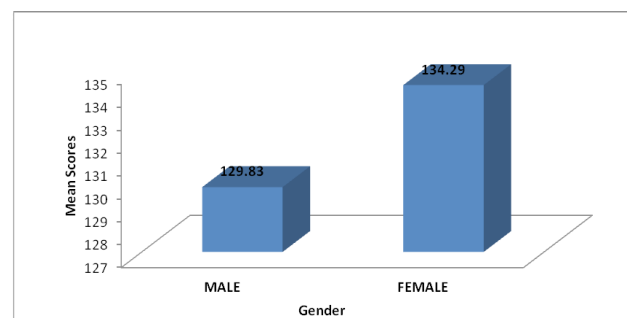
TABLE 1: Significance of Mean Difference between Male and Female Senior Secondary School Teachers in their Techno-Pedagogical Competence

GROUP	N	Mean	SD	SED	t'-Value	Remarks
MALE	48	129.83	34.87	6.84	0.65	Not Significant
FEMALE	52	134.29	33.37			

Interpretation

Table 1 reveals the mean value of male and female senior secondary school teachers with regard to their techno-pedagogical competence is 129.83 and 134.29 respectively. The value of standard deviation in case of male and female senior secondary school teachers is 6.84. The t'-value of male and female senior secondary school teachers in terms of their techno-pedagogical competence comes out to be 0.65 which is not significant at 0.05 level of confidence.

Therefore, the stated hypothesis, there exists no significant difference between male and female senior secondary school teachers in techno-pedagogical competence, is accepted at 0.05 level of confidence.



Graph 1 Mean Techno-Pedagogical Competence Scores of Male and Female Senior Secondary School Teachers

Result pertaining to difference between Government and Private Senior Secondary School teachers with regard to their Techno-Pedagogical Competence

Ho: There exists no significant difference among government and private senior secondary school teachers

in their techno-pedagogical competence.

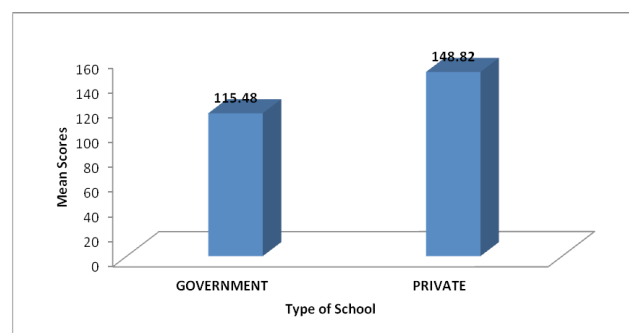
TABLE 2: Significance of Mean Difference between Government and Private Senior Secondary School Teachers in their Techno-Pedagogical Competence

GROUP	N	Mean	SD	SED	t'-Value	Remarks
GOVERNMENT	50	115.48	32.93	5.95	5.61	Significant
PRIVATE	50	148.82	26.16			

Interpretation

Table 2 reveals the mean value of government and private senior secondary school teachers with regard to their techno-pedagogical competence is 115.48 and 148.82 respectively. The value of standard deviation in case of government senior secondary school teacher is 32.93 and private senior secondary school teacher is 26.16. The t'-value of government and private senior secondary school teachers in terms of their techno-pedagogical competence comes out to be 5.61 which is significant at 0.01 level of confidence. Private senior secondary school teachers are more techno-pedagogical competence as compared to government senior secondary school teachers.

Hence, the stated hypothesis, there exists no significant difference in techno-pedagogical competency between the government and private senior secondary school teachers, is rejected at 0.05 level of confidence.



Graph 2 Mean Scores of Techno-Pedagogical Competence between Government and Private Senior Secondary School Teachers

CONCLUSIONS

The in-depth analysis of the data reveals that male and female senior secondary school teachers do not differ significantly from each other with respect to their techno-pedagogical competence. The researcher is of the view that such results may be because of the reason that gender

is not concerned with techno-pedagogical competence. Anyone can have techno-pedagogical competence irrespective of their gender. Similarly results show that government and private senior secondary school teachers differ significantly from each other with respect to their techno-pedagogical competence. The techno-pedagogical competence has been found more in case of private school teachers as compared to govt school teachers. This may be because of the reason that private school focusses on the application of modern and updated technology in education, meaning thereby they appoint teachers who already possess such kind of competence. On the other hand, teachers themselves keep themselves updated with application of technology in education sector as to sustain in the academic environment of private sector educational institutions. The results of the study clearly indicate the need to develop techno-pedagogical competence among teachers in government schools as today is the era of technology and if teachers are lacking un such competence then how will instill skills among students regarding use of technology in our day to day life. Moreover, study also indicate a strong requirement on the part of govt to provide training to existing teachers of govt schools with the intent to raise their techno-pedagogical competence as nowadays such skills are very crucial in contemporary education sector.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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Stylised Facts on Drivers and Constraints in Zimbabwe's Manufacturing Sector Performance

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ABSTRACT

This study aim at identifying major constraints and drivers affecting performance in the manufacturing sector in Zimbabwe. Using comparative literature from the region, the study managed to explicitly show that despite dollarization of Zimbabwe's economy, the sector continues to show poor indicators of the manufacturing sector. Stylised facts of manufacturing sector share in GDP, volume of manufacturing index, manufacturing sector share in total productive sector value added and manufacturing sector employees and total earnings were poor in a post dollarized Zimbabwe. Low local demand, competition, finance and infrastructure are major constraints in the manufacturing sector in Zimbabwe. Policy stability, zero corruption tolerance, FDI, reliable power and retooling can drive the manufacturing sector. In conclusion, the government should provide an enabling economic environment sustainable to salvage the struggling manufacturing sector in Zimbabwe.

Keywords: manufacturing, performance, drivers, constraints, Zimbabwe's economy, local demand, capacity utilisation

INTRODUCTION

The study focuses on the manufacturing sector in Zimbabwe which was one of the most significant pillars of the economy. It has contribution to the Gross Domestic Product (GDP), export earnings, employment levels and investment opportunities as supported by Kanyenze, Kondo, Chitambara and Martens¹. The United Nations Development Programme (UNDP)² and the Confederation of Zimbabwe Industries (CZI)³ concluded that the manufacturing sector was the mainstay of Zimbabwe's economy. Despite the great contribution from Zimbabwe's manufacturing sector to the economy, its efficiency has been on the decline Gumbe and Kaseke⁴.

Background of the study

Manufacturing has historically been the driver of economic growth, structural change, and catch-up in world developments. CZI⁵ stated that, in Zimbabwe, 15% of the formal employment is in the manufacturing sector, when the economy is at its peak. The McKinsey Global Institute⁶ further found out that manufactured goods make up 70% of global trade. In the same vein,

the Reserve Bank of Zimbabwe (RBZ)⁷ posits that Zimbabwe's manufacturing sector contributes 37% to exports when it is at its peak.

The following trend analysis show that the manufacturing sector is not performing well in Zimbabwe. Few but major key indicators (manufacturing sector share in GDP, volume of manufacturing index, manufacturing sector share in total productive sector value added and manufacturing sector employees and total earnings) are picked below and analysed.

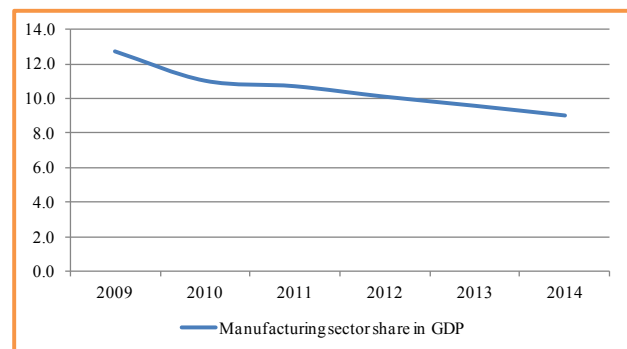


Figure 1: Manufacturing sector share in GDP, 2009 to 2014, Zimbabwe

Source: Authors' calculation from ZIMSTAT database

The figure above shows that the manufacturing sector has lost its contribution to national output. Manufacturing sector contribution to GDP has been going down from 2009 to 2014 despite dollarization in 2009. This shows that the decline in contribution to growth is due to production constraints.

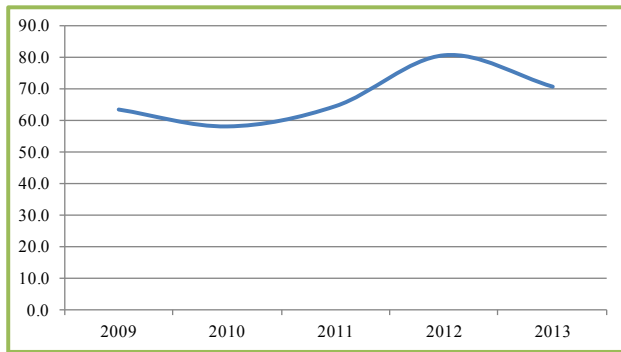


Figure 2: Manufacturing sector share in total productive sector value added

Source: Authors' calculation from ZIMSTAT database

Despite the fall in contribution to GDP due to production shortcomings, the manufacturing sector share in total value addition value addition has actually shown some upward trend since dollarization in 2009 (Figure 2). The share of manufacturing sector in value addition increased from about 63% in 2009 to about 71% in 2013. This increase is mostly due to the decrease in contributions to value addition by the mining sector, whose contribution decreased from about 29% in 2009 to about 15% in 2013.

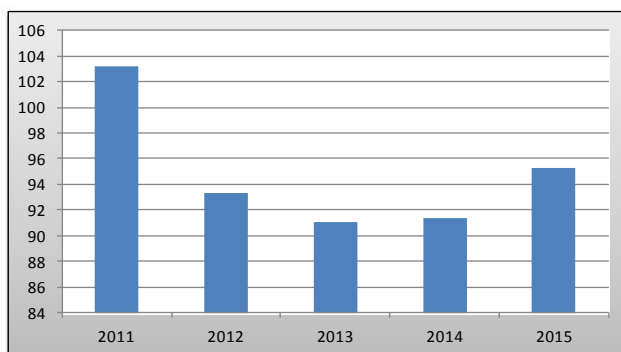


Figure 3: Volume of manufacturing index, Zimbabwe, 2011 to June 2015

Source: Adapted from ZIMSTAT

One of the indicators that can be used to assess manufacturing sector performance is Volume of

Manufacturing Index (VMI), which is produced by the Zimbabwe Statistical Agency (ZIMSTAT). The VMI is an index which measures changes in the volume of production of the manufacturing sector on a monthly and annual basis. The VMI has its base year set at 2009 (i.e. 2009=100). Thus the value of the VMI in each year is a reflection of the difference in performance between the respective year and the performance in 2009. The VMI trend shows that the manufacturing sector output has been declining since 2011 relative to its levels in 2009 (Figure 3). While production in 2011 was above the 2009 level by about 3%, by 2014 it had decreased to only about 9% compared to the level in 2009.

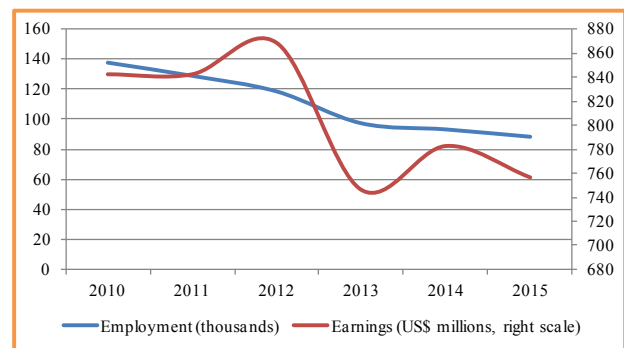


Figure 4: Manufacturing sector employees and total earnings, 2009 to 2015

Source: Adapted from ZIMSTAT

By 2015, the number of people employed in the manufacturing sector had decreased by about 36% from about 138,000 in 2009, which is quite significant. Although the decrease was quite cyclical unlike the number of employees, the wages (earnings) of manufacturing sector employees also decreased significantly over the period; the total earnings of about 756 million for the manufacturing sector in 2015 implies that earnings had decreased by about 10% from the levels in 2009. This smaller decrease compared to the number of employees could be reflecting the high retrenchments costs which still need to be finalized by the firms.

The background analysis has shown that the manufacturing sector in Zimbabwe is facing performance challenges. The indicators generally show a struggling manufacturing sector, where production challenges continue to affect performance. The sector is thus not expected to be efficient and competitive. However, while this is the aggregate picture for the whole sector, it is also important to establish the key drivers and constraints in these key indicators.

Research Problem and study objectives

Despite the significant contribution that the manufacturing sector can make to the Zimbabwean economy, the efficiency of the firms in the sector has been on the decline as stated by Kanyenze et al.¹ and CZI³. On the backdrop of the overall economic slowdown, the results of the CZI (8) reveal slackening economic activity as overall capacity utilization has continued declining from 44.9% in 2012 to 39.6% in 2013 UNDP⁹; Kanyenze et al.¹. Although the economy has stabilized and started to grow in the dollarized era, the efficiency and contribution of the manufacturing sector has not improved. Marongwe¹⁰ attested that capacity utilization of the manufacturing firms has remained below 40%, despite the stabilization of the economy after 2008 continued declining from 44.9% in 2012 to 39.6% in 2013. In order to solve the research problem, this study will determine the drivers of efficiency in Zimbabwe's manufacturing sector and identify the levels and kinds of inefficiencies in Zimbabwe's manufacturing sector.

Literature

Chikabwi, Chidoko and Mudzingiri¹¹ investigated the common drivers of the manufacturing sector using a sample of nine SADC countries for the period 200-2013. The study concluded that trade openness, technology transfer and capital investment positively influenced manufacturing sector productivity growth in the SADC countries. The major constraints noted in this study were labour force and innovation. This study which utilised the panel data methodology posit that existing empirical researches present conflicting evidence which is still igniting research studies in this area including this one.

Tanzania Country Report¹² identified universal drivers of manufacturing sector performance which include among others, the legal and regulatory environment, support institutions, infrastructure, higher education and training, market efficiency (including labour market efficiency), market size, financial market development, technological readiness and innovation. Tanzania Country Report¹² further noted that Tanzania has a comprehensive set of good manufacturing-related policies in place which failed to improve manufacturing performance as a result of poor implementation strategies and at time by too optimistic and unrealistic deadlines. In Tanzania, the manufacturing sector enjoys incentives which are short term in nature and unpredictable

as they are supported by ineffective institutions. In sum, according to the African Development Report¹³, Tanzania's manufacturing sector faces a number of binding factors and constraints. These include various policy, institutional, and capacity constraints; legal and regulatory frameworks; as well as developmental aspects, such as inadequate infrastructure quantity and quality, availability and access to finance, and technology.

METHODOLOGY

The study uses annual data from an average of 250 questionnaires that are sent to respondents in the manufacturing sector. Companies are drawn from the four CZI Chambers namely Mashonaland, Manicaland, Matabeleland and Midlands. These include both CZI members and non-members. The data set covers the years 2013-2017. More data sets were sort from various Government of Zimbabwe (GoZ) publications, of much use were those from Ministries, ZIMSTAT, Reserve Bank of Zimbabwe (RBZ) and Zimbabwe National Chamber of Commerce (ZNCC).

Drivers and constraints of performance in the manufacturing sector

The background analysis on the manufacturing sector key indicators shows that the manufacturing sectors is performing badly. The drivers and constraints affecting performance in the manufacturing sector in Zimbabwe are presented, interpreted and discussed.

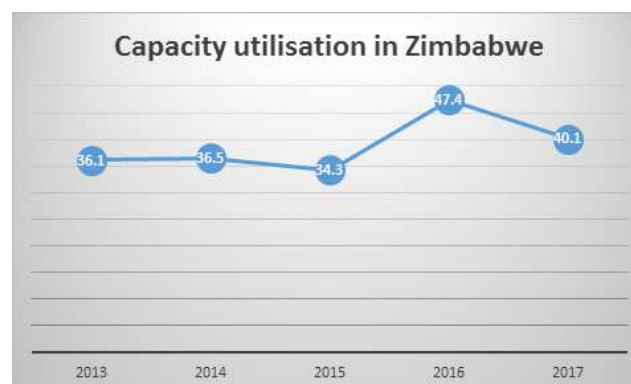


Figure 5: Capacity utilisation

Source: Adapted from the Manufacturing sector survey

Capacity utilisation has remained below 50 % for the period 2013- 2017. African Development Bank Report¹³, showed that Tanzania's manufacturing sector is constrained by low manufacturing capacity which by transitivity reduces manufacturing sales, manufacturing

export, manufacturing sector employment and manufacturing sector contribution to GDP. Decimation in the Zimbabwe’s manufacturing sector is by no means an excuse since capacity utilisation has remained low with an average downward trend.

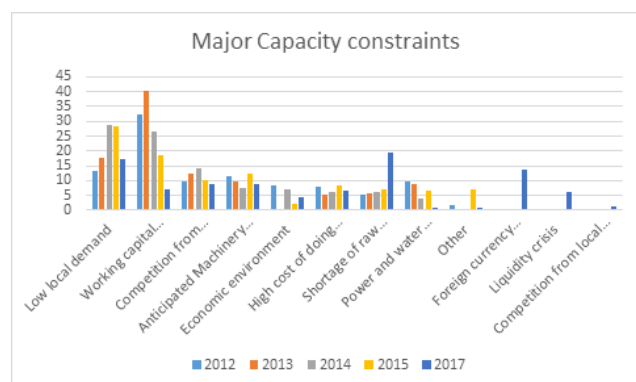


Figure 6: Major capacity constraints

Source: Adapted from the Manufacturing sector survey

The average downward spiral on capacity utilisation is constrained largely by working capital and low local demand. African Development Bank Report¹³ cited lack of structured finance both for investment and working capital as a major driver in Sub Saharan Africa in general and Tanzania in particular. Low local demand restricted capacity as the country faces competition mainly from South Africa, Zambia and China. Shortage of raw materials and foreign currency shortages constrained manufacturing capacity in 2017. Marongwe¹⁰ attested that capacity utilization of the manufacturing firms has remained below 40%, despite the dollarisation of the economy after 2008 as foreign currency shortages persisted.

Table 2: Major Capacity constraints

Major Capacity constraints	2012	2013	2014	2015	2017
Low local demand	13.3	17.6	28.8	28.4	17.18
Working capital constraints	32.3	40.2	26.5	18.6	6.87
Competition from imports	9.5	12.5	14.2	10.3	8.59
Anticipated Machinery and machine breakdowns	11.4	9.8	7.3	12.3	8.59
Economic environment	8.4	0	7	2	4.47
High cost of doing business	8	5.2	6.2	8.3	6.53
Shortage of raw materials	5.3	5.9	6.2	6.9	19.59
Power and water shortages	9.9	8.8	3.8	6.4	1.03
Other	1.9	0	0	6.9	0.69
Foreign currency shortage	0	0	0	0	13.75
Liquidity crisis	0	0	0	0	6.19
Competition from local producers	0	0	0	0	1.37

Source: Adapted from the Manufacturing sector survey

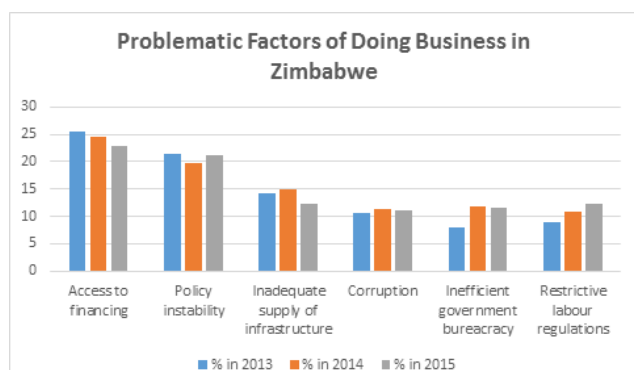


Figure 7: Problematic factors of doing business in Zimbabwe’s manufacturing sector

Source: Adapted from the Manufacturing sector survey

The most problematic constraint of doing business in Zimbabwe remained challenges to accessing finance by the manufacturing sector for the period 2013-2015. Corruption, policy instability and reversal in Zimbabwe negatively affected manufacturing sector performance which Calabrese, Papadavid and Tyson¹⁴ blamed for poor performing manufacturing sector in Rwanda. Chikabwi, Chidoko and Mudzingiri¹¹ concluded that infrastructure challenges is a challenge in nine Sub Saharan countries in manufacturing sector performance. Access to financing, policy stability, adequate infrastructure, no to corruption and liberal policies can drive manufacturing sector in Zimbabwe.

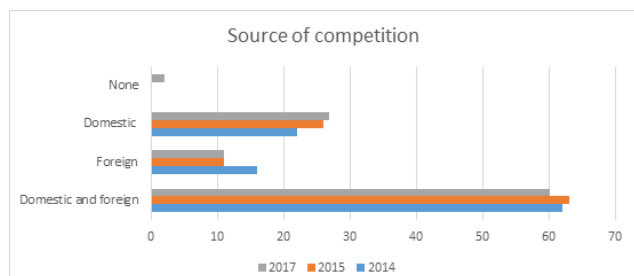


Figure 8: Source of Competition in the manufacturing sector

Source: Adapted from the Manufacturing sector survey

Competition is vital for competition and product diversity in modern economies but surprisingly manufacturing firms in Zimbabwe cite it as a major constraint to their performance. Most Sub Saharan countries as alluded to by Chikabwi, Chidoko and Mudzingiri¹¹ face import competition in their markets. Some manufacturing firms in Zimbabwe faced no competition in 2017 after benefiting from trade restriction imposed by Statutory Instrument 64 which restricted some imports.

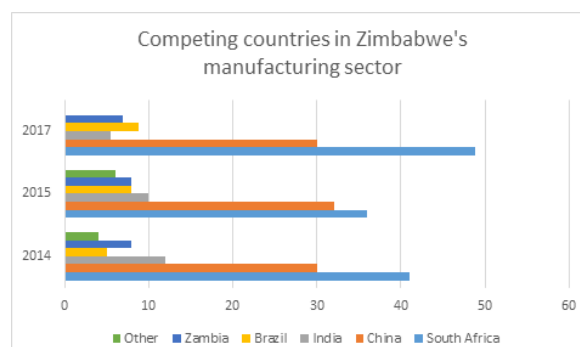


Figure 9: Competing countries in Zimbabwe’s manufacturing sector

Source: Adapted from the Manufacturing sector survey

The manufacturing sector in Zimbabwe faces stiff competition mainly from South Africa and China. Major source of imports is South Africa, China, Brazil, India and Zambia. These countries are major exporters of food and beverages. This implies that Zimbabwe’s food and beverages manufacturing sub-sector is performing poorly. Zambia and Brazil has exported a lot of maize owing to the draught induced food shortages. The McKinsey Global Institute⁶ further found out that manufactured food make up 70% of global trade which Zimbabwe is failing to satisfy.

Sales Destination of manufactured goods

Source: Adapted from the Manufacturing sector survey

Sales from Zimbabwe’s manufactured goods is dominated by both local and export market. CZI¹⁵ found that exports to other destinations is driven by trade blocs and pricing structures in Zimbabwe. Low domestic demand leaves the imports to compete away in sales for the domestic market. Zimbabwe is a high cost producer of manufactured goods due to the use of United States dollar as local currency. This on its own attracts more imports and make locally produced goods uncompetitive.

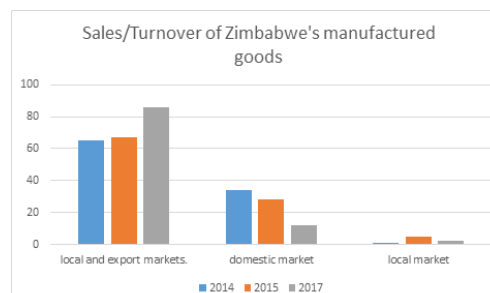


Figure 10: Problematic Infrastructure Factors

Source: Adapted from the Manufacturing sector survey

Power cuts and shortages is the largest constraining infrastructural factor in the manufacturing sector in Zimbabwe. Electricity is a key driver in the manufacturing sector as hi-tech machinery need to be powered consistently to achieve desired capacity. CZI (15) observed that the energy industry in Zimbabwe is marred by corruption, obsolete and outdated machinery

which need to be replaced. Tanzania Country Report¹² found that inadequate infrastructure has limited capacity utilisation of the manufacturing sector in Tanzania. Top of the list constraining infrastructural factors in Zimbabwe are power cuts and shortages, lack of ports, poor road networks especially the one connecting to South African who is the major trading partner. Contrary to Zimbabwe, Tanzania and South Africa have ports as a major driver of production and imports of manufactured goods.

Table 3: Trade constraints for Zimbabwe's manufactured products

2014	2015	2017
1. Access to trade finance	1. Access to trade finance	1. Identify potential markets and buyers
2. Access to imported inputs at competitive prices	2. Identifying potential markets and buyers	2. Access to imported inputs at competitive prices
3. Identifying potential markets and buyers	3. Access to imported inputs at competitive prices	3. Access to trade finance
4. Burdensome procedures at foreign borders	4. Burdensome procedures at foreign borders	4. Burdensome procedures and corruption at foreign borders
5. Technical requirements and standards abroad	5. Difficulties in meeting customer requirements	5. Export licensing requirements

Source: Adapted from the Manufacturing Sector survey interviews

The themes which are constraining trade in manufactured goods are listed above in order of their influence in the given years. Access to trade finance was the major constraint both in 2014 and 2015. In 2017 access to trade finance was relegated to third ranked

constraint for trade in manufactured goods. Burdensome procedures and corruption at foreign borders is a constraint in Zimbabwe and Tanzania as explained by the Tanzania Country Report¹².

Table 4: Constraints of doing business

2014	2015
· Cash Shortages	Poor/deteriorating economic conditions - not conducive for business growth
· Competition from Imports	Needs major change and business friendly policies-too many restrictions
· Power Cuts	Liquidity challenges-need FDI
· Policy Instability	High unemployment and low aggregate demand
· Corruption	Economy currently stagnant/uncertain
	High costs of doing business

Source: Adapted from the Manufacturing Sector survey interviews

CONCLUSION AND IMPLICATIONS

Manufacturing firms in Zimbabwe need to embrace advanced technologies in order to be globally competitive. The firms need advanced software, sensors, and massive amounts of data and analytics so as to ensure smarter products, processes, and more closely connected customers, suppliers, and manufacturing Global Human Capital Trends Report¹⁶. Prioritisation of technology oriented research is critical to catch up with technology, which is seldom stagnant. This can also be achieved through partnerships with other firms in the region and globally, which are already operating using such technologies. There is therefore need for positioning Zimbabwe firms as attractive for investment, which would make it easier for such partnerships to be negotiated. Manufacturing companies need to focus on targeting new, smart and strategic partnership models to help drive improvements.

As a result of stylised facts in this research, an efficiency study should be carried out. This efficiency study will draw its input and output variable from this study. It can be deduced that cost of inputs, electricity can be some input variables to be considered whilst value addition, sales volume and volume of manufacturing index can be probable output variables for the proposed efficiency study. The efficiency study can be disaggregated according to the manufacturing sub-sectors in Zimbabwe.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Cyber Bullying as an Outcome of Social Media Usage: A Literature Review

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ABSTRACT

Most of the research on cyber bullying available on the internet is of foreign origin. Research studies on this constant on Indian population are required. Thus calls for a narrative review of the available literature in foreign as well as Indian context. This present study tried to meet this requirement by presenting a narrative review on cyber bullying construct literature. Electronic data bases like Eric, Proquest, google scholar, J-gate, Eric were used as the data sources. Literature in the form of research articles and reviews articles were searched the words with the exact key words “**cyber bullying**” and “**Indian**” in the title was selected for study and literature on related key words was strictly ignored. The literature included research articles citing the first recorded case of bullying to certain latest finding in this subject in recent times. The study found that the use of technology is in rise in Indian, with the Indian youth spending at least an hour or two on the social networking sites being vulnerable to cyber bullying and suffering in due course owing to poor awareness and bad implementation of cyber laws.

Keywords: *Cyber Bullying, Cyber Laws, Social Networking Sites.*

INTRODUCTION

Bullying has been a long topic of discussion among researchers across the world. The word bullying is traced from 1530s. It is deliberate, intentional and aggressive act, carried out by an individual or group of individuals who are more powerful in order to give physical and psychological harm to others who are weak and emotional. Bullying is not limited to harassing someone physically, e.g. beating, kicking, pushing, but it also occurs verbally like abusing, name calling, spreading rumors, joking, threatening and embarrassing¹. Bullying incidents lead to various problems in an individual such as depression, low self-esteem, poor grades, eating and sleeping habits get disturbed, and sometimes victim think of committing suicide². Even though various laws are formulated to stop bullying, still people get harassed through newly available modes like online mode, where the harassment is experienced by the victim in the cyber space and hence the name cyber bullying³.

Though bullying occurs in different forms, some of the mainly occurring types of this menace presently existing in the society are:

Verbal Bullying: This type of bullying involves usage of words, phrases, or verbal clues that embarrass, harass, or intimidate others. For example, name calling, teasing, passing racial comments, sarcasm, rumors, mean spirited comments, and intimidating words are the various forms of verbal bullying.

Difference between Traditional Bullying and Cyber Bullying

There are some important aspects of cyber bullying that separate it from traditional bullying. For example, in the traditional sense, bullies are found either at workplace or at a school. However, the bullies in the cyber space remain anonymous, making this form of bullying effective in action and dangerous in effect. Conventionally, the targets of bullying in schools are the children who are physically weak, overweight, unpopular or disabled, where the bullying takes place during the day time. On the contrary, there is no particular time for a victim to suffer bullying in the cyber space. As a result, the children feel heightened sense of victimization. The act of bullying in the cyber space can happen in the forms of uploading of images, sending derogatory

messages and interaction that occur in virtual reality which is different from the reality experienced routinely. In traditional bullying, the victim can experience a small period of respite from bullying on going back to home, but in cyber bullying, there is no respite from the stress until the victim gets back the electronic device. Such a heightened sense of powerlessness experienced by the victim under cyber bullying is supported by the work of Dooley et al. (2009). In traditional bullying, a victim can predict when he or she is going to be bullied (e.g. at school or on the playground); whereas in cyber bullying, the victim does not know when and where he or she is going to be bullied, or how (e.g. cell phone, computer), which leads to a feeling of heightened powerless. Recent studies suggest that cyber bullying is pervasive and ranks as one of the most common form of harassment

among adolescents.

METHODOLOGY

The study is purely based on the Indian reviews on Cyber bullying. There are very few studies on Cyber Bullying in Indian context. Electronic data bases like Eric, Proquest, Google scholar, and J-gate, were used as the data sources. The words with the exact key words “**cyber bullying**” and “**Indian**” in the title were selected for study. In the present 23 study studies from the year 2007 to 2016 were explored and their findings are discussed. Further these studies highlighted the Prevalence of cyber bullying through different modes, and how menace of cyber bullying cases can be prevented. The following table shows the main focus of the studies cited in the present study.

S.No.	Name of the Author	Year	Name of the Study	Focus of the Study
1	Mehta and Jaiswal	2007	“Cyber Bullying: An Indian Perspective.”	Separate law for cyber bullying should be framed so, that victims can register their complain.
2	Batra,	2011	“Cyber-Bullying in India : The Search for a Solution Why the Current Law in India is Ill- Equipped.”	Indian laws are still ill-equipped as it cannot control teens who act as bully in cyber bullying offence.
3	Tolia ⁵	2014	“Cyber bullying: A Socio-Legal Perspective”	Occurrence and prevention of cyber bullying
4	Sivakumar ⁴	2013	“Computer Mediated Interpersonal Crimes : A Study of Cyber Bullying among College Students in Cosmopolitan Cities”	Indian adolescents spend a lot of time on social networking sites.
5	Brahme and Mundhe ⁶	2014	“A Comparative Study of Widely Used Histogram Equalization Based Image Contrast Enhancement Methods”	Social networking sites acts as a vehicle for cyber bullying.
6	Srivastava	2012	“Pessimistic side of information & communication technology: cyber bullying & legislature laws”	Cyber bullying leads to physical, social and emotional problems.
7	Singh and Sonkar repeated, and hostile behavior by an individual or group that is intended to harm another or others. The purpose of the study was to explore the nature of cyber bullying, its impacts and the use and effectiveness of online coping strategies used by young adult. The information was collected from those male and female who used communication technologies. The sample consisted of 80 young adults, female (N=60	2013	“Cyber bullying: Experiences, impacts and coping strategies among young adults.”	Cyber bullying occurs in different forms and female gender is more victimized than male.
8	Singhal and Bansal,	2013	“Improved Textual Cyber bullying Detection Using Data Mining”	Networking sites needs to frame certain rules for creating an account.
9	Kesavamoorthy	2013	“Legal Study on the Protection of Children in Social Network : Special Reference to Indian Law”	Age as a compulsory criterion for creating social media accounts and cyber expert should be consulted for talking with this issue.
10	Nalini&Sheela	2014	“A survey on Data mining in Cyber Bullying.”	Detection and prevention of cyber bullying offences.
11	Venkataraghavan	2015	“A Study on the Usage of Mobile Phones for Cyber Bullying Among Tweens & Teens of Chennai”	Higher percentages of children are using mobile phones for cyber bullying.
12	Gupta, & Aparajita	2014	“No child ’s play : Online bullying a growing worry”	Difference between Traditional and Electronic bullying

Cont...

13	Microsoft Corporation	2012	“Online Bullying Among Youth 8-17 Years Old – India”	Percentage of cyber bullying in India
14	Learning,	2016	“Securing Cyber future.”	Secure social environment
15	Saha & Srivastava	2014	“Indian women at risk in the cyber space: A conceptual model of reasons of victimization”	Increasing rate of cyber-crimes against women
16	Halder & Jaishankar	2007	“Bullying and Cyber Bullying in Schools: Need to address the Legal and Policy Vacuum in India”	Awareness and types of cyber bullying
17	Mint	2016	“Indian millennial overconfident , unprepared to deal with cybercrimes : Report”	Half of the population is cyber victim.
18	Sharma, Kishore and, Sharma	2017	“Aggression in schools: cyberbullying and gender issues.”	Internet etiquettes, behavior disorder, and suicide
19	Gopalakrishnan & Sundram	2014	“Cyber bullying victimization and social anxiety among secondary school students”	Factors like high social anxiety and free internet usage leads to cyber bullying
20	Lavanya, & Prasad	2014	“A Study on the Prevalence of Cyber Bullying in Chennai.”	Avoid sharing of personal information on social networking sites.
21	Kaur	2016	“Cyber bullying : an overview in Indian Schools”	Involvement of young ones in cyber bullying and prevention strategies.
22	Mcafee Report	2014	“Internet & Social Media Usage among youth in Indian”	Statistical figure of Indian involved in cyber bullying.

Available Literature on Cyber Bullying in the Indian Context:

Though there are many western studies related to cyber bullying, there are no or less empirical researches in India to unearth this modern phenomenon. found that the Indian adolescents are online every day for at least an hour or two, and are active in social media platforms like Face book⁵. Conducted a study titled Cyber bullying: A Socio-Legal Perspective and the findings suggest that social networking act as a catalyst for cyber bullying occurrence⁶. It further highlights that an adolescent in order to maintain the authority over his or her peer group, gets involved in cyber bullying incidents. This study highlights that our Government should frame laws as to curb this harmful activity from expanding further.

McAfee’s Tweens, teens and technology in 2014, conducted a survey on 1422 Indian online tweens aged 8-12 years old and teens aged 13-17 years old²⁴. The study found that 50% of the Indian Adolescents are victim of cyber bullying either they are involved or they seen others. The reports highlighted that one in three Indian youths have been cyber bullied. The studies further bring forth certain medium through which cyber bullying incidents are occurring.

SAMPLE	PLATFORM	SITES	CITIES	PERCENTAGE OF USAGE	PLACE OF USAGE	RISK AWARENESS.
711 Male and 711 Female	Desk top (41%) 36% laptops and Smart phones (27%).	Face book (93%), YouTube (87%) and (79%). WhatsApp	Mumbia, Delhi, Chennai,Hyderabad, Ahmadbad, Pune	70% youth spend more than 5 hours on internet in week	(52%) use social networking sites and internet at school.	57% being 8-12 years and 47% 13-17 years old (80%) aware that sharing online activity can put them in trouble.

CONCLUSION

There are various reasons that lead people to get involved in cyber bullying instances. Either bullies don’t like other person or most of the time they take it as light activity and indulge in committing offence. Most of the time people get engaged in cyber bullying because they

are unaware about its consequences. It is also found that mostly young ones embrace others as they considered it as fun activity and for entertainment purposes. In order to impress their peers adolescents participate in cyber bullying offences because they want to show case their power.

The unregulated use of social networking sites by adolescents are somehow creating a situation of digital world and the adolescent is less and less interactive physically and verbally with the person around him such as parents, teachers and peers. The bullying influence either as victim or as bully causes a great damage to his relationship with parents, teachers and peers. Also lack of interaction and over usage of internet is putting the adolescents in a stage of awareness and they are taking the cyber bullying experience as a regular phenomenon and are not aware about its concept, overreach and effects. Cyber bullying is a real problematic issue to handle for teens, tweens, parents and teachers. It affects every aspect of life. Like traditional bullying cyber bullying causes serious damage to a person that sometimes it leads to committing suicide also. Most commonly cyber bullying victims reported the feeling of anger, embarrassment, fear, sadness, worried, threatened, distressed, loneliness, anxiety, poor academic performance at school, loss of confidence and self-esteem, revenge Cyber-bullying, self-harm, even suicide, family problems, academic difficulties, school violence and various delinquent behaviors.

Cyber bullying is a serious problem and it needs to be resolved. From the thorough review of above studies it can be concluded that Indian youth's usage of social networking sites is much higher than other countries and as a result the large percentage of population becomes victim of cyber bullying. It is also found in studies that most of the Indian have no knowledge of cyber bullying and therefore government needs to organize seminars, awareness camps for parents, teachers and especially for minor section of the population. Much needs to be done in the front of forming cyber-bullying laws and on their stringent implementation.

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Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Perception on the Commitment of Organization Board: Modeling with Importance Performance Analysis

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Abstract. This paper aims to find out the perception of an organization member on the commitment of its management. The variables studied are the level of importance and the level of satisfaction of the management performance. The sample used is taken proportionally from an organizational environment. Data collection methods using questionnaires and conducting interviews directly with respondents. The method used to measure perceptions using the Importance Performance Analysis (IPA) method. Statements are based on five characteristic dimensions according to the SERVQUAL method. In the paper using SPSS 22.00 syntax to measure the validity, reliability and analysis of research data. The results of data analysis will be able to explain the very dominant factors that affect the interests and satisfaction of organizational members on the performance of the board, so that it can contribute to the improvement of the vision and mission of the organization.

Keywords: IPA, SERVQUAL method, SPSS 22.00

INTRODUCTION

Activities will not exist if there is no environment and vice versa. Environment and living things interact with one another. The environment, as it is, experiences development along with the development of living things that live around it. The environment will continue to develop through the activities of living things while life is still going on, as well as the organism itself^{1,2}.

The environment that exists today is an environment that has been processing and developing for years through previous lives³. The present environment is the result of the adaptation of every era. Even so, the present situation does not always last forever. Every individual who occupies an environment at a certain time⁴, has perceptions to form a better environment. They adapt and regulate the environment in which they work.

Perception is how individuals choose, organize, and interpret their impressions to give meaning to the surrounding environment. However, what a person feels can be very different from what is expected. Very often we feel incompatible with what is happening around us. This is related to the human nature of home economicus which is never satisfied in meeting their needs, in this case satisfaction with their environment⁵⁻⁸.

In the previous paper on student perceptions of university education organizations where they studied, many factors influenced student perceptions of the lecture environment. Likewise with the university environment, must be able to know the factors that are considered important for improvement. These factors are compiled into questionnaires based on five dimensions of Service Quality (SERVQUAL) developed by Zeithaml, Parasuraman and Berry^{3, 8, 11-13}.

METHOD

The research method used in this study is descriptive quantitative type research method. This type of research method is used with a view to finding facts with the right interpretation and the aim is to find a systematic picture, and accurate facts.

Early Implementation

At this stage several activities are carried out, among others:

Data Collection

The population in this paper is a member of a socio-religious organization, the Catholic Church of Stasi Santo Paskalis Diski, Deli Serdang. The sampling technique used in this research is accidental sampling, namely who can be found members who are willing to

become respondents. Based on the Slovin formula, the minimum number of samples that can be taken is 100 respondents. The minimum number of sample sizes can also be determined based on Krecjie and Morgan Tables.

Litelature Study

Literature study is carried out by looking for references to the theoretical needs of research-based community service activities. Study literature in the form of books, journals, and the internet.

Needs Analysis

At this stage, analyze the needs that can support the implementation of activities. Some aspects of needs analysis include location, equipment, reading materials and supporting equipment.

Location Review

Researchers make a visit to the location of the activity as part of the implementation phase so that the

team can find out the conditions of the field that will be the place for the implementation of the activity. The site review was conducted repeatedly to ensure interactive communication with activity partners. The location of the activities was carried out in the Diski neighborhoods of Sunggal Subdistrict, Deli Serdang Regency, Sumatra Utara.

Importance Performance Analysis and SERVQUAL

The Importance Performance Analysis (IPA) method was originally developed to find an overview of the relationship between the level of importance and performance of marketing. The approach with this method is not something new in research. The relationship is then described in a diagram to then analyze the strengths and weaknesses of the company’s services. The diagram is divided into four regions, the dividing lines are the average of each level of importance and level of satisfaction¹⁵. The formula used:

$$\bar{X}_i = \frac{\sum_{j=1}^n X_{ij}}{n} \quad \text{and} \quad \bar{Y}_i = \frac{\sum Y_{ij}}{n} \tag{1}$$

Where:

\bar{X}_i = Factor average performance to i , where $i = 1,2,3, \dots, N$

\bar{Y}_i = Average factor interest to i , where $i = 1,2,3, \dots, N$

X_{ij} = Score factor performance levels to i from the respondent to j , where $i = 1,2,3, \dots, N$ and $j = 1,2,3, \dots, n$

Y_{ij} = Score the level of importance of the factor to i from the respondent to j , where $i = 1,2,3, \dots, N$ and $j = 1,2,3, \dots, n$

N = Number of factors / attributes

n = Number of respondents

Whereas to obtain the average of all the factors of importance and level of satisfaction based on equation (1) is obtained by the equation:

$$\bar{X} = \frac{\sum_{i=1}^N \bar{X}_i}{N} \quad \text{and} \quad \bar{Y} = \frac{\sum_{i=1}^N \bar{Y}_i}{N} \tag{2}$$

where:

\bar{X} = The average of all performance / satisfaction level factors

\bar{Y} = The average of all factors of interest level

The diagram of the division of regions with the IPA method is illustrated in Figure 1. To compile the factors that influence the quality of performance, a system of compilation of questionnaires is needed with SERVQUAL. With the SERVQUAL method¹⁶, all the factors studied are arranged into five dimensions, namely factors: tangible, reliability, responsiveness, assurance, and empathy. This dimension is used to facilitate the preparation of the science research questionnaire.

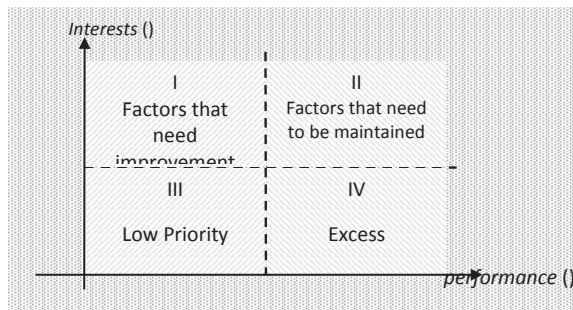


Figure 1. IPA analysis diagram

RESULT AND DISCUSSION

Respondent Data Analysis

The following is a graph of respondents answers from 25 factors.

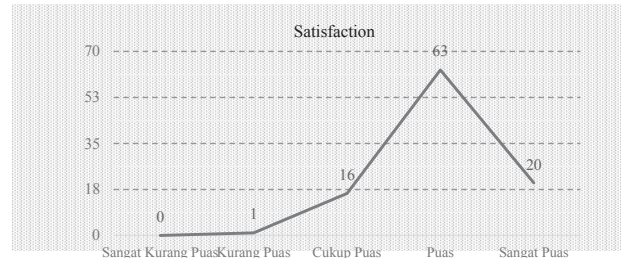


Figure 2. Graph of Performance Level According to Respondents

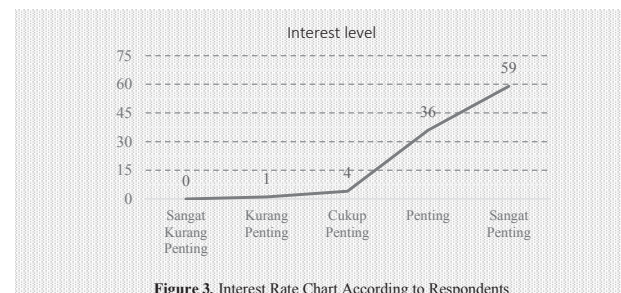


Figure 3. Interest Rate Chart According to Respondents

Data Validity and Reliability Test

Validity test is done to determine the validity of the questionnaire used for data collection, obtained by calculating the correlation of each score from the respondents answer⁶.

Validity test is done using SPSS 22.00 program with the following criteria:

- If $r_{count} \geq r_{table}$ then the question item is valid
- If $r_{count} < r_v$ then the question item is not valid
- r_{counr} can be seen in the Corrected Item Total Correlation column
- r_{table} under the condition $df = (n - 2)$ and a significance level of 5% that is $df = (100 - 2) = 98$, with value $t_{tabel} = 1,660551217$ so that the value is obtained r_{tabel} :

$$r_{table} = \frac{t}{\sqrt{df + t^2}}$$

$$r_{table} = \frac{1,660551217}{\sqrt{98 + 1,660551217^2}} = \frac{1,660551217}{10,03780007} = 0,165429796 \approx 0,165$$

Then the r_{tabel} is value 0,165

Table 1. Data Validity Test for Satisfaction and Interest of Respondents

Attribute	Pearson Correlation ($\times 10^{-1}$)		$(\times 10^{-1})$	Status	
	Satisfaction	Interests		Satisfaction	Interests
A1	6,46	5,65	1,65	Valid	Valid
A2	6,14	5,04	1,65	Valid	Valid
A3	6,29	5,58	1,65	Valid	Valid
A4	5,83	7,41	1,65	Valid	Valid
A5	6,19	6,89	1,65	Valid	Valid
A6	7,37	6,15	1,65	Valid	Valid
A7	4,79	4,22	1,65	Valid	Valid
A8	6,43	5,51	1,65	Valid	Valid
A9	6,24	7,31	1,65	Valid	Valid
A10	7,01	7,77	1,65	Valid	Valid
A11	6,70	7,35	1,65	Valid	Valid
A12	6,82	7,42	1,65	Valid	Valid
A13	7,54	7,62	1,65	Valid	Valid
A14	7,32	7,01	1,65	Valid	Valid
A15	7,82	7,50	1,65	Valid	Valid
A16	6,94	6,22	1,65	Valid	Valid
A17	5,43	6,87	1,65	Valid	Valid
A18	5,93	6,78	1,65	Valid	Valid
A19	6,73	7,75	1,65	Valid	Valid
A20	6,34	7,42	1,65	Valid	Valid
A21	6,95	7,41	1,65	Valid	Valid
A22	6,83	8,29	1,65	Valid	Valid
A23	5,98	7,17	1,65	Valid	Valid
A24	6,57	7,33	1,65	Valid	Valid
A25	6,15	7,76	1,65	Valid	Valid

Source: Data with SPSS 22.00

Table 1 shows that for all attributes the question of satisfaction level and all attributes of the question of importance level can be said to be valid.

Reliability testing was carried out using the 22.00 SPSS program with the following criteria:

If value Cronbach's Alpha ≥ 0.6 then the data in this study are said to be reliable

If value Cronbach's Alpha < 0.6 then the data in this study are said to be unreliable

The results of data processing with SPSS 22.00 that the value of Cronbach's Alpha satisfaction level factors = $0.942 > 0.6$ so that the perceptual data of respondents is reliable and can be used for this study. While the value of Cronbach's Alpha factors of importance level = $0.952 > 0.6$ so that the perception data of the respondents is also reliable and can be used for this paper.

Analysis of Performance Interest Level with Importance Performance Analysis (IPA) Method

Quadrant analysis is a building that is divided into four sections which are bounded by two lines that intersect perpendicular to the points (x, y), where x is the average of the score of the implementation level of all factors and y is the average of the average score of the level of importance of all factors that influence the satisfaction of service users.

Table 2. Calculation Result of SERVQUAL dimension with IPA Method

Attribute	Information	Average	Average
	I. Dimensions of Physical Evidence (Tangible)		
A1	Church cleanliness and neatness	3,74	4,59
A2	Has parking space	3,79	4,34
A3	Equipment in support of complete worship	3,97	4,53
A4	Seating for pianists, worship officials, altar servants (choirs) and choir members is clearly arranged	4,18	4,63
A5	Availability of church bulletin boards and appropriate use	3,77	4,30
A6	Condition of supporting equipment in the church	3,72	4,35
A7	Cleanliness and availability of clean water in the toilet	2,79	4,20
	II. Reliability Dimension (Reliability)		
A8	The Imam / Leader of worship delivers the sermon material clearly	4,38	4,67
A9	Worship takes place according to the schedule	4,28	4,61
A10	The regulations applied in the church are right on target	4,02	4,42
A11	The selection of worship songs in accordance with the rules of the church celebration	4,29	4,60
A12	Use of the Organ / Piano church by the Organist / Pianist	4,10	4,48
A13	The socialization of the church management work plan	3,92	4,43
	III. Response Dimension (Responsiveness)		
A14	The ability of church administrators to answer people's questions clearly	3,92	4,39
A15	The availability of the church in responding and responding to the complaints of the people	3,78	4,46
A16	The Church accepts and serves the invited guests of the church well	4,13	4,50
A17	Church administrators serve file management quickly and professionally (marriage letters, baths, chrism, etc.)	4,15	4,47
A18	Church administrators take action according to procedures	3,99	4,44
	IV. Guarantee Dimension (Assurance)		
A19	The church's environmental security and the presence of security officers	4,06	4,70
A20	Ease of obtaining information (activity schedule, church news, procedures, etc.)	4,05	4,57
A21	Clarity of the administrative provisions in the administration	4,03	4,56
	V. Dimension of Concern (Empathy)		
A22	Church priests / administrators provide motivation for the people	4,21	4,65
A23	Church administrators pay attention to the condition of the church	4,13	4,52
A24	The existence of a church organization supports the aspirations and interests of the people	3,89	4,34
A25	Church administrators are polite and friendly	4,28	4,61
Rata-rata		= 3,983	= 4,494

Processed data, 2018

The results of the calculations in Table 2 are arranged in the quadrant IPA diagram as shown in Figure 4.

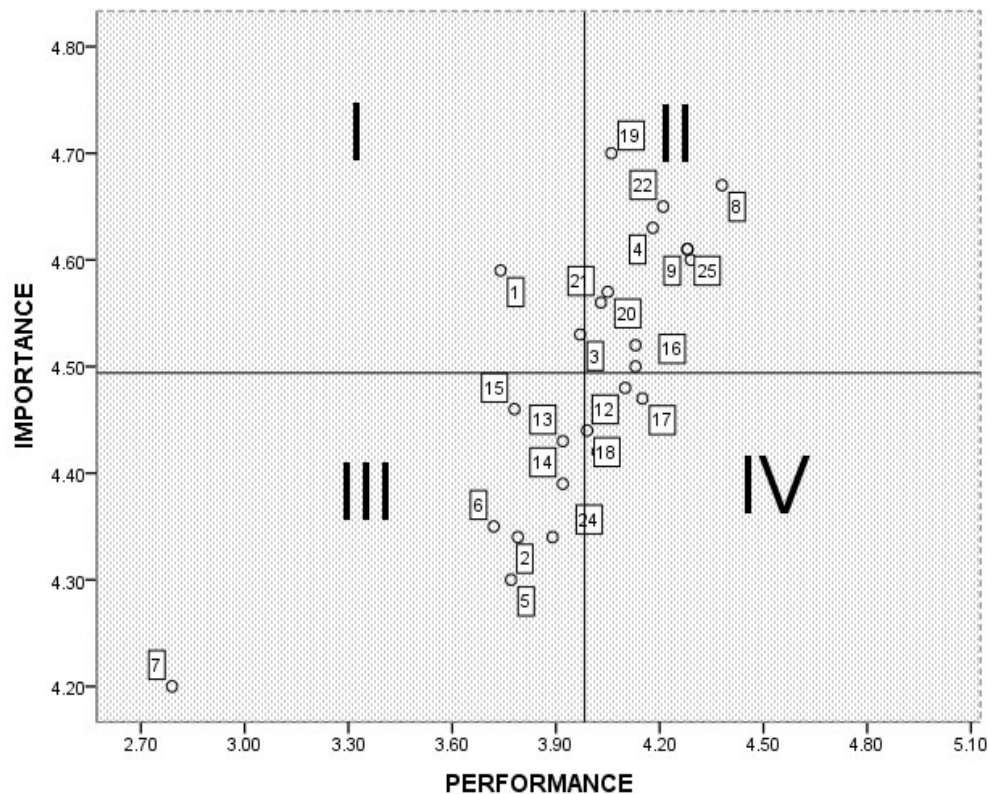


Figure 4. Distribution of attribute scores into the IPA Quadrant

1. Quadrant I (Main Priority), in this quadrant describes the factors that are considered important and expected by the people but the performance of the church management has not given satisfaction to what is expected optimally, thus making the people feel disappointed. This dimension needs to be prioritized for improvement. Attributes included in quadrant I are:

1. Church cleanliness and neatness

2. Availability of church bulletin boards and appropriate use

2. Quadrant II (Maintain Achievement), is the quadrant that is most expected by the people, these attributes are in accordance with what is felt and as factors that are considered important and are expected to support the satisfaction of the people so that the church management is obliged to maintain the performance achievement. Attributes that include quadrant II are:

1) Seats for pianists, worship officers, altar attendants (misdinar) and choir members are clearly arranged

2) Priest / worship leader delivers the sermon material clearly

3) Worship takes place according to the schedule

4) Selection of worship songs according to the rules of church celebrations

5) The Church receives and serves the invited guests of the church well

6) Security of the church environment and the presence of security officers

7) Ease in obtaining information (activity schedule, church news, procedures, etc.)

8) Clarity in the costs of administrative provisions in management

9) Church Imams / Administrators provide

motivation for the people

10) Church administrators pay attention to the condition of the church

11) Church administrators are polite and friendly

3. Quadrant III (Low Priority), there are factors that are considered to have a low level of perception or actual performance and are not too important or not too expected by the people so that the church management does not need to prioritize or give more attention to these factors. Attributes that include quadrant III are:

1) Has parking space

2) Cleanliness and availability of clean water in the toilet / bathroom.

3) Condition of supporting equipment in the church

4) Cleanliness and availability of clean water in the toilet / bathroom

5) The socialization of the church management work plan

6) The ability of church administrators to answer people's questions clearly

7) Availability of the church in responding to and responding to complaints of the people

8) The existence of an ecclesiastical organization supports the aspirations and interests of the people

4. Quadrant IV (Excessive), in this quadrant there are factors that are considered not too important and not too expected by the people so that the church management is better to allocate resources related to these factors to other factors that have a higher priority level. Attributes that include quadrant IV are:

1) The regulations applied in the church are on target

2) Use of church organ / piano by an organic / pianist

3) Church administrators serve file management quickly and professionally (marriage letters, baths, chrisms, etc.)

4) Church administrators take action according to procedures

CONCLUSION

This paper aims to determine the level of satisfaction of members of the members' perceptions of the performance of the organizers of the organization, in this study socio-religious organizations. The IPA method is used to measure the relationship between consumer perceptions and priority of product / service quality improvement, which is also known as quadrant analysis. In general, members have been satisfied with the service of the board based on 25 attributes in this study. Important attributes to improve are the cleanliness and neatness of the church, the use of church notice boards and their effective use. These results emphasize that church administrators maintain their performance because they are considered very important by respondents.

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Impact of Leadership Styles of Secondary School Principals on Work Motivation of Teachers in Bhutan

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ABSTRACT

The present study is focus to investigate the impact of leadership styles of secondary school Principals on work motivation of teachers in Bhutan. Descriptive survey method was used to collect the data from two hundred and twenty teachers from four Districts in Bhutan through convenience sampling technique. The findings indicated that 1) the democratic leadership style predominates from other two leadership styles as perceived by school teachers, there by showing that as per the perception of school teachers, principals in school of Bhutan are generally practicing democratic leadership style; and 2) leadership styles of principals have impact on the work motivation of teachers in schools. Teachers working with principals having democratic leadership style have high work motivation as compared to teachers working with principals having autocratic leadership style.

Keywords: Leadership Styles of School Principal, Work Motivation and Teachers.

INTRODUCTION

Leadership Styles

The way an individual performed his/her roles and handled the affairs of an institute is termed as his/ her leadership styles. It helps to influence the attitude of the employee motivation and job satisfaction. The moral of employees influenced by the leadership style the leader used. It is, therefore the way leader leads his/ her leadership styles. Some leaders they are more of work-oriented rather paying attention to the relationship with subordinates. Some are more of relationship oriented. However, a leader who emphasizes the people relation or work is well thought-out to be at the middle to leadership styles.

Okumba (1998) defines leadership styles as specific behaviors practiced by an individual to motivate his/her teammates to attain the aims of an institution.

Oyedemi (1998) & Adeyemi (2004) on the other hand said that the school principal controls various schools' resources and can accelerate or demolish the progress of education in school^{1, 2}. Therefore, a leadership style plays a significant role in school management. In the present research, investigator only focused on the three

types of leadership styles which are autocratic, laissez-faire and democratic.

Work Motivation

Work motivation is a group of active drives that comes within a person to initiate, plan and complete his/her work. It differs from person to person. Work motivation helps people to increase his/her performance level and willingness towards the work. Arousal, direction, and intensity are the three processes that are the concern with work motivation. Arousal is a provocation, which is stimulated by individual's necessities where direction is the way which people follow in order to achieve their goals but the intensity is the amount of energy an individual put into task performance. Motivation is the willingness to do something and it is conditioned by the actions of ability to satisfy some needs of the individuals. A need means some of our internal status that makes certain outcomes which appear attractions. As a saying, a motivated person is more dedicated to the organization, infect more of job satisfaction which leads towards productive outcomes. Thus, as a leader (Principal) should motivate their subordinate to use their skill and knowledge in order to achieve their aim of the organization. The subordinate who does not have

job satisfaction and de-motivation may lead to falling the organizational goal. Therefore, principal has to use different approaches to motivate teachers.

Idah & Jacob (2014) conducted a study to see the motivation in teaching staff for their work commitment with respect to leadership style³. The finding shows a strong association between transformational leadership behaviors and commitments. Results shows that encouragement to staff for creativity in their work, complete trust in staff, developing congenial work environment for staff and inspiring the staff for constructive initiatives by leaders directed the staff towards their work commitment.

Kelzang (2014) conducted a study to determine the factors affecting teacher motivation in government middle secondary schools of Thimphu, Bhutan. The findings revealed that the top three motivating factors are personal growth, professional growth, and feedback from the principal respectively⁴. The results also show that teachers in the study are moderately motivated with respect to the factors listed in the questionnaire. The study finally revealed that there is no gender difference in terms of motivation as a teacher. The research implies that school management and the concerned authority of the government need to investigate why motivation is moderate and take appropriate step to further boost motivation.

Supriadi, Yusof & Abdul (2015) conducted a study in Special Province of Central Jakarta in order to find out the correlation of work motivation, academic achievement and work discipline of primary school teachers with instructional leadership of the school head teacher⁵. The finding revealed that there exist statistical significant correlation in instructional leadership of school head teacher, the work discipline of a teacher with academic achievement and work motivation.

Tandinla (2015) conducted the study on the topic teaching effectiveness of middle secondary school teachers of Bumthang District of Bhutan in relation to work motivation⁶. Result revealed that a statistical significant difference exists in teaching effectiveness of middle secondary school teachers with respect to gender, local and experiences. There exists no significant difference in work motivation between genders, locale, and experiences of school teachers and in regression analysis work motivation emerge as a significant

predictor of teaching effectiveness but there exists a significant difference between the locales.

Alghazo & Al-Anazi (2016) conducted to see the association in employee motivation and leadership style. The finding shows that there exists the strong association between employee motivation and leadership style⁷.

Arman, Syamsul & Manda (2016) investigated the effect of school head's competence in motivating teachers towards work⁸. The results show that there is an association in school head's competence and teachers work motivation. It shows there are positive effects on teachers work motivation in relation to competence school principals and supervisor.

Statement of Problem

In this present study, an attempt has been made to explore the work motivation of teachers with respect to the leadership styles of their school principals in secondary schools of Bhutan.

Operational Definition of Key Terms

Leadership Style

An outline of behaviors adopts by a leader to influence the behaviors of his/her followers is termed as leadership style.

Work Motivation

Work motivation is a technique or art to put effort on employee towards the work goal through a specific path.

Objectives

To identify leadership styles of secondary school principals as perceived by teachers.

To study the impact of leadership styles of secondary school principals on work motivation of teachers.

Hypothesis

There exists significant impact of leadership styles of the secondary school principals on work motivation of teachers.

Delimitation of the Study

The present study delimited to school teachers teaching in different secondary schools situated in four districts namely Paro, Thimphu, Punakha and Wangdue

of Western Bhutan.

Design of the Study

The descriptive survey method was used to collect the data from two hundred and twenty teachers (109 male and 111 female teachers) teaching in secondary schools situated in four districts (Paro, Thimphu, Punakha and Wangdu) of Bhutan through convenience sampling technique. Leadership Styles Scale by Dr. Savita Gupta and Ms. Kezang Choden (2016) and Work Motivation Questionnaire by Thinley Namgay & Kuenzang Dorji (2014) were used to collect the data⁹. The objectives and hypothesis of the study have been tested by using percentage and one-way ANOVA.

RESULTS AND DISCUSSION

Analysis of data, result and interpretation of findings has been done keeping in view the objectives and hypothesis of the study.

Result pertaining to Leadership Styles of Secondary School Principals as perceived by Teachers

The objective was to identify styles of leadership among secondary school principals as perceived by teachers. After administrating the leadership styles scale, scores in each leadership style has been calculated for each respondent. Leadership style against highest score has been declared as the leadership style of secondary school principals perceived by the teachers. Three different leadership styles were computed in terms of numbers and percentage. The detail results have been presented in table 1.

Table 1 : Number and percentage of Secondary School Principals in different Leadership Styles as Perceived by Teachers

S. No	Leadership Styles	Number of Teachers	Percentage of Teachers
1	Autocratic Leadership	13	5.91
2	Democratic Leadership	192	87.27
3	Laissez-Faire Leadership	15	6.82
Total		220	100

Interpretation

Table 1 shows that out of 220 teachers that constituted the sample population, 13 teachers professed that their principals use autocratic leadership style, 192 teachers revealed that their principals use democratic leadership style whereas 15 teachers say that their principals use laissez-faire leadership style. Hence, it can be concluded that autocratic leadership style is minimally practiced comparing to laissez-faire leadership style whereas the democratic leadership style predominates the figure there by showing principals in schools of Bhutan are generally practicing democratic style. The same result found by Choden (2016) that democratic leadership style predominates in the secondary school in Bhutan. The percentage of secondary school principals leadership style falling in the democratic leadership style is 87.27%, while that in autocratic leadership style and laissez-Faire leadership style are 5.91% and 6.82% respectively.

Result pertaining to Impact of Leadership Style of Secondary School Principals on Work Motivation of Teachers

The objective was to study the impact of different styles of leadership among secondary school principals on work motivation of teachers. After administrating the work motivation questionnaire and leadership style, mean, standard deviation, standard error of difference and One-Way ANOVA for work motivation of the teachers for three different leadership styles of secondary school principals were computed and the result have been presented in table 2.

Table 2: Mean and SD of Work Motivation of Teachers with respect to Leadership Styles of Secondary School Principals

Leadership Styles of Secondary School Principals	Number of Teachers	Mean	SD
Autocratic Leadership	13	54.15	10.99
Democratic Leadership	192	64.92	10.77
Laissez-faire leadership	15	60.80	8.28

Interpretation

As shown in table 2 the mean work motivation scores of teachers for different leadership styles of secondary school principals namely autocratic leadership, democratic leadership and laissez-faire

leadership as perceived by teachers are 54.15, 64.92 and 60.80 respectively and their standard deviations were 10.99, 10.77 and 8.28 respectively. The mean work motivation of the teachers corresponding to democratic leadership style of secondary school principals is the highest where as the mean of work motivation score of teachers corresponding to autocratic leadership style of secondary school principals is lowest among all the three leadership styles of school principals.

To explore the significant difference between means of work motivation of teacher for different leadership styles of secondary school Principals namely autocratic leadership, democratic leadership and *laisser-faire* leadership, One –Way ANOVA was applied. The summary of One-Way ANOVA for work motivation of teachers with respect to different leadership styles of secondary school principals is given in table 3.

Table 3: Summary of One-Way ANOVA for Work Motivation of Teachers with respect to Leadership Styles of Secondary School Principals

SOV	Df	SS	MS	F-value	Remarks
Between	2	1577.07	788.54	6.97	P<0.01
Within	217	24555.92	113.16		
Total	219	26132.99			

*SOV- Summary of One-Way ANOVA; Df-Degree of freedom; SS- Sum of Squares and MS-Mean Squares

The F-Value as seen in the table 3.26 is 6.97, which is significant at 0.01 levels. Hence, the stated hypothesis, there exists significant impact of styles of leadership among secondary school principals on work motivation of teachers, is not rejected.

To find out the statistical significance of difference between the means of work motivation of teachers with respect to different styles of leadership among secondary school principals, t^2 - test was applied pair wise on work motivation with respect to different styles of leadership among secondary school principals. The results of the t-test have been summarized in table 4.

Table 4: Significance of Difference between Means of Work Motivation of Teachers with respect to Leadership Styles of Secondary School Principals

Count	LS	Mean	SD	SED	t^2 -value	Significant
13	AL	54.15	10.99	3.09	3.49	P<0.05
192	DL	64.92	10.77			
13	AL	54.15	10.99	3.65	1.82	P>0.05
15	LFL	60.80	8.28			
192	DL	64.92	10.77	2.85	1.45	P>0.05
15	LFL	60.80	8.28			

*LS-Leadership Styles; AL-Autocratic Leadership; DL-Democratic Leadership; LFL-Laisser-faire leadership; SD-Standard deviation and SED-Standard Error of difference

Interpretation

As shown in table 4 the mean work motivation scores of teachers corresponding to autocratic and democratic leadership styles of principals are 54.15 and 64.92 respectively. The values of standard deviation are 10.99 and 10.77 respectively. The t' -value comes out to be 3.49. For $df = 203$, the critical values are 1.97 and 2.59 at 0.05 and 0.01 level of confidence. The calculated t' -value comes out to be 3.49, which is significant at both the levels of confidence. Therefore, it can be said that there exists statistical significant difference in work motivation of teachers corresponding to autocratic and democratic leadership styles of principals.

The mean work motivation scores of teachers corresponding to autocratic and laissez-faire leadership styles of principals are 54.15 and 60.80 respectively. The values of standard deviation are 10.99 and 8.28 respectively. For $df = 22$, the critical values are 2.07 and 2.82 at 0.05 and 0.01 level of significant. The calculated t' -value comes out to be 1.82, which is insignificant at both the levels of confidence. Therefore, it can be said that there exists no statistical significant difference in work motivation of teachers corresponding to autocratic and laissez-faire leadership styles of principals.

The mean work motivation scores of teachers corresponding to democratic and laissez-faire leadership styles of principals are 64.92 and 60.80 respectively. The values of standard deviation are 10.77 and 8.28 respectively. For $df = 205$, the critical values are 1.97 and 2.59 at 0.05 and 0.01 level of confidence. The calculated t' -Value comes out to be 1.45, which is insignificant at both the levels of significant. Therefore, it can be said that there exists no statistical significant difference in work motivation of teachers corresponding to laissez-faire and democratic leadership styles of principals.

In view of the above result and discussion the stated hypothesis, there exists statistical significant impact of leadership styles of principals on work motivation of teachers is not rejected in case of autocratic and democratic leadership style of principal whereas is rejected for other two combinations of leadership styles of principals i.e. Autocratic and laissez-fair leadership styles and democratic and laissez-fair leadership styles.

CONCLUSIONS

1. The democratic leadership style predominates from

other two leadership styles as perceived by school teachers, there by showing that as per the perception of school teachers, principals in school of Bhutan are generally practicing democratic leadership style. The percentage of principal's leadership style falling in the Democratic leadership style is 87.27%, while that in Autocratic leadership style and Laissez-Faire leadership style are 5.91% and 6.82% respectively based on the perception of school teachers. The same result found by Choden (2016) that democratic leadership style predominates in the secondary School in Bhutan.

2. Leadership styles of principals have impact on the work motivation of teachers in schools. Teachers working with Principals having democratic leadership style have high work motivation as compared to teachers working with Principals having autocratic leadership style.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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Art of Visual Communication, Evolution and its Impact

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ABSTRACT

In the field of art, visual communication plays an important role to communicate with the viewer. Visual communication is evolving around time to time but it is not a current invention. This visual communication has a history. It is very useful in the contemporary world. Although it has a long history trail but still today it plays a prominent role in the world of digital communication. Meaning of visual communication is that something which can be attained with the help of eyesight and display. In this manner any display thing and which can be seen through sight fall in this category like map, signals, painting, illustration, graphic, books, animation, web designs, advertising, films and etc. Anything that comes with a message can be fall in this category and can be code a message in a beautiful way and that message can leave a strong impact on viewer mind and could change their behavior towards a certain company. This communication and its impact can be measured; assessment of visual communication totally depends on the understanding of identified audience. Visual communication can build an image of a company, that image can be set or delivered with the representation of logo. Now a day's logo plays a prominent and important role to communicate and develop the identity and image of a company or business in the corporate world. Logo is an important element of any business and product. Another term is very near to the concept of logo that is 'branding' meaning "assign a brand name to". Branding is a process which creates an image or name of product in the market. Logo and branding are very much important to each other. Intend of this research is to discuss the visual communication evolution and its impact on the consumer behavior in the reference of graphic design.

Keywords: *Art, Visual Communication, Graphics, Impact*

INTRODUCTION

Communication is very much important in our daily life an individual cannot spend a single day without any communication. It is not necessary to have communication between two individuals; communication means receiving information from a source and makes an action on that. The individual who transfer that message is stated as the sender and the person or group who received that information is termed receiver. An idea, facts, instructions, opinions, and emotions can be delivered as information. Definition of communication is the act or process of communicating; fact of being communicated" and "the imparting or interchange of thoughts, opinions, or information by speech, writing, or signs".¹ Communication have three different modes. First mode is "Interpersonal Communication" meaning "Interpersonal communication is a two-way means of communication that allows the participants to evaluate and respond to each other."² Second mode is "Interpretive Communication" meaning "Sender

(presenter or writer) delivers the information, and the listener or reader (or viewer in the case of television and other forms of visual media) concludes or understands the concepts presented to them. Interpretive communication lets intake and division according to individual beliefs and understanding".³ Third mode is "Presentational Communication" meaning "a speaker is speaking to a group of people, audience or presenting a performance or presentation in script and has no other resources of engaging with the addressees".⁴ Communication can be further divided into two different forms like visual communication and verbal communication. This research intends to discuss the visual communication which fall in the second mode of communication i.e. "Interpretive Communication".

Visual communication is the strongest medium to communicate in the present era. In this type of communication, you can deliver the information, enlighten the viewer and entertain the audience through images and text. Today when the technology is on its

peak many companies determine to communicate with their consumer, audience and consumers via visual communication (advertising) because it takes minimum of their time with an effective impact. Now a days people mostly rely on visual communication. Graphic design, signs, films, Tv commercial and other uncountable sources of visual communication. These all are advanced form of communication otherwise visual communication is the oldest form. Visual communication evolves with the passage of time and leaving strong impact on the viewer mind as this is growing. Saying that visual communication is a form of art is not wrong. As it is the oldest way of communication; Communication is the basic need to survive. Capacity to communicate others in more effective way is most important reason to be exist like a civilization. Now a days almost every business communicates with their audience, consumer and viewer with visual communication which is called a form of art i.e. Logo. Logo is Greek language word meaning "Imprint".³ Meaning of Logo is "Conceptual representation like writing a visual and referential linguistic sign that does not take the phonetic dimension into consideration."⁴ To communicate with audience logo is very important element of every product and business in the corporate world. Branding is another terminology for logo and meaning of branding is "assign a brand name to"⁵. To build an image in consumer mind branding plays very important role in it and with the help of advertising campaign a business or company defined their advertising and branding theme. Which help companies to build notable image in the consumer mind. Logo is an important part of branding.

To understand the importance and impact of visual communication it is must to study visual communication types. Visual Communication in advertising has many types like logo, print campaign, TV commercial, website etc. It's very much important to choose an accurate type for visual communication according to the purpose like, for advertising; you should know your audience background. This research highlights the consumer behavior towards the products and brands. And the perception of viewer towards those ads.

LITERATURE REVIEW

Without communicating with each other no one can grow or cannot spread and preserve the knowledge and information just like people from stone age. Because lack of preserved information or documented

knowledge, today there is very limited information about them. If we go back to see its history then human used this form of communication million years ago in stone age settlements. They communicate through paintings, paintings they paint in cave's walls and on ceilings, those paintings helped them to communicate, paintings contain various hunting scenes, anatomy study of different animals or it might be possible they delivered their hunting traditions to their coming generations through these paintings. Identify any specific reason is impossible because we have no any manuscript record of their language.

Later Indus Valley Civilization (3300 – 1300 BC), this was one of the oldest civilizations came to know with well-planned architecture⁶, but historians are restricted in their knowledge for this civilization because they could not find any way to understand their language which is still fall underneath in unknown category. Although there are traces of the way of communication they might had, that source is seals (Fig. No. 1) which has been discovered from diverse places and in numerous shapes with contains various symbols written (engraved) on it.

Egyption and Mesopotamia Civilizations have the acclaim of being the most the most primitive known writing systems are thought to have invented in the Middle Eastern civilizations of Mesopotamia (cuneiform) and Egypt (hieroglyphs) (Fig. No. 2 & 3) over five thousand years ago⁴. The Maya from Central America, another settlement of ancient people who have early glyphs. This civilization reached to its peak started from 300 BC and mysteriously vanished in the 16th century AD.⁴

Early glyphs from one more ancient people, the Maya of Central America, whose civilization cultivated from 300 BC⁴ before vanishing inexplicably in the 16th century AD, were based on a sophisticated written calendrical system.⁴ Though the first notorious European writing appeared from pre-Homeric Greece and Crete. Egypt and Mesopotamia reflect the progressive development in the race of human history through the invention of scripts. Rosetta Stone revealed in Egypt (1799)⁴ which contain similar inscription in three dissimilar idioms i.e. Greek, Egyptian Hieroglyphs and Demotic which makes easy to comprehend the hieroglyphs in the first place. Hieroglyphs (Fig. No. 2 & 3) are combination of different symbols; the symbols

represent the sounds and the way of communication of once existing language.

If we compared the qualities of hieroglyphs with logo and logo's purpose. Then put this statement would not be mistaken that hieroglyphs are very first representative depiction of Pictogram (Fig. no. 4) in antiquity. Meaning of pictogram is; any symbol which delivers and conveys a message. Pictogram is alternative of logo form. This symbolic representation has been using in later upcoming civilizations since. This form of representation and communication evolved with the passage of time and became one of the strongest ways to communicate with masses despite their different backgrounds and language they speak.

For example, in the advertisement of Jet washing detergent (Fig. No. 5 and 6) company have showed black and white photographic based ads. In which they have showed a satisfied and happy woman. And in present era Sufi Soap (Fig. No. 7&8) and Surf Excel (Fig. No. 9&10) companies presented their vision and their target audience very directly in Surf Excel (Fig. No. 10) they are showing a young, energetic and fun-loving mother of a boy who is playing football and get some stains. And in second ad (Fig. No. 9) a grandmother aged woman with a very obedient and well-mannered boy. On the other hand, in Sufi Soap (Fig. No. 7&8) ad company used their packaging and a caption in Urdu language which is mother language of Pakistan can be understand by most people in Pakistan. In sufi soap ad there is a combination of text and Package image only on the other hand in surf excel they are showing a young mother may be a housewife who is very much happy and satisfied with the results of surf excel and they are delivering their message in English language which is much showing that only the people who are able to understand English can read and understand this message as the image is very much clear and loud that the lady is very much satisfied with the outcomes of product.

CONCLUSION

Communication is very much important to excel in every field even as a civilization only can survive if have communication. As communication is very important and this research paper has discussed the importance of visual communication, and how this type of communication evolve around the era with the passage of time with leaving a strong impact on it. With

the passage of time every company adopt this visual communication source to advertise themselves for their consumer and their growth in the corporate world. Advertising is a key to attract your consumer and make them to buy certain product. Through advertising they delivered their message and inspire their consumer to buy their product. Face of communication have changed with the passage of time, communication developed from hieroglyph to pictograms. This change happened because that was the demand of time. With the passage of time different civilization appeared, survived and gone. Every civilization and settlement leave an impact on society and society reach to next level with every settlement's progress. And now time has come when the whole world could be considered as a global village. That change happed with the help of technology. As technology achieved a level in contemporary world and that achievement demands a change in every aspect of life including communication. To full fill that requirement visual communication has developed and evolve itself. Most of the companies mostly rely on visual communication and they advertise themselves and grab the attention of their target audience. Perception of consumer and user has changed and developed with the time as well. Today no one have time in their busy routine lives and everyone want solution of their problem very quick. Because competition has increased the demand of consumer. People who are target audience have information and exposure of different brands and product due to media, and its everyone wish to look pretty, feel healthy and deliver best to their families. Companies first develop a demand or need of their product in consumer life by showing very energetic, healthy, successful models and actors in their ads who are using their product and informing, delivering given message and encouraging them (consumer) to buy their (company) product. Because people get inspired by their idols and they do what they ask them to do. Companies and concept developers now how to target which class by showing certain living style, environment, dresses and most importantly with the language they are choosing for delivering their message. Purpose of this research paper is to study that how Pakistani advertisement has changed with the passage of time and how they are attracting consumers toward a specific product and company.

Conflict of Interest: Nil

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Professional Ethics of Teacher Educators in Relation to Value Pattern

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ABSTRACT

Professional ethics possessed by teacher educators largely influence the performance of their pupils. It is also believed that teacher educators with high value patterns are likely to possess more professional ethics. The purpose of this study was to find out whether there exists any relationship between professional ethics of teacher educators in relation to their value pattern. One hundred teacher educators from Agra and Firozabad districts of Uttar Pradesh were selected on the basis of simple random sampling method. Descriptive survey approach was followed to conduct the study. "Professional Ethics Scale for Teachers (PEST) by Jasmine Kaur" and "Teachers Value Inventory (TVI) by H.L. Singh and S.P. Ahluwalia" were used to collect data. Results of the study revealed that gender is not a factor in determining the professional ethics of teacher educators, whereas the value pattern of teacher educators differs significantly on the basis of gender. It also indicates that there exists a positive co relationship between professional ethics and value pattern of teacher educators.

Keywords: *Professional ethics, Value pattern, Teacher educator, Gender*

INTRODUCTION

In the field of education, professional ethics refers to the value system of ethical behaviour shown by teachers while carrying out their duties viz. teaching, researching, consulting, rendering extension activities etc. Burant, Chubbuck and Whipp, (2007) argued that our attention in teacher education should not only confine to the construction of acquaintance and skills but also of the triggering moral responsiveness¹.

Gunzenhauser (2012) states "as a professional a teacher should show an equal level of dignity to every person as an individual²." Teacher's reverence towards the pride of his students should be demonstrated through the way he fulfills his professional obligations³.

The role of a teacher is not confined to his organization only. Rather it covers the parents, the society as well as the nation. "Teachers strongly influence the overall ethical climate of the educational institute⁴." "The overall conduct of teachers affects the moral development of students⁵." Therefore, in order to develop the moral character of students, the teachers should act in the most ethical way. Ethics possessed by the teacher not only help in developing values in his

students but also it helps him in his professional growth (Hasu, 2003). "Since every teacher is a value educator, he should develop a clear vision of his role in value orientation and should be able to identify the potential of different subjects and situations in school for fostering universal values"⁶.

In a study on "the value pattern of teachers", Patel (1979), found that female teachers possess more aesthetic and religious values than male teachers⁷. However, male teachers score more in political values in comparison to their female counterparts. Verma and Tyagi (1988), found that male teachers were high in political values as compared to female teachers whereas female teachers score more in social values than male teachers⁸. The study by Dhull and Mahesweta (2005), is also in agreement with the fact that male teachers score more in political values than female teachers⁹. The study conducted by Kumari (1996), shows a contrasting result of the above data¹⁰. Accordingly, male teachers score significantly higher in political as well as in social and aesthetic values than female teachers. In an international study conducted by Raj (1981), it is found that Ethiopian teachers exhibit more social, cultural and theoretical values than Indian teachers¹¹. However, no significant

differences were found in the scores of academic and aesthetic values in the teachers of these two countries. The study also reveals that Indian teachers score higher in religious values than Ethiopian teachers. Studies conducted by Kumari(1996), and Kumar (2006), reveal the value pattern of rural and urban teachers¹². In the study of Kumari, it is found that rural male teachers are less moral than urban male teachers whereas rural female teachers are less aesthetic and religious than urban female teachers. The study by Kumar found no significant difference in the religious, aesthetic and health value of both urban and rural female teacher trainees. Same results were revealed by an investigation done by Kanti (2013) to find out the “value preference of prospective secondary school teachers”¹³.

Our society is now going through the process of change due to globalization, economic crisis, social innovations and advancement in technology. In such rapidly changing circumstances, teaching experience needs exposure to different social, economic and political climate augmented by interaction between and among teachers, students, parents and public in general. This exposure is characterized by variety, length and intensity that do affect an individual’s prize for things and objects, for thoughts and ideas, for values and ideals. Consequently there is a change, modification, deletions and additions in the value pattern among teachers. This study was an attempt to find out if there exists any relationship between professional ethics and value pattern of teacher educators.

OBJECTIVES

1. To explore the professional ethics and value preference of teacher educators.
2. To find out the gender wise difference in the professional ethics and value pattern of teacher educators.
3. To explore the relationship between professional ethics and value pattern of teacher educators.

METHODOLOGY

It was a quantitative study based on descriptive survey method. The study was delimited to 100 teacher educators of Agra and Firozabad districts of Uttar Pradesh selected by simple random sampling technique.

Professional Ethics Scale for Teachers (PEST) by

Jasmeen Kaur was used to measure the professional ethics of teacher educators¹⁴. This scale was designed to measure various aspects of teaching profession such as responsibility, honesty, integrity, attitude, cooperation, respect for self and others, assessment of students, conduct and diligence of teachers etc. professional ethics of teachers varies from 0 to 40. On the basis of their obtained scores teachers with less than 24 falls under low professional ethics category, within 24 to 30 categorized as average and with more than 30 falls under teachers possessing high professional ethics. Teachers Value Inventory (TVI) by H.L.Singh and S.P.Ahluwalia was used to assess the value pattern of teacher educators. This scale intended to measure seven patterns of values related to teachers. They are social, economic, religious, aesthetic, theoretical, political and hedonistic.

Results and Discussion

In order to assess the professional ethics among teacher educators, collected data was scored and presented in table 1.

Table 1: Professional Ethics of Teacher- educators

Level of professional ethics	Norms (scores)	Percentage
High	<24	18.2
Moderate	24-30	46.6
Low	30>	35.2

The data shown in the above table revealed that 18.2% of teacher educators show high level of professional ethics, 46.6% show average and 35.2% exhibit low level of professional ethics. Hence there is no uniformity among teacher educators in their professional ethics. Thus, the level of professional ethics of teacher educators mostly falls in average category. The reason may be that teachers besides teaching and research activities, the teachers are overburdened with other extension activities and they may be struggling to maintain some sort of ethics in their profession. Findings of the study is supported by Scales (2002), Zheng and Hui (2005), Itai *et al.*(2006), Li (2007) and Ozbek (007)^{15,16,17,18,19}.

Mean scores of different values were calculated to find out the order of value preferences of prospective

teachers. Ranks were assigned on the basis of those calculations and presented in table 2 below:

Table 2

Values	Mean	Rank
Theoretical	90.6	2 nd
Economic	78.5	4 th
Aesthetic	80.4	3 rd
Social	99.8	1 st
Political	74.5	6 th
Religious	75.2	5 th

The table shown above indicates that teacher educators give first preference to social values whereas last preference is given to political value. Findings of this study is in line with those of Kakkar (1971), and Macheil (1991)^{20,21}.

Hypothesis 1: There is no significant difference in the professional ethics of male and female teacher educators. In order to test the hypothesis, the collected data has been scored and presented in table 3.

Table 3: Professional Ethics of Male and Female Teacher -educators

Variable	Gender	N	Mean	SD	t-value
Professional ethics	Male	50	24.57	3.75	0.28
	Female	50	24.71	3.41	

The above table shows the mean difference between male and female teachers in relation to their professional ethics. The table value reflects that the mean values of male and female teacher educators are 24.57 and 4.71 respectively. The t-value 0.28 is found insignificant at 0.05 level. Therefore, the null hypothesis stating the insignificant difference between male and female teachers in relation to their professional ethics is accepted.

Hypothesis 2: There is no significant difference in the value pattern of male and female teacher educators. The following table shows the mean difference in

different dimensions of value pattern in relation to gender:

Table- 4: Value Pattern of Teacher-educators in Relation to Gender

Values	Gender	N	Mean	SD	t value
Social	Male	50	102.22	8.52	1.05
	Female	50	104.58	12.65	
Economic	Male	50	90.77	12.87	0.2
	Female	50	90.45	12.43	
Political	Male	50	87.34	10.46	2.62*
	Female	50	82.33	7.84	
Religious	Male	50	130.03	10.83	1.98*
	Female	50	134.71	13.79	
Aesthetic	Male	50	117.37	13.49	2.0*
	Female	50	125.6	25.31	
Theoretical	Male	50	82.55	13.58	0.37
	Female	50	81.51	10.05	

The above table illustrates the locale difference in the mean scores of male and female teachers in relation to their value pattern. A comparative study of the mean scores of political value reveal that male teachers exhibit more political value (M=87.34) in comparison to female teachers (M=82.33). The presence of more political values in male teachers is in agreement with the findings of Patel (1979), Gupta (1998), Verma and Tyagi(1988), Kumari (1996), Sandya (1999) and Dhull(2005)^{22,23}. However, the t values for religious and aesthetic value are statistically significant which shows that male and female teacher educators differ significantly in these values. Female teachers are more prone to religious and aesthetic values (M=134.71 and 125.6) in comparison to their male counterparts (M=130.03 and 117.37) respectively. This finding is supported by Patel (1979), and Kumari (1981)²⁴. The table indicates that there is non-significant locale difference in the social, economic and theoretical values of male and female teacher educators. The mean scores of social (102.22 vs. 104.58), economic (90.77 vs.90.45) and theoretical values (82.55 vs. 81.51) reveal that both male and female teachers possess nearly the same level of these values. Thus the above hypothesis stating that there is no significant difference in the value pattern of male and female teacher educators is rejected.

Non- significant difference in theoretical values for both the sexes reveals that both male and female perspective teachers are giving value to cognitive approach. Similarly, equal mean scores in social and economic values indicate the inclination of both the sexes to become socially adjusted as well as economically self sufficient. The presence of more political values in male teachers shows that they are more oriented towards power and dominance. Whereas the indigenous culture of our Indian tradition may be a contributing factor for the female teachers to score more in religious and aesthetic values.

Hypothesis 3: “There is no significant relationship between professional ethics of teacher educators in relation to their value pattern”. The kinship between these two variables is stated in table 4.

Table- 5: Relationship between Professional Ethics and Value Pattern among Teacher -educators

Category	N	R	Significance
Professional ethics	100	0.33	Significant
Value pattern	100		

The value of correlation with regard to professional ethics and value pattern of teacher educators is found to be insignificant at 0.05 level of significance. Thus, the hypothesis i.e., “there is no significant relationship between professional ethics of teacher educators in relation to their value pattern” is rejected. From the result, it can be concluded that there exists a positive but negligible correlation between professional ethics and value pattern of teacher educators.

CONCLUSION

Result of the study shows a wide variance in the level of professional ethics of teacher educators. Many teachers possess average level of value pattern. Though teacher educators possess different levels of professional ethics, their ethics don't differ with regard to their gender. Gender is an influencing factor in determining the social, economic and theoretical value of teacher educators. The level for the above values is almost the same for both the sexes. However, male and female teachers do differ significantly in religious, aesthetic and political values. Male teachers are high in political values whereas female teachers are more prone to religious and aesthetic values. So far as the relationship between professional ethics and value pattern of teacher

educators are concerned, it is found that both of these variables are positively correlated. Values possessed by teacher educators help in developing their professional ethics. A value enriched teacher is likely to exhibit more professional efficiency. Professional ethics shown by teacher educators are likely to be transformed to their students who would ultimately lead the nation in future. Therefore, professional ethics should be exhibited by a professional in accordance to reasonably high standards and acceptable moral conduct. As value pattern possessed by a teaching professional is a contributing factor in determining his professional ethics, efforts should be made to enhance his professional values.

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Eve-Teasing: Effect on Emotional Intelligence of Adolescent Girls In Relation to Stress

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ABSTRACT

The world is transforming swiftly in education, technology, science and society itself. In this changing world, a woman is also going through equal transformation. She has moved shoulder to shoulder with the man and partaken his endeavor in every area of life. She has also made herself accessible to the outer universe and made a space for herself there too. The maximum credit for this upliftment of women goes to education. But at the same time when a women moves out of her home for getting education in some good educational institution or work , she does face many problems, and Eve-teasing is one such pernicious, horrid and disgusting practice which poses a threat to the security and wellbeing of a girl.

Keyword: *Eve, Tease, Harassment*

INTRODUCTION

The word 'Eve' is making a reference to the Biblical allusion of eve alluring Adam to deviate from the track of righteousness. The English Dictionary denotes 'tease' to allure someone physically with no motive of satisfying. Both terms are employed to present women negatively in a mode of 'Eve-teasing'¹. But the fact remains that it is the woman who becomes a victim in eve-teasing. Eve-teasing is said to be the most prevalent issue in India, chiefly affecting women. The formation of Indian society has always been paterfamilias. But in the present era, women have tried to come out of this captivity by venturing into male dominated fields². Though, we have progressed technologically, academically etc., yet the most basic foundation of society is depicting no sign of advancement. A thorough look at the daily news paper displays so many crimes against women. Eve-teasing is a big problem in many urbane cities of India³. A considerable percentage of Indian women have encountered or are tolerating this menace. It may be a public transport system or general places or shopping marts or multiplexes, women find themselves exposed to the threat of Eve-teasing at all places. Eve-teasing is crucial problem and it requires more heed than what it has indeed received⁴.

Emotional Intelligence

The term emotional intelligence has been rooted

from social intelligence, which was conceived by E.L.Thorndike in 1920. Emotional Quotient (EQ) is used synonymously with emotional intelligence. It was first Peter Salovey of Yale University and John Mayer of Hampshire in 1990, who originated the term emotional intelligence and explained it as a type of social intelligence that involved the capability to manage one's own and others feelings and emotions to segregate among them and to apply this information to direct one's thoughts and behaviour⁵. Emotional intelligence is the product of one's genetic makeup and interaction with his surrounding forces. Till now, it was found that intelligence is not the single measure of success. It is the recent concept. It assists the individual in making decision or finding solution to problems within the framework of situations and interpersonal affinities. It refers to an ability for identifying our own feelings and those of others. Emotional intelligence is another way of being intelligent^{6, 7}. It includes perceiving what your feelings are and employing your feelings to make sound decisions in life. It's being capable to control distress moods well and manage impulses. It's being inspired and remaining full of hopes and optimistic when you have set back in working to achieve your goals. It is the insight knowing what the people surrounding you are feeling. In the light of how much stress schools, colleges and other organizations place on IQ alone, it is shocking that only a very limited part of a person's accomplishment at

work, or in life, is described by IQ. When IQ test counts are paralleled with how well people function in life, the highest rating of how much difference IQ makes is only about 20 percent. This implies that IQ alone is incapable of explaining about 80 percent of job success. As much as 80 percent of success is said to be derived from EQ.⁸

Emotional Intelligence involves fields such as:

Recognizing emotion: The ability to identify how you and those surrounding you are feeling.

Applying emotion: The capability to generate emotions and then to use logic with this emotion.

Comprehending emotion: The ability to comprehend the crucial emotions and emotional “chains” in what way emotional conversion takes place from one stage to another.

Managing emotion: The ability which permits you to regulate emotions in yourself

STRESS

Stress as a term means “to draw tight” and has been used to describe troubles, affliction, force, pressure, strain, or strife. It has been acknowledged as an external load or force supplied on the person and observed the person’s reaction to an obstruction. It has become an inevitable companion today in all fields of life⁹⁻¹². Its managements and coping has become a great concern for physiologists, psychologists, psychiatrists, clinicians and educationists. In some cases, it becomes mental health problem, which needs to be dealt with systematically. In another sense, stress is considered as a class of impetus which threatens a person in some form and hence causes disorder in his behaviour. Thus stresses are the factors or causes that lead to maladjustment and disorganization of the behaviour. The American Psychological Association (2007) found in American poll that one-third of population in the United States inform undergoing very high level of negative stress¹³⁻¹⁸. Stress as a general word is used to various psychologic (mental) and physiologic (bodily) burdens experienced or felt by people in their lives. According to the ‘Health Centre (2006)’ there are four main types of stress¹⁹⁻²³:

Distress: - Distress is a negative stress brought about by regular adaptations or amendments in a routine. It gives birth to feelings of displeasure and ignorance¹⁹.

Eustress:- Eustress is a sort of a brief phase stress that gives instant power. Eustress takes place at points of raised physical activity, excitement, and inventiveness. It is a beneficial stress that originates when impetus and inspiration are required²⁴.

Hyper Stress or Excessive Stress: - Hyper stress happens when a person is forced above what he or she can manage. Hyper stress develops from being overburdened or burned out with excess work. It affects all phases of a person’s life which includes their work, their family life and even their life in society and personal affinities²⁵.

Hypo stress: - Hypo stress is adverse of hyper stress. Hypo stress takes place when an individual is turned off or unquestioned. People who go through hypo stress are often disturbed²⁶.

OBJECTIVES OF THE STUDY

1. To study the Eve-teasing among adolescents girls.
2. To study the Emotional Intelligence of adolescents girls.
3. To study the Stress of adolescent girls.
4. To study the Eve-teasing of adolescent girls in relation to Emotional Intelligence.
5. To study the Eve-teasing of adolescent girls in relation to stress.
6. To study the difference in Eve-teasing of adolescent girls in relation to their location of school.

Hypotheses

There is no significant difference in the Eve-Teasing of Adolescent girls studying in urban and rural schools.

There is no significant difference in the Emotional Intelligence of Adolescent girls studying in urban and rural schools.

There is no significant difference in the Stress of Adolescent girls studying in urban and rural schools.

There is no significant relationship between Eve-Teasing and Emotional Intelligence of Adolescents girls.

There is no significant relationship between Eve-Teasing and Stress of Adolescents girls.

There is no significant difference in Eve-Teasing of adolescent girls in relation to location of school.

Delimitations of the study

The study was limited to school going adolescent girls only.

School going adolescent girls from District Ferozepur were taken to study the problem.

The present study was delimited to study the effect of Eve-teasing on Emotional Intelligence and Stress in adolescent girls.

Sample of the study

The sample comprised of 200 adolescent girls selected randomly from Ferozepur district. 100 girls were taken from rural and 100 from urban schools.

Tools Used

1. Eve-teasing: A Self prepared tool.
2. Emotional Intelligence Test by Prof.Roquiya Zainuddin & Dr.Anjum Ahmed.
3. Students Stress Scale by Dr. Zaki Akhtar.

Analysis and Interpretation

Objective 1. To study the Eve-teasing among Adolescent Girls.

Table 1.1 Showing the frequency score of Eve-teasing among adolescent girls.

Class Interval	Frequency (f)	Cumulative Frequency	CPF
41-50	2	2	1
51-60	4	6	3
61-70	7	13	6.5
71-80	44	57	28.5
81-90	58	115	57.5
91-100	65	180	90
101-110	19	199	99.5
111-120	1	200	100

Mean=84.89; S.D. = 11.59; Minimum Score=49; Maximum Score=112; Range=63.

Table 1.1 depicts that 29% of sample falls in the mean interval 81-90 in the Eve-teasing among Adolescent Girls, having mean value of 84.89. 28.5% of respondents lie in the class intervals that are above the mean class interval 81-90 and 42.5% of the adolescent girls score in the lower class intervals than the mean class interval 81-90.

Table 1.2 Showing the Mean score in Eve-teasing of Adolescent Girls

Eve-teasing	Urban	Rural	Total
Mean	84.89	88.53	86.71

Table 1.2 shows the mean score of Eve-teasing of urban (100) adolescent girls is 84.89 and rural (100) adolescent girls is 88.53 and the total mean score of Eve-teasing is 86.71. The Rural adolescent girls experience high Eve-teasing as compared to urban adolescent girls and total of Eve-teasing mean score.

Discussion: -The above table depicts that the mean score of rural adolescent girls is higher as compared to mean score of urban adolescent girls and total adolescent girls which may be interpreted as rural adolescent girls have to face more Eve-teasing as compared to urban adolescent girls.

Objective 2. To study the Emotional Intelligence among Adolescent Girls.

Table 2.1 Showing the frequency score of Emotional Intelligence among adolescent girls.

Class Interval	Frequency	Cumulative Frequency	CPF
20-30	1	1	1
31-40	0	1	1
41-50	3	4	2
51-60	54	58	29
61-70	111	169	84.5
71-80	29	198	99
81-90	2	200	100
Total	200		

Mean=63.15; S.D. = 6.84; Minimum Score=27; Maximum Score=83; Range=56.

Table 2.1 depicts that 0.55% of sample falls in the mean interval 61-70 in the Emotional Intelligence

among Adolescent Girls having mean value of 63.15. 29% of respondents lie in the class intervals that are above the mean class interval 61-70 and 15.5% of the students score in the lower class intervals than the mean class interval 61-70.

Table 2.2 Showing the Mean score Emotional Intelligence of Adolescent Girls

Emotional intelligence	Urban	Rural	Total
Mean	63.15	65.15	64.15

The Table 2.2 shows the mean score of emotional intelligence of urban (100) adolescent girls is 63.15 and rural (100) adolescent girls is 65.15 and the total mean score of emotional intelligence is 64.15. The rural adolescent girls experience high emotional intelligence as compared to urban adolescent girls and total of emotional intelligence mean score.

Discussion: - It is evident from the above table that the mean score of rural adolescent girls is higher as compared to mean score of urban adolescent girls and total adolescent girls. It is interpreted that rural adolescent girls are more emotionally intelligent as compared to urban adolescent girls.

Objective 3. To study Stress among adolescent girls.

Table 3.1 Showing the frequency score of Stress among adolescent girls.

Class Interval	Frequency	Cumulative Frequency	CPF
80-100	20	20	10
101-120	50	70	35
121-140	57	125	62.5
141-160	45	172	86

161-180	23	195	97.2
181-200	5	200	100
Total	200		

Mean=135.17; S.D. = 23.66; Minimum Score=82; Maximum Score=187; Range=105.

Table 3.1 depicts that 27.5% of sample falls in the mean interval 141-160 in Stress among adolescent girls having mean value of 141-160. 63.5% of respondent lie in the class intervals that are above the mean class interval 141-160 and 14% of the adolescent girls score in the lower class intervals than the mean class interval 141-160.

Table 3.2 Showing the Mean score of Stress of Adolescent Girls

Stress	Urban	Rural	Total
Mean	135.17	129.46	132.315

Table 3.2 shows the mean score of Stress of urban (100) adolescent girls is 135.17 and rural (100) adolescent girls is 129.46 and the total mean score of Stress is 132.315. The urban adolescent girls has high Stress as compared to rural adolescent girls and total of Stress mean score.

Discussion: - It is evident from the above table that the mean score of urban adolescent girls is higher as compared to mean score of rural adolescent girls and total adolescent girls. It is interpreted that urban adolescent girls have to bear more stress as compared to urban adolescent girls.

Objective 4. To study the Eve-teasing of Adolescent Girls in relation to Emotional Intelligence.

Table 4.1 Showing the significant relationship between Eve-teasing of Adolescent Girls in relation to Emotional Intelligence.

Variable	N	Mean	S.D.	Coefficient of Correlation	Result	Table value	Significance level
Eve-teasing	200	86.71	11.59	0.099	Positive Correlation	0.13 at 0.05level	Not Significant At 0.05 and 0.01
Emotional Intelligence	200	64.15	6.84			0.18 at 0.01level	

Table 4.1 depicts that mean score of Eve-teasing of adolescent girls is 86.71 and mean score of Emotional Intelligence of adolescent girls is 64.15. The S.D. of Eve-teasing is 11.59 and S.D. of Emotional Intelligence is 6.84. The correlation of Eve-teasing and Emotional Intelligence of adolescent girls is 0.099. The obtained value is higher than the table value of 0.05 level is 0.13 and 0.01 level is 0.18 respectively. Therefore, the obtained value is not significant at both levels. There is no significant relationship between Eve-teasing and Emotional Intelligence.

Discussion: From the above result it is clear that obtained value is lower significant at both levels (0.05 and 0.01). So it is concluded that there is no significant relationship between the Eve-teasing of Adolescent Girls in relation to Emotional Intelligence.

Hence the Hypothesis No. 4, 'There is no significant relationship between Eve-teasing and Emotional Intelligence of Adolescent girls' is accepted.

Objective 5.To study the Eve-teasing of Adolescent Girls in relation to Stress.

Table 5.1 Showing the relationship between Eve-teasing of Adolescent Girls in relation to Stress.

Variable	N	Mean	S.D.	Coefficient of Correlation	Result	Table value	Significance level
Eve-teasing	200	86.71	11.59	-0.3176**	Negative Correlation	0.13 at 0.05 level	Significant at 0.05 and 0.01
Stress	200	132.315	26.66			0.18 at 0.01 level	

Table 5.1 shows that the mean score of Eve-teasing of adolescent girls is 86.71 and mean score of Stress of adolescent girls is 132.315. The correlation of Eve-teasing and Stress of adolescent girls is - 0.3176. The S.D. of Eve-teasing is 11.59 and S.D. of Stress is 26.66. The correlation of Eve-teasing and Stress of adolescent girls is -0.31. The obtained value is higher than the table value at 0.05 level is 0.13 and at 0.01 level is 0.18 respectively. Therefore the obtained value is significant of both levels. There is significant relationship between Eve-teasing and Emotional Intelligence.

DISCUSSION

From the above result it is clear that obtained value is significant at both levels (0.05 and 0.01). So it is concluded that there is no significant relationship between the Eve-teasing of Adolescent Girls in relation to Stress.

Hence the Hypothesis No. 5, 'There is no significant relationship between Eve-teasing and Stress of Adolescent girls' is rejected.

Objective 6. To study the difference in Eve-teasing of adolescent girls in relation to the location of school.

Table 6.1 Depicting the difference in Eve-teasing of adolescent girls in relation to the location of school.

Sr. No.	Group	N	Mean	S.D	Df	t- value
1	Urban girls	100	84.89	11.48	196	2.93**
2	Rural girls	100	88.53	11.46		

*Significant at 0.05 level **Significant at 0.01 level

Table 6.1 shows that mean score of the difference in Eve-teasing of adolescent urban girls in relation to the location of school is 84.89 and mean score of Eve-teasing of adolescent urban girls in relation to the location of school is 88.53. The standard deviation of adolescent urban girls is 11.48 and of adolescent rural girls is 11.46. The obtained value is higher than the table of 0.05 levels and 0.01 levels. Therefore the obtained value is significant at 0.01 levels.

Discussion: From the above result it is clear that the obtained value is significant at both levels (0.01 & 0.05). So it is concluded that there is significant difference in Eve-teasing of adolescent girls in relation to the location of school.

CONCLUSIONS

In the light of analysis and interpretation of data, the following conclusions were drawn from the sample taken in the present study:

It is concluded that the mean score in eve-teasing of adolescent girls studying in rural school is 88.53 which is higher than the mean of adolescent girls studying in urban schools (84.89). Hence adolescent girls studying in rural schools are more a victim of Eve-teasing than adolescent girls studying in urban schools.

A careful examination of the result revealed that adolescent girls studying in rural schools are more emotionally intelligent than adolescent girls studying in urban schools.

Further, the results reveal that the girls studying in urban schools undergo more stress than girls studying in rural schools.

It is further concluded from result that coefficient correlation is not significant for the relationship between

Eve-teasing and Emotional Intelligence. Hence Eve-teasing has no significant relationship with Emotional Intelligence.

It is further concluded from result that coefficient correlation is significant for the relationship between Eve-teasing and Stress. Hence Eve-teasing has a significant relationship with Stress.

A careful examination of results reveal significant difference in Eve-teasing of adolescent girls in relation to the location of school. Therefore, the location of school does impact the eve-teasing of adolescent girls.

Conflict of Interest: Nil

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The Efficacy of Prophylactic Imipenem in Preventing Post-Ureterorenoscopy Fever

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ABSTRACT

Background: Ureteroscopic removal of stones (URS) has been widely used to treat ureteral stones because it is comparatively safe, has a high success rate, and enables patients to rapidly return to their daily routines. However, some patients experience fever after URS, but the incidence of post-URS fever (18.3 %)¹. This study aimed to investigate the efficacy of imipenem prophylaxis in preventing post-ureterorenoscopy (URS) fever.

Imipenem medication antibiotics used to treat a wide variety of bacterial infections. This medication is known as a carbapenem-type antibiotic. It works by stopping the growth of bacteria. Imipenem is a broad-spectrum beta-lactam antibiotic used for severe bacterial infections caused by susceptible organisms. It has activity against many aerobic and anaerobic Gram-positive and Gram-negative organisms, including *Staphylococcus aureus*, *Streptococcus pyogenes*, *S. agalactiae*, *S. viridans*- group streptococci, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Proteus mirabilis*, *Bacteroides fragilis* and *Peptostreptococcus* species.

In this study 47 patients (32 male and 15 females) were subjected to URS for stone in the ureter, all were given prophylactic dose of imipenem infusion 250mg, at time of induction of anesthesia to study the efficacy of the drug in preventing post-URS fever. Only 3 patients (1 male and 2 females) where their stones at the upper third of the ureter suffered from fever in day zero postoperatively with incidence of (6.4%), treated by additional night dose of the same drug 500mg and paracetamol 1000mg intravenous infusion. We concluded that prophylactic imipenem dose of 250 mg intravenous infusion is associated with a significant decrease of post-URS fever.

Keyword: Imipenem, URS, fever.

INTRODUCTION

Postoperative fever is defined as body temperature $>38^{\circ}\text{C}$ and was graded according to the Clavien grading system². Antibiotic prophylaxis is used to minimize infectious complications resulting from interventions. Side-effects and development of microbial resistance patterns are risks of the use of antibiotics. Therefore, the use should be well considered and based on high levels of evidence.³ The role of ureteroscopy over the last ten years has undergone a dramatic evolution, due to improvements in the ureteroscope size and deflection capabilities, video-imaging, miniature baskets and instruments, and in lithotripsy (stone breakage) with the advent of holmium laser. Over 25% of all kidney stone surgeries are now done using small ureteroscope technology³. Now a day URS is widely used for treatment of ureteric stones by extraction,

pneumatic, laser lithotripsy. On the other hand URS not free of complications. One of the most common complications post-URS procedures is the development of febrile state (fever) in the next few hours (6-12 hours) after URS interventions. The cause of post-URS fever is due to ascending infection at time of interventions for stone disease and the major risk of post-URS fever is the progression of the infection to urosepsis with overall sepsis rate of 2.8% within 48 h of surgery. Furthermore, this risk of sepsis increased cumulatively with longer stent dwell-time before definitive surgery, increasing the risk of sepsis to 9.2% in patients who had a stent *in situ* for >3 months before the treatment of their stone⁴. Imipenem/cilastatin, is an antibiotic useful for the treatment of a number of bacterial infections⁹. It is made from a combination of imipenem and cilastatin. Specifically it is used for pneumonia, sepsis, endocarditis, joint

infections, intra-abdominal infections, and urinary tract infections⁶. It is given by injection into a vein or muscle Hamilton, Richart (2015). Common side effects include nausea, diarrhea, and pain at the site of injection⁷. Other side effects may include *Clostridium difficile* diarrhea and allergic reactions including anaphylaxis¹. It is unclear if use during pregnancy is safe for the baby⁵. Imipenem is in the carbapenem family of medications and works by interfering with the bacteria's cell wall. Cilastatin blocks the activity of dehydropeptidase I which prevents the breakdown of imipenem⁷. In the United States a Imipenem/cilastatin has the ability to kill a wide variety of bacteria. Imipenem is the active antibiotic agent and works by interfering with their ability to form cell walls, so the bacteria break up and die. Imipenem is rapidly degraded by the renal enzyme dehydropeptidase if administered alone (making it less effective); the metabolites can cause kidney damage⁵. Imipenem/cilastatin is indicated for the treatment of severe or complicated skin, tissue, joint, respiratory tract, intra-abdominal, urinary tract and urogenital infections, but not meningitis (as it does not pass through the blood brain barrier), endocarditis, and sepsis due to susceptible organisms.

Its use is generally restricted to severe infections largely in hospitalized patients. The recommended dosage is 250 mg to 1 gram given intravenously every 6 to 8 hours or in intramuscular doses of no more than 1.5 gm daily, usually for five to 14 days. It given as 250-mg intramuscular injections or 500-mg infusion bottles for IV use or 500-mg or 750-mg vials of lyophilized powder for IM injection.

Materials and tools :

47 patients (32 male and 15 females) with ureteric stones

Imipenem 250 mg given as infusion with 100 cc normal saline at time of anesthesia induction.

Ureterorenoscope with pneumatic lithotripsy for stone disintegrations.

Strict body temp. monitoring in the next 24 hours following the interventions..

Laboratory investigations with WBC count and ESR%.

Patients and methods :

This study is a prospective study type from 1/1/2016 to 15/8/2017 done in a private hospital in Baghdad were 47 patients (32 males and 15 females) were given a prophylactic dose of imipenem 250mg intravenous infusion pre-URS procedures and their body temperatures were monitored strictly for detection of postoperative fever. Patients mean age (39.5)years with youngest patients of 18 years and the oldest one was 72 years. Patients with diabetes and immunocompromised were excluded from the study. All the patients were suffering from long standing impacted stones in the ureter. The distribution of their stones site were 20 patients (42.5%) at lower ureter, 17 patients (36.1) at mid ureter and 10 patients (21.3%) at upper ureter. All patients were investigated for renal function test , imaging study and laboratory biochemical analysis.

RESULTS

3 patients (2 females and 1 male) suffer from post-URS fever in the next 12 hours.

Table (1): show the incidence of developing fever in the next 12 hours post-URS.

Gender	Patient NO.	Post –URS fever	Time of onset of febrile state from the procedures/hour	Site of the stone/ureter
Male	32	1(2.1%)	6	Upper third
Females	15	2(4.25%)	5 hour for the first patient 12 hour for the second patient	Upper third

Diagram (1): Show overall fever rate in post-URS patients in comparison with fever after imipenem prophylaxis.

DISCUSSION

The result of this study clearly show that a significant decrease in post-URS fever which usually happened in the next 12 hours following the intervention.

From all 47 patient who were subjected to this study only 3 patients(6.4%) suffered from fever in the next few hours. A 72 years old male with no history of previous ureteric intervention and no history of medical comorbidities suffered from post-URS fever 39.2 C in the next 6 hours and respond well to night dose of imipenem1000mg intramuscular injection and paracetamol infusion. on the other hand 2 females with 53, and 67 years old respectively suffered from post-URS fever. The first 53 years old female was stented in her ureter one month prior to the procedure due to acute ureteric obstruction. That patient suffered from high fever of 40.1C and was treated by additional night therapeutic night dose of imipenem1000mg and paracetamol infusion1000mg followed by dramatic response to treatment in the next few hours and kept on maintenance ceftriaxone injection 1000mg in the next 3 days and discharged with full recovery. The second 67 years old female had clear surgical and medical history also had a fever of 39.7C and history of previous intervention to the ureter but the procedures was associated with long operative time exceeding 1.5 hour. Again that patient treated with therapeutic night dose of imipenem1000mg and paracetamol infusion 1000mg.

The 72 years old male, and the 67 years old female who developed fever probably happened due immunocompromized status related to aging process and still at the range of post-URS fever in which 2 out of 10 of the studied patients where over age of 60 years and (20%) of them suffered from fever. But what was interesting is the 53 years female with history of stented ureter that was impending a urosepsis.

A study done by *Daron Smith 2017*⁴ show that , the risk of sepsis following URS procedure in unstented patients was 1.2%, compared with 4.7% in those with a stent, such that overall, 80% of the patients who developed sepsis had a prior JJ stent *in situ*. Furthermore, this risk increased cumulatively with longer stent dwell-time before definitive surgery, increasing the risk of

sepsis to 9.2% in patients who had a stent *in situ* for >3 months before the treatment of their stone, this push our work in URS procedure to strictly doing a urine culture and sensitivity for all patients of stented ureter pre URS intervention to avoid a horrible complication of urosepsis.

Actually many studies focus on the risk factors of post-operative URS fever but no one of them try to use a prophylactic imipenem for preventing it.

A study done by *Mitsuzuka K 2016*².show that Preoperative pyuria and acute pyelonephritis were significant factors for postoperative febrile UTI and development of urosepsis following URS procedure.

Other study done by *panelAso 2016*⁸. show that ,duration of the operation and number of tracts are risk factors for post URS fever, and this result correlate positively with our 53 years old female who had long operative procedure time exceeding 1.5 hours.

Finally the above result give the following message to us:

Prophylactic dose 250 mg of imipenem is effective in decreasing post-URS fever from 18.3% to 6.4% in patients with negative medical comorbidities.

Previous stenting of the ureter indicates doing urine culture and sensitivity with preoperative treatment prior to doing URS to avoid urosepsis in the next few hours of the procedure.

The longer time spent in the URS procedure the greater the risk of developing post-URS fever.

CONCLUSION

This study gives us a strong evidence that is using a prophylactic dose of 250mg of imipenem is sufficiently efficient in decreasing the incidence of post-URS fever and can be routinely and safely used prior to the procedure in patients with no previous drug allergy to carbapenem group. Moreover it put a highlight to those with stented ureter prior to URS intervention to be more strict in doing urine culture and sensitivity and should be treated accordingly before URS intervention to avoid risk of fever and subsequent urosepsis.

Fillay the length of the procedure has a positive correlation with development of post-URS fever.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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A Study of Impact of Ict on Critical Thinking of Elementary Level Mathematics Students

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ABSTRACT

This research paper is based on the study made by investigator on the impact of ICT on critical thinking ability of mathematics students. The study was experimental in nature. The data was collected from 120 students of elementary level of private schools in Delhi-NCR with ICT facilities. The objectives of the study were (a) To study the critical thinking abilities of elementary level students of mathematics (b) To study the impact of ICT on critical thinking abilities of elementary level students of mathematics. The results show that the impact of ICT on critical thinking abilities of elementary level mathematics students is significant.

Keywords: *ICT, Critical thinking, Elementary level students*

INTRODUCTION

In the present era when we are standing at the crossroads of transition from digital immigrants to natives there are many issues ranging from technology to culture to globalisation and social norms which have widened the gap between the two. In such a situation the teachers have a major role to play to keep the gen next rooted to the ground yet providing them wings to fly. The learning can take place to its fullest only when the learners are taught in the way they want to learn and take interest in the methods through which the teaching and learning is taking place.

The present generation of learners is living in an uncertain world where there are constant threats of terrorism, school violence, globalisation, influential media, and acute climatic conditions. This has led the parents of this generation to become overprotective and shielding in nature. Each parent wants their child to be the best in almost all arenas which has put tremendous pressure on the young minds and more so, on their teachers. Because of their inability at such tender age to handle such parental pressures and expectations they tend to give up and start indulging in anti-social behavior, psychological complications, drug abuse and increased delinquent behavior. So these young buddy minds need to be the decision makers and must acquire the ability to think critically.

Need of the study

We the human beings have been blessed with the ability to think and make judgements. But in due course of time our education system has made way to mechanical learners. According to NCTM (2000) there is need to inculcate critical thinking skills through the subject of mathematics and pedagogy of mathematics¹⁰. Also, Jacob(2012) states that problem related to real life can be solved with the young students with ease and on their own if the higher order thinking skills like critical thinking is encouraged amongst the learners⁶. The fundamental of the present Indian education system is its examination, which enforces rote memorization and ignore the development of higher order thinking skills. The schools only emphasize on learning of the facts and memorization using the outdated lecture method of teaching which does not initiate use of higher order critical thinking skills².

The results of research conducted by Chukwuyenum (2013) are evident that the achievement score in mathematics can be improved with the development of critical thinking ability amongst the learners¹.

Also, the major areas of concerns with the present era of young learners are that they are more into socializing, always reaching out for mobiles or tabs or laptops. Also, they want to reason out things and know its utility, they question. But isn't all this very natural, who would like to go back to the black and white submissive modes of

learning when abundance of information is available at the click of a mouse. But all this requires a well prepared program which includes engaging and exciting pedagogical innovations.

There is need of a league of teachers and teacher educators who can extend themselves beyond their comfort zone to unleash their potential to reach out to the young vibrant minds and evolve their innate capabilities.

Role of ICT in education

There has been tremendous work in the field of technology. The teachers are expected to have potential to handle the changing classroom scenario in terms of research, effective thinking, communication and creation. In the intermediate level of ICT competency for teachers as recommended by National Policy on ICT in school education the teachers should be the creator of digital content and also should be proficient in managing data with the help of various ICT tools like hardware devices as well as software applications. Also UNESCO has prescribed integration of ICT at pedagogical level in addition to integration at curricular or spatial level. In this regard many initiatives have been taken by Central Institute of Education Technology (CIET), NCERT in terms of National Repository for Open Educational Resources (NROER) in 2013, e-pathshala and e-PG pathshala in 2015 and Massive open online courses (MOOCs) with the name swayam in 2016 are to name a few. But still the majority of teachers are struggling and juggling with the basic interface with technology⁹.

One tool that can be used in most efficient manner for developing higher order thinking skills like reflective thinking, problem solving, critical thinking and creative thinking amongst the learners is Information and Communication Technology. With the help of ICT various information can be collected, disseminated, manipulated, retrieved and stored etc. with utmost accuracy and thus the higher order thinking skills can be developed in an effortless manner by the teachers amongst the learners.

Critical thinking and mathematics

According to Facione (2011) in general “critical thinking consists of interpretation, analysis, evaluation, inference, explanation, self-regulation”. It is evident that these are also the characteristics of mathematics and so while developing general critical thinking skills

it can initially be made domain specific in context of mathematics⁴. Critical thinking as defined by Krulik and Rudnik (1995)⁷ is “Critical thinking is analytical thinking and reflection that involve testing activities, questioning, connecting and evaluating all aspects of a situation or problem”. According to Shakirova (2007) in order to deal with social, practical and scientific problems in an effective manner, critical thinking skills are essential¹². The students who can think critically are good problem solvers. And since problem solving is an integral part of mathematics learning and triggers critical thinking ability so critical thinking leads to learning of mathematics more engaging and meaningful. Also, Cobb et al., (1992) specifies that through meaningful learning of mathematics the higher order thinking skills may be developed in a systematic manner at the school level².

Use of ICT for developing critical thinking

The systematic and organized way of developing critical thinking is with the help of appropriate practice of technology in the subject of mathematics. Mathematics by nature is unambiguous, logical and hierarchical. Use of technology allows the students to explore the various possible solutions, make inferences, synthesis and analyse the problems and arrive at the conclusions in a streamlined manner with ease. Also, use of technology allows the otherwise unexplored areas where concrete examples are very difficult to use in mathematics more practical and interesting.

Objectives of the study

To study the critical thinking ability of elementary level students in mathematics.

To study the effect of ICT on critical thinking ability of elementary level students.

METHODOLOGY

The sample of the study consisted of 120 children (60 boys and 60 girls) of class VIII from three schools in Delhi NCR. Purposive sampling technique was used for choosing the schools for the study based on the availability of ICT facility.

Tools used

Monitoring proforma, adopted by the investigator

Basic Technology competencies for educators inventory by Flowers C and Algozzine B

Self-developed critical thinking questionnaire (covering class VIII NCERT curriculum)

Findings of the study

The self-constructed Critical Thinking questionnaire was administered on the 60 students each of control and experimental groups. The tool consisted of 25 questions of mathematics specially designed to test interpretation, reasoning, analysis, synthesis etc. These skills and were assessed using the standardized rubric of “Holistic critical thinking scoring rubric developed by Peter A.Facione and Noreen C Facione.” The results of analysis are discussed below:

Table1: Comparison of Pre-Critical thinking scores between control and experimental respondents

Groups	N	Mean	SD	t-value
Control Group	60	13.717	6.857	1.337(NS)
Experimental Group	60	15.217	7.726	

NS – Not significant

It can be observed from the Table 1 that the mean pre-test scores of control and experimental groups on critical thinking variable are 13.717 and 15.217 respectively with their SD 6.857 and 7.726 respectively. The t-ratio between the two groups on critical thinking is 1.337 which is found to be insignificant. It signifies that the control and experimental groups having no difference in their critical thinking.

Table 2: Comparison of Post-Critical thinking scores between control and experimental respondents

Groups	N	Mean	SD	t-value
Control Group	60	31.5	8.775	10.045**
Experimental Group	60	49.217	10.220	

**Significant at 0.01 level

It can be observed from the Table 2 that the mean post-test scores of control and experimental groups on critical thinking variable are 31.5 and 49.217 respectively with their SD 8.775 and 10.220 respectively. The t-ratio between control and experimental group on critical

thinking is 10.045 significant at 0.01 level of significance. It indicates that there are significant difference in critical thinking scores of control and experimental in their Post-test. Experimental group scored more in comparison to control group.

Table 3: Comparison of difference of Pre and Post Critical Thinking scores of both control and experimental group respondents

Group	N	Mean	SD	t-value
Control Group	60	17.783	7.399	14.301**
Experimental Group	60	34	6.433	

**Significant at 0.01 level

It can be observed from the Table 3 that the difference of mean pre and post test scores of control and experimental groups on critical thinking variable are 17.783 and 34 respectively with their SD 7.399 and 6.433 respectively. The t-ratio between the two groups on critical thinking is 14.301 which is significant at 0.01 level of significance. It indicates that the students of two different groups differ significantly in critical thinking. The comparison of mean scores further reveals that the mean score of experimental group in post-test is much higher than the pre-test. It shows that the ICT intervention programme has positive effect on the critical thinking of elementary level children.

Table 4: Comparison of Critical thinking scores between Pre and Post Experimental group respondents Paired t-Test (N=60)

Group	Mean	SD	t-value
Pre –Experimental	15.217	7.726	40.936**
Post –Experimental	49.217	10.220	

**Significant at 0.01 level

It can be observed from the Table 4 that the mean pre-test and post-test scores of experimental group on critical thinking variable are 15.217 and 49.217 respectively with their SD 7.726 and 10.220. The t-ratio between the two groups on critical thinking is 40.936 which is found to be significant at 0.01 level of significance. It signifies

that there is significant difference between the pre and post test scores of experimental groups with respect to the variable of critical thinking. The comparison of the mean score further reveals that ICT has positive effect on the critical thinking ability of the elementary level students in mathematics.

CONCLUSION

Thus it can be determined that there is a significant difference between the critical thinking ability of students taught with ICT, although there is increase in the critical ability of both the groups but as evident from the tables that the critical thinking ability has increased more by using ICT for teaching mathematics. ICT can be used as a great tool by the teacher and teacher educators to enhance higher order critical thinking skills in the specific subject of mathematics. Although, it is very imperative to inculcate student's critical thinking skills across all specific subjects but more so in mathematics. Learning of subject like mathematics which is unambiguous, scientific and hierarchical should not be only learning of mathematical content. Rather it should lead to enrichment of critical thinking skills necessary which will develop the life skill of problem solving amongst the young learners and help them in facing the obstruction in their social life.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Depression among Senior Secondary School Students: Influence of Internet Addiction

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ABSTRACT

Internet is a cardinal part of our day to day life. Although it has numerous benefits but we can't ignore its negative impact on the younger generation. The current paper studies the influence of internet addiction on depression among senior secondary school students in Jalandhar District of Punjab. The sample for the research consisted of 200 senior secondary school students. Personal Assessment Inventory and Internet Addiction Test were employed to collect the required data. The results indicate that depression and internet addiction of senior secondary school students are significantly related with each other. Insignificant difference exists between students with high internet addiction and low internet addiction in their depression. Boys and girls do not differ significantly on the variable of depression. Interaction effect of gender and internet addiction on depression of secondary school students is found to be significant. On the basis of results, recommendations were given.

INTRODUCTION

In the contemporary world internet has an enormous role in altering the lives of the individuals in the society. Now internet is an inseparable part of individual's life and segregation from it is beyond imagination¹. There is no second thought on this that impact of internet is more on the adolescents in comparisons to others in the society². Internet has numerous benefits but we can neglect the adverse impact of its usage, prominently overuse or misuse and various physical and psychological probes associated with it³. There is a growing concern about whether its usage is excessive and, if so, whether it amounts to an addiction. When the individual uses the internet just to attain the desired outcomes within appropriate period of time any cognitive or behavioural discomfort, than that usage is considered as healthy use of internet⁴. Whang, Lee, & Chang, 2003a⁵; Widyanto, (2007) unlimited internet usage which is also known as uncontrolled usage of internet, net addiction or internet addiction. Internet addiction is explained as overpowering urge to use internet without need, consider time consumed as waste without linking to internet^{6,7,8,9}. Cao and Su (2007) excessive use of internet is also observed in diverse societies and cultures and it is found that the group who is at higher risk is adolescents¹⁰.

Anxiety disorders are associated with internet addiction¹¹, and various mental health issues, like ADHD, Playing games for longer period of time, bipolar disorders, social fear¹², gambling and depression in the youth. There are parallel evidence of adolescents suffering from depression who are addicted to internet and vice-versa^{13,14}. Sorrow, lack of sleep, loss of appetite, unfriendly mood, bleakness, low self-esteem and suicidal ideation are the evidences of depression¹⁵. Mental disorders like depression, stress and anxiety are reported in persons who exhibit low hardiness. A psychologically hardy student instead of avoiding and withdrawing from stressful situations tries to cope up with such situations and take them as opportunities to learn¹⁶.

Depression, loneliness, stress and anxiety are predicted by internet addiction. Usage of internet is gender sensitive and boys are having high risk of internet addiction as compared to their counter parts. Males internet addicted differ significantly in the level of depression, anxiety, stress and loneliness from their counterparts¹⁷. Relationship between both self-esteem and depression is so strong that with the help of scores of self-esteem and depression, scores of internet addiction can be anticipated to some extent. Low self-esteem and depression are the amplifier and cardinal reasons

of internet addiction¹⁸. Level of internet addiction and severity in depression is having positive correlation with each other¹⁹. It is also revealed that depression in the students are occur due to the social isolation which is the aftermath of internet addiction.

Young (1998) has found that huge proportion of internet addict's adolescents have a past of undergoing anxiety and depression. Seifi, Ayati and Fadaei (2014) found that internet addiction, depression, stress and anxiety are positively related with each other. Regression analysis revealed that addiction towards internet is predicted by 17% of depression variable, 20% by anxiety and 13% by stress. Internet addiction and depression are correlated with each other²⁰.

Dutta (2016) indicates that there is insignificant difference in severe depression dimension of mental health and overall mental health between internet addicted and non-addicted adolescent students. A study conducted in Chinese Tai Wai revealed that depression propensity is negatively related with PIU²¹.

Gholamian, Shahnazi, Hassanzadeh (2017) in their study on Iranrain high school student found that majority of the students are normal users of internet only 2.9% high school students are severely addicted to internet. Further, the mean scores of anxiety, depression and stress are significantly more in those high school students, who are having high internet addiction as compared to normal users of internet. For this study Senior Secondary School Students of Jalandhar District in Punjab, have constituent the sample to investigate the influence of internet addiction on their depression²².

Purpose of the Study

The prime objective of the study is to explore the influence of internet addiction on the depression among secondary school students.

Delimitation of the study

1. 200 senior secondary school students were taken for the study.
2. The study was confined only to schools of Jalandhar districts.

Design of the study

The goal of currentresearch was to find influence of internet addiction on the depression level of secondary

school students. Correlation technique was employed to examine the influence of internet addiction on the depression

2×2 factorial design was used on the scores of depression which was studied as dependent variable. Internet addiction was studied as independent variable and was used for the purpose of classification viz. students with high Internet Addiction and students with low Internet Addiction. Sex of the Students was studied as classificatory variable wherein, male and female students were studied.

The layout of the design is presented in figure below

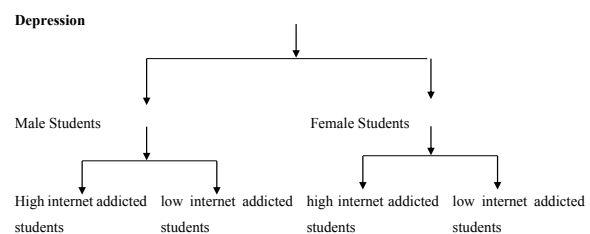


Fig. 1 Schematic presentation of 2×2 factorial design on the scores of depression in relation to internet addiction

Sample

The total sample include in the present study comprised of 200 senior secondary school students 100 girls and 100 boys. The subjects were selected from the senior secondary schools of Jalandhar district only.

Tool used

Following tool were used for the collection of data:

1. IPAT Personal Assessment Inventory by Krug and Laughlin (1976).
2. Internet Addiction Test by Young (1998).

Statistical technique used

1. The following statistical techniques were used: Product moment method of correlation will be calculated to test the hypotheses.
2. 2×2 ANOVA was calculated to find main effect and interaction effect of independent variables Internet Addiction and Gender on dependent Depression.

Analysis and Interpretation of the results

The analysis of the data was done by computing mean, standard deviation, product moment coefficient of correlation and ANOVA has been presented in table 1 and 2.

Table 1: Relationship between depression and internet addiction of senior secondary school students

Variables	N	Value of 'r'
Depression and Internet Addiction	200	0.178*

**Significant at 0.01 level

* Significant at 0.05 level

(Critical Value 0.138 at 0.05 level and 0.181 at 0.01 level, df 198)

Form the table1 it is crystal clear that depression is significantly correlated with internet addiction ($r = .178$) at 0.05 level. This result shows that higher level of internet addiction leads to depression. Those adolescents who have higher Internet Addiction will have depression. Thus the hypothesis H_1 : There exists no significant relationship between internet addiction and depression is rejected. This finding is supported by Hakimzade et. al. 2010; Jafari and Fathizade, 2012 where they found that internet addiction and depression are related with each other^{23,24}.

Table 2: Summary of 2×2 Analysis of Variance

Source of variance	SS	Df	Mss	f-ratio
Internet Addiction (A)	134.56	1	135.56	1
Gender (B)	135.56	1	135.56	1
Interaction (A×B)	359.8	1	359.8	7.76*
Within	4914.53	106	46.36	
Total	5051.05	107		

**Significant at 0.05 level
0.01 level

* Significant at

(Critical Value 3.94 at 0.05 level and 6.90 at 0.01 level, df 106)

Main effects

Internet addiction (a)

It is clear from the table- 2 that the F-Ratio for the difference between mean scores of depression, was found to be 1 which is insignificant even at 0.05 level of confidence. This indicates that high internet addiction and low internet addiction found do not differ on the mean depression scores. Thus the data provide sufficient evidence to accept the hypothesis (H1) viz. “There exist no significant difference between high internet addiction group and low internet group on the variable of depression” is accepted.

Gender (b)

Table- 2 revealed that F-Ratio for the difference between mean scores of depression, was found to be 1 which is insignificant even at 0.05 level of confidence. This indicates that boys and girls found do not differ on the mean depression scores. Thus the data provide sufficient evidence to accept the hypothesis (H2) viz. “There exists no significant difference between boys and girls on the variable of depression is accepted.

Interaction (axb)

Table- 2 depicts that F-Ratio for the difference between mean scores of depression, was found to be 7.76 which is insignificant even at 0.01 level of confidence. This indicates that interaction effect of level of internet addiction and gender found to be differ significantly on the mean depression scores. Thus the data provide sufficient evidence to not accept the hypothesis (H2) viz. There exists no interaction between internet addiction and gender on the variable of depression” is not accepted.

CONCLUSION

On the basis of analysis of data and interpretation of the results, the subsequent assumptions were drawn:

1. Depression and internet addiction among secondary school students are related with each other.
2. Insignificant difference exists between students with high internet addiction and low internet addiction on their depression.
3. Boys and girls do not differ significantly on the variable of depression.

4. Interaction effect of gender and internet addiction on depression among secondary school students is significant.

Educational implications

The present study showed a significant relationship between internet addiction and depression. Internet is a pool of knowledge. Adolescents are very inquisitive nature. They always look for the sources of information. Internet can act as “boon or bane” to them. If proper internet education and awareness is provided to them, then their energies would be channelized in the right direction. So, schools should impart internet education and awareness among the students. Moreover, the access to internet is equal for both boys and girls. Teachers and parents should direct them to use internet in a healthy manner. Adolescents like to stay in their virtual or imaginary world. Parents and teachers should not restrict them but make them aware how to use it effectively so that they do not get addicted and have healthy mental makeup.

Suggestions for the further study

The present investigation suggests that following areas for further study:

1. The present study has been conducted on senior secondary school students. A study may be replicated on the some other age group.
2. The same study can be conducted on college going students.
3. The same study can be conducted by adding more variables like locus of control, social-esteem, stress and anxiety.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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Assessing Leadership Styles of Higher Education Students through Blake and Mouton's Managerial Grid

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ABSTRACT

In the current changing dynamics of global market leader plays an eminent role in accomplishment of organization goal and attainment of task. Leaders may benefit to release tensions, harmonize misunderstanding and deal with disruptive behaviors¹. So as a leader, the student must be able to adapt the leadership style that works for the group for which they are responsible.

Managerial Grid initially consist five different styles of leadership (Authoritarian, Team, Country club, Impoverished and middle of the road) related with concern for people and the concern for production into 9X9 matric.

The present study aims to make the Managerial Grid of Higher Education Students through Managerial Grid prepared by Blake and Mouton. The data will be collected by using standardized construct which is Managerial Model (1985) with 41 students who were studying Leadership Development course in Master in Business Administration. For all 41 Students individually Managerial Grid will be organized to understand their Future managerial judgment track².

Keywords: Higher Education, Leaders, Leadership Styles, Managerial Grid

INTRODUCTION

In current scenario leadership shows an eminent character in the success and failure in the Industry. Leader plays the role of the middle man who conveys the message from top to lower and maintain the harmonious relationship among them. In the past decades the concept of managerial grid was introduced by the Robert Blake and Jane Mouton in between 1958 to 1960 and it was firstly printed in 1964^{3,4}. The present model inclined by the Fleishman two dimension models^{5,6}. The first dimension was Consideration means performance of single respect for dependents considerations and deliberation of their official state of mind. The second dimension was Initiating construction enumerated to the quantity to which a leader organized and clear his or her character and those of underlings in order to achieve organizational goal. Blake and Mouton's attitudinal dimensions consist "Concern for Production", repeating unnecessary attitude towards outcomes, and "Concern for People", denoting meditation for others applied when leadership is trained.

Blake and Mouton's Managerial Grid

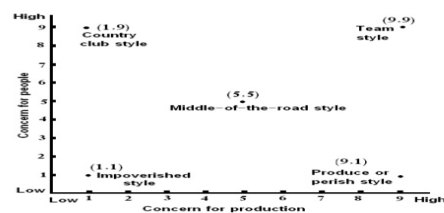


Figure 1. Blake and Mouton's Managerial Grid

Source: Blake and Mouton (1964) *The Managerial Grid*, Houston Gulf Publishing

Figure 1 shows The Blake and Mouton leadership Grid

Concern for production or task placed on X-axis.

Concern for people mentioned on the Y-axis.

Blake and Mouton model lies on two axis X and Y and both ranging from 0 to 9. It consists of five quadrants which study the behavior of those in managerial position's

Table 1. The leader's characteristics according to the grid model

Sr. No.	Determinants of Managerial Grid Model	Leader's Characteristics
1	Impoverished Management(1,1)	The impoverished leaders are ineffective and avoid side taking and they are not responsible for creating a health and motivating work environment.
2	Middle of the Road Management (5,5)	Middle of the road managers having compromising nature. The leader maintains balance between either task or people.
3	Country-Club Management (1,9)	The country club leader will seek compromiser between employers and employees. These type of leader focuses on being agreeable and maintain smooth human relation. Although these managers invite modernization and good ideas but tend to reject ideas which are create difficulties.
4	Authority- Compliance Management (9,1)	The authoritarian leaders are very autocratic by nature. This type of leader believes penalty as the most appropriate means to motivate employees.
5	Team Management (9,9)	The team leadership styles leaders are very cooperative by nature and discuss problems with the subordinates. Problems in working associations will be handling by motivating people directly and attempting to work out solutions with them.

REVIEW OF LITERATURE

In the current changing dynamics of global market leader plays an eminent role in accomplishment of organization goal and attainment of task. Leaders may help to remove tensions, harmonize misunderstanding and deal with disruptive behaviors (Fisher2000). So as a leader, the student must be able to adapt the leadership style that works for the group for which they are responsible. In this study Oostenveld et.al (2009) conducted a study on relationship among leaders' communication style and human oriented leaders, task oriented leadership style and leadership outcomes. The study concluded that charismatic leaders are more communicative and task oriented leadership style managers are less talkative⁷. The study further explained that communication styles significantly related to knowledge sharing behaviors, perceived leader presentation, gratification with the frontrunner and assistant's team promise. In the study of found ample correlation between character characters and leadership styles and also highlight traits for operative leadership styles like human oriented so that instructor become cognizant to accept individuals personalities which brings operative performance and alteration⁸.

Strong et.al (2013) served the styles of leadership and learning of self-directedness among students of

agrarian courses .To achieve objective 93 students of 2 different leadership courses was selected as sample .The study determined strong relationship between human orientation leadership style and directedness of learning's. Furthermore most of defendants had a country club leadership style⁹. (Thomas et al., 2013) studied on leadership style and self-learning of students studying separate agronomy leadership courses. 93 students were selected to achieve objective and found strong relation among self-learning and human orientation style of leadership which is related to people orientation leadership style and self-learning and relates to country club leadership style¹⁰.

Arleane and Roberson (2005) found that the most effective style of leadership is 9,9 which depicts the team leadership style. researched on managerial grid model in Iranian Prosperous Organization, 165 respondents taken from the Iran's Organization's to achieve objective. The study further explained companies lies medium of the road area (5, 5 scores) in the leadership grid¹¹. Gilvania et. al, 2014 worked on managerial grid model in Iranian Prosperous Organization. The study selected 165 employees from the Iran Organizations. This present study originate Iranian Prosperous Organization responses medium of the road area (5,5 scores) in Managerial grid model.

Nikezic et.al (2013) found strong relation between human orientation leadership style and self-learning and relates to country club leadership style¹².

Arleane and Roberson (2005) worked on suitable assistances and virtuous principles to fill leadership designation. The study originate that a (9, 9) method is the utmost operative leadership style and also originate level of existence and leadership styles relates to each other¹³. researched on managerial grid model in Iranian Prosperous Organization, 165 respondents taken from the Iran's Organization. The study found that companies lies medium of the road area (5, 5 scores) in the leadership grid. Gilvania et. al, 2014¹⁴ worked on managerial grid model in Iranian Prosperous Organization. This study conclude Iranian Prosperous Organization responses middle of the road area (5, 5 scores) in Managerial grid. The study concluded most of the employees have been fallen in the authoritarian leadership style. The study also concludes that there is no dominant leadership style so it shows that the participants who enrolled in leadership course are not committed for a single leadership style. Apart from it, (Yazicioglu et.al, 2013) conducted a study to examined a management styles of the Turkish managers in on the Blake and Mouton's managerial Grid Model in term of demographic profile. To fulfill the objective the study selected the sample of 771 managers different from private and public sector¹⁵. The study conclude the differences in managers' managerial styles in term of seniority, marital status, level of education, managerial designation, working experience and to must professional education training absolutely affect leaders' managerial behaviors. Mishra et al. (2015) depicted a study to prepare the Managerial grid by using Managerial grid Model given by Robert Blake and Jane Mouton on selected Textile Industry in Punjab. The study selected 35 managers, supervisors and top executives in the manufacturing Industry. 35 managers individual grid has been prepared and conclude that most of the employees fall down in the Team Leadership style i.e. (high on concern for task and high on concern for people)¹⁶.

RESEARCH METHODOLOGY

Objective

1. To prepare the Managerial Grid of Higher Education Students by using Blake and Mouton managerial grid model.

2. To measure the Leadership styles of the Higher Education Students with the help of Managerial Grid Model.

Hypothesis of the study

H1: Higher Education Students are motivated on Team leadership.

H2: Higher Education Students are focused headed for Country Club leadership.

H3: Higher Education Students are engaged headed for Authoritarian leadership.

H4: Higher Education Students are directed to impoverished leadership.

H5: Higher Education Students are motivated on the "Middle of the Road" leadership.

Research Design for the study

To achieve the objective descriptive research design has been accompanied to measure the leadership styles among the higher education students.

Sample size

The study selected 41 students who were studying Leadership Development course in Master in Business Administration in reputed university.

Tools and administration of construct

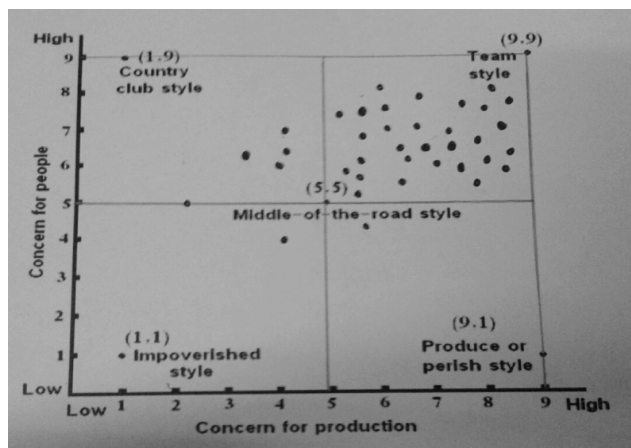
To measure the leadership style the standardized scale was used which was given established by *The Blake and Mouton Managerial Model (1985)*. It contains 18 items; Measuring Leadership styles such as (**Authoritarian Leaders, Team Leader, Country Club Leader, Impoverished Leader and Middle-of-the-road**) Leadership Style. The data was collected from the students who were studying Leadership Development course in Master in Business Administration with the help of standardized scale on 5 point liker scale.

RESULT AND DISCUSSION

Table 1 signifies the responses of the 41 students who were studying Leadership Development course in Master in Business Administration taking into explanation the covering of responses to accomplish demonstration in the work with the presentation portion of all 41 respondents.

The Managerial Grid Model of student represents the individual grid of 41 students in which the left hand side of the one box represents the score of the People Oriented Leadership Style and the right side of the box represents the score of the Task Oriented Leadership Style. The human Oriented Leadership Style contains 9 statements i.e. 1, 4,6,9,10,12,14,16,17 and the Task Oriented Leadership Style also contains 9 statements i.e. 2,3,5,7,8,11,13,15,18. After getting the response from both People and Task Oriented Leadership Style one total score came for both then it multiplies with 0.2 because in Blake and Mouton Managerial Grid there are 5 style of leadership Style so one divide by five it shows 0.2. So from the below represents the individual score of 41 students on People Oriented and Task Oriented Leadership Style and also show the individual Grid of each Students.

Objective 1: To prepare the Managerial Grid of Higher Education Students by using Blake and Mouton Managerial Grid Model.



Objective 2: To study the Leadership styles of the Higher Education Students on the basis of Managerial Grid.

Figure: 2 Managerial Grid Model

From the Blake and Mouton managerial grid model it is clear that out of 41 Higher Education Students 34 students fallen in team leadership style it shows students who perceived themselves as a Future Managers were under in Team leadership style and shows high capacity to complete their task.

CONCLUSION

As per the proposed model given by Robert Blake and Mouton Managerial Grid all the 41 students who were studying Leadership Development course in Master

in Business Administration in Lovely Professional University, Punjab, prepared their managerial grid model as shown in fig. 1.2.

H1: supported because 83% of the managers fall in team leadership style and it shows high on task oriented leadership style and also high on their relationship oriented leadership style. Team leadership style managers always encourage the team efforts as efficiently as possible to attain organizational goal.

H2: not confirmed because only 9.75% of the manager fallen in first quadrant in which the managers are low on people and high on their task orientation style.

H3: not supported because only 2.43% of the managers fallen in the fourth quadrant Authoritarian leaders concentrated on “Concern for Task”.

H4: not supported since smaller number of managers only 2.43% fallen in impoverished leadership and used as their individual leadership style.

H5: not supported because very less managers only 2.43% fallen in Lassie fair leadership style and used as their particular leadership style.

From the above study it is clear that the 41 students who were studying Leadership Development course in Master in Business Administration in Lovely Professional University, individually they all are Task Oriented Leaders and they all are fallen in the Team Leadership Style in Blake and Mouton Managerial Grid. (Mishra et. al 2015) from this study it is clear that managers of Vinayak fabrics are fallen under team leadership style, this depicts that can complete task on time. (Zafar 2011) also supported that executive managers were fallen under in the team management style¹⁷.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Career Indecision among Senior Secondary School Students: Impact of Internet Savviness

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ABSTRACT

The career indecision construct is a matter of concern for the high school students¹. Many factors such as perceived social support, personality, self-esteem and neuroticism are contributing to the career indecision². The current research was conducted to inspect the impact of internet savviness on the career indecision among the senior secondary school students. The study included 720 senior secondary school students (240 students from each type of schools i.e. government, government aided and private schools, out of 360 are male students and 360 are female students). The results revealed that career indecision and internet savviness are negatively related with each other. Male and female do not differ on their career indecision but they differ on their internet savviness. Students studying in private school are less uncertain about their career choice and confident in using internet.

INTRODUCTION

In the transition period from senior secondary to higher education students encounter a cardinal turning point as they have to choose their career³. Career decision making is not only an intricate process but also very nerve-racking and confusing experience. The stressful period may be too overwhelming for them. Impact of this is that it leads to poor career choice. Career indecision amongst undergraduate university students is considered an incapability to choose an occupation of university major⁴. Some students choose their career without bumping into any problems, but many students come across lots of hurdles during choosing their career⁵. The aftermath of these hurdles is that it can adjourn the beginning process, halt it in the between or leading to indecision.

Objectives

Following objectives were framed in the study:

1. To find out the relation between Career Indecision with their internet savviness

2. To compare government, government aided and private school students with respect to Career Indecision and Internet Savviness
3. To compare male and female students with respect to Career Indecision and Internet Savviness
4. To find out the predictors of career indecision from the internet savviness and its dimensions.

RESULTS AND DISCUSSION

Data was analyzed and interpretation of the results was done variable wise as per the objectives of the study

Results related to the relationship of Career Indecision of senior secondary school students with their Internet savviness

Table 1: Correlation matrix of career belief with internet savviness

Variables	CI	IS (Total)	IG	CMC	ISE	CSE	IF	SC
CI	1							
IS (Total)	-.147**	1						
IG	-.177**	.549**	1					
CMC	-.028	.656**	.234**	1				
ISE	-.056	.656**	.331**	.377**	1			
CSE	-.099**	.578**	.123*	.426**	.238**	1		
IF	-.042	.597**	.196**	.226**	.378**	.177**	1	
SC	-.118**	.615**	.262**	.327**	.283**	.340**	.343**	1

*Significant at the 0.05 level ** Significant at the 0.01 level

Where stands for CI: Career Indecision, IS: Internet Savviness, IG: Information Gathering, CMC: Computer Mediated Communication, ISE: Internet Self Efficacy, CSE: Creative Self Expression, IF: Internet Fluency, SC: Social Collaboration

It is lucid from the table 1 that the calculated value of correlation of career indecision with internet savviness total and its dimensions namely information gathering, creative self-expression and social collaboration is negative. This demonstrates that if the students studying in senior secondary classes are able to discriminate and filter accurate information from the abundance of data found on internet, are creating artwork, blog, videos and collaborate online to perform personal and school work are more likely to have less uncertainty in making relevant career decisions. They choose their career with more ease as compared to the students without these abilities. On the other hand, the calculated correlation value of career indecision with computer mediated communication, internet self-efficacy and internet fluency dimensions of internet savviness is not significant. It demonstrates that these dimensions of internet savviness have no influence on the career indecision of the senior secondary school students. On the basis of above mentioned results Ho1 namely "There exists no significant relationship of Career Indecision of senior secondary school students with their Internet Savviness" is partially accepted.

Results relating difference between students studying in government, government aided and private senior secondary school students in career indecision, internet savviness and its dimensions

Table 2: Comparison of government, government aided and private senior secondary school students in career indecision, internet savviness and its dimensions

Variables	Source of Variation	Sum of Squares	Df	Mean Square	F
Career Indecision	Between Groups	1618.286	2	809.14	30.91**
	Within Groups	18768.49	717	26.17	
	Total	20386.78	719		
Internet Savviness (Total)					
Internet Savviness (Total)	Between Groups	1740.558	2	870.27	7.70**
	Within Groups	80975.39	717	112.93	
	Total	82715.95	719		
Information Gathering					
Information Gathering	Between Groups	314.353	2	157.17	12.98**
	Within Groups	8677.946	717	12.10	
	Total	8992.299	719		
Computer Mediated Communication					
Computer Mediated Communication	Between Groups	7.053	2	3.52	0.52
	Within Groups	4793.592	717	6.68	
	Total	4800.644	719		
Internet Self-Efficacy					
Internet Self-Efficacy	Between Groups	63.658	2	31.82	4.98**
	Within Groups	4576.542	717	6.38	
	Total	4640.2	719		
Creative Self Expression					
Creative Self Expression	Between Groups	76.108	2	38.05	5.61**
	Within Groups	4863.779	717	6.78	
	Total	4939.888	719		
Internet Fluency					
Internet Fluency	Between Groups	4.044	2	2.02	0.23
	Within Groups	6182.888	717	8.62	
	Total	6186.932	719		
Social Collaboration					
Social Collaboration	Between Groups	28.675	2	14.33	2.42
	Within Groups	4239.325	717	5.91	
	Total	4268	719		

** Significant at 0.01 level (4.63)

*Significant at 0.05 level (3.00)

The above table 2 indicates that the calculated value of F ratio for the difference between different type of institution i.e. government, government aided and private in career indecision is significant. This reflects that students studying in different types of institution differ significantly in their career indecision. On the basis of the above mentioned finding, it can be stated that Ho2 i.e. “There exists no significant difference in the Career Indecision of senior secondary school students studying in government, government aided and private schools” is thus not accepted.

Table 3: Comparison of government aided and government senior secondary schools students incareer indecision, internet savviness and its dimensions

Variables	Government Aided			Government			t-ratio
	Mean	S.D.	SE _M	Mean	S.D.	SE _M	
Career Indecision	24.25	5.33	0.34	26.17	4.74	0.31	4.18**
Internet Savviness	102.75	11.28	0.73	100.59	9.76	0.63	-2.25*
Information Gathering	21.13	3.45	0.22	19.62	2.84	0.18	-5.23**
Internet Self Efficacy	13.40	2.70	0.18	13.64	2.58	0.17	1.20
Creative Self Expression	16.13	2.72	0.18	15.81	2.29	0.15	-1.40

**Significant at 0.01 level (2.59)

* Significant at 0.05 level (1.96)

It is crystal clear from the table 3 that t-value calculated for the career indecision of school students studying in government aided and government schools was found to be significant at 0.01 level. It can further be explained that students studying in government schools are having higher career indecision as compared to government aided school students.

It infers that government school students are not able to select and commit to their career easily as compared to their government aided school students.

Table 4: Comparison of government and private senior secondary schools students incareer indecision, internet savviness and its dimensions

Variables	Government			Private			t-ratio
	Mean	S.D.	SE _M	Mean	S.D.	SE _M	
Career Indecision	26.17	4.74	0.31	22.50	5.26	0.34	8.03**
Internet Savviness	100.59	9.76	0.63	104.38	10.78	0.70	-4.04**
Information Gathering	19.62	2.84	0.18	20.89	4.05	0.26	-3.96**
Internet Self Efficacy	13.64	2.58	0.17	14.11	2.28	0.15	-2.12*
Creative Self Expression	15.81	2.29	0.15	16.60	2.78	0.18	-3.41**

**Significant at 0.01 level (2.59)

* Significant at 0.05 level (1.96)

It is lucid from the table 4 that t-value calculated for the career indecision of students studying in government and private schools was found to be significant at 0.01 level. It can further be explained that students studying in government schools are had higher career indecision as compared to their private school counterparts.

Table 5: Comparison of government aided and private senior secondary schools students in career indecision, internet savviness and its dimensions

Variables	Government Aided			Private			t-ratio
	Mean	S.D.	SE _M	Mean	S.D.	SE _M	
Career Indecision	24.25	5.33	0.34	22.50	5.26	0.34	3.61**
Internet Savviness	102.75	11.28	0.73	104.38	10.78	0.70	-2.94**
Information Gathering	21.13	3.45	0.22	20.89	4.05	0.26	0.72
Internet Self Efficacy	13.40	2.70	0.18	14.11	2.28	0.15	-3.14**
Creative Self Expression	16.13	2.72	0.18	16.60	2.78	0.18	-1.88

**Significant at 0.01 level (2.59)

* Significant at 0.05 level (1.96)

Above table 5 indicates that t-value calculated for the career indecision of senior secondary school pupils educating in government aided and private schools was found to be significant at 0.01 level. It can further be explained that students studying in government aided schools are had higher career indecision as compared to their private school counterparts.

Results relating difference between male and female senior secondary school students in career indecision, internet savviness and its dimensions

Table 6: Comparison of male and female senior secondary schools students in career indecision, internet savviness and its dimensions

Variables Mean		Male		Female			t-ratio	
		S.D.	SE _M	Mean	S.D.	SE _M		
Career Indecision		24.45	5.355	.282	24.16	5.298	.279	.742
Internet Savviness		104.01	10.44	.550	101.14	10.823	.570	3.61**
Dimensions of Internet Savviness	Information Gathering	20.35	3.777	.199	20.75	3.271	.172	-1.50
	Computer Mediated Communication	16.62	2.414	.127	15.92	2.702	.142	3.69**
	Internet Self Efficacy	13.94	2.485	.131	13.50	2.579	.136	2.32*
	Creative Self-Expression	16.56	2.488	.131	15.80	2.699	.142	3.89**
	Internet Fluency	18.43	2.659	.140	17.59	3.132	.165	3.88**
	Social Collaboration	18.44	2.339	.123	17.89	2.502	.132	3.07**

** Significant at 0.01 level (2.58)

* Significant at 0.05 level

(1.96)

The above table shows that t-value for career indecision of male and female students found to be insignificant even at 0.05 level. It reflects that boy and girl students are not having different level of career indecision. After the above discussion, it can be stated that the Ho4 “There exists no significant difference in the Career Indecision of male and female senior secondary school students” is accepted.

A look at the above table reflects that the t-value calculated with internet savviness total and its dimensions namely computer mediated communication, internet self-efficacy, creative self-expression, internet fluency and social collaboration of the boys and girls students was found to be significant at 0.01 level. It depicts that boys and girls students differ on their internet savviness and its dimensions namely computer mediated communication, internet self-efficacy, creative self-expression, internet fluency and social collaboration.

It can be further explained that male students are comfortable and confident with internet, they communicate through various formats audio, video, instant messaging, e mails, chat rooms and discussion forums, they have positive thoughts about their potentialities to achieve a desired level of competency in navigating the internet and collaborate online to perform personal work and school work as compared to their female counterparts. On the basis of above findings, it can be stated that the Ho5 “There exists no significant difference in the Internet Savviness of male and female senior secondary school students” is not accepted.

Results relating impact of internet savviness and its dimensions on career indecision

Table 7: Stepwise multiple regression equations for career indecision and internet savviness and its dimension

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.177 ^a	.031	.030	5.2444	.031	23.225**	1	718	.000
2	.193 ^b	.037	.035	5.2315	.006	4.549*	1	717	.033
3	.214 ^c	.046	.042	5.2127	.008	6.195*	1	716	.013
4	.234 ^d	.055	.049	5.1918	.009	6.771*	1	715	.009

* Significant at 0.05 level (3.85)

** Significant at 0.01 level(6.66)

a. Predictors: (Constant), IG

b. Predictors: (Constant), IG, CSE

c. Predictors: (Constant), IG, CSE, SC

d. Predictors: (Constant), IG, CSE, SC, IS (total)

e. Dependent Variable: CI

The above table represents stepwise multiple regression equations for career indecision which is criterion (dependent) variable and independent variables internet savviness and its dimensions. At the first step information gathering dimension of internet savviness was introduced. Adjusted R square value indicating that 3.0 % of the variance in the career indecision is described by the information gathering dimension on internet savviness. To observe whether the surge in the percentage of the total variance after addition were significant or not, the F-value is calculated. The F-value for this step is significant at 0.01 level. This demonstrates that surge in the prediction value after the addition of the information gathering dimension of internet savviness is significant.

CONCLUSIONS

The study documents the following conclusions

Significant negative relationship is found between career indecision of senior secondary school students with internet savviness and its dimensions namely information gathering, creative self-expression and social collaboration. Further, if students studying in

senior secondary classes are able to discriminate and filter accurate information from the abundance of data found on internet, is creating artwork, blog, videos and collaborate online to perform personal and school work are possibly have less uncertainty in choosing relevant career decisions.

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Linguistic Intelligence and Social Intelligence in Secondary School Students: A Regression Analysis

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ABSTRACT

This study examines the influence of linguistic intelligence on social intelligence. Sample for the study includes 152 urban secondary school students (77 boys and 75 girls) from muslim minority community, of class IX of Vikas High School, Edi Bazar Hyderabad, Telangana, India. The data for measuring Social Intelligence is collected using Tromso Social Intelligence Scale (TSIS) developed by Silvera et al. (2001)¹. Linguistic Intelligence is measured using the GPA score of the students in the latest formative evaluation of languages (Hindi, Telugu and English). SPSS Ver.23 is used to measure the regression coefficient and squared regression coefficient. The correlation coefficient between linguistic and social intelligences is $r=0.507$ (sig. at $\alpha=0.01$). The simple linear regression coefficient of the two variables is $R=0.507$ ($p=0.000$) and adj. squared regression coefficient $R^2=0.252$ ($p=0.000$). The role of gender is found to be strong on both the variables and hence partial correlation is conducted blocking the influence on gender on them. The partial correlation coefficient is $r_{1,2,3}=0.387$ ($p=0.000$). In the light of these evidences, there is a highly statistically significant, positive in nature and strong in magnitude relationship of linguistic intelligence and social intelligence in school students of VIIIth and IXth standards. Girls from muslim community are found to be more linguistically and socially intelligent than boys with point biserial correlation coefficients between gender and linguistic intelligence being $r=0.705$ (sig. at $\alpha=0.01$) and between gender and social intelligence being $r=0.355$ (sig. at $\alpha=0.01$), respectively. The Educational implications are discussed in the light of the findings of Sacher committee report.

Keywords: Linguistic Intelligence, Social Intelligence, Gender, Secondary School Students, Muslim Minority Community, Sacher Committee Report.

INTRODUCTION

One of the important aspects in the acquisition of a language is the social context of its learning. Children follow the way adults use specific pieces of language and practice the same in turn. A sense of competence develops in the child pertaining to his or her acquisition of a language depending on the feedback received during the course of interaction with peers and elders. Several of such feedbacks prove to be the basis on which the child further develops conclusions on the importance of language expressions as a whole ².

The significance of meeting people in the acquisition of language by the children from their most knowledgeable adult parents and peers is also mentioned

in Social interactive theory, which in turn is based on Social cultural theories proposed by Vygotsky³.

Quotation from the Sacher Commission Report (2006).

Research Objectives

To study the relationship between social intelligence and linguistic intelligence in secondary school students from muslim minority community.

To study whether linguistic intelligence is a predictor of social intelligence in secondary school students from muslim minority community.

To study the relationship between gender and social intelligence in secondary school students from muslim minority community.

To study the relationship between gender and linguistic intelligence in secondary school students from muslim minority community.

To study the relationship between social intelligence and linguistic intelligence in secondary school students from muslim minority community blocking the influence of gender.

To study whether gender is a predictor of social intelligence in secondary school students from muslim minority community.

To study whether gender is a predictor of linguistic intelligence in secondary school students from muslim minority community.

Method

Sample

Sample for the study includes 152 urban secondary school students from muslim minority community (77 boys and 75 girls) of class IX of Vikas High School, Edi Bazar Hyderabad, Telangana, India, selected using simple random sampling. Prior permission to administer the tool of the study was taken from the Principal of the secondary school.

Measures

Tromsø Social Intelligence Scale (TSIS): The tool has 21-items self report questionnaire covering 3 factors, namely Social information processing (SP), social skills (SS) and Social awareness (SA) created by Silvera et al. (2001). The TSIS uses a 7- point Likert scale (from 1 = describes me extremely poorly to 7 = describes me extremely well) for each of the 21 items for the subjects to rate to the degree that the statement of the item describes them, and hence the scoring ranges from 7 to 49 for each of the 3 subscales measuring the three factors using 7 items.

The scale reports internal consistency of each of the three factors at Social information processing ($\alpha=0.81$), social skills ($\alpha=0.86$) and Social awareness ($\alpha=0.79$), which are fairly acceptable values. The scale is found to possess construct validity.

Linguistic Intelligence of the students is measured using the grade point average scored by them in a regional language Telugu, national language Hindi and international language English, in the recently concluded formative evaluations.

Statistical Techniques:

Apart from mean and standard deviations of the constructs, Pearson's product moment correlation is used to find the relationship between social and linguistic intelligences. Point-biserial correlation is used to find whether gender is associated with social and linguistic intelligences. To find the relation between the two intelligences blocking the role of gender, partial correlation is used. Simple linear regression is used to figure out whether linguistic intelligence is the predictor of social intelligence, and also whether gender predicts social intelligence and linguistic intelligence, in the secondary students belonging from the muslim minority community. All the statistics are computed using SPSS Ver.23.

Procedure

The data was collected from the students in the classroom while the class was in session. The students were given clear instructions on how to fill the instrument of social intelligence. The data pertaining to linguistic intelligence in the recently concluded formative evaluation was collected from the office records.

RESULTS

Table 1: Mean and Standard Deviation (N=152, Girls =75 (49.34 %), Boys=77 (50.65 %))

Variable	Statistic		Significance
	Mean	S.D.	
Social Intelligence	4.4555	0.55545	Yes t-cal = 4.658 (p=0.000) df=150 (Sig.2-tailed)
Social Intelligence of Girls	4.6549	0.54485	
Social Intelligence of Boys	4.2613	0.49647	
Linguistic Intelligence	59.8684	21.69120	Yes t-cal = 12.179 (p=0.000) df=150 (Sig.2-tailed)
Linguistic Intelligence of Girls	75.3147	15.79974	
Linguistic Intelligence of Boys	44.8234	15.06598	

Table 2: Testing of Hypothesis 1

	SI	LI	Hypothesis H ₀
SI Pearson Correlation	1	0.507**	Rejected
Sig.(2-tailed)		0.000	
N	152	152	
LI Pearson Correlation	0.507**	1	
Sig.(2-tailed)	0.000		
N	152	152	

**Result is significant at the 0.01 level (2-tailed)

Interpretation: The relationship between social intelligence and linguistic intelligence is highly significant ($\alpha=0.01$) with the correlation coefficient positive in nature and moderate in strength. The null hypothesis stands rejected.

Table 3: Testing of Hypothesis 2

	SI	Gender	Hypothesis H ₀
SI Point biserial Correlation	1	- 0.355**	Rejected
Sig.(2-tailed)		0.000	
N	152	152	
Gender Point biserial Correlation	- 0.355**	1	
Sig.(2-tailed)	0.000		
N	152	152	

Interpretation: The relationship between gender and social intelligence is highly significant ($\alpha=0.01$) with the point biserial correlation coefficient negative in nature and moderate in strength. During data analysis, girls were assigned the value of 0 and boys were assigned the value of 1. From the result obtained, it is implied that girls have more social intelligence than boys. The mean social intelligence of girls and boys are 4.6549 and 4.2613, and the difference is significant ($p=0.000$). The null hypothesis stands rejected.

Table 4: Testing of Hypothesis 3

	LI	Gender	Hypothesis
LI Point biserial Correlation	1	-0.705**	Rejected
Sig.(2-tailed)		0.000	
N	152	152	
Gender Point biserial Correlation	-0.705**	1	
Sig.(2-tailed)	0.000		
N	152	152	

**Result is significant at the 0.01 level (2-tailed)

Interpretation: The relationship between gender and linguistic intelligence is highly significant ($\alpha=0.01$) with the point biserial correlation coefficient negative in nature and strong in strength. During data analysis, girls were assigned the value of 0 and boys were assigned the value of 1. From the result obtained, it is implied that girls have more linguistic intelligence than boys. The mean social intelligence of girls and boys are 75.3147 and 44.8234, and the difference is significant ($p=0.000$). The null hypothesis stands rejected.

Table 5: Testing of Hypothesis 4

Control Variable		SI	LI	Hypothesis H ₀
Gender	SI Partial Correlation	1	0.387**	Rejected
	Sig.(2-tailed)		0.000	
	df	0	149	
	LI Partial Correlation	0.387**	1	
	Sig.(2-tailed)	0.000		
	df	149	0	

**Result is significant at the 0.01 level (2-tailed)

Interpretation: The relationship between social intelligence and linguistic intelligence blocking the influence of gender on linguistic intelligence is found to be positive in nature and moderate in strength, as the partial correlation coefficient value is $r_{12.3} = 0.387$, highly sig, at $\alpha=0.01$ level. The null hypothesis stands rejected.

Table 6: Testing of Hypothesis 5

R	R ²	Adj. R ²	Std. Error of Estimate	F Cal.	df1	df2	Sig. F	Hypothesis H ₀
0.507	0.257	0.252	0.4835	51.912	1	150	0.000	<i>Rejected</i>

**Result is significant at the 0.01 level (2-tailed)

Interpretation: Linguistic intelligence definitely predicts social intelligence in secondary school students as the simple regression coefficient $R=0.507$, is moderate in strength and highly significant at $\alpha=0.01$ level. For unit variance in linguistic intelligence there can be 25% change in social intelligence among the sample subjects as $R^2 / \text{Adj.}R^2$ (taking error caused by chance into consideration) is $0.257/0.252$. The null hypothesis stands rejected.

Table 6: Testing of Hypothesis 6

R	R ²	Adj. R ²	Std. Error of Estimate	F Cal.	df1	df2	Sig. F	Hypothesis H ₀
0.355	0.126	0.121	0.52090	21.696	1	150	0.000	<i>Rejected</i>

**Result is significant at the 0.01 level (2-tailed)

Interpretation: Gender definitely predicts social intelligence in secondary school students as the simple regression coefficient $R=0.355$, is moderate in strength and highly significant at $\alpha=0.01$ level. For unit variance in gender there can be 12% change in social intelligence among the sample subjects as $R^2 / \text{Adj.}R^2$ (taking error caused by chance into consideration) is $0.126/0.121$. The null hypothesis stands rejected.

Table 6: Testing of Hypothesis 7

R	R ²	Adj. R ²	Std. Error of Estimate	F Cal.	df1	df2	Sig. F	Hypothesis H ₀
0.705	0.497	0.494	15.43233	148.319	1	150	0.000	<i>Rejected</i>

**Result is significant at the 0.01 level (2-tailed)

Interpretation: Gender definitely predicts linguistic intelligence in secondary school students as the simple regression coefficient $R=0.705$, is strong in strength and highly significant at $\alpha=0.01$ level. For unit variance in gender there can be 49% change in linguistic intelligence among the sample subjects as $R^2 / \text{Adj.}R^2$ (taking error caused by chance into consideration) is $0.497/0.494$. The null hypothesis stands rejected.

DISCUSSION

Researchers generally agree on the existence of no significant difference between boys and girls with respect to general intelligence (Halpern and LaMay,

2000)¹⁶, .H. Naderi, R. Abdullah and H. TengkuAizan, 2008)¹⁷. But, there are research studies which state that boys possess more general intelligence than girls (Adrian and Buchanan, 2005)¹⁸, and girls outperform boys with respect to specific cognitive abilities (Hyde, 2005¹⁹; Lynn *et al.*, 2002)²⁰, like interpersonal or social intelligence (Rammstedt and Rammsayer, 2000, Bennett, 1996)^{21,22}. Findings in linguistic research of the last few decades reveal the differences that exist in learning and then using languages, between the genders (Zare-ee, A., Mohd Don, Z., Knowles, G., & Tohidian, I. (2015).

Trading on such lines, this study clearly establishes highly significantly that linguistic intelligence predicts

social intelligence in secondary school students belonging from even a marginalized muslim minority community, and girls from this community have both these types of intelligence more than boys concurring with the results of previously conducted research on multiple intelligence and the presence of its components in boys and girls of foreign cultures (Esmacili, F., Behnam, B., Esmacili, K., 2014)²³.

The findings reflect the role of language acquisition and social skills for general success in present times all across the board. To reap the benefits of learning in mother tongue, the three language formula was adopted in 1960s in India, according to which every child was to be provided instruction in local, national and international languages. As per the constitution of India, article 350A, it is directed to the state and the local authorities that appropriate arrangements must be made to ensure children belonging from linguistically minority groups to receive education in their mother tongue.

But, in the context of muslim community, Sacher committee report states that one of main reasons for poor educational status of muslims in India is due to lack of schools at elementary students from this community perform poorly in Urdu, leave alone languages like English. This in turn leads to their social isolation in national and global context, in later years of life and also in finding proper employment opportunities.

The committee found that there is a culture of considering education to be non-essential for girls in muslim community, who are married off early. This leads to lower enrollments of girls in schools coupled with their higher drop-out rates. Some of the possible reasons which add fuel to the fire are no access to schools within easy reach, lack of girl's hostels, absence of female teachers and no availability of scholarships at tertiary level of education for girls.

Owing to these reasons, though research studies indicate higher prospects of success for girls and women from this community, the reality is that they not only lag behind the muslim boys and men in educational attainments, but also with women in general at the national level. This trend extends in less representation of these women in the social discourse of the society and country.

Further studies must be carried out on larger samples of students from this community to replicate this study.

The influence of socio-economic status and age can also be included in future studies. The study was conducted in the city of Hyderabad and needs to be replicated in other parts of a large and culturally diverse nation like India. This study also recommends construction of a social intelligence scale for adolescents taking into account the social milieu of muslim minority community.

CONCLUSION

The highly statistically significant relationship of linguistic intelligence as predictor of social intelligence and the role of gender on them, obtained from this research, bears certain significance in the upliftment of minorities and especially the women and the girl children of muslim community in India. The government should work harder towards the implementations of the recommendations of Sacher committee report at grass root level but promoting Urdu as the medium of instruction at lower level and as an optional subject up to tertiary level along with the teaching of languages like Hindi and English to anticipate greater participation and representation of men and especially women from this community in all areas of public life.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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Impact of Adversity Quotient on Learning Behaviour among Secondary School Students

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ABSTRACT

This study was conducted to find the impact of adversity quotient of secondary school students on their learning behaviour. Descriptive survey method was used to realize the objectives: to find the gender and locality related difference in adversity quotient and learning behaviour among secondary school students; to study the relationship between adversity quotient and learning behaviour among secondary school students; to study the impact of adversity quotient on learning behaviour among secondary school students. A sample of 339 secondary school students was collected using stratified random sampling by administering Learning Behaviour Scale (2014) and Adversity Quotient Profile (2015). Data were analyzed using percentage, mean, SD, t-test, coefficient of correlation and regression analysis. The results of the study revealed that female secondary school students possess greater adversity quotient and exhibit better learning behaviour than male secondary school students. Rural secondary school students possess greater adversity quotient and exhibit better learning behaviour than urban secondary school students. A significant positive relationship was found between learning behaviour and adversity quotient of secondary school students. Adversity quotient was found to be a significant predictor of learning behaviour of secondary school students.

Keywords: Learning behaviour, Adversity Quotient(AQ), Secondary school students.

INTRODUCTION

Adversity Quotient

Dr. Paul Stoltz defined Adversity Quotient as “the science of human resilience”. Adversity means unfavourable situations and difficulties. Adverse conditions make one person to learn several things and it also analyse one’s capacity and courage. AQ is the capacity of the human being to tackle with the adversities of his life. It is the science of person’s hardiness. Adversity quotient is the broadly accepted measure and technique in the world to evaluate how persons reply to and deal with adverse situations in their life. There are four dimensions in AQ (CORE):

C= Control: It means the level to which you can manipulate the condition?

O=Ownership: It means to what level do you grasp by hand in charge for improving this condition? To what level are you in charge to play a number of roles in making it superior?

R=Reach: It means the level to which the adversity extend beyond the condition at hand?

E=Endurance: How extended will the adversity be endured/tolerated by any person?

Review of related literature reveals that relationship between self-empowerment and adversity quotient is significant¹. CBSE, ICSE and SSC school students differ significantly in their adversity quotient. Adversity quotient score had improved their school performance. Enhancing the capability to handle adversities corresponds to good performance². Adversity quotient was found to be positively correlated with learning behaviour. Emotional intelligence was positively correlated to learning behaviour³. Students having high adversity quotient were easily adaptive to new environment and able to convert it into favourable environments⁴. Academic performance of students is related significantly with their adversity quotient. Adversity quotient of students is not influenced by gender. Logic of special choice, dominance, self-confidence, achievement motivation and enthusiasm,

factors influence the adversity quotient. Self-confidence influences the AQ of students. Achievement motivation directly influences the adversity quotient, dominance indirectly influences the AQ, while sense of self-esteem, self-confidence, personal freedom, ambition and enthusiasm are the variables which influence the adversity of these students⁵. AQ and academic performance of students is positively related. It was found that academic performance is a factor which affects adversity quotient. Adversity quotient of students is significantly related to their Mathematics achievement.⁶ AQ and achievement motivation are positively correlated⁷. Adversity quotient has a positive correlation with student's learning behaviour. In addition, father's levels of academic achievement and education had a significant impact on student's learning behaviour. Defence mechanism and adversity quotient of secondary school students are not related. Male and female do not differ in their defence mechanism and adversity quotient⁸. Adversity quotient had a positive correlation with students learning behaviour. The levels of academic achievement and education had a significant impact on students learning behaviour⁹. Achievement motivation and learning behaviour predict adversity quotient of higher education students¹⁰. Cognitive style and adversity quotient of secondary school students are positively correlated.

Learning Behaviour

Learning behaviour comprises motivation, attention, learning –related social skills, approach to learning in little kids and these are predictive of their later social adjustment and academic in school. McDermott and Schaefer (1999), and Schaefer (2004) described abstract rationale for the significance of considering learning behaviours in assessing student's learning difficulty. McClelland and Morrison (2013) worked more on the concept of learning behaviour and they identified: Competence Motivation (motivation or reluctance to take tasks), concentration (under instruction, paying concentration), and Attitude Toward Learning (readiness to be help) make easy winner in educational achievement and students learning. Evaluation of such learning behaviours can supply extra insight into student learning difficulty and additional assist in remediation of learning troubles due to their awareness to interventions. Learning behaviour comprises:

Attention: It refers to how we actively process the specific information which is meaningful for us.

Attitude: It is tendency of an individual to reply positively or negatively towards a person, situation, object, or an idea. Attitude influences an individual's action of choice, and challenges to responses, reward and incentives, (together called stimuli).

Competence Motivation: It is the drive to be fine at a little, allow the person to present high class job. Competence forced students seek skill mastery, obtain pride in increasing and use their problem-solving skills and strive to be original when confronted with obstacles. They study from their knowledge.

Strategy/Flexibility: Learning strategies are the action and/or thoughts that students apply to total learning tasks. These are the apparatus that student themselves can employ separately according to their need and ability to complete any task.

A review of related literature reveals that self-defeating behaviour has a negative correlation with learning behaviour¹¹. Both adversity quotient and emotional intelligence are positively correlated with learning behaviour. Adversity quotient has a positive correlation with student's learning behaviour. In addition, father's levels of academic achievement and education has a significant impact on student's learning behaviour. Adversity quotient had a positive correlation with students learning behaviour. The levels of academic achievement and education had a significant impact on students learning behaviour. Achievement motivation and learning behaviour predict adversity quotient of higher education students.

SIGNIFICANCE OF THE STUDY

Learning is the modification of behaviour through experience. Adversity quotient is how well a person resists and works in the adverse situations. With the help of adversity quotient, it is better to understand how a person and others respond to challenges and adversity in every aspect of their life. Learning behaviour comprises motivation, attention, learning-related social skills, approach to knowledge in little kids and these are predictive of their later social adjustment and academics in school. An analysis of review of related literature shows that Kanjanakaroon (2000), Dsouza (2006), Kuntakaew (2007), Yun (2008), Huijuan (2009), Pangma, Tayraukham and Nuangchalerm (2009), Zhou (2009), Cura and Gozum (2011), Cornista and Macasaet (2013), Malia and Zahyah (2013), Nikam and Uplane

(2013), Praditsang, Hanafi (2013), Kumar (2015), Singh & Kaur (2017) have conducted studies on adversity quotient. Also, Romruen (2006), Malia and Zahyah (2013), Praditsang and Hanafi (2013) and Singh & Kaur (2017) have conducted studies on learning behaviour of the students. A trend was found that adversity quotient influences academic performance of students. Correlation was found between adversity quotient and learning behaviour of the students. None of the researcher has undertaken a study to find the extent to which adversity quotient can predict the learning behaviour of the secondary school students. In order to fill the research gap, this study was undertaken i.e. exploring, whether adversity quotient determines the learning behaviour of secondary school students or not? If yes, to what extent. Learners, parents, teachers, curriculum framers, examiners, administrators and policy makers may get benefits from the results of the study in order to do their duties in a better way.

OBJECTIVES

1. To find the difference in adversity quotient among secondary school students on the bases of gender and locality.
2. To find the difference in learning behaviour among secondary school students on the bases of gender and locality.
3. To study the relationship between adversity quotient and learning behaviour among secondary school students.
4. To study the impact of adversity quotient on learning behaviour among secondary school students.

HYPOTHESES

1. There exists significant difference between secondary school boys and girls in their adversity quotient.
2. There exists significant difference between rural and urban secondary school students in their adversity quotient.

3. There exists significant difference between secondary school boys and girls in their learning behaviour.

4. There exists significant difference between rural and urban secondary school students in their learning behaviour.

5. There exists significant positive relationship between adversity quotient and learning behaviour among secondary school students.

6. Adversity quotient can predict learning behaviour among secondary school students.

RESEARCH METHOD

Descriptive survey method was used in the present study.

SAMPLING TECHNIQUE

Stratified random sampling technique was used. The sample of the study comprised of 399 secondary school students of 10th class from Baramula, Srinagar and Kupwara districts of Jammu and Kashmir state (India).

TOOLS USED

Adversity Quotient Scale (2015) developed by the Kumar, M.

Learning Behaviour Scale (2014) developed by Kaur, R.

STATISTICAL TECHNIQUES

Mean, standard deviation (SD), t-test, co-efficient of correlation and regression analysis were used as statistical techniques to analyse the data.

RESULTS AND DISCUSSION

Gender Related Difference in Adversity Quotient:

Table 1 represents data regarding gender related differences in AQ.

Table 1: Gender Related Difference in Adversity Quotient

	Gender	No. of Students	Mean	SD	df	t-value
Adversity Quotient	Boys	128	53.82	8.38	337	3.01**
	Girls	211	56.64	8.36		

** = Significant at 0.01 level

Table 1 indicates that in case of adversity quotient, the t-value for difference between secondary school boys and girls is 3.01, which is significant at 0.01 level. Since mean score (56.82) of secondary school girls was greater than mean score (53.82) of secondary school boys hence it may be interpreted that secondary school girls possess greater adversity quotient as compared to their counter parts secondary school boys. Thus, hypothesis that “there exists significant difference between secondary school boys and girls in their adversity quotient” was accepted.

Locality Related Difference in Adversity Quotient:

Table 2 represents data regarding locality related difference in AQ.

Table 2: Locality Related Difference in Adversity Quotient

	Locality	No. of Students	Mean	SD	df	t-value
Adversity Quotient	Rural	167	59.05	8.05	337	8.10**
	Urban	172	52.20	7.45		

**=Significant at 0.01 level

Table 2 reveals that for adversity quotient, the t-value for difference between rural and urban secondary school students is 8.10, which is significant at 0.01 level. Since mean score (59.05) of rural secondary school students was greater than mean score (52.20) of urban secondary school students, hence it may be interpreted that rural secondary school students possess greater adversity quotient as compared to their counter parts urban secondary school students. Thus, hypothesis that “there exists significant difference between rural and urban secondary school students in their adversity quotient” was accepted.

Gender Related Difference in Learning Behaviour:

Table 3 represents data regarding gender related difference in learning behaviour.

Table 3: Gender Related Difference in Learning Behaviour

	Gender	No. of Students	Mean	SD	df	t-value
Learning Behaviour	Boys	128	98.38	9.22	337	6.35**
	Girls	211	105.86	12.33		

**=Significant at 0.01 level

Table 3 indicates that for learning behaviour, the t-value for difference between secondary school boys and girls is 6.35, which is significant at 0.01 level. Since mean score (105.86) of secondary school girls was greater than mean score (98.38) of secondary school boys, hence it may be interpreted that secondary school girls possess better

learning behaviour as compared to their counter parts secondary school boys. Thus, hypothesis that “there exists significant difference between secondary school boys and girls in their learning behaviour” was accepted.

Locality Related Difference in Learning Behaviour:

Table 4 represents data regarding locality related difference in learning behaviour.

Table 4: Locality Related Difference in Learning Behaviour

	Locality	No. of Students	Mean	SD	df	t-value
LEARNING BEHAVIOUR	Rural	167	106.11	12.05	337	4.87**
	Urban	172	100.05	10.79		

**=Significant at 0.01 level

Table 4 reveals that for learning behaviour, t-value for difference between rural and urban secondary school students is 4.87, which is significant at 0.01 level. Since mean score (106.11) of rural secondary school students was greater than mean score (100.05) of urban secondary school students, hence it may be interpreted that rural secondary school students possess better learning behaviour as compared to their counter parts urban secondary school students. Thus, hypothesis that “there exists significant difference between rural and urban secondary school students in their learning behaviour” was accepted.

Relationship between Adversity Quotient and Learning Behaviour of Secondary School Students:

Table 5 represents data regarding relationship between AQ and Learning Behaviour of secondary school students.

Table 5: Co-efficient of Correlation Between Adversity Quotient and Learning Behaviour among Secondary School Students

Variable	N	df	Co-efficient of Correlation
Adversity Quotient	339	337	0.279**
Learning behaviour			

**=Significant at 0.01

Table 5 indicates that co-efficient of correlation between AQ and learning behaviour of secondary school students is 0.279. It was found to be significant at 0.01 level. Therefore, it may be interpreted that there exists significant positive relationship between learning behaviour and adversity quotient of secondary school students. An improvement in learning behaviour leads to a raise in the level of AQ of secondary school students and vice versa. Thus, hypothesis that “there exists significant relationship between learning behaviour and adversity quotient of secondary school students” was accepted.

6. Impact of Adversity Quotient on Learning Behaviour of Secondary School Students:

Table 6: Regression Analysis between Adversity Quotient and Learning Behaviour

Variable	R	R Square	Adjusted R Square	Std. Error of the Estimate	F
Adversity Quotient	0.279	0.0785	0.075	11.36	28.25**

** Significant at 0.01

Table 6 shows the coefficient of correlation among adversity quotient and learning behaviour. The coefficient is 0.279 and its square is 0.0785. This means that 7.85% variance in learning behaviour is explained by adversity quotient.

Table 7: ANOVA for Regression

Model	Sum of Squares	df	Mean Square	F-Ratio
Regression	3681.5	1	3681.5	28.52**
Residual	43509	337	129.11	
Total	47190	338		

**** Significant at 0.01 level**

Table 8: Coefficient of Regression

Model	Unstandardized Coefficients		t
	B	Std. Error	
Constant	81.39	4.10	19.85
Scores of AQ	0.39	0.07	5.34

**** Significant at 0.01 level**

Table 7 shows that F value is 28.52, which is significant at 0.01 level of significant. This means that the model presented the significance in predicting learning behaviour of secondary school students. Thus, the hypothesis that “there exists relationship of adversity quotient with the learning behaviour” was accepted. Hence, this result suggested for calculating regression analysis. It is evident from the table 8 that adversity quotient is significant predictor of learning behaviour. One-unit change in adversity quotient will make a change of 0.39 units in learning behaviour. In other words, one percent change in adversity quotient can make a change of 39% in learning behaviour and is statistically significant.

The regression equation formulated from these variables is as given below:

Learning Behaviour = 81.39 + 0.39 (Adversity Quotient)

RESULTS AND DISCUSSION

Secondary school girls possess greater adversity quotient and better learning behaviour as compared to their counter parts secondary school boys. Findings of Nikam and Uplane (2013), Huijuan (2009), Singh & Kaur (2017) are just opposite, they found that male and

female do not differ in their adversity quotient.

Rural secondary school students possess greater adversity quotient and better learning behaviour as compared to their counter parts urban secondary school students. No study was found to support or oppose this result.

There exists significant positive relationship between learning behaviour and adversity quotient of secondary school students. This result is being supported by Kuntakaew (2007), Malia and Zahyah (2013), Praditsang and Hanafi (2013), Singh and Kaur (2017).

Adversity quotient is a significant predictor of learning behaviour among secondary school students. Kuntakaew (2007), Malia and Zahyah (2013), Praditsang and Hanafi (2013), Singh and Kaur (2017) have also found the similar results.

RECOMMENDATIONS

Since girl students possess more adversity quotient and better learning behaviour than boys hence we as a teacher, administrator and parent should consider this fact while dealing with girl students in schools. Girl students should be provided with more adverse situations and challenging tasks so that they can excel in their performance. On the similar lines rural students should

be exposed to more challenging tasks and provided with adverse situations so that they can be trained well to face the challenges of real life in the future. Also, adversity quotient is a significant predictor of learning behaviour hence secondary school students should be trained well to face adverse situations in order to improve their learning behaviour.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Perceived Social Support and Perceived Stress, Relations to Adjustment among Migrant Students: A Test of Buffering Hypothesis

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ABSTRACT

Current study intended to probe into the association amongst the perceived stress and adjustment, and also the main and buffering effect of support from other and support from friend, in a sample of 325 JNV migrants (196 = male and 129 = female) migrant students of Jawahar Navodaya Vidyalaya. Bivariate analyses revealed strong correlation of perceived stress with educational, emotional and social adjustment. Test of interaction effects indicated that support from significant others and friend buffered the influence of higher level of perceived stress on educational, social and emotional adjustment. Outcomes of the present research supports moderating part of perceived social support in relation to perceived stress and proposes the requirement for enabling the intact support system for migrants. Implications for minimising the effects of perceived stress among migrant students are also discussed.

Keywords: *perceived stress, perceived social support, adjustment, migrants*

INTRODUCTION

Migration in Jawahar Navodaya Vidyalaya (JNV)

In the case of Jawahar Navodaya Vidyalaya, a residential school for rural talent, migration scheme was presented to nurture the emotions of national integration and also to lessen the gap in culture. In this scheme the students migrate from one linguistic region to another linguistic region under three language formula for only one year. When students migrate from their JNV to another JNV, they meet new culture, food habits, environment and language. In the new environment students may learn a lot of new things, take up to new challenges and enjoy themselves making new friends, learning different language, getting involved in new social community but at the same time they might face many problems related to social, emotional and academic area. Misra et al. (2003) stated that all the migrated students have to go through the adjustment process to cope with the new social and educational environment¹. Adjusting to novel environments adds extra strain on the migrated child to cope with the different language, stud

habit, and cultural values².

Purpose of the study

The primary objective of the study is to probe into the role of perceived stress in defining the adjustment of the migrant students as well as to establish perceived social support as moderator of adverse effects of the perceived stress on adjustment (educational, emotional and social).

DATA ANALYSIS AND RESULT

The present study was conducted using correlation (Product moment) Pearson's product and regression (hierarchical) in analysing the obtained data.

Descriptive statistics along with inter correlation of the study's variables appears in table 1.1. All three dimensions of adjustment were significantly related with social support's high levels from significant others, friends, and family. Perceived stress was also found significantly correlated with all the three dimensions of adjustment i.e. emotional, social and educational. As the scoring of the adjustment scale is in reverse manner

(lower the score, better the adjustment), so the positive sign of the correlation coefficient should be considered as negative.

Table 1: Relationship among Adjustment, Perceived Social Support, and Perceived Stress of Migrated Students (N=325)

	Perceived Stress	Others Support	Friend Support	Family Support	Educational adjustment	Emotional adjustment	Social adjustment
Perceived stress	1						
Others Support	-.389**	1					
Friend Support	-.410**	.468**	1				
Family Support	-.303**	.209**	.268**	1			
Educational adjustment	.407**	-.510**	-.401**	-.415**	1		
Emotional adjustment	.464**	-.544**	-.481**	-.345**	.648**	1	
Social adjustment	.395**	-.560**	-.383**	-.372**	.587**	.488**	1

* Significant at 0.01 level

Analysis through Regression

Hierarchical regression was run to calculate the main and moderating effects of the buffering variable (Support from others, friends and family).

*In all the tables of regression analysis perceived stress is considered as constant predictor (a).

Table 2: Buffering Effects of Perceived Social Support from Others on The Relationship Between Perceived Stress And Educational Adjustment

Variable	B	SE	β	t	R	R ²	ΔR^2	ΔF
Step 1					.407 ^a	.165	.165	64.042*
Perceived Stress	.267	.033	.407	8.003				
Step 2					.558 ^b	.312	.146	68.386*
Perceived Stress	.161	.033	.245	4.892				
Perceived Other Support	-.286	.035	-.415	-8.270				
Step 3					.652 ^c	.426	.114	63.742*
Perceived Stress	.156	.030	.238	5.179				
Perceived Other Support	-.218	.033	-.316	-6.644				
Perceived Stress × Perceived Other Support	-.049	.006	-.353	-7.984				

** Significant at 0.01 level

- b. Predictors: (Constant), Perceived Stress, perceived others support
- c. Predictors: (Constant), Perceived Stress, perceived others support, Perceived Stress * perceived others support
- d. Dependent Variable: Educational Adjustment

The analysis was carried out to examine the buffering effect of perceived support from others support on the relationship of perceived stress and educational adjustment. In step 1, perceived stress was entered, $\Delta F(1,323) = 64.042, p = 0.000$ and accounted for 16.5% significant variance in educational adjustment of migrated students. Introduction of perceived others support in step 2 explained additional 14.6% variance in the educational adjustment of the migrated students, and the change in R^2 was significant, $\Delta F(1,322) = 68.386, p=0.000$. To examine the moderation effect of perceived others support, interaction term was entered in to last step, which contributed additional 11.4% significant variance, $\Delta F(1,321) = 63.742, p=0.000$, in educational adjustment of the migrated students. In the third model, specifically, perceived stress, $b = .238, t(321) = 5.179, p=0.000$, perceived others support $b = -.316, t(321) = -6.644, p= 0.000$ and the interaction term $b = -.353, t(321) = -7.984, p=0.000$ significantly predicted educational adjustment of migrated students.

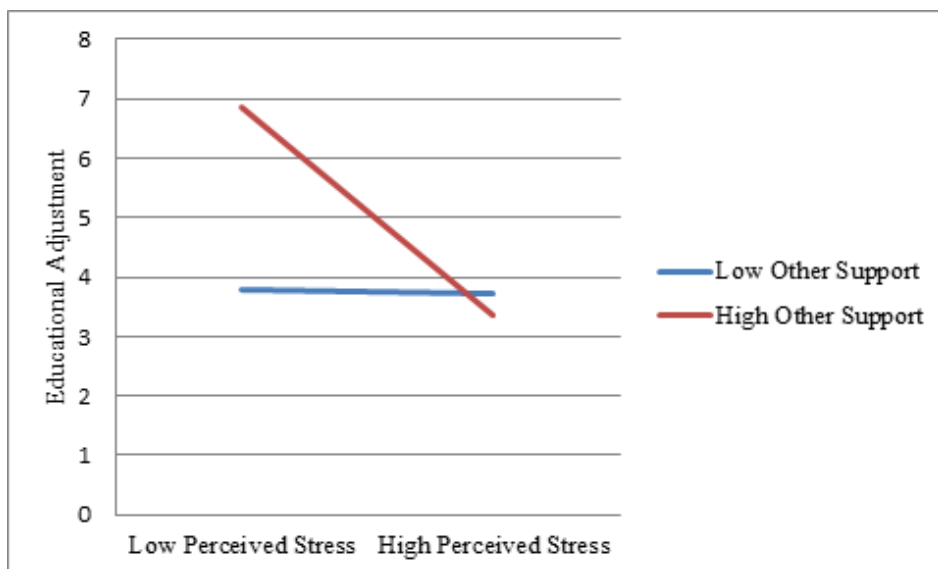


Figure 1 Moderating effect of Perceived Other's Support on Educational Adjustment

Table 3: Buffering Effects of Perceived Social Support from Others on The Relationship Between Perceived Stress And Emotional Adjustment

Variable	B	SE	β	t	R	R ²	ΔR^2	ΔF
Step 1					.464 ^a	.215	.215	88.701*
Perceived Stress	.251	.027	.464	9.418				
Step 2					.609 ^b	.371	.156	79.833*
Perceived Stress	.161	.026	.298	6.206				
Perceived Other Support	-.243	.027	-.428	-8.935				

Cont... Table 3: Buffering Effects of Perceived Social Support from Others on The Relationship Between Perceived Stress And Emotional Adjustment

Step 3					.670 ^c	.449	.077	45.078*
Perceived Stress	.158	.024	.291	6.476				
Perceived Other Support	-.197	.026	-.347	-7.446				
Perceived Stress × Perceived Other Support	-.033	.005	-.291	-6.714				

*Significant at 0.01 level

b. Predictors: (Constant), Perceived Stress, perceived others support

c. Predictors: (Constant), Perceived Stress, perceived others support, Perceived Stress * perceived others support

d. Dependent Variable: Emotional Adjustment

The analysis was carried out to examine the buffering effect of perceived support from others support on the relationship of perceived stress and emotional adjustment. In step 1, perceived stress was entered, $\Delta F(1,323) = 88.701, p = 0.000$ and accounted for 21.5 % significant variance in emotional adjustment of migrated students. Introduction of perceived others support in step 2 explained additional 15.6 % variance in the emotional adjustment of the migrated students, and the change in R^2 was significant, $\Delta F(1,322) = 79.833, p = 0.000$. To examine the moderation effect of perceived others support, interaction term was entered in to last step, which contributed additional 7.7% significant variance, $\Delta F(1,321) = 45.078, p = 0.000$, in emotional adjustment of the migrated students. In the third model, specifically, perceived stress, $b = .291, t(321) = 6.476, p = 0.000$, perceived others support $b = -.347, t(321) = -7.446, p = 0.000$ and the interaction term $b = 0.291, t(321) = -6.714, p = 0.000$ significantly predicted educational adjustment of migrated students.

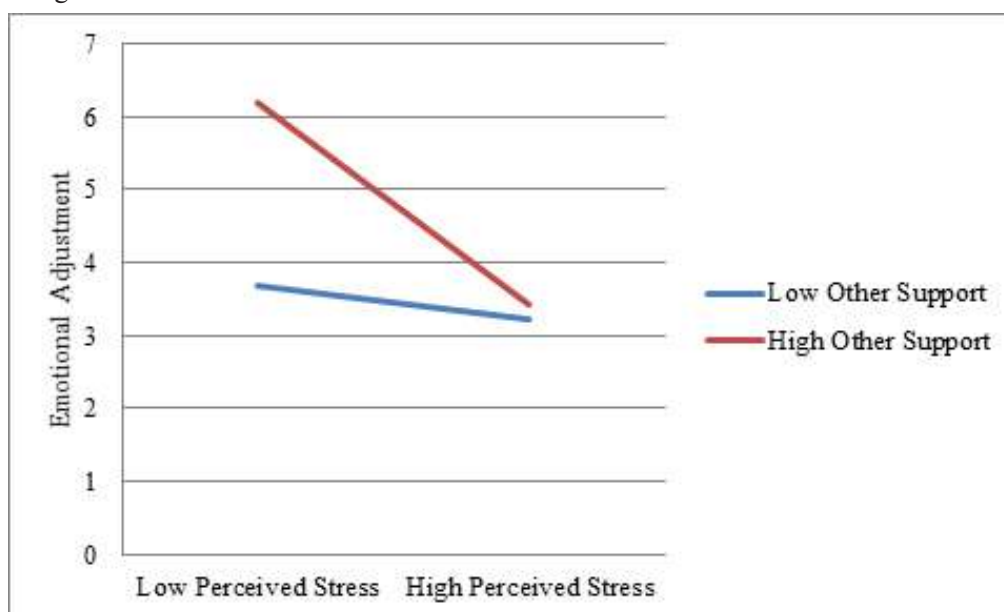


Figure 2: Moderating effect of Perceived Other's Support on Emotional Adjustment

Table 4: Buffering Effects of Perceived Social Support from Others on The Relationship Between Perceived Stress And Social Adjustment

Variable `	B	SE	β	t	R	R ²	ΔR^2	ΔF
Step 1					.395 ^a	.156	.156	59.866*
Perceived Stress	.304	.039	.395	7.737				
Step 2					.592 ^b	.351	.194	96.417*
Perceived Stress	.161	.037	.209	4.298				
Perceived Other Support	-.385	.039	-.479	-9.819				
Step 3					.684 ^c	.467	.117	70.317*
Perceived Stress	.155	.034	.202	4.561				
Perceived Other Support	-.305	.037	-.378	-8.263				
Perceived Stress × Perceived Other Support	-.058	.007	-.357	-8.386				

*Significant at 0.01 level

b. Predictors: (Constant), Perceived Stress, perceived others support

c. Predictors: (Constant), Perceived Stress, perceived others support,

Perceived Stress * perceived others support

d. Dependent Variable: Social Adjustment

The analysis was carried out to examine the buffering effect of perceived support from others support on the relationship of perceived stress and social adjustment. In step 1, perceived stress was entered, $\Delta F(1,323) = 59.866$, $p = 0.000$ and accounted for 15.6 % significant variance in social adjustment of migrated students. Introduction of perceived others support in step 2 explained additional 19.4 % variance in the social adjustment of the migrated students, and the change in R^2 was significant, $\Delta F(1,322) = 96.417$, $p=0.000$. To examine the moderation effect of perceived others support, interaction term was entered in to last step, which contributed additional 11.7%

significant variance, $\Delta F(1,321) = 70.317$, $p=0.000$, in social adjustment of the migrated students. In the third model, specifically, perceived stress, $b = .202$, $t(321) = 4.561$, $p=0.000$, perceived others support $b = -.378$, $t(321) = -8.263$, $p = 0.000$ and the interaction term $b = -.357$, $t(321) = -8.386$, $p=0.000$ significantly predicted social adjustment of migrated students.

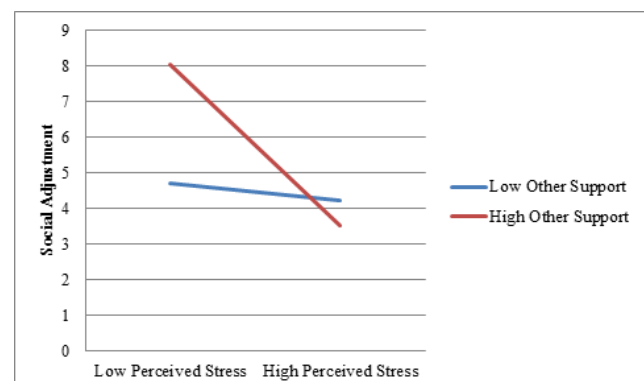


Figure 3 Moderating effect of Perceived Other's Support on Social Adjustment

CONCLUSION

A major body of researches have been carried out about the adjustments trends of international students, but nothing has been done in the area addressing the adjustment trends of migrant students within the country. Furthermore, several studies have been carried to investigate the adjustment problems international immigrant students, eventually nothing is known about the migration experience in India. The current study provides the first in-depth knowledge about the adjustment of migrant students in JNVs, which is a very ambitious project of Government of India for promoting the rural talent as well as the cultural harmony. The results confirm adverse effects of perceived stress on JNV migrant students and provide evidence social support helps in buffering the effects of high levels of perceived stress.

Conflict of Interest: Nil

Source of Funding: Self

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Reinforced Concrete Bridge Structural Health Classification using Hybrid Principal Component Analysis and Artificial Neural Network Approach with Wireless Sensor Network

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ABSTRACT

Structural health monitoring (SHM) and evaluation of bridges is interesting and radically important with the exponentially increasing demand for safety and its functionality in relation with economic, industrial and civil benefits. In bridge health evaluation systems, the modal parameters can only access the required accuracy after multiple and looping experiments due to varying ambient parameters. The paper proposed an approach of bridge structural health evaluation and classification method based on the combined multivariate linear principal component analysis (PCA) and multilayer artificial neural network (ANN) which is used to compensate temperature on vibration data and classify bridge health respectively. Bridge health can be classified as good, needs rehabilitation and critical. A wireless sensor network (WSN) composed of six autonomous motes is installed along the deck of the reinforced concrete laboratory bridge test platform to acquire vibration, and bridge and environment temperature data. The critical points of the bridge wherein maximum deflections occur are determined using moment diagram. Nondestructive testing (NDT) using controlled vibration testing (CVT) and platform physical alteration technique is implemented with formulated damage test cases to provide different excitations on the bridge. Peak picking (PP) algorithm was used to mitigate data congestion. The optimization technique of scaled conjugate gradient (SCG) is the algorithm used to train the three-layer feedforward ANN and sigmoidal function was used as the activation type for output neurons. There is 0.0038881 cross-entropy (CE) performance and 99.8% accuracy during network training. Satisfactory tested neural network CE performance of 0.00636106 and 98.4% accuracy in classifying bridge health is obtained.

Keywords---*Artificial Neural Network, Bridge Health Classification, Wireless Sensor Network.*

INTRODUCTION

Bridge is an essential transportation link across rivers, roads, islands and even inter-buildings. According to the Department of Public Works and Highways (DPWH), as of December (2015) there are 13.10% of the total number of bridges nationwide were inspected having poor condition and 5.36% were considered as having bad condition. Bridges in the Philippines are materially classified as permanent if it is made from concrete or steel, and temporary if made from bailey and timber. Collectively, what alarming is the increasing number of bridges classified as poor which at the end of February (2015) it peaked to 15.48%¹. Many unobservable environmental parameters such as temperature, humidity, and wind force disturb the natural

stability and characteristics of civil infrastructures.

Natural frequency, aside from mode shape and damping that are the standard vibrational properties of bridge structures, is the frequency at which the bridge oscillates without any excitation, internal induced force and damping force affecting the system. At equilibrium state of the bridge, the natural frequency exhibits the true condition of the structure. It is the parameter that provides excellent vulnerability to temperature, making it also the easiest parameter to be extracted, quantified and analyzed². The acceleration parameter representing the natural frequency of the structure can be used to determine and evaluate the degree of damage concealed in the beams and decks having linear behavior³. As ambient temperature easily affects

the molecules of solid matters, including the materials and components of bridge, it may cause expansion and compression along the deck continuously⁴. Young's modulus is directly affected by ambient temperature. It is the mechanical property of solid materials that are linear elastic. As temperature increases, Young's modulus of concrete bridges decreases making it vulnerable to damage⁵. Thus, it offers a reasonable motion to eliminate the temperature effect in bridge health evaluation and classification system. Strain-temperature correlation analysis of a tied arch bridge using monitoring data was used to develop linear regression models for structural performance evaluation⁶. Statistical analysis of temperature field-static strain linear relationships of cable stayed bridges was used to obtain probability models for performance assessment application⁷. Certainly, it agrees to use temperature and vibration parameters in analyzing the condition of certain bridge structure as these parameters show off the ease of extracting raw and unobservable values.

Existing nondestructive testing techniques for structural health diagnosis and prognosis are indeed limited for continuous data acquisition and monitoring that is a requirement of SHM. It includes acoustics, ultrasonic waves, electromagnetic and radiographic methods⁸. These methods provide local damage detection.

Principal component analysis (PCA) is a multivariate Gaussian statistical procedure that uses orthogonal linear transform (OLT) to transpose a matrix of feature data. Principal components are normally ranked based on variance. Variants of PCA were used in data reduction such as⁹ and ¹⁰.

Artificial neural network (ANN) is basically composed of input layer, hidden layer containing the artificial neurons, output layer, weights and biases, which learns what response is quantified to particular input without providing task-specific rules. Classification systems were done using^{11,12} and¹³. All the abovementioned studies done in the past used steel test bed as their reference platform or mere computer simulation techniques to generate correlations among parameters and perform damage detection through acquired data. Hence, in order to verify the relationships of temperature and vibration with other bridge materials, usage of Reinforced Concrete Bridge is an appropriate alternative. Accordingly, it is

apparent that machine learning through multivariate linear principal component analysis and artificial neural network are best suited to enhance the data integrity and classification of bridge health. Bridge evaluation is undeniably a mathematically involved procedure and requires minimum inbuilt measurement parameters.

The aim of this study is to apply the combined PCA-ANN approach for reinforced concrete bridge health classification. Specifically, this study aims to construct a reinforced concrete bridge laboratory test platform and develop damage test cases; develop the wireless sensor network composed of six motes; employ principal component analysis to compensate temperature on vibration data and formulate the mathematical model through multiple linear regressions (MLR); and develop an artificial neural network for classifying the structural health of the bridge.

Experimental Design

The experimental design is shown in Fig. 1. It is subdivided into four phases that each complies with the objectives of the study.



Fig. 1. Block diagram of the system

Construction of Bridge Test Platform and Development of Damage Test Cases

With the aid of STAAD Pro software, the Banalo Bridge in Bacoor, Cavite was modeled to generate its moment diagram with self-weights and moving loads conditions. Moment diagram depicts the maximum deflection on different sections of the deck where motes must be installed. Shown in Fig. 2 is the platform configured for controlled vibration testing (CVT). Accelerometers and temperature sensors are distributed and installed along the deck.

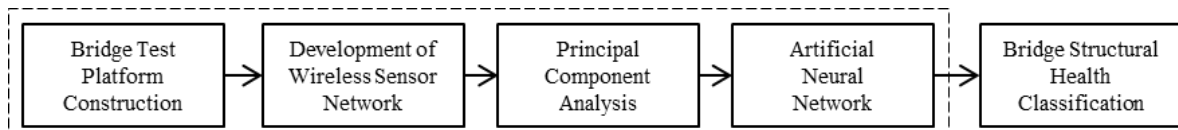


Fig. 2. Panoramic view of the actual setup of reinforced concrete bridge laboratory test platform with proper placement of motes

The damage test case (TC) used the combined platform physical alteration technique in which different sections of the test bed is being deformed and removed from its most stable state, and the subwoofer vibration testing. A 10 Hz sinusoidal wave tone was used as the reference excitation frequency which acts as the ambient excitation. The data rate of all TCs is 100 Hz and each test lasts for an hour in early morning, noon time and night time to vary temperature. Pick peaking (PP) algorithm was used to automatically transmit the maximum acquired vibration data for each minute. This will also lessen data congestion.

Table 1. Damage test cases using platform physical alteration technique and vibration testing.

Cluster	Test case	Conditions
Undamaged	TC1	No subwoofer excitation, no platform alteration
Damaged	TC2	No subwoofer excitation, all bolts from roller support are removed
	TC3	With subwoofer excitation, no platform alteration
	TC4	With subwoofer excitation, all bolts from roller support are removed
	TC5	With subwoofer excitation, part of decks are cracked
	TC6	Combination of TC4 and TC5

Development of Wireless Sensor Network

In Fig. 3, the WSN is composed of six motes that are connected in star topology with the router, which is wirelessly connected to a repeater. The repeater serves as the gateway to a remote terminal. Each mote is composed of power core using arechargeable battery, processing core using Raspberry Pi (RPi) 3 Model B, dataacquisition core using accelerometers and temperature sensors, and wirelesscommunications core using the build-in wireless fidelity (WiFi) module of RPi. Secured copy protocol (SCP) was employed for file transfers between hosts on the WSN. Cron was employed as for execution and transmission time scheduling. Accelerometers were calibrated using inclination sensing and customized subwoofer-setup techniques. Temperature sensors were calibrated using two-point calibration technique¹⁴.

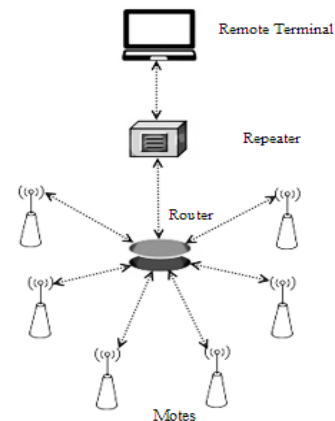


Fig. 3. Four-tier wireless sensor network architecture

Implementation of Principal Component Analysis and Development of Temperature-Compensated Mathematical Models

After the collection of training data, PCA using cumulative proportion (CP) criterion and correlation matrix method (CorMM) was implemented using NumXL which retains three principal components serving as the end effector of the mathematical models for temperature-compensated vibration data that were

developed using multiple linear regression (MLR)¹⁵. The mathematical models were embedded to RPi system. The output data for this stage serve as the input training data set for ANN.

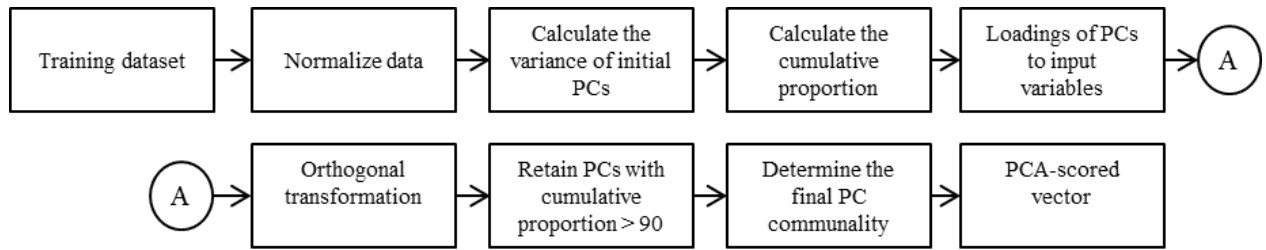


Fig. 4. Principal component analysis using cumulative proportion criterion flowchart

Development of Artificial Neural Network

After gathering the training set for ANN model, initialization of number of artificial neurons, network hidden layers, weights and biases were done using MATLAB nntool. The activation function of the artificial neural neurons implementing backpropagation algorithm is a weighted sum of the sum of inputs x_i multiplied by their respective weights w_{ji} .

$$A_j(x, y) = \sum_{i=0}^n x_i w_{ji} \tag{1}$$

The most common output function is the sigmoidal function that resembles a very close to one for large positive numbers, 0.5 to zero, and very close to zero for large negative numbers. This is an advantage for smooth transition between low and high output of the neurons.

$$O_j(x, \bar{y}) = \frac{1}{1 + e^{-A_j(x, \bar{y})}} \tag{2}$$

The developed three-layer feedforward ANN with backpropagation algorithm has 3 input neurons at the input layer, 10 neurons at the hidden layer and 3 neurons at the output layer. Three-digit binary final grade representation was used: ‘100’ for good, ‘010’ for needs rehabilitations and ‘001’ for critical bridge health classifications. This criterion is based on the common range of bridge natural frequencies in which 0.92 Hz and 1.5 Hz to 4.5 Hz is classified good and critical respectively¹⁶. For this study, vibration of less than 0.92 Hz is considered good (TC1), 0.92 Hz to 1.5 Hz needs rehabilitation (TC2-TC4), and more than 1.5 Hz are critical (TC5-TC6). The 70% of the total input data was used for training, 15% for validation and 15% for testing. Training data are presented to the network during training and the network is adjusted according to its error. Validation data are used to measure network generalization. Testing data provides an independent measure of network performance during and after

training.

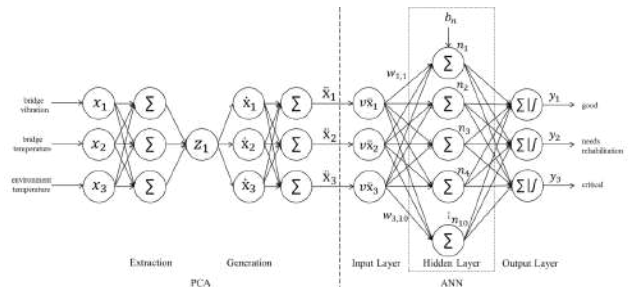


Fig. 5. Hybrid network of principal component analysis and three-layer feedforward artificial neural network with 10 hidden artificial neurons

ANALYSIS OF RESULTS

Temperature Compensation

The PCA-processed data for z-axis vibration has the mathematical model shown in Eq. 3. In this manner, it acts as the final filter of vibration data causing the input to ANN as temperature-compensated data. As shown in Fig. 6, the deviation of raw and PCA-reconstructed vibration data was the yielded temperature compensation.

$$x = 1.1676 - 0.01523 (\text{bridgeTemp}) + 0.0074 (\text{enviTemp}) \tag{3}$$

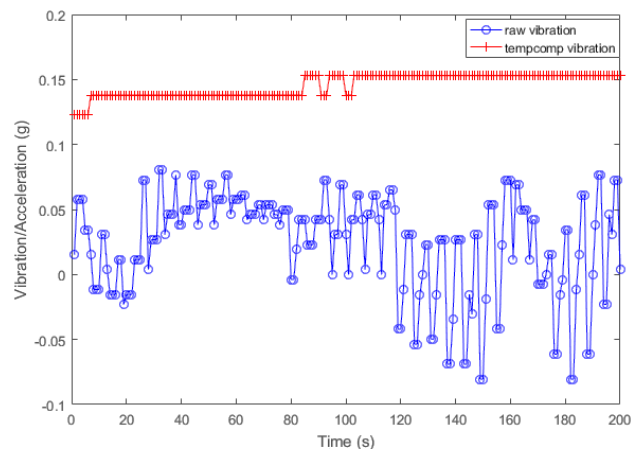


Fig. 6. Temperature-compensated vibration data using supervised principal component analysis

Bridge Health Classification

The triple binary digit output neuron representation in which ‘100’ denotes good bridge health, ‘010’ for bridge that needs rehabilitation, and ‘001’ for critical bridge health classification are sampled hereunder.

Table 2. Sample training data and results of back propagation artificial neural network.

Bridge Health Classification	Actual Output			Artificial Nodes (N)		
	N1	N2	N3	N1	N2	N3
Good	1	0	0	0.9896	1.65E-05	1.05E-06
Needs Rehabilitation	0	1	0	1.22E-05	1.0000	1.34E-07
Critical	0	0	1	1.01E-05	1.32E-05	0.9996

Neural network structure was experimented and varied based on the number of hidden artificial neurons and hidden layers to yield the best system performance. The key parameters are the processing time, cross-entropy (CE) value and regression coefficient (R) to determine the best neural network.

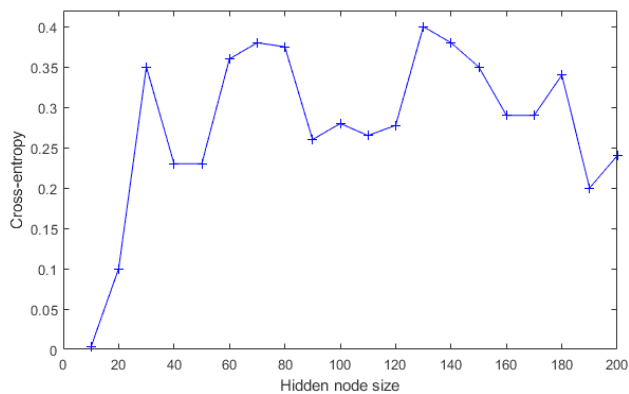


Fig. 7. Number of hidden nodes versus cross-entropy

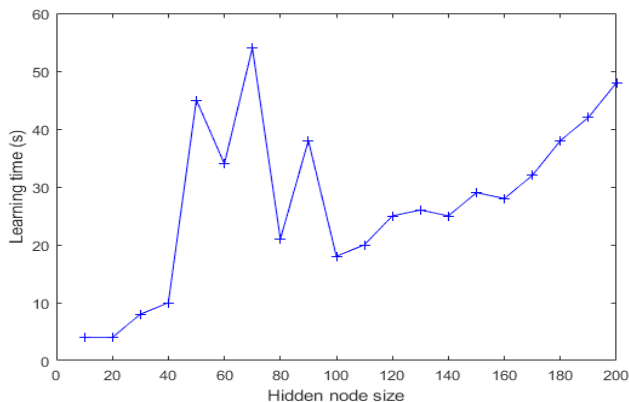


Fig. 8. Number of hidden nodes versus learning time in seconds

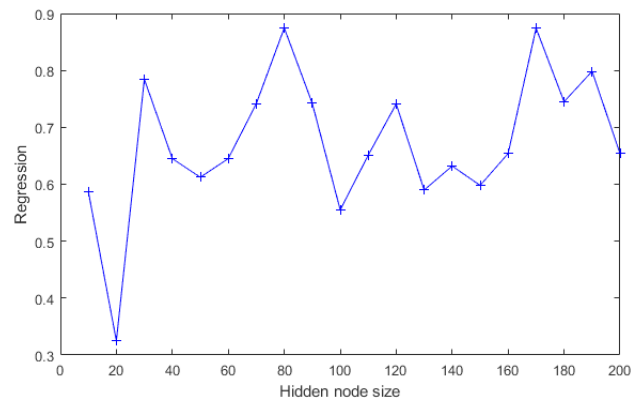


Fig. 9. Number of hidden nodes versus regression coefficient

By referring to Fig. 7 to 9, it is noticeable that lowest cross-entropy and learning time are obtained from hidden node size of 10. The highest regression coefficient was obtained at hidden node size of 190. Fig. 7 depicts that there is considerably increase in cross-entropy from 10 to 40 hidden artificial nodes with varying pattern for higher magnitude nodes. The CE performance error proves the divergence of predicted from actual values. Fig. 8 depicts a particular linear increase for learning time as the number of hidden artificial node increases. Fig. 9 depicts no particular pattern in regression coefficient in increasing the magnitude of hidden artificial nodes.

Fig. 10 shows the training, validation and test performances of the trained ANN. Its cross-entropy performance is 0.0038881 which indicates good performance of the network, wherein 0 being the ideal value that every predicted value corresponds to actual value. Cross-entropy provides good classification of the system. 88 epochs were used by the network to achieve

the best validation.

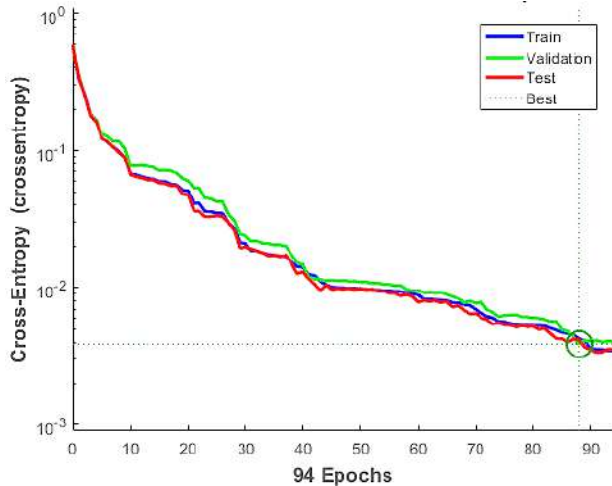


Fig. 10. Performance plot of the trained neural network for bridge health classification

Fig. 11 depicts the overall confusion matrix of the developed neural network. It shows how accurate the system classifies each entry data. The training, validation and test accuracy are 99.7%, 100% and 100 % respectively. Out of 2,160 attempts to classify target output, 1.2% is wrong. Hence, overall system accuracy is 99.8%.

All Confusion Matrix

Output Class	1	358 16.6%	0 0.0%	0 0.0%	100% 0.0%
	2	2 0.1%	1080 50.0%	2 0.1%	99.6% 0.4%
	3	0 0.0%	0 0.0%	718 33.2%	100% 0.0%
		99.4% 0.6%	100% 0.0%	99.7% 0.3%	99.8% 0.2%
		1	2	3	
		Target Class			

Fig. 11. Overall confusion matrix of the developed neural network

The neural network was tested using 2160 samples and resulted to cross-entropy error measure of 0.00636106 and the percentage of misclassified samples is 1.57407%. With the tested samples, the mean relative error is 0.00020734. Fig. 9 shows the comparison of the ANN output and the actual value of test samples.

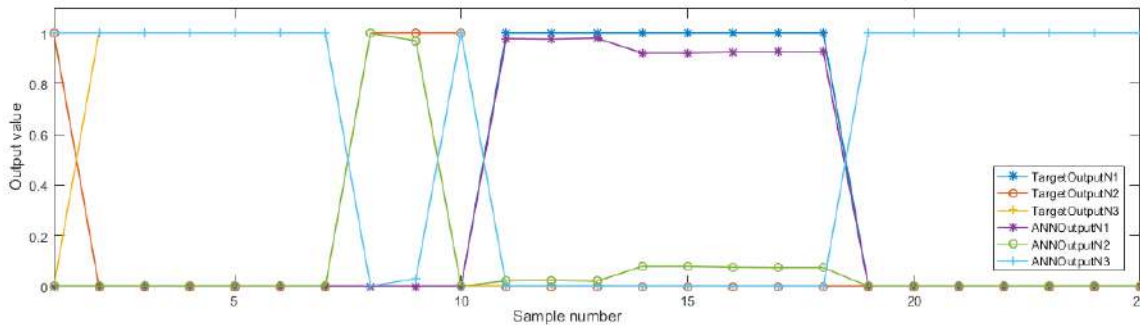


Fig. 12. Overall confusion matrix of the developed neural network

CONCLUSION

Nondestructive testing through controlled vibration testing offers numerous vibration patterns along reinforced concrete bridge platform. Decentralized wireless sensor network offers good setup to mitigate bulk data ingestion. Temperature compensation using principal component analysis with cumulative proportion criterion provides suitable amount of transformation and extraction of feature vectors for more reliable interpretation of raw vibration data. Artificial neural network with binary digitrepresentation was capitalized in classifying bridge health whether it is still good to use,

needs rehabilitation or critical with accuracy of 98.4%. Statistically, the output data of the trained network has no difference with the target data. Thus, the hybrid PCA-ANN approach is an effective tool for reinforced concrete bridge healthclassification.

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Optimization Modeling for Sustainable Production and Scheduling of Crude Palm Oil Milling Industries

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ABSTRACT

Crude palm oil (CPO) can be obtained from the milling process of raw materials, called fresh fruit bunch (FFB) into end products palm oil. The process usually through a series of steps producing and consuming intermediate products. The CPO milling industry considered in this paper does not have oil palm plantation, therefore the FFB are supplied by several public oil palm plantations. Due to the limited availability of FFB, then it is necessary to choose from which plantations would be appropriate. This paper proposes a mixed integer linear programming model for the supply chain integrated problem, considering waste. The mathematical programming model is solved using neighborhood search approach.

Keywords: *Optimization, Crude Palm Oil, Mixed Integer programming, Supply Chain, Neighborhood Search.*

INTRODUCTION

The production process of crude palm oil (CPO) should go through the milling process of raw materials, called fresh fruit bunch (FFB) into end products palm oil. The process usually through a series of steps producing and consuming intermediate products. These raw materials, intermediate and end products are necessarily to be inventoried, allowing one to produce and consume them at different moments and rates in time. Even though for palm oil the time to keep raw material in inventory is very short. Each step of process may require several input products and may produce one or several outputs. If the CPO Company does not have any palm oil plantation, the FFB as raw materials must be purchased from oil palm plantation surrounding.

In order to be able to meet the market demand and to stay competitive, palm oil companies should have production plan strategies. A plan which involves the necessary acquisition of resources and the availability raw materials, as well as planning of the production activities required to process materials into finished goods. All of the process is to satisfy customer demand in the most efficient or economical way, i.e. minimizing total costs¹. Determination of the optimal amount of production has become one of the key component for a production planning².

Typically, solving production planning problems involve making decisions regarding the size of production lots, or production levels, for each of the time periods in a planning horizon. Additionally, these problem solutions may also include decisions on the quantities of raw materials (components) to purchase, order or process, inventory levels for finished products and components, production sequence, and other variables related to these aspects.

In production planning manner, it is essential to consider material flow and inventory balance equations in a model using a relative discretization of time, such as years, quarters, months or weeks³. Linear Programming (LP), Mixed Integer Linear Programming (MILP), and Mixed Integer Non-Linear Programming (MINLP) models are often appropriate and useful for solving such problems with a clear quantitative objective function: net profit, contribution margin, cost, total sales, total production, etc³.

CPO milling industries can be regarded as process industries in which production process and distribution flow are to define a supply chain management system. The primary optimal performance of the operations is to obtain the minimum total operating cost from processing raw material into final product and then deliver them to distribution centre^{4,5}.⁶ presented the optimization modelling of an integrated the supply

chain system which combine raw material suppliers, several plants, distribution centres, warehouses and customers. ⁷analysed more complicated situation for the integrated supply chain. They modelled the supply chain performance which involved multiple feed mills, multiple plantation, and multiple products. ⁸addressed an MILP model, which integrate production, distribution and marketing and integrated plants and sales points. Their paper intends to reveals the relevant features required for the complete supply chain management with a multi-site production network. ⁹develop a MILP global supply chain model for solving product – plant and customer – distribution center assignments. In their paper, there are several supply chain echelons, and number and locations of distribution centers. ¹⁰generate a two-stage supply chain model to determine the optimal quantities of products to be produced at each plant, and then transported from each plant to each distribution center. However, large numbers of constraints and binary variables turned out, and its size increases exponentially as the numbers of products, plants, and distribution centers increase. A hybrid Taguchi-Immune method is applied¹¹ to optimize supply chain design problem with multiple shipping options, distributed customer needs, and fixed lead times. ¹²proposed mixed integer linear programming models and computational approaches for tackling the problem of uncertain multi-echelon supply chains with inventory. ¹³consider a multi-period production system which involve load distribution and production planning. A three-phase heuristic approach and Tabu Search were used for solving the integrated model.

When we intend to apply production planning in a more sophisticated way for complex manufacturing systems, it is usual to find such applications made through Mixed Integer Linear Programming (MILP) models. This is due to the nature of the decision variables for some features involved in such problems, e.g., set-up costs and times, start-up costs and times, machine assignment decisions, ordering costs and times, and so on. These costs and times are fixed per batch and are not proportional to the batch size. Therefore, binary or integer variables are required to model them¹.

¹⁴develop a continuous time model for production planning and scheduling applicable to batch processing plants. Initially, the proposed model is a Mixed Integer Nonlinear Program (MINLP), and it is then reformulated as a mixed integer linear programming (MILP) using

linearization techniques. The model aims at maximizing the net profit obtained from the batch production, with respect to restrictions relating to batch assignment, operation and equipment setup time, and scheduling periods. A multi-product batch paint processing plant is considered for a real case implementation to show the effectiveness of the model. Another MILP model for integrated location-production-distribution planning can be found in¹⁵.

¹⁶addresses a production planning of palm oil together with the capacity planning of palm oil processing plants in Thailand. His paper intend to treat CPO as the main feedstock of biodiesel production. A mixed integer linear programming model is proposed. In¹⁷, a nonlinear programming model for CPO production planning is addressed with considering minimization of water consumption at the milling process. However they only consider the optimization process in the CPO milling process. Another production planning of CPO which consider only at the milling process can be found in¹⁸. They use fuzzy logic strategy to provide a simpler mechanism in order to obtain the relationship between the processing variables and the amount of CPO and also palm kernel losses.¹⁹develop an optimization model in a supply and demand system for CPO production planning. The objective of their model is to select which market of CPO would be appropriate, and also to calculate how much demand should be delivered in the selected market. [20] present a multi-objective optimization model for a CPO sustainable production planning considering the reliability of financial risk.

Mathematical Model

The model formulated is to decide optimally

1. The amount of FFB to be bought from each palm oil plantation (ton)
2. The amount of CPO to be produced (ton)
3. The amount of CPO to be delivered to each customer (ton)
4. The amount of Waste produced in the milling process (ton)
5. To decide from which plantation FFB should be bought (binary)

In such a way to minimize the overall operational costs.

Decision variables are defined as follows.

- x_{ij}^t The amount of FFB (ton) needs to be bought from plantation I for milling j in time period t
- y_j^t The amount of CPO (ton) to be produced at milling j in time period t
- z_{jk}^t The amount of CPO (ton) to be delivered from milling j to customer k in time period t
- v_j^t The amount of liquid waste (ton) produced after the milling process in milling j in time period t
- w_j^t The amount of solid waste (ton) produced after the milling process in milling j in time period t
- δ_{ij} A binary variable which is 1 if FFB for milling j is bought from plantation I and zero otherwise

Parameters.

- α_{ij} Transportation cost (Rp.) from plantation I to milling j per kilometer
- d_{ij} Distance (km) from oil palm plantation i to milling j
- β_j Production cost (Rp.) at milling j
- γ_{jk} Transportation cost (Rp.) to deliver CPO from milling j to customer k
- λ_j Cost (Rp.) for processing liquid waste at milling j
- ρ_j Transportation cost (Rp.) for solid waste at milling j
- τ_{ij}^t Overall price (Rp.) to buy FFB from plantation i for milling j in time period t
- Cm_j^t Milling capacity (ton) at milling $j \in J$ in time period $t \in T$
- CP_j^t Production capacity (ton) at milling $j \in J$ in time period $t \in T$
- CA_i^t Quantity of FFB (ton) available at plantation $i \in I$ in time period $t \in T$

Sets.

- I set of oil palm plantations with index i
- J set of CPO milling with index j
- K set of customers with index k
- T set of time period with index t

Regarding to the structure of the problem, it is easy to observe that the problem can be expressed as a mixed integer linear programming (MILP) model.

Firstly we formulate the objective function.

The operational costs can be expressed as follows.

$$C_1 = \sum_{i \in I} \sum_{j \in J} \sum_{t \in T} (\alpha_{ij})(d_{ij})x_{ij}^t \tag{1}$$

Transportation cost of FFB from oil palm plantation $i \in I$ to milling $j \in J$ in time period $t \in T$.

$$C_2 = \sum_{j \in J} \sum_{t \in T} \beta_j y_j^t \tag{2}$$

Processing cost to produce CPO at milling $j \in J$ in time period $t \in T$.

$$C_3 = \sum_{j \in J} \sum_{k \in K} \sum_{t \in T} \gamma_{jk} z_{jk}^t \tag{3}$$

Transportation cost of CPO from milling $j \in J$ to consumer $k \in K$ in time period $t \in T$.

$$C_4 = \sum_{j \in J} \sum_{t \in T} \lambda_j v_j^t \tag{4}$$

Processing cost of liquid waste resulted after the milling process at milling $j \in J$ in time period $t \in T$.

$$C_5 = \sum_{j \in J} \sum_{t \in T} \rho_j w_j^t \tag{5}$$

Transportation cost of solid waste after the milling process at milling $j \in J$ in time period $t \in T$.

$$C_6 = \sum_{i \in I} \sum_{j \in J} \sum_{t \in T} \tau_{ij} \delta_{ij}^t \tag{6}$$

Cost to buy FFB from palm oil plantation $i \in I$ for milling $j \in J$ in time period $t \in T$, if plantation I is chosen.

There are several constraints must be met expressed as follows.

$$\sum_{i \in I} x_{ij}^t \leq C m_j^t \quad \forall j \in J, t \in T \tag{7}$$

Eq. (7) states that the quantity of FFB to be bought from oil palm plantation $i \in I$ for milling $j \in J$ should fit to the capacity of milling $j \in J$ in time period $t \in T$

$$\sum_{j \in J} \sum_{t \in T} y_j^t \leq \sum_{j \in J} \sum_{t \in T} C p_j^t \tag{8}$$

Eq. (8) describes that the quantity of FFB to be processed in milling $j \in J$ should meet the production capacity of milling $j \in J$ in time period $t \in T$.

$$\sum_{i \in I} x_{ij}^t \leq \sum_{i \in I} C A_i \delta_{ij}^t \quad \forall j \in J, t \in T \tag{9}$$

Eq. (9) presents that the quantity of FFB to be bought from oil palm plantation $i \in I$ for milling $j \in J$ should satisfy to the availability of FFB in the plantation $i \in I$, if the plantation is chosen, for time period $t \in T$

$$\sum_{j \in J} z_{jk}^t \leq \sum_{j \in J} y_j^t \quad \forall k \in K, t \in T \tag{10}$$

Eq. (10) expresses that the quantity of CPO to be delivered to customer $k \in K$ from milling $j \in J$ cannot be greater than the quantity produced in milling $j \in J$ in time period $t \in T$

$$v_j^t + w_j^t \leq \sum_{i \in I} x_{ij}^t \quad \forall j \in J, t \in T \tag{11}$$

Eq. (11) states that the quantity of solid and liquid waste from milling $j \in J$ should be less than the quantity of FFB have been processed in time period $t \in T$.

$$\sum_{i \in I} \sum_{j \in J} \delta_{ij} = n \tag{12}$$

Eq. (12) is to make sure that there would be only n plantation available to supply FFB for each milling $j \in J$.

$$x_{ij}^t, y_j^t, z_{jk}^t, v_j^t, w_j^t \geq 0, \quad \delta_{ij} \in \{0,1\}, \quad \forall i \in I, j \in J, k \in K, t \in T \tag{13}$$

Eq. (13) is for the type of decision variables.

The Algorithm

First we separate the integer part and the fractional part

$$x = [x] + f, \quad 0 \leq f \leq 1$$

of the (continuous) solution of the relaxed problem, $[x]$ is the integer component of non-integer variable x and f is the fractional component.

Stage 1.

Step 1. Get row i^* the smallest integer infeasibility, such that $\delta_{i^*} = \min\{f_i, 1 - f_i\}$

(This choice is motivated by the desire for minimal deterioration in the objective function, and clearly corresponds to the integer basic with smallest integer infeasibility).

Step 2. Do a pricing operation

$$v_{i^*}^T = e_{i^*}^T B^{-1}$$

Step 3. Do calculating $\sigma_{ij} = v_{i^*}^T \alpha_j$

With j corresponds to

$$\min_j \left\{ \left| \frac{d_j}{\alpha_{ij}} \right| \right\}$$

the maximum movement of nonbasic j at lower bound and upper bound.

Otherwise go to next non-integer nonbasic or superbasic j (if available). Eventually the column j^* is to be increased from LB or decreased from UB. If none go to next i^* .

Step 4.

Solve $B\alpha_{j^*} = \alpha_{j^*}$ for α_{j^*}

Step 5. Do ratio test for the basic variables in order to stay feasible due to the releasing of nonbasic j^* from its bounds.

Step 6. Exchange basis

Step 7. If row $i^* = \{\emptyset\}$ go to Stage 2, otherwise Repeat from step 1.

Stage 2. Pass1 : adjust integer infeasible superbasics by fractional steps to reach complete integer feasibility.

Pass2 : move integer feasible superbasics. The objective of this phase is to run a highly localized search to verify local optimality.

CONCLUSIONS

This paper presents an integrated of production – distribution planning faced by a CPO milling industry with no oil palm plantation. Therefore this industry is necessarily to buy FFB from several oil palm plantation. Due to the limited availability of FFB then the management has to decide from which plantations would be appropriate to buy such that to meet the production capacity of the milling industry. We develop a mixed binary linear programming model to formulate the planning problem. A direct approach is proposed for solving the model.

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An Integer Programming Model For Sustainable Multi-Product Fish Production Planning Problem

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ABSTRACT

Production planning of multi product can be regarded as one of the fundamental aspects in manufacturing system. In terms of fish processed products the production planning produces simultaneously multi fish products from several types of raw fish resources. The objective of the planning problem is to fulfil production and sourcing decisions such that to meet customer demand considering production capacity, workforce availability and inventory restrictions. This paper addresses the management of fish manufacturing which performs processing fish into several seafood products. A mixed integer programming model is proposed to model the problem. We propose a Direct search approach based on activity constraints strategy to solve the model. A real world problem as a computational experience from North Sumatra province is presented.

Keywords: *Integer Programming, Production planning, Uncertainty, Modeling, Uncertainty*

INTRODUCTION

The objective of a production planning problem is to fulfil customer demands based on production and sourcing decisions so as to maximize profit or to minimize operation costs subject to production capacity, raw material flow, and inventory restrictions. Therefore the problem is inherently an optimization problem.

In terms of the parameter of the mathematical models, the optimization of production planning can be classified into: deterministic models and stochastic models. In deterministic models the parameters or the data are assumed to be known. Whenever the parameters are uncertain then we have stochastic models. Typically the uncertainty can be overcome by using “best guesses” of uncertain values. However, these deterministic models would end up solving “mean-value” or “worst-case” problems. The solution to such “worst-case” or “mean-value” problems are often inadequate—large error bounds arise¹. Neglecting uncertainty, the deterministic production planning problem models, though widely studied in the literature, are less acceptable and deployed in practice.

This paper considers production planning problem which arises in marine fisheries industry in Indonesia. Marine fisheries also take part as an important element

in the economic development of Indonesia. This industry could also provide benefit to people who live at the surrounding areas, to increase the financial gain of local government, and to maintain sustainability. Fisheries industrial sector can be categorized into three different parts, i.e., open sea fishing, fish cultivation and processed fish. This paper is focusing on the latter sector.

The proposed model explicitly includes uncertain parameters. Most of the references of optimization problems which contain uncertain parameter come under the heading of stochastic programming. See²⁻⁴ for a good description of the basics. The appropriate structure for our fish problem is a two-stage stochastic program with recourse. In such models, generally the objective function value is assigned to minimizing expected costs or to maximizing expected benefits (linear or nonlinear), although the function value can also refer to the expected value of the quadratic deviations of certain specific targets or the variance of the second-stage recourse function. There are two kinds of decision variables involve. Those determined at the first-stage, called here-and-now decision variables, in which the random variables are still unknown; in this paper, they correspond to the production cost and workforce of the first period. Those determined at the second-stage,

called recourse decision variables, in which the random variables have been realized. These variables represent reactive decisions made to response to the uncertainty factor. See also⁵⁻⁷ for deeper explanation.

This paper is organized as follows. In Section two we review briefly the two-stage recourse model. Section three describes the problem background. The stochastic programming model of the problem is in Section four. Section five presents the solution basic approach.

$$\min c_x^T x + \sum_{s=1}^S p_s (q^T y^s) \tag{1}$$

$$s.t. Ax = b \tag{2}$$

$$T^s x + W y^s = h^s \quad s = 1, \dots, S \tag{3}$$

$$x, y^s \geq 0 \quad s = 1, \dots, S \tag{4}$$

Eq. (2) represent the first-stage and Eq. (3) represent the second-stage. x is the vector of first-stage decision variables which is scenario-independent. The optimal value of x is not conditional on the realization of the uncertain parameters. c_x is the vector of cost coefficient at the first-stage. A is the first-stage coefficient matrix and b is the corresponding right-hand-side vector. y is the vector of second-stage (recourse) decision variables. q is the vector of cost (recourse) coefficient matrix and h^s is the corresponding right-hand-side vector and T^s is the matrix that ties the two stages together where $s \in \Omega$ represents scenarios in future and p_s is the probability that scenario s occurs. In the second-stage model, the random constraint defined in (3), $h^s - T^s x$, is the goal constraint: violations of this are allowed, but the associated penalty cost, $q^T y$, will influence the choice of x . $q^T y$ is the recourse penalty cost or second-stage value function and $\sum_{s=1}^S p_s (q^T y^s)$ denotes the expected value of recourse penalty cost (second-stage value function).

Problem Background

In Indonesia, the fish processed industries can be found mostly at the coastal area, therefore it is not surprising that the production system is carried out in traditional manner. In this paper, we consider the production plan produced by the community at the coastal area for eight kinds of products. As mentioned in²², production planning can be defined as to plan raw materials (in this case several species of fish) and

Computational results and conclusions, respectively, in Section six and seven.

Framework of Two-Stage Recourse Model

In the following, the framework of two-stage stochastic integer programming model is briefly described. For detail, the reader is referred to²¹. The mathematical expression of the stochastic linear programming model can be written as follows.

production resources in such a way to transform the raw materials into fish processed results. The plan is necessarily to meet customer demand in a very economic way (i.e. to minimize cost), and also to preserve environment. The industry run by the community of that area wish to generate a production plan for these eight fish products to fulfil market demand within each period of time $t, t = 1, \dots, T$.

This paper does not put focus merely on classic production plan but also considers environmental factor in the production problem. A production planning problem which imposes environmental aspects beside the economic and social aspects can be called as a sustainable product²³. This is the case where we should minimize waste due to processing fish raw material.

Decision variables and parameters used are defined as follows.

Sets

T = number of periods

N = set of fish products

M = set of raw fish

S = set of scenarios

Variables

1. X_{jt} : Quantity of fish to be produced $j \in N$ in period $t \in T$ (ton)
2. u_{it} : Additional amount of raw fish $i \in M$ to purchase in $t \in T$ (unit)
3. k_t : Number of workers required in period $t \in T$ (man-period)
4. k_t^- : Number of workers laid-off in period $t \in T$ (man-period)
5. k_t^+ : Number of additional workers in period $t \in T$ (man-period)
6. I_{jt} : Quantity of product $j \in N$ to be stored in period $t \in T$ (units)
7. B_{jt} : Under-fulfilment of product $j \in N$ in period $t \in T$ (units)
8. w_{jt}^p : Quantity of waste of fish product $j \in N$ in period $t \in T$ (units)

Parameters

1. $\alpha, \beta, \gamma, \delta, \mu, \rho, \lambda, \eta$ are all costs
2. D_{jt} : Demand for product $j \in N$ in period $t \in T$ (units)
3. U_{jt} : Upper bound on u_{jt}
4. r_{ij} : Amount of resource $i \in M$ needed to produce one unit of product $j \in N$
5. f_{it} : Amount of resource $i \in M$ available at time $t \in T$ (units)
6. a_j : Number of worker needed to produce one unit of product $j \in N$

The Stochastic Programming Model

Minimize

$$\begin{aligned} & \sum_{j \in N} \sum_{t \in T} \alpha_{jt} x_{jt} + \sum_{i \in M} \sum_{t \in T} \beta_{it} u_{it} + \sum_{t \in T} \mu_t k_t + \sum_{t \in T} \gamma_t k_t^- + \sum_{t \in T} \delta_t k_t^+ \\ & + \sum_{j \in N} \sum_{t \in T} \eta_{jt} w_{jt}^p + \sum_{s \in S} p_s \sum_{j \in N} \sum_{t \in T} \rho_{jt}^s I_{jt}^s + \sum_{s \in S} p_s \sum_{j \in N} \sum_{t \in T} \lambda_{jt}^s B_{jt}^s \\ & + \sum_{s \in S} p_s \left\{ \sum_{j \in N} \sum_{t \in T} \left(\rho_{jt}^{s'} I_{jt}^{s'} \right)^2 \right\} + \sum_{s \in S} p_s \left\{ \sum_{j \in N} \sum_{t \in T} \left(\lambda_{jt}^s B_{jt}^s - \sum_{s' \in S} \lambda_{jt}^{s'} B_{jt}^{s'} \right)^2 \right\} \end{aligned} \tag{5}$$

Subject to

$$\sum_{j \in N} r_{ji} x_{jt} \leq f_{it} + u_{it} \quad \forall i \in M, \forall t \in T \tag{6}$$

$$u_{it} \leq U_{it} \quad \forall i \in M, \forall t \in T \tag{7}$$

$$\sum_{j \in N} a_j x_{jt} \leq k_t \quad \forall t \in T \tag{8}$$

$$0.10x_{jt} \leq w_{jt}^p \leq 0.20x_{jt}, \quad \forall j \in N, \forall t \in T \tag{9}$$

$$\sum_{j \in N} \sum_{t \in T} w_{jt}^p \leq C^p \tag{10}$$

$$\varepsilon_1 \leq \frac{\sum_{s \in S} P_s \sum_{j \in N} \sum_{t \in T} I_{jt}^S - \sum_{s' \in S} P_{s'} \sum_{j \in N} \sum_{t \in T} I_{jt}^{S'}}{\sum_{s \in S} P_s \sum_{j \in N} \sum_{t \in T} I_{jt}^S} \leq \varepsilon_2 \tag{11}$$

$$\varepsilon_3 \leq \frac{\sum_{s \in S} P_s \sum_{j \in N} \sum_{t \in T} B_{jt}^S - \sum_{s' \in S} P_{s'} \sum_{j \in N} \sum_{t \in T} B_{jt}^{S'}}{\sum_{s \in S} P_s \sum_{j \in N} \sum_{t \in T} I_{jt}^S} \leq \varepsilon_4 \tag{12}$$

$$k_t = k_{t-1} + k_t^+ - k_t^- \quad t = 2, \dots, T \tag{13}$$

$$x_{jt} + B_{jt-1}^S + I_{jt}^S - B_{jt}^S = D_{jt}^S \quad \forall j \in N, \forall t \in T, \forall s \in S \tag{14}$$

$$x_{jt}, u_{it}, k_t, k_t^-, k_t^+, I_{jt}^S, B_{jt}^S \geq 0 \quad \forall j \in N, \forall i \in M, \forall t \in T, \forall s \in S \tag{15}$$

The demand for each period is uncertain. Under the random demand in each period we should decide the number of each product to be stored in inventory or to fulfil the under fulfilment for each period.

All of these decisions can be found in expression (5) of the model as an objective function. Constraint (6) presents the amount of resource $i \in M$ needed to produce product $j \in N$ at least should have the same amount of resources available at time $t \in T$ together with the additional resource needed. However, the additional resource needs to have an upper bound (Expression (7)). In constraint (8), we have the number of workers needed to produce one unit product $j \in N$. The amount of fish waste should be between 10%-20% can be found in (9). Constraint (10) expresses that the process of fish waste should be width in the capacity C^p . Ranges for the variability can be found in constraints (11) and (12). Constraint (13) ensures that the available workers in any period equal the number of worker from the previous period plus any change in the number of worker level during the current period. The change in the number of worker level may be due to either adding extra workers or laying-off redundant workers. Constraint (14) determines either the quantity of product to be stored in inventory or to purchase from outside to fulfil the shortfall in meeting market demand.

Model formulated in expression (5) through to (15) is in deterministic equivalent form, due to the fact that, the random variables form has been replaced by scenario and in the objective function of these random terms have been pre multiplied by the corresponding probabilities p_s . The method for transforming a stochastic programming model to its deterministic equivalent model was addressed in^{6,16}.

The Algorithm

The algorithm for solving the model consists of two cycles.

Cycle 1.

After solving the relaxed problem, the procedure for searching a suboptimal but integer-feasible solution from an optimal continuous solution can be described as follows.

Step 1. Get row i^* the smallest integer infeasibility, such that

$$\delta_{i^*} = \min\{f_i, 1 - f_i\}$$

(this is to minimize the deterioration of the value of the optimal continuous result)

Step 2. Calculate

$$v_{i^*}^T = e_{i^*}^T B^{-1}$$

this is a pricing operation

Step 3. For step length

$$\text{Calculate } \sigma_{ij} = v_{i^*}^T a_j$$

$$\text{With } j \text{ corresponds to } \min_j \left\{ \left\lfloor \frac{d_j}{\sigma_{ij}} \right\rfloor \right\}$$

I. For nonbasic j at lower bound

If $\sigma_{ij} < 0$ and $\delta_{i^*} = f_i$ calculate $\Delta = \frac{(1 - \delta_{i^*})}{-\sigma_{ij}}$

If $\sigma_{ij} > 0$ and $\delta_{i^*} = 1 - f_i$ calculate $\Delta = \frac{(1 - \delta_{i^*})}{\sigma_{ij}}$

If $\sigma_{ij} < 0$ and $\delta_{i^*} = 1 - f_i$ calculate $\Delta = \frac{\delta_{i^*}}{-\sigma_{ij}}$

If $\sigma_{ij} > 0$ and $\delta_{i^*} = f_i$ calculate $\Delta = \frac{\delta_{i^*}}{\sigma_{ij}}$

II. For nonbasic j at upper bound

If $\sigma_{ij} < 0$ and $\delta_{i^*} = 1 - f_i$ calculate $\Delta = \frac{(1 - \delta_{i^*})}{-\sigma_{ij}}$

If $\sigma_{ij} > 0$ and $\delta_{i^*} = f_i$ calculate $\Delta = \frac{(1 - \delta_{i^*})}{\sigma_{ij}}$

If $\sigma_{ij} > 0$ and $\delta_{i^*} = 1 - f_i$ calculate $\Delta = \frac{\delta_{i^*}}{\sigma_{ij}}$

If $\sigma_{ij} < 0$ and $\delta_{i^*} = f_i$ calculate $\Delta = \frac{\delta_{i^*}}{-\sigma_{ij}}$

Otherwise go to next non-integer nonbasic or superbasic j (if available). Eventually the column j^* is to be increased from LB or decreased from UB. If none go to next i^* .

Step 4. Calculate

$$\alpha_{j^*} = B^{-1} a_{j^*}$$

i.e. solve $B\alpha_{j^*} = a_{j^*}$ for α_{j^*}

Step 5. Ratio test used to maintain feasibility; there would be three possibilities for the basic variables in order to stay feasible due to the releasing of nonbasic j^* from its bounds.

If j^* lower bound

Let

$$A = \min_{i^* \neq i^* | \alpha_{ij^*} > 0} \left\{ \frac{x_{B_{i^*}} - l_{i^*}}{\alpha_{ij^*}} \right\}$$

$$B = \min_{i^* \neq i^* | \alpha_{ij^*} < 0} \left\{ \frac{u_{i^*} - x_{B_{i^*}}}{-\alpha_{ij^*}} \right\}$$

$$C = \Delta$$

the maximum movement of j^* depends on:

$$\theta^* = \min(A, B, C)$$

If j^* upper bound

Let

$$A' = \min_{i' \neq i^* | \alpha_{ij^*} < 0} \left\{ \frac{x_{B_{i'}} - l_{i'}}{\alpha_{ij^*}} \right\}$$

$$B' = \min_{i' \neq i^* | \alpha_{ij^*} > 0} \left\{ \frac{u_{i'} - x_{B_{i'}}}{-\alpha_{ij^*}} \right\}$$

$$C' = \Delta$$

the maximum movement of j^* depends on:

$$\theta^* = \min(A', B', C')$$

Step 6. Exchanging basis for the three possibilities

1. If A or A'
 1. $x_{B_{i'}}$ becomes nonbasic at lower bound $l_{i'}$,
 2. x_{j^*} becomes basic (replaces $x_{B_{i'}}$)
 3. x_{i^*} stays basic (non-integer)
 2. If B or B'
 1. $x_{B_{i'}}$ becomes nonbasic at upper bound $u_{i'}$,
 2. x_{j^*} becomes basic (replaces $x_{B_{i'}}$)
 3. x_{i^*} stays basic (non-integer)
 3. If C or C'
 1. x_{j^*} becomes basic (replaces x_{i^*})
 2. x_{i^*} becomes superbasic at integer-valued
- repeat from step 1.

CYCLE2, pass1: adjust integer-infeasible superbasics by fractional steps to reach complete integer-feasibility.

CYCLE2, pass2: adjust integer feasible superbasics.

This phase aims to conduct a highly-localized neighbourhood search.

Computational Result

The planning horizon covers for every three months, i.e. $T = \{1, 2, 3, 4\}$. After we had a survey to the location, then we found out that the market situation for the 8 fish processed products could come out within three possible situation i.e., good, fair and poor, with associated probabilities of 0.30, 0.50 and 0.20 respectively. Nevertheless, the method addressed in17 could be used in order to get an efficient number of scenarios. The data of the problem can be found in24.

Table 1. The Number of Each Product to be Produced (ton)

Product	Period			
	1	2	3	4
1	250	250	250	300
2	900	900	900	950
3	200	200	200	300
4	200	200	200	300
5	200	200	200	300
6	200	200	200	300
7	200	200	200	300
8	200	200	200	300

Table 2. Additional Resources to be used (ton)

Resources	Period			
	1	2	3	4
Machine 1	12.20	12.20	12.20	16.95
Machine 2	9.80	9.80	9.70	13.80
Machine 3	8.65	8.75	8.65	12.55

Table 3. Workforce Plan

Policy	Period			
	1	2	3	4
Reg. workforce	38	35	35	47
Add. workforce	35	0	0	12
Lay off	0	0	0	0

Table 1, Table 2, and Table 3 representing the computational result describes the quantity of each product to be produced, additional resources needed, and the plan for workforce, respectively.

CONCLUSIONS

In this paper, a two-stage stochastic programming model is presented for solving a sustainable production planning problem of a fish processed industry. The uncertainty turned up from the demand.. The model involves to decide the number of worker which is very important for the local government in order they could recruit a number of local people. The other important thing is to conserve sustainability. We address a direct algorithm for solving the mixed integer stochastic programming problem.

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Phenanthrene Biodegradation Efficiency of *Bacillus* sp. P4a Isolated from Hydrocarbon Contaminated Soil

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ABSTRACT

In this study, phenanthrene-degrading bacteria was successfully isolated from hydrocarbon contaminated soil. The bacteria were identified based on their morphological, biochemical activities and molecular identification using 16S rRNA. The phenanthrene – degrading capabilities was cultivated in an enrichment culture containing phenanthrene as a sole source of carbon and energy. The phenanthrene degradation was analysed using Gas Chromatography-Flame Ionization Detector (GC-FID) and the result obtained indicated that the *Bacillus* sp. P4a was capable of degrading to about 83.01% in the enrichment culture. The *Bacillus* sp. P4a has been shown to degrade phenanthrene via salicylate pathway which produced salicylic acid and catechol compound after 14 and 28 days of incubation. The result revealed that this bacterial isolate can be highly recommended for bioremediation of hydrocarbon contaminants due to their capability to degrade phenanthrene.

Keywords: *Phenanthrene, Bacillus sp. P4a, Biodegradation, Bioremediation, Contaminated soil*

INTRODUCTION

In recent decades, the contamination of soil by pollutant such as polycyclic aromatic hydrocarbon (PAH) has caused serious concerns. To begin with there are several facts about PAH that need to be acknowledged. First, PAHs have a widespread occurrence in various ecosystems which enable them to persist for a long time in the environment¹. Second, due to its toxic, mutagenic and carcinogenic properties, prolonged exposure to a high concentration of PAHs can cause acute and chronic health problems². Thus, bioremediation is a technique created to remediate the PAH contamination to reduce the negative impacts of the PAH. It is widely used to remove PAHs from the environment since it is cost effective and environmentally friendly compared to other conventional methods. This technique involves the conversion of toxic chemical substances to less harmful substances by biological means such as a microorganism. Microorganisms such as bacteria and fungi are widely used in this approach due to their ability to degrade pollutants³.

The inoculations of potential microorganism are widely used in the bioremediation of a contaminated

site. Usually, the indigenous microorganisms are important keys and are responsible for the success in bioremediation study. The diversity of phenanthrene-degrading bacteria commonly associated with the PAH content at the contaminated site⁴ is important since it can be utilized using various types of bacteria and can be used as a sole carbon source. The objective of the present study was to determine the biodegradation capability of the bacterial isolate using a shake flask system. The widely used shake flask system in this study is due to the low cost and simple handling method. It is also to determine the involvement of intermediates during the phenanthrene degradation process in the liquid system. Searching for bacteria that can degrade PAH effectively is of great importance for bioremediation purposes.

MATERIAL AND METHOD

Sample Collection

The soil samples obtained near a palm oil mill factory were collected using clean stainless steel spatula and stored in sterile plastic bags before being transferred to the laboratory. The samples were stored at 4°C before analysis.

Enrichment and Isolation of Phenanthrene-degrading bacteria

The phenanthrene-degrading bacteria were enriched in flasks containing 150 ml of Minimal Salt Medium (MSM), 15 g of soil sample and 5 ml of phenanthrene (330 mg/l). The MSM contained (g/L): 1.0 g $(\text{NH}_4)_2\text{SO}_4$, 0.1 g $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$, 0.8 g K_2HPO_4 , 0.2g KH_2PO_4 , 0.012g $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, 0.003 g $\text{MnSO}_4 \cdot 7\text{H}_2\text{O}$, 0.003 g $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ in 1 Liter of distilled water⁵. The flasks were incubated at 30°C with 150 rpm. Then, 5 ml aliquots were transferred to a new MSM containing 5 ml of phenanthrene. The flasks were shaken for 14 days. Bacteria were isolated by the serial where 0.1 ml from the series of dilution was spread onto the nutrient agar (NA) plates and incubated at 30°C for 48 hours.

Identification of the selected phenanthrene-degrading bacterial isolate

The identification and characterization of selected bacterial isolates were based on macroscopic and microscopic observations. The morphology of the bacterial isolates was observed using the Gram staining technique. The physiological characterization of the bacteria was performed using standard biochemical tests of the BBL Crystal Identification Kit⁶. The bacterial isolates were further characterized at the molecular level of DNA sequencing analysis of 16S rRNA.

Phenanthrene degradation analysis by locally isolated bacteria

The analysis of phenanthrene concentration in the culture medium was conducted at the regular interval every 4 days. Duplicated bacterial cultures were centrifuged at 5000 rpm for 10 minutes and at 4°C. The layer of the obtained supernatant was mixed with 100 ml of hexane in 250 ml separation funnel and vigorously shake. There were two layers or phases formed in the separation funnel. The extraction was repeated three times and the hexane phase (top layer) was separated and pooled in a beaker. Then, it was air dried in a fume hood. When the analysis was to be carried out, the samples were then dissolved with an equal volume of hexane (100 ml) and the phenanthrene was quantified by a Clarus 500 Gas Chromatography Flame Ionization Detector (GC-FID).

Preparation and identification of phenanthrene metabolites

An analysis of phenanthrene metabolites⁷ in the culture medium was conducted at Day 0, Day 14 and Day 28 of incubation. The cells were removed by centrifugation at 5000 rpm for 10 minutes and 4°C. The supernatants obtained were membrane-filtered using Whatman No.1 filter paper. The filtered supernatant was acidified to pH 2 with 2M HCl. Then the supernatant were extracted with three volumes of 100 ml ethyl acetate. The organic extracts were pooled and concentrated to 10 ml using rotavapour unit (Buchi, Germany). The extracts were air dried and stored at room temperature until further analysis. The residue was then dissolved in 1 ml of methanol and analysed using Gas Chromatography-Mass Spectrometry (GC-MS Agilent 6890N/59731).

RESULTS AND DISCUSSION

Identification of phenanthrene-degrading bacteria

The morphology of the potential phenanthrene-degrading bacterial was observed using the Gram staining method. It was shown that the Isolate P4a is Gram-positive rod-shaped bacteria. It was produced a white colony possessed a dry surface, a filamentous form of the colony, flat elevation and filiform margin. The identification that based on a biochemical test and BBL Crystal Identification Kit showed that Isolate P4a was preliminarily identified as *Bacillus* sp. The molecular approach such as 16S rRNA gene analysis of Isolate P4a was carried out using genomic extraction, PCR and sequencing. The DNA sequences of the whole insert of Isolate P4a was 1498-1512 bp of the nucleotide sequence, obtained from the sequencing of 16S rDNA fragment. The sequences obtained were used for the similarity search against Gen Bank database at NCBI using the BLAST program (<http://blast.ncbi.nlm.nih.gov/Blast.cgi>). The sequence showed 99% of the *Bacillus* sp. N30 identity (Accession no. GU086432), respectively. *Bacillus* sp. was the most widely reported phenanthrene degraders isolated from the environment^{8,9 & 10} also reported that *Bacillus* degrading phenanthrene was identified using 16 S rRNA sequences with 99% similarity to *Bacillus pumilus*.

Degradation activity of phenanthrene by *Bacillus* sp. P4a

Phenanthrene degradation by *Bacillus* sp. P4a and its bacterial cell count are shown in Figure 1a. There is a decrease in the phenanthrene concentration from 290.39 mg/L on 0 day to 49.34 mg/L on the 28th day of cultivation. There was about 83.00% of phenanthrene degradation throughout the 28 days incubation. The degradation was analyzed using GC-FID to measure the decrease in the peak area of phenanthrene. Concomitant phenanthrene degradation with the growth of bacteria can be observed (Figure 1a). The bacteria count increases from Log CFU/ml 4.10 at day 0 to Log CFU/ml 5.67 after 8 days of cultivation. Referring to Figure 1a, it shows that the bacteria grow in the log phases on the first day of cultivation up to 8 days after inoculation. This condition suggests that the bacteria have been previously exposed to PAH particularly during the isolation and screening processes. These bacteria have been able to adapt to the medium containing phenanthrene. Once the bacteria have adapted to the new medium, they begin to reproduce and multiply their numbers for each increment of time. However, the bacterial growth steady has shown a decrease from Log CFU/mL 5.67 at day 8 to Log CFU/mL 3.27 at day 28 of cultivation¹¹. where the bacterial reproduction and growth regularly reduced because the carbon and nutrient sources have been used by the bacteria in the cultivation medium. By the end of the cultivation period, the bacterial growth entered the final growth phase which nutrients have been depleted and cell number decreases. The phenanthrene degradation activity is different from one species to another.¹², *Bacillus* sp. could utilize various PAH such as phenanthrene as a sole source of carbon.

Fig. 1: Profile of *Bacillus* sp. P4a growth (1) Profile of viable cell count and phenanthrene concentration (mg/L) in flask system containing *Bacillus* sp. P4a (2) Profile Control 1 and Control 2 of phenanthrene concentration (mg/L) and viable cell count in flask system containing *Bacillus* sp. P4a (3) pH value of the *Bacillus* sp. P4a during incubation time in flask system Log CFU/mL and phenanthrene concentration error bars indicate means with standard error of three replicates.

According to Doddamani and Ninnekar (2000)¹³ and Feng *et al.* (2012)¹⁴, that *Bacillus* sp. produced

1-hydroxy-2-naphthoic acid during the phenanthrene degradation processes. Therefore, during this period, the pH was measured. It was found to have decreased from 7.20 to 6.31 (Figure 3). Thus, the decreasing pH may be caused by the production of acid substances created by the bacteria which may alter the pH of the medium.

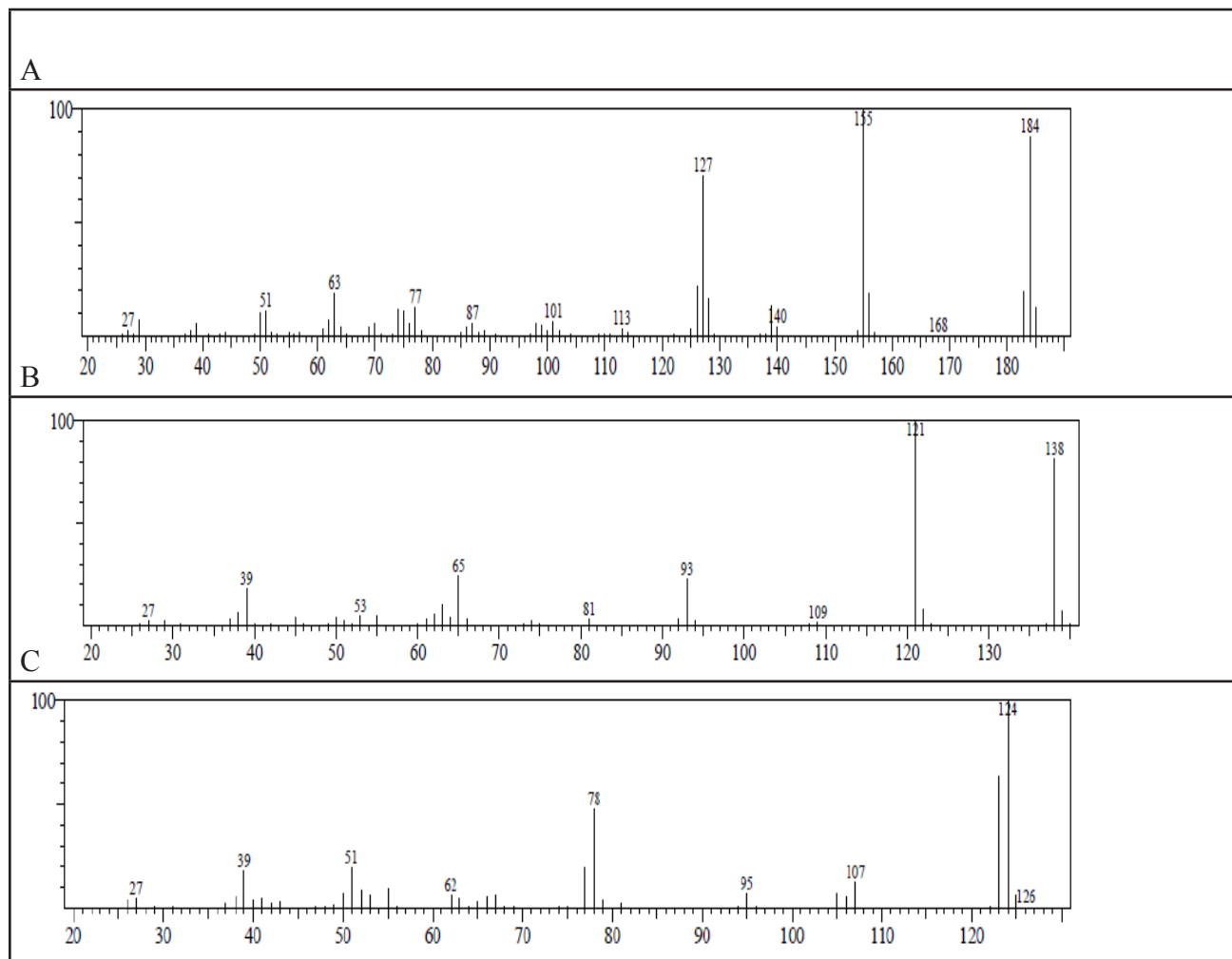
Two controls have been set up which consisted of Control 1 and Control 2. Control 1 was designated as C1 and contained MSM and phenanthrene only without the addition of bacteria. While for C2, it was designated as C2 which contained MSM and bacterial inoculums only, without the spiking of phenanthrene in the medium. Both of these acted as controls to show that the degradation activity was actually performed by the bacterial inoculums. The results in Figure 1b show no decrease of phenanthrene concentration observed in the control. This condition may support the fact that the disappearance of phenanthrene in the culture can be attributed to bacterial degradation. It is also observed that the bacterial growth has decreased on the 28th day of cultivation because of the loss of bacterial metabolic activity due to the lack of nutrient is phenanthrene supplied to the medium. This happened because the bacteria have utilized all the phenanthrene present in the medium for their energy source. During the cultivation period, the pH was observed to have decreased from 7.20 to 6.31 (Figure 1c). the degradation of the phenanthrene produced 1-hydroxy-2-naphthoic acid could affect the pH in the medium¹⁵.

Metabolites production in phenanthrene degradation by *Bacillus* sp. P4a

There are a few reports on the ability of *Bacillus* sp. to degrade phenanthrene^{13,16 & 17}). In the present study, there were three metabolites identified by GC-MS from the organic extracts of *Bacillus* sp. The P4a culture containing phenanthrene was incubated at Day 0, Day 14 and Day 28 (Table 1). The metabolites obtained correspond with 1-naphthalenecarboxylic acid, salicylic acid and catechol, respectively (Figure 2).

Table 1: GC-MS data for metabolites of phenanthrene obtained from organic extract of *Bacillus* sp. P4a culture

Incubation (Day)	Metabolites	Retention time (min)	m/z of fragment ions % Relative Intensity	Possible structure
0	A	10.7	184 (16, M ⁺), 155 (100, 140 (4), 127 (70), 113 (3), 101 (6), 87 (5), 77 (12), 63 (19), 51 (11), 27 (2)	1-Napthalene carboxylic acid
14	B	9.73	138 (17,M ⁺), 121 (100), 109 (2), 93 (23), 81 (3), 65 (25), 53 (5), 39 (82), 27 (2)	Salicylic acid
28	C	8.95	126 (2, M ⁺), 124 (100), 107 (12), 95 (7), 78 (48), 62 (7), 51 (19), 39 (18), 27 (5)	Catechol



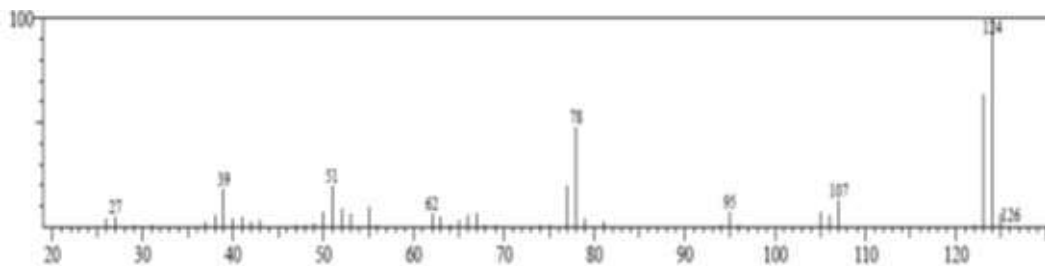


Fig. 2: Mass spectral profiles of phenanthrene metabolites produced by *Bacillus* sp. P4a, (A) 1-Naphthalenecarboxylic acid (B) salicylic acid and (C) catechol.

CONCLUSION

Bacillus sp. P4a showed the capability in degrading phenanthrene which was 83.01% at 28 days of incubation. It has been shown to degrade phenanthrene via salicylate pathway which produced salicylic acid and catechol compound after 14 and 28 days of incubation. Thus *Bacillus* sp. P4a gave a great potential to be applied in bioremediation of environments polluted by phenanthrene. These potential bacterial culture can be highly recommended for bioremediation of hydrocarbon contaminants due to their capability to degrade phenanthrene.

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Work Place Happiness: A Tool for Teacher Effectiveness

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ABSTRACT

Happiness at work place can be spelt as “spirit at work”. Spirit at work refers to teachers experience about their work and their feeling associated to the work with great meaning in a positive way. The individual’s happiness may comprise of engagement of work and job satisfaction in the school. Workplace happiness considers very crucial at various segments both for teachers and the institutions. Happiness has a domino effect on the productivity of an institution and for individual teacher’s well-being. The productivity means impacting on teacher satisfaction and commitment as a result failing to the fulfillment of the goals of an organization. The well-being covers the following aspects “physical, emotional, social and mental”. The past reviews in psychology found that, workplace happiness increases the attention of teachers exhibiting positive moods, emotions, positive values and attitudes. Subsequently, some of the factors influencing workplace happiness are depending on individuals’ needs, interests, hopes, personalities and expectations. Today, even all academicians and practitioners are fond of focusing the workplace happiness as their main subject. Thus, the present paper reviews about the definition, causes and end-results of teachers’ happiness at work place from the past literature views.

Keywords: *Workplace Happiness, Job satisfaction, work engagement, well-being, spirit at work.*

INTRODUCTION

It is very important to live happily as it is regarded the most fundamental aim in most of the societies¹. Diener and Diener² stated that the happiness is important to humans as it appears in emotions but most of the people are mostly not as much happy as they wish to be. The happiness has captivated the devotion of thinkers since the history has begun³ and it has come to the face of psychologists for investigation recently. However, the positive psychological thoughts raised in the previous era⁴ has given legitimized care to the happiness and other beneficial situations as contrast to the formerly leading disease model which focused courtesy unduly to health-related diseases; such as, depression, stress, illness and other similar adverse consequences and experiences.

The word ‘Happiness’ is a wider concept that comprises of a huge number of paradigms which range from temporary dispositions and sentiments to fairly constant attitudes and possessing firm individual characters at the individual level. Perhaps, happiness isn’t just an incentive, it is a need for the smooth functioning at workplace. Happiness can be well-

defined as the occurrence of regular constructive affect, seldom adverse effect and having satisfaction with one’s life⁵. Happiness shall be influenced either by short lasting actions or long-lasting circumstances in the work at work place. Moreover, this is being influenced by many constant qualities such as personality, needs, expectations, hopes, likes and interests.

WORKPLACE HAPPINESS

The happiness at workplace means it is the individual’s belief that the work performs fruitfully, if the work autonomy is provided, and has an effective interaction, providing positive feedbacks, maintaining good relationships, and providing good support from the organization for teachers’ personal development⁶. On the other hand, happiness at work place can be defined as “spirit at work”. Spirit at work refers to workforce experience about their work and their feeling associated to the work with great meaning in a positive way.

Happiness at work place is associated with the attitude and emotions of teachers⁷. The positive attitude of a person will inspire him or her to feel, to act, to think

towards development of resources and fulfillment of the goals⁸ and there are contributory factors to enhance innovativeness, creativity and quality of the work⁹⁻¹³. Investigators found that there is a direct effect between work place happiness and affective commitment¹⁴.

Parker & Martin (2009)¹⁵ conducted study on roles of managing and buoyancy to predict teachers' engagement and happiness in the school. There were 515 samples from 18 different schools in Australia. From their study it was found out that around 90% of the variance was shown at the level of individual and less than 10% was accounted on work place well-being, buoyancy and coping strategies in those schools. Thus, Organizations need to give more focus on coping, buoyancy to build positive attitudes of teachers to fulfill their happiness and engagement in the school.

Song, et al. (2014)¹⁶ conducted study for 1,125 respondents from 38 Korean high schools. Then it was found out that the work place happiness impacts on knowledge sharing among Korean teachers, creativeness, and work performance in the school. Therefore, it is must for the organization concerned to provide necessary supports as to encourage them to become more creative, innovative, and collaborative towards their work as these factors are key to success in an organization.

Siirisunhirun & Dhirathiti (2015)¹⁷ concluded from their studies that the joyful mind and the joyful emotion had a solid association and impact on the engagement of teachers in an organization. Job satisfaction, workloads, commitment, feedbacks had an effect on teachers' affective engagement. However, the result revealed that there is a contradiction to it based on traditional belief in Thai context. According to traditional views the workplace happiness, engagement, job satisfaction was based on the perceptions of teachers in the school.

Buragohain and Hazarika (2015)¹⁸ explored workplace happiness and job satisfaction of 100 secondary school's teachers of Dibrugarh (India). The result of the study revealed that the work place happiness has the relation with the teachers' job satisfaction. The teachers who were happy at work place have shown more satisfaction with their work. Moreover, the positive relationships among teachers of secondary teachers thrived their mindset to live in harmonious settings which ultimately connected with job satisfaction. Thus, job satisfaction of teachers in secondary schools is closely

associated with happiness and it impacts in producing the work quality and bringing overall success in schools.

Proto (2016)¹⁹ studied "Are happy workers more productive". The studies conducted both laboratory and the real world proved that the institutions must give more focus on employees' well-being. Because the happiness of the employees has been shown as a motivating factor for an individual to put in the greater effort on his or her work and boost to increase the productivity of the work. Again, the agency must provide all required facilities to create a happier working environment for the employees and on top of that the managers are to be rewarded based on employees' job satisfaction. The investigator concluded that there should be platforms for the employees to participate in decision making as a result to raise their job satisfaction.

Yusoff, et al. (2016)²⁰ conducted studies on the effect of workplace happiness towards teachers' affective commitment and innovative behavior of teachers in Malaysia for 835 samples. From the study they found that teachers are more creative, innovative and more confident, committed towards their profession when they are happy at their work place.

Arora and Bhagat (2016)²¹ stated that happiness is used to describe the quality of lives or wellbeing. Lacking workplace happiness will increase the absenteeism, low out comes of an organism, and low decision-making capacity. The well-being covers the following aspects "physical, emotional, social and mental".

Abdullah and Ling (2016)²² investigated and found that there is a direct link between teachers' commitment, motivation and the workplace happiness. Thus, the happiness of teachers is being created by the working environment of school principals but subsequently the teachers too need to enhance their self confidence and trust collaboratively beside the school management for creating a conducive atmosphere at workplace.

Abdullah, et al. (2016)²³ investigated on the welfare in the workplace using wellness-performance Model in Malaysian teachers' perspective. The study comprised of 180 samples and concluded that school climate, teachers' contribution, trust, teacher confidence and involvement, contributed to an individual teacher to grow into full potential provided with some sort of rewards and trust.

Abdullah and Ling (2016)²⁴ conducted the study on the work place happiness effects on innovative behavior and affective commitment of secondary teachers in Malaysian schools consisting of 835 samples. The study was conducted to find the effects of the work-place happiness on affective commitment, innovative behavior of the secondary teachers and school culture. From their study they concluded that all these variables have the positive correlation and the workplace happiness has full intervention on the relationships of school culture and innovative behavior of teachers and then it has partial effects on the relationship of affective commitment and school culture. They further suggested that the organization should give especial focus on happiness of teachers in the workplace to endure their commitment

to enhance their creativity, innovativeness and work motives.

Ma and MacMillan (2018)²⁵ in their study on teacher's professional satisfaction with regards to work place conditions which was based on the administration control, teachers competency in teaching and organizational climate on a sample of 2,202 in New Brunswick Elementary School. The study revealed that in the field of professional positions the female teachers were more satisfied than male teachers. Moreover, the work place conditions impact on teacher satisfaction and fulfillment of the goals besides the administration control, organizational culture and teaching competency.

Analysis:

SI #	Author(s) & Year	Country	Findings	Inferences
1	<i>Parker & Martin (2009)</i>	<i>Australia</i>	Found around 90% of the variance was shown at the level of individual and less than 10% was accounted on work place well-being, buoyancy and coping strategies in those schools.	Organizations need to give more focus on coping, buoyancy to build positive attitudes of teachers to fulfill their happiness and engagement in the school.
2	<i>Song, et al. (2014)</i> <i>Abdullah, et al. (2016)</i> <i>Abdullah and Ling (2016)</i> <i>Yusoff, et al. (2016)</i>	<i>Korea</i> <i>Malaysia</i> <i>Malaysia</i> <i>Malaysia</i>	Found out that the work place happiness impacts on knowledge sharing among teachers, creativeness, innovative and work performance in the school.	Organization needs to have concern to provide necessary supports as to encourage them to become more creative, innovative, collaborative towards their work as these factors are key to success in an organization.
3	<i>Siirisunhirun & Dhirathiti (2015)</i>	<i>Thailand</i>	Job satisfaction, workloads, commitment, feedbacks had an effect on teachers' affective engagement.	However, that there is a contradiction to it based on traditional belief in Thai context. According to traditional views the workplace happiness, engagement, job satisfaction was based on the perceptions of teachers in the school.
4	<i>Buragohain and Hazarika (2015)</i> <i>Abdullah and Ling (2016)</i>	<i>India</i> <i>Malaysia</i>	The result of the study revealed that the work place happiness has the relation with the teachers' job satisfaction. The teachers who were happy at work place have shown more satisfaction with their work.	Job satisfaction of teachers in secondary schools is closely associated with happiness and it impacts in producing the work quality and bringing overall success in schools. Therefore, the school management has to maintain positive relationships with teachers.
5	<i>Proto (2016)</i>	<i>Germany</i>	The happiness of the employees has been shown as a motivating factor for an individual to put in the greater effort on work and boost to increase the productivity of the work.	Can be concluded that there should have platforms for the teachersto participate in decision making and schools to provide adequate facilities as a result to raise their workplace happiness.

Cont...

6	Arora and Bhagat (2016)	India	Found lacking workplace happiness will increase the absenteeism, low out comes of an organism, and low decision-making capacity. The well-being covers the following aspects “physical, emotional, social and mental”.	The working conditions must be given a digital focus by the school management. So that, all teachers are physically strong, morally straight, emotionally balance, mentally sound and socially fit to excel happiness in the work place.
7	Ma and MacMillan (2018)	Brunswick	Resultrevealed that in the field of professional positions the female teachers was more satisfied than male teachers.	The work place conditions impact on teacher satisfaction and fulfillment of the goals besides the administration control, organizational culture and teaching competency.

CONCLUSION

As to conclude, there are numerous predictors of workplace happiness such as gender, age, pay, work, marital status, working climate, qualifications and management etc. Teachers are happy when their needs and hopes are achieved. The present study results that all teachers contribute positively for achieving organizational goals through innovative behavior if they are in the state of happy at workplace. Similarly, the participation of teachers’ declines if they are unhappy in the work place. This clearly indicates that the work place happiness has greater force and must be given importance in order to bring typical achievement in the organization through collective innovative ideas.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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The Participation of Women in the Village Adat Justice: the Regulations and Its Implementations in North Aceh Regency

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ABSTRACT

Adat justice is one of the local wisdom possessed by the people of Aceh. The *adat* justice in Aceh was formed and carried out by *adat* law community to resolve issues between citizens. This research used normative juridical research method for reviewing the rules of regulations about the role of women and the empirical studies to understand the implementations, also to know the factors restricting the role of women in *adat* justice at *gampong*. It can be concluded the role of women in *adat* justice system at *gampong* in North Aceh Regency has not been done properly. In general leaders and community leaders are still reluctant to include women in *gampong* governance structure. Thus the lack of women representative directly related to the implementation of *adat* justice system at *gampong*. There are internal and external factor that inhibiting women participation.

Keywords: *gampong*, *Adat*, *Law*

INTRODUCTION

Adat justice system is one of the indigenous local wisdom which belonged to the people of Aceh. The presence of *adat* justice in Aceh are formed and carried out by *adat* law community. The *adat* justice system, here is the customary judicial in Aceh villages or *gampong*, has been existed before Independence of Indonesia and its existence is recognized in the Constitution and the rule of Act in Indonesia. In Article 1 (3) of the 1945 Constitution unequivocally mentioned that Indonesia is a State of law, means that every citizen has equality in front of law regardless of gender differences, men as well as women. Recognition and respect for *adat* law community described in Article 18B (2) of the 1945 Constitution, namely the State shall recognizes and respects *adat* communities along with their traditional rights as long as they remain in existence and are in accordance to societal development and the principle of unitary state Republic of Indonesia, and shall be regulated by Acts.

Gampong is a small unit of *adat* law community which has territorial boundaries and authority over the local community based on the origin and customs. *Gampong*, equivalent of *desa*, is an administrative village that uniquely to the province of Aceh in the system of governance of the unitary state of Republic

Indonesia¹. Each village may establish an *adat council* in accordance to the origin and customs and traditions¹. The *Adat council* may form *adat* justice system led by *keuchik*. *Adat* justice system is a means to resolve disputes in the community. The process of dispute resolution, such as dispute between citizens, is done by customary practices of consensus decision-making (*musyawarah mufakat*) to reconcile the involved parties². Therefore, the harmony and balance of community life that disturbed can be restored.

The *adat council* has regulated in the regulations: the Act number 11 of 2006 on the Governing of Aceh, Aceh Qanun number 5 of 2003 on the Governance of *Gampong* in the Province of Aceh, as well as North Aceh Regency Qanun number 4 of 2009 on the Governance of *Gampong*. The process of dispute resolution through the *adat council* led by *keuchik*, and assisted by *Tuhapeut* (the council of elders), *imuemmeunasah* (the leader of local *Masjid*), and sekretaris *gampong* (the village clerk) as the clerk of court.

The question in this research is how does the participation of the female characters in the dispute resolution process through *adat* justice at *gampong*, and what are the inhibiting factors on women's participation in the *adat* justice system at *gampong* in North Aceh

Regency.

METHOD

This study was conducted using qualitative research method with normative juridical and empirical jurisdiction approach. Data were analysed descriptively. The data collection includes the study of literature and regulations, namely Act number 11 of 2006 on Aceh Government, Aceh Qanun number 5 of 2003, North Aceh Regency Qanun Number 4 of 2009 on the Governance of Gampong, Qanun Number 9 of 2008 on the Management of *Adat* Life and *Adat Istiadat*, Qanun Number 10 of 2008 concerning *Adat* Council; as well as related Acts and regulations as the primary data³. Secondary data include the analysis of documentation and interviews with the leaders and members of the community and *adat* council who's involved in the implementation of *adat* justice. They are *keuchik*, *tuhapeut*, *imeummeunasah*, the clerk and the community prominent members.

RESULTS AND DISCUSSION

The participation of women in social setting

From the history of the people of Aceh, the involvement of women representatives in various social activities and their leadership have been recognized by both domestic and international. History records how a number of prominent representatives of Acehnese women would struggle in defences of their country which is recognized as national heroes.

Both theoretically and practically, the participation of women in various fields of social life is a reality. Since the ancient times till now Acehnese women had participated not only in domestic affairs but also in public affair. Although for some reason, this condition is rarely found documented or published properly⁴.

From the brief history above can be understood that the involvement of women in the various levels and area of public affairs also in government is not new for people of Aceh. In the present days women participation is especially high in the education field, and there are women who hold positions in government as well as non-government. However, this is still considerably rare cases and it's caused by various factors, such as interests and views of the policy makers. One public position that has no significant progress on the participation of women is the women involvement in the *adat* justice at *gampong*.

Participation of Women in *Adat* Justice

The participation of women in the *Adat* Justice is an important issue. It's a means for equality of rights between men and women which guaranteed by the 1945's Constitution of the Republic of Indonesia and other rules of laws, also as a means to strengthen the existence of *adat* justice. The presence of women rep in *adat* justice will facilitate the process of dispute resolution, particularly in the dispute which one or both parties are women and children.

Beside as members of the panel of *adat* justice, the women representative is a facilitator, mediator or an advisor, so that the handling on the cases experienced by women and children will be safer and easier, and the women would not feel discriminated against⁸.

Some residents of Gampong Paya Punteut who have been in disputes and resolved through *adat* justice said that they were not satisfied and also uncomfortable in expressing their experience to men. They also stated that in the past dispute resolution process there were only male, because there are no female rep in the *adat* justice system at their community. The same stated by a resident of Gampong Cunda who also hope to have women rep in the *adat* justice system at their community, so that the women involved in dispute are more comfortable in communicating with her problems.

Currently women's participation in *adat* justice in Aceh, especially in the area of this research held, is very alarming. It is hardly found a representative of women who is involved structurally as a member of *tuhapeut* in the village. Stated by Mr. Muntasir, as *keuchik* well as a native of Meunasah Keh in Nibong Sub-district, there are no women included as *tuhapeut gampong* yet. Various administrative villages in North Aceh Regency said to be in similar situation. Stated by Mr. Muzakir A. Talib that some *villages* around him, namely *Gampong Rawalteek*, *Gampong Matang Drien*, and *Gampong Biram*, the existence of women as an element *tuhapeut gampong* also unheard. Similarly, in neighbor city Lhokseumawe it's rarely found to have women involved in *adat* justice. The opportunity for participation of women as judges in *adat* justice will be open, if she is elected and sit as member of *tuhapeut*.

The statements above show the recognition of the rights of women in political also in *adat* institutions that exist in society. The participation of women in various

fields already has a strong legal basis in Aceh and Indonesia.

Factors Inhibiting Participation of Women

Importance of women's participation in the process of settling disputes through *adat* justice system at *gampong*, should be fully supported by all parties. However, its implementation is not easy because it is due to various inhibiting factors which impede the inclusion of women as board members of *adat* justice. Those factors can be divided into two categories:

Internal Factors

Among internal barriers experienced by women in Aceh are the false perception and old mindset that women are incompetent and unfit to be involved in public matters. The presumption became a shackle for women at *gampong* in order to exist not only in the public space but also in *adat* justice system.

Women are not prepared to participate in the dispute resolution process of *adat* justice. Several prominent women stated that they have never been involved whenever legal proceedings of *adat* justice held at their villages, so it never occurred to prepare their self or the next generations to be involved in the assembly of *adat* justice. In general, they do not know that Acts require the representation of women in *tuhapeut* and are a means to participate in the implementation of *adat* justice.

There are no women involved in *tuhapeut* in their community, yet. So most women are not motivated to learn about social studies and dispute resolution that became one of the tasks of *tuhapeut* with *keuchik* and *imeum*.

Various rules of law as mentioned above have been set on the representation of women in political parties, government, as well as in *adat* justice in the provinces. In reality the implementation will require understanding and a genuine desire of all parties, namely the leaders of *gampong*, religious leaders, and the communities in realizing the mandate of the Act. The most important party in this case is the women, they have to prepared in order to truly representation in various fields can help people, especially women. Thus, all parties will recognize the presence of women in the village government and the participation on *adat* justice in the dispute resolution process.

External Factors

In addition to internal factors, there are a number of external factors that are causal interplay with internal factors, as an example, among others:

Mindset of some religious leaders and community leaders who think women logical capability is lower than men, is a quitter and giving up easily. Some assume men have superior ability to think than women, has a firmness and commitment, better physical strength and courage. Another reason said to be women must to obtain permission from the husband to able to join *tuhapeut* and the husband is not necessarily permit. These are hardly have strong basis as women are actively involved in various other social activities in their communities, whether in day or night.

Religious factor is also often used to justify that the woman must not sitting together in a conference room with a man who is not *mahram* which is not good in view of the Islamic religion. But in fact, the chief of village often requires the assistance of women, usually wife of *keuchik* or *Imeum* the women rep from PendidikanKesejahteraanKeluarga (PKK) or other female members. If necessary the women will be called in a meeting or proceedings of *adat* justice, yet they were never formally included in the governance structure of *gampong* or named as one of the *tuhapeut* member as stipulated in *QanunGampong*. The same thing is also found in the Sub-district Nibong that no women were included in the elements of *tuhapeut* and *adat* justice structurally. When women rep is needed to approach to the women or children involved in the dispute, the wife of *keuchik* and the wife of *imeum* or other female will be summoned.

The similar findings also came from western area of North Aceh Regency. TeungkuSyafie, the *Imuem* of West Reuleut, that women are not included in *adat* justice, including in the settlement of disputes about women's issues that involve women / children or male, are all completed by the men. Different statement are delivered by Adnan Hasan some *gampong* has written names of women member of *tuhapeut*, such as *GampongReuletTimu*.

Keuchik Bluka Teba said that the head of village know on the existence of regulations requiring the participation of women in the structure of *tuhapeut*. There are several reasons to have not been involved women in the structure

of *tuhapeut*, such as it is difficult to have women members because their meeting often held at night and women are not proficient in giving opinions, especially in terms of dispute resolution. Beside *tuhapeut*, “women are not often excluded in other important meetings such decision-making meetings related to the development of the village.” AinulMardhiah said.

Based on the above can be explained briefly that the participation of women in *adat* justice has not been done as it should be due to various factors mentioned above. The mindset of religious leaders and community leaders such as the above cannot be justified and does not have a strong foundation, or it can be said is a fallacy. For example, the Prophet Muhammad’s wife Aisha is a teacher and teaches men. Whether in past and present, many female Islamic scholars have women and men disciples. Thus there is no reason for leaders, *adat* leaders and religious leaders for not including women in structure of *tuhapeut* and in the implementation of *adat* justice.

To change those mindset it ought to correct their understanding on the limitations that should and should not be violated by men and women according to Act. Particularly in *adat* justice, the necessary adherence and compliance of *adat* and community leaders is needed to improve the engagement of women rep in the peace building process in present and the upcoming future.

The concluding remarks of Preamble to CEDAW emphasized on the need of changes in traditional roles and participations of men and women in society and in the family to achieve equality⁵. The traditional roles based on the inferiority or superiority of one gender is a man-made, construct of society. Thus, it can be changed also by people who are committed to achieving an equitable and prosperous society. This change of view can only be realized if the stakeholders (legislative, judicial, executive and the entire community) feel obliged to take steps to delete the old mindset and tradition detrimental to participation and position of women in the family and society, towards the fair and prosperous society⁵.

For the balance and benefit for all, there are several matters that must be considered before women actively participate in public spaces. Woman working at home and outside the home as an effort to carry out *the good and prohibiting unjust injunction* that had been ordered in Islam. Therefore, the perspective is used to accept

the participation of women in politics is solely for message *amrumba’rufwabilnahyu ‘anilmunkar*. In a public activity, both women and men should go by the principle of *fastabighulkhairat* (or competing in goodness). This means Islam encourages Muslims to reach the level of knowledge and high skills, so women can contribute better to the people. Every Muslim man should provide the opportunity for his wife to take part *sindakwah* as a Muslim. It said that Prophet Muhammad (PBH) ask men to not prohibit wives who ask for permission to go to the mosque to worship. The participation of women in the public sphere must in balance with household duties as wives, mothers, and educators for their children, so that harmony in the family is maintained. Muslims also should keep *adab* (Islamic manner code) and maintaining *iffah* (pride) as a Muslim to remain noble⁴.

Thus, it is inappropriate when women should be inhibited in doing good for the nation and the country, because women are also part of the citizens who have rights and obligations to the state and nation. As creatures of Allah, the women are also assigned as a *khalifah* on earth. There is no discrimination, because in the end that distinguishes a person with another is their *taqwa* to the Creator of Universe.

CONCLUSION

Based on description above can be concluded that the participation of women in *adat* justice *the village* in the city of Lhokseumawe and North Aceh Regency has not been done properly as mandated by *Qanuns* and Act of Aceh Government. In general, leaders and community leaders are still reluctant to include female characters in the governance structure of *gampong*, so the women rep directly involved in the implementation of *adat* justice system at *gampongis* very little or none. The inhibiting factors are: **internal factors** the level preparedness of women as member of *tuhapeutor* as facilitator in *adat* justice system is little to none; **external factors** that mindset of community leaders, *adat* and religious leaders who brought up the religion as a reason for not including women in *tuhapeut* structure and on the *adat* justice system at *gampong*.

Conflict of Interest: Nil

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The Influence of Economic Growth Per Capita and the Average Length of Schooling on the Human Development Index in West Java

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ABSTRACT

Although the province of West Java has a relatively high GRDP, it has not fully paid attention to the development of human resources. This is indicated by the low average length of schooling in each district / city. There are still nineteen districts / cities in the province of West Java that have an average length of schooling under 9 years. Both of these, both GRDP and school averages, are assumed to have implications for the HDI. To determine the interrelationship between these variables, a study was conducted in West Java. The study was conducted to determine the effect of per capita GRDP level and school length average number on the Human Development Index. To achieve this goal, an analysis of GRDP and HDI is used with the equations of Egbulonu and Nwokoro. The results $GRDP = -2.825150 + 0.369888AGRO + 0.917197IND + 0.079170MYS$ and $HDI = -101.0269 + 9.76691PDRB + 0.728485MYS$

These results show α of -101.0269, which means that if the independent variable GDP per capita and the average length of school time (MYS) is zero, the dependent variable Human Development Index (HDI) will be negative -101.0269. This means that without the GRDP per capita (community income) and the average length of school in the community, human development will not be possible. Furthermore, the PDRB coefficient is 9.766914, which means that if there is a change in GDP per capita increase of 1% (assuming other variables are constant), the Human Development Index (HDI) figure will increase by 9,766914 index points.

Keywords: human resource development, GRDP, average length of schooling, HDI

INTRODUCTION

Indicators of the success of development in the field of education and health can be seen from the figures of the Human Development Index (HDI). The Human Development Index is a composite index that focuses on three basic dimensions of human development: living a long and healthy life, the ability to study, and the ability to achieve a decent standard of living¹. National HDI is 69.55 while each province ranges from: 57.25-78.99². The highest HDI is the Jakarta Special Capital Region (DKI) province with the lowest and Papua Province, while the West Java province is 69.55. This figure shows the conditions that are still lagging behind because the province has a relatively high Gross Regional Domestic Product (GRDP). The value of GRDP at the

2010 constant price of West Java Province in 2015 was Rp. 25,840,540.00. Since West Java province has the largest population among other provinces in Indonesia, the development of its human resources requires great attention.

One of the problems in the development of human resources in West Java is the low average length of schooling for residents of West Java. During the period of 2004 to 2015 the average length of schooling in West Java was still under 9 years of age, which had not fulfilled the 9-year compulsory education requirement set by the government². Of the 26 districts and cities, only 26.92% or seven districts / cities whose average length of schooling is over 9 years: Cimahi is 10.78 years, Depok is 10.71 years, Bekasi is 10.71 years, Bandung

is 10.52 years, Bogor is 10.20 years old, Cirebon is 9.76 years, and Sukabumi is 9.08 years. Meanwhile, 73.07% or nineteen other districts and cities still have an average length of schooling under 9 years. Therefore, it is assumed that regions with high HDI rates have a high average number of years of schooling. In other words, economic growth is closely related to the development of the quality of human resources in an area.

Economic growth is one indicator of the success of economic development of a country. In general, economic growth is defined as an increase in the ability of the economy to produce goods and services³. Economic growth shows the extent to which economic activity generates additional income in a given period⁴. With economic growth, it is expected that people's income, as owners of factors of production, will increase. Economic growth is defined as an increase in Gross National Product (GNP) which is greater or smaller than the level of population growth and changes in economic structure⁵. Developing a theory of economic growth means giving immaterial weight such as enjoyment, satisfaction, happiness, a sense of security and peace to the community⁶. An economy can be considered as developing if long-term per capita income tends to increase⁷. In other words, economic growth refers more to quantitative changes and can be measured based on data on Gross Domestic Product (GDP) or income, or the final market value of the final goods and services produced from an economy over a period of time. Economic growth in this period can be viewed from the level of community welfare. The level of welfare of the population can be measured by an increase in GDP per capita. The level of welfare of the population will be achieved if the per capita GRDP increases faster than population growth⁸. The purpose of this study was to determine the effect of per capita GRDP level and school length average number on the Human Development Index in West Java.

MATERIALS AND METHOD

The analysis was carried out using regression techniques using the Index of Agricultural Output, the index of the industrial sector production, the interest rate, and the exchange rate level, as the independent variable, and the Real GDP number as the dependent variable⁹. Furthermore, an empirical study of the two-way relationship between human development and regional economic performance in Indonesia is carried

out¹⁰. Based on the two techniques, the following equation is used:

1) To calculate GRDP, the equation is:

$$GRDP_t = \alpha_0 + \alpha_1(AGRO_t) + \alpha_2(IND_t) + \alpha_3(IPM_t) + e_t \dots\dots (1)$$

2) To calculate the HDI, the equation is:

$$HDI_t = \beta_0 + \beta_1(GRDP_t) + \beta_2(MYS_t) + v_t \dots\dots (2)$$

GRDP is regional per capita Gross Regional Domestic Product to year t, IND_t is the Value of Industry Contribution in regional GDP to year to year in Rupiah, AGRO_t is the Value of Agricultural Contribution in regional GDP to year to year in Rupiah, MYS_t is Average the average length of regional school to year t, HDI_t is the Human Development Index area to year t, α_i and β_i are the parameters of regression $i = 1, 2, 3, \dots, n$, e_{it} and v_{it} are errors / confounding variable, whereas $i =$ area i ($i = 1, 2, 3, \dots, 26$) and $t =$ year to t ($t = 2010-2015$). In using equations (1) and (2) the ratio of oil and gas to GRDP is not taken into account, taking into account the contribution of the agricultural sector in GRDP and the value of the contribution of the industrial sector in GRDP. While for the average variable the length of women's school is replaced by the average length of school variables in each district / city in West Java. In the calculation of the HDI, the education level component is measured from two indicators, namely: literacy rate (Lit) and the average length of schooling (Mean Years of Schooling). Literacy rates are the percentage of educators aged 15 years and over who can read and write in Latin letters or other letters. Average length of school, which is the average number of years spent by people aged 15 years and over at all levels of formal education that has been undertaken or is undergoing. This indicator is calculated from the highest education variable that is completed and the level of education being completed and the level of education that is being occupied. The average length of school (MYS) is analyzed using the equation:

$$MYS = \text{highest conversion year} + \text{class ever occupied} - 1 \dots\dots (3)$$

RESULTS AND DISCUSSION

The lowest PDRB value of the regency / city of West Java province tends to have the value of the contribution of the agricultural sector and the value of the contribution of the small industrial sector, shown in Figure 1 below.

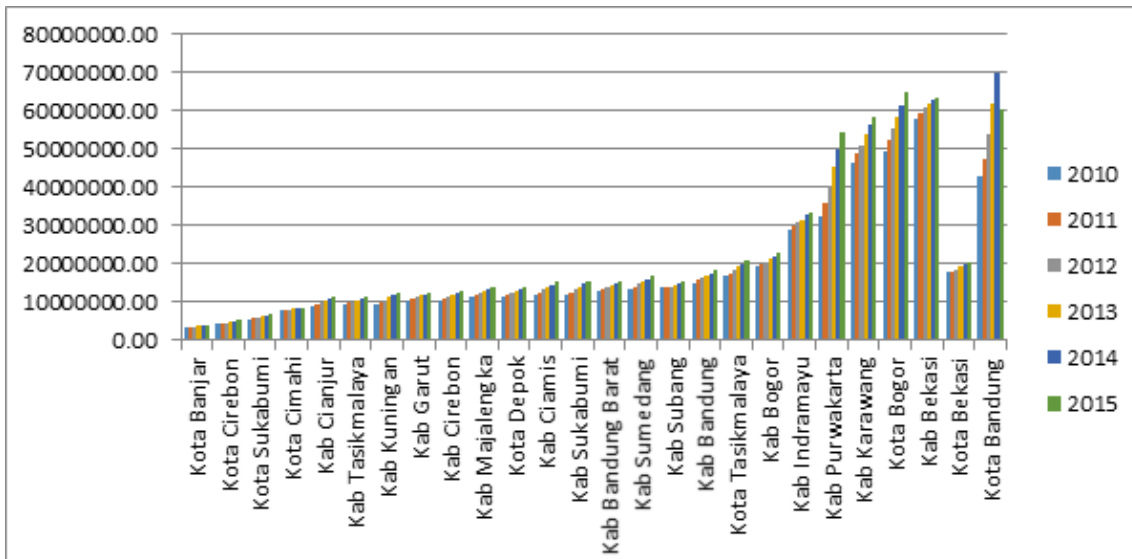


Figure 1. Development of GRDP per capita Regency / City in West Java

On the basis of Constant Prices in 2010 (Rupiah)

Based on Figure 1 above the districts/cities that have the highest rate of per capita GRDP are Bekasi District of Rp. 61,149,708.00. If Bekasi Regency is connected with the influence of the value of the industrial sector’s contribution to GDP per capita, Bekasi Regency is proven to be the Regency with the largest contribution of the

industrial sector in the GRDP. While the regencies/cities that have the smallest average GDP per capita figure are Banjar City, which is Rp. 3,565,733. From the figure, it appears that there is an imbalance and inequality in the level of GDP per capita in districts / cities in West Java. Furthermore, the development of the average length of schooling for each district / city in West Java in the period 2010-2015 is shown in Figure 2 below.

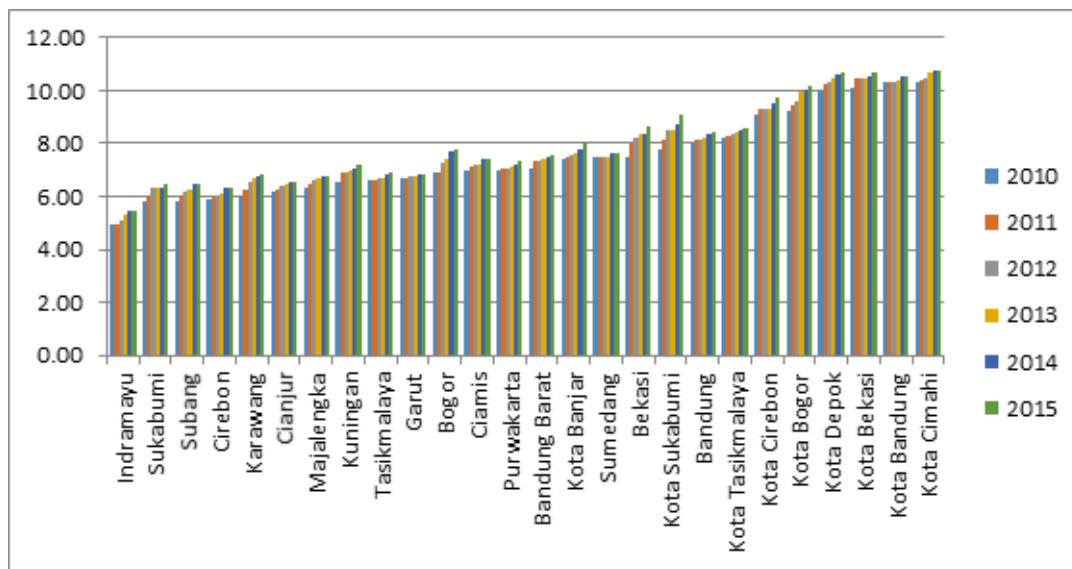


Figure 2. Development of the average length of school in the province of West Java

Based on Figure 1 above, it can be seen that out of 26 regencies / cities there were only 6 (23.07%) districts/ cities with an average of 9 years of schooling, namely Cirebon City (9.39 years), Depok City (10.39 years)

, Cimahi City (10.56 years), Bekasi City (10.45%), Bandung City (10.40%), and Bogor Regency (9.74 years). Meanwhile, 20 (76.93%) other districts / cities still have an average length of schooling under 9 years.

Cimahi City is an area that has the highest average school length of 10.56 years and Indramayu Regency is the region with the lowest average school length of 5.19 years. But the average number of years of schooling in districts / cities in West Java Province from 2010 to 2015 has never reached 12 years, this shows that the province of West Java is still left behind in terms of improving the quality of public education.

Description of the variable Value of Agricultural Contribution in GRDP, Value of Industry Contribution in GRDP, Average value for each population aged more than 15 years in formal education, Human Development Index, and economic growth (GDP per capita). The results of the analysis of each variable based on the minimum value, maximum value, mean and standard deviation are shown in Table 1 below.

Table 1. Results of descriptive analysis of each variable

	N	Minimum	Maximum	Mean	Std. Deviation
AGRO	156	32437.00	11197706.63	3484002.07	2966092.055
IND	156	242072.07	161947397.05	17826066.2	31752678.71
PDRB	156	3166183	69895470.78	21126395.2	17363408.02
MYS	156	4.93	10.78	7.7740	1.53229
IPM	156	58.58	79.67	67.8244	5.21767
Valid N (listwise)	156				

Based on Table 1 above, It can be found that the minimum value, maximum value, average and standard deviation of each research variable from 2010 to 2015. Variables in agricultural contribution in GRDP have a minimum value of Rp. 32,437,000,000; maximum value of Rp. 11,197,706,630,000; an average of Rp3,484,002,070,000 and a standard deviation of Rp. 9,966,092,050,000. Variable of industrial contribution in GRDP has a minimum value of Rp242,072,070,000; maximum value of Rp161,947,397,050,000; an average of Rp. 17,826,066,200,000, - and a standard deviation of Rp. 31,752,678,710,000. - The average value variable

for each population over the age of 15 years in taking formal education (years) has a minimum value of 4.93 years; maximum value of 10.78 years; an average of 7.77 years and a standard deviation of 1.53 years. The Human Development Index variable has a minimum value of 58.58; maximum value of 79.67; an average of 67.82 and a standard deviation of 5.22, and the variable of economic growth (GDP per capita) has a minimum value of Rp3,166,183, -; maximum value of Rp69,895,470.78; an average of Rp21,126,395.20 and a standard deviation of Rp. 17,363,408.02. Furthermore, to find out the GRDP in West Java province, equation (1) is used, the results of the analysis are shown in Table 2 below.

Table 2. The results of the analysis of partial influence on GRDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.825150	1.302437	-2.169127	0.0318
AGRO?	0.369888	0.110378	3.351095	0.0010
IND?	0.917197	0.061589	14.89216	0.0000
MYS?	0.079170	0.023991	3.299994	0.0012

Based on Table 2 above, the panel data regression equation with the Fixed Effect model obtained GRDP as follows:

$$GRDP = -2.825150 + 0.369888 AGRO + 0.917197 IND + 0.079170 MYS$$

Furthermore, the results of the HDI analysis using equation (2) are shown in Table 3 below.

Table 3. The results of the analysis of partial influence on the HDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-101.0269	6.348597	-15.91327	0.0000
PDRB?	9.766914	0.482967	20.22274	0.0000
MYS?	0.728485	0.256516	2.839922	0.0052

Based on the data in Table 3, the form of panel data regression equation with the Fixed Effect model is as follows:

$$\text{HDI} = -101.0269 + 9.766914\text{PDRB} + 0.728485\text{MYS}$$

The tcount value of the GDP variable is 20.22274, with p-value of 0.0000 and the direction of its influence is positive, so that it can be concluded that partially the GDP variable has a significant effect on the HDI with a positive direction of influence. Furthermore, the value of t count MYS variable of 2.839922, with a p-value of 0.0052 and the direction of its influence is positive, so it can be concluded that partially the MYS variable has a significant effect on the HDI with a positive direction of influence.

The results of the analysis using equation (2) show α equal to -101.0269. If the independent variable per capita GRDP and Average School Length (MYS) is zero, the dependent variable Human Development Index (HDI) will be negative -101.0269. This means that without the GRDP per capita (community income) and the average length of school in the community, human development will not be possible. PDRB per capita variable and average length of school have a significant effect on the level of HDI. GRDP coefficient is 9.766914 which means that if there is a change in GDP per capita increase of 1% (assuming other variables are constant), then the number of Human Development Index (HDI) will increase by 9,766914 index points. This is consistent with the results of Brata's research (2002) that the increase in GDP per capita will significantly increase the Human Development Index. Furthermore, the MYS coefficient is 0.728485 which means that if there is a change in the

increase in Average School Length (MYS) by 1 year (assuming other variables are constant), then the Human Development Index (HDI) number will increase by 0.728485 index points. This is consistent with the results of the study that the increase in the average length of female schooling by one year will increase the Human Development Index number by 17.9 index points¹⁰. The effect of increasing the average length of schooling for the Human Development Index is greater than the increase in the average length of schooling in general (without gender classification).

CONCLUSION

Based on the results of research and discussion on Causality of Economic Growth and the Human Development Index in West Java for the period 2010 to 2015, the researchers concluded that Economic Growth (GRDP per capita) and Average School Length have positive and significant effects on the Human Development Index in West Java Province in 2010 to 2015. Referring to the results of the study, the West Java regional government needs to guarantee the 12-year compulsory education funding in order to encourage an increase in the average length of school population in the province of West Java.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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The Optimal Level of Production Factors to be Applied of Maize Farming at Kuta Makmur District North Aceh Regency

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ABSTRACT

This research was conducted based on the idea that farmers of maize did not ever orient to apply the production factors at the optimum level on their farm. The research carried out in Kuta Makmur District North Aceh Regency Aceh Province. The purpose of this study was to determine the level of input application and to determine the optimum level of maize production factor to be applied in maize farming in Kuta Makmur District, North Aceh Regency. Cobb Douglas production function for maize that obtained by this research is as follow:

$$Y = 0.3253X_1^{10.263} X_2^{20.261} X_3^{30.229} X_4^{40.103} X_5^{50.196} X_6^{60.002} e^U$$

Where: size of land is X_1 , quantity of seed is X_2 , quantity of Urea is X_3 , quantity of SP-36 is X_4 , quantity of KCl is X_5 , and quantity of labor is X_6 . The effect of those input on the level of maize production simultaneously highly significant, it was showed by the high value of $F_{calculated}$ and R^2 , otherwise the effect of independent variable of inputs partially still significant for X_1 , X_2 and X_3 , but for X_4 , X_5 and X_6 could not affect the level of maize production significantly. All level of inputs application are situated in reasonable region where the increasing of inputs less than 1% due to addition of input addition of input at 1%. Except labor and all the other application of inputs should be increased for the optimal reason. In addition to quantity of labor application specially should be reduced. The following are quantity of input should be applied in the related of optimization reason: Optimal size of land is 7.9 Ha, Seed 48.33 kg/Ha, Urea 402.80 kg/Ha, SP-36 284.60 kg/Ha, labor 39 mandays.

Keywords: *Maize, Feed industry, Livestock*

INTRODUCTION

The highest maize consumption so far is for food and feed industry. Usually maize uptake for industrial needs is an indication of the better level of economic life of the community, so the level of animal protein consumption will also increase. Increased consumption of animal protein ultimately Has a direct impact on the development of the livestock industry, especially poultry farming.

In connection with the above problems, it is necessary to conduct research to determine the level of input application and to determine the optimum combination of its application in smallholder maize farming in Kuta Makmur District, North Aceh Regency.

RESEARCH METHODOLOGY

This research took place from April 2018 to Jun 2018. This research was conducted in Kuta Makmur District, North Aceh Regency. The study was conducted in this area, this area is a center of maize production in North Aceh Regency. In relation to determining the optimum level of fertilizer application. The population in this study was the farmer who planted maize in the November 2017 planting season. Sampling was done in a simple random sampling, by interviewing 93 maize farmers in the study area.'

In order to analyze the level of input applied and the optimum level of input applied, the Cobb Douglass production function is applicationd, namely:

$Y = A X_1 X_2 X_3 X_4 X_5 X_6 \epsilon U$
(Ferguson,1975)

Y = Maize production produced by farmer (ton);

X_1 = Land area (Ha);

X_2 = Number of seed (kg);

X_3 = Number of Urea fertilizer (kg);

X_4 = Number of fertilizer of SP-36 (kg);

X_5 = Number of Kcl (kg);

X_6 = Number of labor (Mandays);

$\beta_1, \beta_2, \dots, \beta_6$ = Coeffisien of input (production elasticity);

e = Logarithm natural ($e = 2,718\dots$)

The model in the above equation is estimated by using the SPSS program (Version 25)

Analysis of level of input application

The level of input application through Cobb Douglass production functions analysis for maize farming in the study area. Analysis of Cobb Douglass production function for maize farming carried out in the study area is based on production data and input application data from farmers in the November 2017 planting season. Variables included in the analysis of this production function are six. The average application of inputs application in this analysis are: land area (X_1) = 1.22 Ha, maize seeds (X_2) = 30.72 kg, Urea fertilizer (X_3) = 247.95 kg, SP-36 fertilizer (X_4) = 153.53 kg, muriate of potash fertilizer (KCl) (X_5) = 88.85 kg, and labor (X_6) = 126.22 mandays. The results of the regression analysis of the maize production function can be seen in Table 1 below.

Table 1. Estimation of Production Function of Cobb Douglass of Maize Farming in the Study Area

Input Variable	Coeffisien (Elasticity)	Standard Error	T _{calculated}	Sig	VIF
NLX1	0.263	0.083	3.166	0.003	9.736
NLX2	0.261	0.134	1.945	0.057	22.727
NLX3	0.229	0.134	1.710	0.094	23.127
NLX4	0.103	0.099	1.042	0.302	14.728
NLX5	0.196	0.123	1.270	0.210	22.75
NLX6	0.002	0.060	0.310	0.975	5.560
Constant = 0.3253					
R ² = 0.96					

- Notes
- *** = Significant at 99%
 - ** = Significant at 95%
 - * = Significant at 90%
 - NS = None Significant.
 - NL = Natural Logaritms

Based on the results of the Cobb Douglass production function above, the Cobb Douglass production function for maize farming in Kuta Makmur Sub-District can be formulated as follows:

$$Y = 0.3253X_1^{0.263} X_2^{0.261} X_3^{0.229} X_4^{0.103} X_5^{0.196} X_6^{0.002} eU^{1,2}$$

In the case of knowing whether the regression analysis of the production functions Has fulfilled the provisions of the good production function model (goodness of fit), it is examined from the significance of F calculated and R2 values. From the results of the analysis presented in Table 2, the calculated F value is 224,611. This F calculated is greater than the value of F table at a 99% confidence level. This means that all the independent variables analyzed (land area, number of seeds, amount of Urea fertilizer, amount of SP-36 fertilizer, amount of KCl fertilizer, and number of workers) together Have a very significant effect on the dependent variable (level of production corn). Besides that, the influence of the variables together on the level

of production can also be assessed from the R² value. From the analysis R² = 0.96 means that the level of corn production can be explained by the variable land area, number of seeds, amount of Urea fertilizer, amount of SP-36 fertilizer, amount of KCl fertilizer and amount of

labor use by 96%. While the other 4% was caused by factors that were not included in the model. From the description above shows that the calculated F value is very real and the R² value is very high, meaning that the production function model used is appropriate³.

Table 2. Analysis of Variants of Production Function of Maize Farming in the Research Area

No.	Source	Sum of Squares	df	Mean Square	F _{calculated}	Significant Level
1	Regression	44.238	6	7.373	224.611	0.0000
2	Residual	1.641	50	0.0328		
3	Total	45.880	56			

In order to test or to detect of classic assumption violation is about the presence or absence of multicollinearity, autocorrelation and heterocedasticity, tests are carried out. In the case of knowing whether there is multicollinearity is by seeing the value of VIF (Variant Inflating Factor). Based on the VIF tabel (Table 1), there is no multicollinearity of the inputs production of land and labor becaapplication the production inputs Have a VIF tabel that is smaller than 10, whereas in other production inputs namely seeds, Urea, SP-36, and KCl there are multicollinearity it has a VIF tabel that is greater than 10.

VIF tables between 1 to 10, indicate the lower the multicollinearity, whereas if the VIF tabel is greater than 10 indicates the value of multicollinearity is increasingly serious.

Table 3. Production Elasticity, Average Production, Marginal Product, Marginal Production Value, Marginal Production Value Ratio with Input Prices

Input Factor (X)	Production Elasticity (PE _x)	Average Product (AP _x)	Marginal Product (MP _x)	Marginal Product Value (MPV _x)	Price of Product (P _y)	MPV _{xi} P _y Ratio
X ₁	0.263	8.30	2.2000	5.500.000	27.000	203.70
X ₂	0.261	0.30	0.0800	200.000	10.000	0.05
X ₃	0.229	0.04	0.0090	22.500	1.200	18.75
X ₄	0.103	0.10	0.0100	25.000	1.700	14.10
X ₅	0.156	0.10	0.0200	50.000	1.700	29.41
X ₆	0.002	0.10	0.0002	500	12.500	0.04

The autocorrelation check was application by using Durbin Watson test, and from the results of the calculations showed that there was no autocorrelation.

In order to test or to detect of heteroscedasticity is application by Park's test by regressing X_i to e_{i2}, where X_i is the independent variable while e_i is an error term. The calculation results show there is no heterocedasticity. In seeing the extent to which the influence of the independent variable (production input application) on the level of production can be interpreted through the value of the elasticity coefficient.

Furthermore, in analyzing the optimization of the application of production inputs is done by entering the unit price of production inputs application (Table 3).¹⁻⁴.

Notes:

AP = Average Product Px4
= Price of SP-36

PM = Marginal Product Px5
= Price of KCl

VMP = Value of Marginal Product
Px6 = Labor rate

Px1 = Land rent

Px2 = Seed price

Px3 = Urea price

Partially the production factor of the land area and the number of seeds application Had a very significant effect on the increase in production respectively at the significant level of 1%, 5%, and 10%, but the production inputs of SP-36, KCl and Labor did not Have real effect

The optimum level of input applied

Furthermore, partially the production inputs that affect the increase in maize production in the study area during the November 2017 planting season are interpreted as follows:

Land Area (X1)

The partial test results on the regression coefficients of the production input show that the value of $t_{calculated}$ is greater than t_{table} at 99% confidence level, which means that the effect is very significant on the increase in maize production.

The elasticity coefficient of the variable is 0.263, meaning that each 1% increase in seed will increase production by 0.263%. In terms of technical efficiency, the application of the body is still at a rational stage. The average production from the production input (PRxi) is 8.3 tons per Ha, thus the marginal production of the production input (PMx1) is 2.2, so every additional 1 Ha will be added an additional production to 2.2 tons.

To determine the level of optimization of the application of production factor of land area, it is compared with the marginal production value (MPVxi) by leasing land (Hxi). From the calculation results obtained $MPVxi = Rp.5,500,000$, while $Hxi = Rp27,000$, then $MPVxi / Hxi = 203.7$, meaning the level of land application was not reached optimum or not efficient so

its application needs to be increased or added. In order for the ratio between $MPVx1$ and $Hx1$ to be equal to 1, the farmer must expand his maize farming land to 7.9 Ha.

Optimal number of seeds must be cultivated by farmers if they want to get maximum profits. This optimal number of seed can still be reduced again by improving cultivation technology.⁵

Seed (X2)

The partial test results on the regression coefficients of variable seeds showed that $t_{calculated}$ was greater than t_{table} at 95% confidence level, which means that the number of seeds application Have a very significant effect on increasing maize production.

The elasticity coefficient of the seed variable is 0.261, meaning that each addition of 1% seed will increase production by 0.261%. In terms of technical efficiency the application of seeds is still in a rational stage. The average production of the seed variable (PRx2) is 0.3 tons per 1 kg of seeds, thus the marginal production of the production input (PMx2) is 0.08 tons, so each addition of 1 kg of seeds will be added an additional production of 0.08 tons.

To determine the optimization level of the application of variable seeds, it is compared with the marginal production value (MPVx2) with the price of the seed (Hx2). From the calculation results obtained $MPVx2 = Rp200,000$, while $Hx2 = Rp10,000$, then $MPVx2 / Hx2 = 20$, meaning the level of seed application was not reached optimum or not efficient so that its application needs to be increased or added. In order for the ratio between $MPVx2$ and $Hx2$ to be equal to 1, the farmer must increase the amount of maize seeds to 402.80 kg of seeds per Ha. optimal seeds must be cultivated by farmers if they want to get maximum profits. This optimal seed rate can still be reduced again by improving cultivation technology⁶.

Urea Fertilizer (X3)

The partial test results on the variable urea regression coefficient shows that $t_{calculated}$ is greater than the T_{tabel} at the 90% confidence level which is used to significantly affect corn production. Production elasticity of the Urea fertilizer production factor is 0.229 which means that each addition of Urea fertilizer production

factor of 1% will increase production by 0.229%, in terms of technical efficiency, the use of Urea fertilizer is in the rational stage (area II). The average production factor for Urea fertilizer production (PRx3) is 0.04 tons per one kg of urea, thus the marginal production (PMx3) is 0.009 tons. Because the price of Urea fertilizer in the November 2017 planting season is Rp. 1,200.00 / kg and the price of corn is Rp. 2,500,000 / ton, then $NPx3 / Hx3 = 18.75$. The steps are in terms of the level of optimization (economic efficiency)

The use of urea fertilizer still needs to be improved because the level of use is still not optimal, so that the ratio between MPVx3 and Hx3 is equal to 1, then farmers must use urea up to 402.80 kg / Ha (Dwiratna N.P,Sophia,2016)

SP-36 Fertilizer (X4)

The reason that can be given why the addition of P Has an unreal effect on increasing corn production is because at a low pH, P will be bound by Al. The production elasticity of the SP-36 fertilizer production factor is 0.103 which means that each additional factor of 1% SP-36 fertilizer production will increase the production of corn by 0.103%. From a technical perspective the use of this production factor is in the rational stage (area II). The average production for SP-36 fertilizer production (PRx4) = 0.01 tons. From the calculation results obtained $MPVx4 / Hx4 = 14.71$. In terms of economic efficiency the use of fertilizers still needs to be improved. In order for the ratio between MPVx4 and Hx4 to be equal to 1, the farmer must use SP-36 fertilizer to 284.60 kg/Ha⁷.

KCI Fertilizer (X5)

The production elasticity of the KCL fertilizer production factor is 0.156 which means that every additional factor of KCI fertilizer production is 1% will increase production by 0.156%. in terms of technical application of this production factor is in the rational stage (area II). The average production for KCI fertilizer (PRx5) is 0.1 tons per kg of KCI fertilizer. Marginal production is 0.02 tons. From the results of the calculation that $MPVx5 / Hx5 = 29.41$. Thus in terms of economic efficiency the application of KCI fertilizer production factors is still not optimal or in other words its application still needs to be improved. In order for the ratio between MPVx5 and Hx5 to be equal to 1, farmers must application KCI fertilizer up to 284.60 kg / Ha.⁷

Labor (X6)

Factor production elasticity of labor production is equal to 0.002, meaning that with the addition of labor application of 1% will increase production by 0.002%. From a technical perspective, the application of this production factor is in the rational stage (area II). The average product due to the application of this production factor (PRx6) is 0.1 tons per HOK, the marginal product (PMx6) is 0.0002 tons. The results of the calculation of $MPVx6 / Hx6 = 0.04$, meaning that the addition of the acceptance value is lower than the value of adding one HOK of labor, in this case it is necessary to reduce the workforce until the optimal level of application is achieved. In order for the ratio between MPVx6 and Hx6 to be equal to 1, the farmer must applied the labor of 38.70 HOK / Ha.

CONCLUSION

In terms of land area, so that farmers can get the maximum profit then he must expand his farm to 7.9 Ha. Thus at the level of existing technology, farmers will achieve maximum profits if he can expand his farm to 7.9 Ha. In the future, the optimal area of land can be even smaller through technological improvements can increase productivity, if there is no increase in factor prices, the optimal land area can also be smaller if there is an increase in the price of the production factor.

Of the five other types of allocation of production factors analyzed: maize seeds, urea fertilizer, SP-36 fertilizer, KCI fertilizer and labor are also at an optimum level. Therefore, the addition of the application of these production factors can be continued until a state is reached the additional marginal production value of each production factor application is the same as the price of the production factor. In this case the seeds to be applied are 48.33 kg / Ha, Urea Fertilizers 402.80 kg / Ha, SP-36 Fertilizers 284.60 kg / Ha, KCI fertilizers 284.60 kg / Ha and labor 38.70 HOK / Ha.

Conflict of Interest: Nil

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Ethical Clearance: IJRISSE Journal Reviewer Committee

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Procedure for Integrated Administration Services, Infrastructure Facilities for Public fulfillment with Service Quality in Purwosari District

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ABSTRACT

Integrated Administration Procedure (Patent) tends to increase the quality of service and bring services closer to the people seen of the aspect of time and service costs. The study was carried out in Purwosari Sub-District Pasuruan Regency in order to analyze the service steps for the integrated administrative sub-district, significant infrastructure, and the value of service to the community. To achieve this goal, an explanatory research conducted to the 3,250 population with the 97 people as the sample. The results show that there was a significant influence between integrated administrative sub-district on service quality, with $t = 0.315$. It had a direct influence on the public fulfillment and service quality, with $t = 0.218$ and $t = 0.387$ respectively. Furthermore, a significant influence was obtained between infrastructure and service qualities with $t = 0.236$ and $t = 0.492$ respectively. However, there is an indirect effect between integrated administration service procedures and infrastructure facilities on public fulfillment, with $t = 0.155$ and $t = 0.190$, respectively. This shows that the higher the quality of service caused by better infrastructure, the it tends to increase public fulfillment.

Keywords: *service, administration, facilities, infrastructure, satisfaction*

INTRODUCTION

Organization is the place where a group of people gather and work collaboratively in a structured way to seek for certain goals or targets set together. It is divided into two groups: private and public sectors of organization¹. Public organization is an organization that tends to produce services for the community regardless of distinguishing their status and position. Public organization is oriented to the public concentration, not profit oriented as the final goal².

In case of the dynamics development of regional governance in achieving good governance, which pays attention on the needs and necessities of the people in public services, Minister of Home Affairs Regulation No. 4 of 2010 issued the Guidelines for Implementing District Integrated Administration on January 15, 2010. Regarding the Guidelines for Implementing District Integrated Administration, issued by the Minister of Home Affairs, is to give the regional government, in

this case the regent or mayor, the chance to optimize the responsibility of the sub-district to build access and increase the service quality, and bring services to the people in city.

The range of integrated-administrative sub-district involves the licensed and non-licensed services sector. The objective of organizing integrated-administrative sub-district is to have the Subdistrict as a community service center, and become a center of facility for integrated-service offices or agencies in the district or city³. Integrated- administrative sub-district has the target to increase quality and bring services closer to the community. Integrated administrative sub-district is a simple innovation but provides great benefits⁴. In addition to facilitate the public obtain the services, it also increases the view and legitimacy of the local government to the community.

Referring to the PAN Decree No. 25 of 2004 concerning Public fulfillment Index, 14 things associated with the activities and facilities performed by service

employees, as well as service steps, appropriateness of requirements, clarity, discipline, responsibility, and ability of employees, the speed of service. equality of facility, courtesy of employees, equality and inevitability of charges, fixed-schedule, comfortable environment, and safety of services. The study aimed to investigate the advantages of the variables, including the effects on the public fulfilment. The research is restricted to procedures for services, infrastructure, public fulfilment and the quality of District Integrated Services/integrated

administrative sub-district (Case study of Purwosari District Office Pasuruan Regency).

Theoretical Review

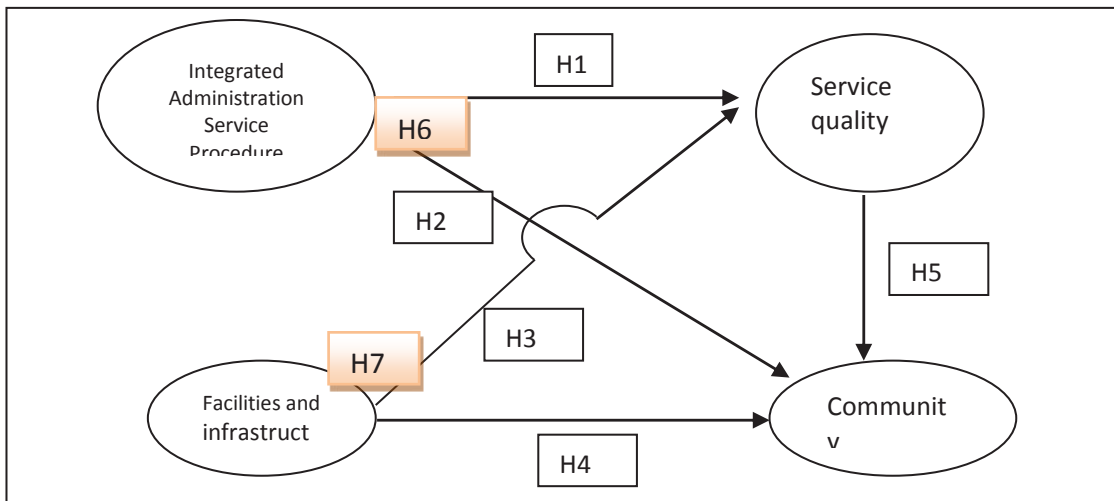
District Integrated Administration Services is the enactment of public services in the sub-district, whose management process starts with the application to the publication of the document, carried out in one place⁵. The difference in conventional service with Patents is as shown in Table 1.

Table 1. Differences in Conventional Services with integrated administrative sub-district

Aspect	Conventional Service	integrated administrative sub-district
Citizens Participation	There is not citizen participation Citizens only accept the public service process as is.	Citizens can access service information in such a way that it is easier to provide input for service improvement Citizens can submit a complaint if the service they receive did not meet the standard that has been determined.
Availability of information	There is not information about the cost and time requirements in such a way that citizens tend to spend more, in the hope that they will finish quickly. Information is usually conveyed directly by sub-district employees to residents, who are taking care of services. the head of the sub-district has difficulty controlling the service costs received by his employees. this can trap the head of the district with the charge of “illegal levies”. There is not database system regarding these services.	Information is available about the type of service, time, costs and procedures for obtaining services; There is socialization about the implementation of public services. Acceptance of service fees could be monitored directly because payments are recorded transparently and accountably. Providing certainty to the district head in carrying out public services
Database	There is not database system regarding services	Equipped with a service database, which is managed and updated continuously

Source: Primary Data processed by researchers, 2017

Furthermore, the infrastructure in question is the ability of agencies to be able to implement or guarantee the procurement and management of adequate funds, provision, maintenance of facilities and infrastructure, and a good information system to support the quality of service to the community. Satisfaction is considered as a person’s feeling that comes with the contrast between his impress with a real product quality and the likely product performance⁶. Further explained that consumer satisfaction is “customer’s of a product or service in terms of whether that product or service has met their needs an expectation”⁶. Indicators in public fulfilment are: overall satisfaction level, conformity of service with community expectations, level of public fulfilment during relationships with institutions⁷. Based on the theories that have been proposed, a conceptual framework could be proposed, as presented in Figure 1.



Source: Hair (2013); processed by researcher (2017)
Figure 1. Conceptual Framework for Patents, Infrastructure

Research Methodology

This research is a descriptive study through a survey approach, with a population of 3,250 people. A total of 97 respondents were taken as a sample of the total population. Questionnaires in the form of direct written information are used for data collection. Variable measurement uses a Likert scale, with scoring on this scale starting from number 1 to number 5, with scoring: Very good (score 5), Good (score 4), Fair (score 3), Bad (score 2), Very Bad (score 1).

Path analysis model is used to analyze the pattern of relationships between variables with the aim of knowing the direct and indirect effects of a set of independent variables on the dependent variable. Path analysis model is a causal relationship pattern. Therefore, the formulation of the research problem within the framework of path analysis only revolves around whether the independent variables (X1, X2, ..., Xk) affect the Y variable, or how much direct causal influence, indirect causal, total causal or simultaneous set of independent variables (X1, X2, ..., Xk) affect the variable Y ⁸.

RESULTS AND DISCUSSION

Data Analysis Results

The results of data analysis related to direct and indirect effects are presented in Table 2 below.

Tabel 2. Pengaruh langsung (Direct) dan tidak langsung (Indirect)

Eksogen	Mediasi	Endogen	Koefisien		
			Direct	Indirect	Total
District administration integrated service procedure	-	Service quality	0.315*	-	0.315
Infrastructure	-	Service quality	0.387*	-	0.387
District administration integrated service procedure	Service quality	Public fulfillment	0.218*	0.155* (0,315x0,492)	0.373
Infrastructure	Service quality	Public fulfillment	0.236*	0.190* (0,387x0,492)	0.426
Service quality	-	Public fulfillment	0.492*	-	0.492

Source: Primary Data Processed by researchers in 2017

Description: * (significant)

Based on Table 2, it could be seen that: The direct influence coefficient of the integrated administrative administration procedure on the service quality is 0.315*. This shows that the procedure for the service of integrated administration of sub-districts has a positive and significant effect on the quality of service. Then, the direct effect coefficient of the integrated administration procedure for the sub-district administration on public fulfillment is 0.218*. This shows that the procedures for the integrated administration services of sub-districts have a positive and significant effect on public fulfillment. Furthermore, the coefficient of direct effect of infrastructure on service quality is 0.387*. This shows that infrastructure has a positive and significant effect on service quality. The direct effect coefficient of facilities - infrastructure on public fulfillment (X2) is 0.236*. This shows that infrastructure has a positive and significant effect on public fulfillment. Then, the direct effect coefficient of service quality on public fulfillment is 0.492*. This shows that service quality has a positive and

significant effect on public fulfillment. Furthermore, the indirect coefficient of influence of sub-district integrated administration service procedures on public fulfillment through service quality is 0.155*. This shows that the procedure for the service of integrated administration of sub-districts has a positive and significant effect on public fulfillment through quality of service. The indirect effect coefficient of infrastructure on public fulfillment through service quality is 0.190*. This shows that infrastructure means a positive and significant impact on public fulfillment through quality of service.

Partial Analysis

Partial analysis is used to test whether or not there is a partial effect of exogenous variables on endogenous variables. The testing criteria state that if the probability value < level of significant (alpha = α) is stated there is a partial effect of exogenous variables on endogenous variables. Testing hypotheses could be known through the summary in the following table.

Table 3. Results of partial analysis

Exogen	Endogen	Koef.	T statistics	Prob/sig.
District administration integrated service procedure	Service quality	0.315	2.994	0.003
Infrastructure	Service quality	0.387	3.684	0.000
District administration integrated service procedure	Public fulfillment	0.218	2.658	0.009
Infrastructure	Public fulfillment	0.236	2.814	0.005
Service quality	Public fulfillment	0.492	6.491	0.000

Source: Primary Data Processed, 2017

The effect of integrated administrative procedures for sub-districts on service quality results in a statistical value of 2.994 with a probability/sig of 0.003. The test results show that the probability < alpha (5%). This means that there is a significant influence on the procedures for integrated administration services of sub-districts on the quality of services.

The effect of infrastructure on service quality results in t statistics of 3.684 with a probability of 0.000. The test results show that the probability < alpha (5%). This means that there is a significant influence of facilities - infrastructure on service quality.

The influence of integrated administrative procedures for sub-district administration on public fulfillment results

in t statistics of 2.658 with a probability of 0.009. The test results show that the probability < alpha (5%). This means that there is a significant influence on integrated administrative procedures for sub-district administration on public fulfillment.

The effect of infrastructure facilities procedures on public fulfillment results in t statistics of 2.814 with a probability of 0.009. The test results show that the probability < alpha (5%). This means that there is a significant effect of infrastructure on public fulfillment.

The effect of service quality on public fulfillment results in y statistics of 6.491 with a probability of 0.000. The test results show that the probability < alpha (5%).

This means that there is a direct significant influence on the quality of service to public fulfillment.

Furthermore, the influence of integrated administrative service procedures for sub-district and infrastructure facilities on public fulfillment through service quality is known that there is a significant influence on integrated administrative service procedures, sub-district and infrastructure facilities on service quality, and there is a significant influence on service quality to public fulfillment. Because both pathways are significant, it could be stated that there is a significant influence on

the procedures of integrated administration services for sub-districts and facilities for public fulfillment through service quality. Thus, the quality of service is able to mediate the effect of integrated administrative service procedures for sub-districts and infrastructure on public fulfillment.

Path diagram conversion into the measurement model is intended to convert the diagram model into an empirical data-based measurement model, which is used to determine the effect of exogenous variables on endogenous variables directly or indirectly.

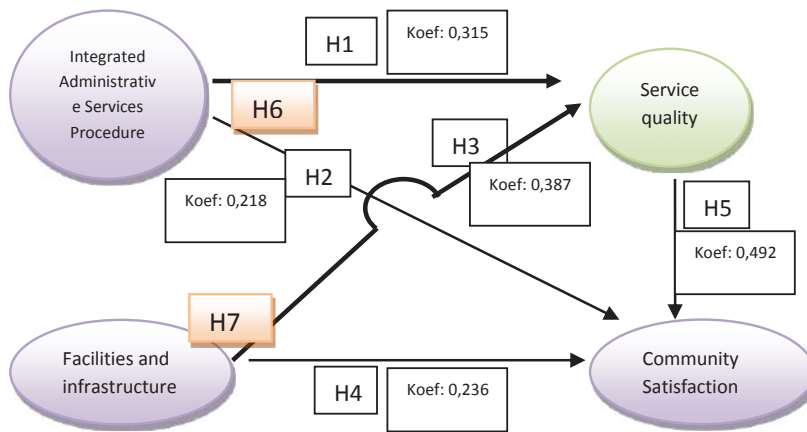


Figure 3. Model Construction

Source: Hair (2013); and primary data is processed (2017)

The empirical model produced is as follows: Model 1 : $Z = 0.315X_1 + 0.387X_2$ dan Model 2: $Y = 0.218X_1 + 0.236X_2 + 0.492Z$

Exogenous variables that most influence the endogenous variables could be known through the highest total effect. Variables that have the greatest total effect on service quality are infrastructure with a total effect of 0.387. Thus, facilities are the most influential variables, or have the most dominant influence on service quality. Variables that have the greatest total effect on public fulfillment are service quality with a total effect of 0.492. Thus service quality is the most influential variable or has the most dominant influence on public fulfillment.

CONCLUSION

Based on the results of the study obtained conclusions as follows: Head of the Office Purwosari District always needs to improve the Quality of Service

to the community, especially related to the fulfillment of integrated administrative service procedures, infrastructure facilities, in order to increase public fulfillment. This could be done by providing clarity of procedures and speed and accuracy of procedures for integrated administration services to the public, especially to improve professionalism in carrying out their duties and functions. This is an effort to help Purwosari District in providing the best service to the community.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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The Role of Women in Food Security (Case Study of Rice Farmers in Blang Pala Village, Banda Baro District, Aceh Utara Regency)

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ABSTRACT

The rice farming community is a producer of staple foods. They not only produce food, but also are responsible for food needs for all members of their families and society. This study aims to describe how the distribution of roles between women and men in agricultural activities (on farm and off farm) to fill household food security in the rice farming community in Blang Pala Village, Banda Baro District, Aceh Utara District, Aceh Province. The study have been done by in-depth interviews with ethnoscience as an approach. The informants were determined based on several minimum requirements: full enculturation, direct involvement of informants with their cultural atmosphere, different cultural backgrounds with researchers, and time availability. The result shows that women have a very important contribution to food security of their families and effort of providing food at the household level. The allocation of roles between husband and wife in agriculture is based on family deliberation, but still those who make decisions are male (husband). This is due to the people of Aceh adhering to Islamic law. In agricultural activities, men play a part in heavy work. Whereas women play a role in work that is considered light. This pattern refers to habits that have become a hereditary culture. Since childhood they have seen how parents share roles in the family, so this also becomes a reference or basis for them to share the roles between men and women in agricultural activities.

Keywords: *Food Security, Agriculture, Farmers, Women, Family*

INTRODUCTION

Agriculture in Indonesia is still the biggest source of livelihood for the community. Most of the land area in Indonesia is utilized for the agricultural sector. Agricultural development aims to increase farmers' income and living standards, growth of employment and business opportunities, improve nutrition and household food security, and decrease poverty in rural areas. All of this is related to the roles, duties and functions of women in rural areas. Even though, the agricultural sector and major employment opportunities do not absorb too many female workers. Based on household income it can be generated by husbands and wives (multiple livelihood patterns), women have job opportunities that can generate income for their households, as an effort to reduce poverty in rural areas. Role and position are two important aspects of social relations in society. Role is a

dynamic aspect of status, when someone has carried out an obligation according to his status, he has a role. Status is often synchronized into a position, which indicates a person's social position in society. In other words, position provides a person with a role as a pattern of interaction among community members in socializing ¹.

Economic allocation is a measurement of the benefits of the labor of household members that are needed for the existence of households to fill the consumption (needs) of goods and services. Economic allocation relates to the allocation of solidarity among household members (men, women, adults, children) in the functioning or non-functioning of their respective roles in obtaining household income and expenditure. Law No.7 / 1996 on Food, defines food security as a condition of food fulfillment for every household, as reflected by the availability of adequate food, both

quantity and quality, safe, equitable, and affordable. The definition of food security includes the macro aspect, namely the availability of adequate food; and also the micro aspect, namely the fulfillment of food needs of every household to lead a healthy and active life². Therefore, the farmer's income will be increase with for the ability of farmers to fulfill the needs of family food which is a basic need that must be fulfill and it can't be replaced with the other needs. But the basic need is not for food only, but they non-food needs such as housing, clothing, education, and health³.

RELATED RESEARCH

Women have a very important role in the effort to consume food at the household level given that in the hands of women or a mother, food is planned, processed and prepared for their families. The size of the budget in planning, processing, preparing and serving foods is also the basis for a woman (housewife) in an effort to improve the quality of food consumed by her family⁴.

The income of farmer women will contribute to household income which will directly affect household food consumption. The income of farm women shows a significant influence on food consumption at the household level with a positive relationship. It is mean, an increase in the income of farmer women will significantly increase the diversity of food in households level⁵.

Man working time allocation is concentrated on farming activities. Women working time allocations was focused on domestic activities. It means that the gender working time allocation shows different patterns between woman and man. Women have contributed more income from non-farm activities compared to man contributions. The factors that are considered to affect the food security level at the farmer's household were gender based on income from non-farm activities, family size, and on-farm income⁶.

PROPOSED METHOD

Ethnoscience is based on a number of interrelated assumptions. One of the assumptions is that the interaction of the human environment in a community or society is different from a community or other community group, and this is strongly influenced by mind, knowledge, and language that are regulated in their culture. Furthermore, that community groups

or a community with different cultures will see and understand their world differently as a result of various social aspects, history, culture, environmental conditions and experience. This approach departs from the main assumption of effective experiences that are cultural because of the same life experience, and generally can be 'seen' or 'perceived' differently by people with different cultural backgrounds⁷.

RESEARCH METHODOLOGY

This research is a socio-cultural study with ethnics as its approach. The data obtained and used in this study is a type of qualitative data, consist of statements about the content, nature, characteristics, and circumstances of something, or statements about various relationships between people with something else. Something that can be a physical objects, patterns of behavior, ideas, values, norms, and also like the physical environment, conversation, as well as events that occur in a community group⁷. Various data elements (emic view) are collected and processed to obtain a descriptive series of "The Role of Women in Food Security" in the rice farming community in Blang Pala Village (Gampong), Banda Baro District, Aceh Utara Regency, Aceh Province.

Data collected according to the research focus in words, actions, situations, documentation and observed events. Collecting this data / information, the researcher as well as an instrument is carried out with documentation and interview activities (in-depth interview). Therefore, the researcher will record, and use the support of recording devices, and observe the behavior of the informant.

RESULTS AND DISCUSSIONS

Blang Pala Village is an agrarian rural area, with the large population in farming, while other livelihoods are from the utilization of processed agricultural and plantation products. The agricultural sector is a main source of livelihood for the community of Blang Pala Village. Farming is important to preservation of nature and other creatures. With the activities in the agricultural sector, people get food which is a basic need for the sustainability of their lives. Rice farming activities in Blang Pala Village include the following activities:

Soil Processing (*Ceumacah*). Soil processing is very important for rice plants and needs more attention. Soil processing is intended to manage and utilize nutrients

needed for rice plants. The processing system can be done in the traditional way by using plows and hoes or trampled and with tractor technology.

Irrigation. Irrigation support the farming with surface water and ground water. The method and rules for irrigating rice fields in Blang Pala Village are usually done 10 days after planting when the paddy plants have looked green, which was 3 stems to be 5-8 stems. Soil management can be done by entering water into the fields until the water is stagnant and making the soil soft. Sometimes people also have to wait for their irrigation water to irrigate their fields. Not infrequently people use rainwater to flooded in their fields.

Nurseries. Nurseries are important in crop cultivation. In rice cultivation, superior variation is preferred to be resistant to pests and diseases, if plants that are affected by disease are usually carried out by refining, and this planting is needed to achieve optimal results.

Rice Planting (*Seumula*). The next stage is the stage of planting rice seeds into rice fields that have been prepared. The steps taken in planting rice seedlings that are planted seeds must be young and have two or three leaves. Enter the rice into the planting hole can be done in a single or double way. One hole for one plant is a maximum of two plants. Furthermore, the process of planting rice seeds is good when the land under conditions that are not inundated by the depth of seedling planting between 1-15 cm and the good method of rice cultivation must be parallel and neat. Usually, these women farmers have a unique thing to help each other in the process of planting rice. This term is called *Meurop*. For example, today a number of women farmers doing rice fields without payment are only provided with lunch by the owners of the rice fields, another time when other women farmers would work their fields, the owners of the rice fields and other women farmers also helped. But there are also female farm laborers who are paid 40,000 IDR/ day. *Meurop* is usually done if the owner of the capital or farm does not have enough money for the rice planting process.

Eradication of Pests and Diseases. Controlling pest and disease are usually done by farmers by using pesticides or burning the hole where the mouse is hiding so the mouse runs away and does not return. Various efforts were made to anticipate the arrival of pests such

as snails, mice, caterpillars/ rods and others.

Harvest (*Keumekoh*). Harvesting is the cutting of rice yields. For farmers in Aceh only recognize 2 seasons a year, that is *Treun U Blang* Season (Fall Season) and *Luah Blang* Season (Season when Empty Rice Fields). In this empty rice field, some people let their cows to eat postharvest haystacks and children also played kite. The harvest season is also known as *Keumekoh* season, people cut rice in a slightly squat position using *sadeup* (rice cutter).

Woman farmers of Blang Pala Village usually use *Sadeup* in cutting rice with a forward movement. After being cut, the rice is stacked using a base so losing of the crop is not much. Furthermore, rice was transported (*inibai*) by men. Then the rice is brought to the threshing machine and dried. After dry rice is immediately taken to the milling machine. After all processes are complete, the rice is stored in a 50 kg or 35 kg sack. Then it is stored in a safe place so is not to be flooded or rainy. Moreover, the women farmers of Blang Pala Village separate rice that will be stored at home for daily life and for sale. Women farmers in Blang Pala Village also have to set aside money from the sale for the farming capital and money for other necessities of life.

The division of roles between husbands and wives in agriculture in informants is mostly based on family deliberations, but still those who make decisions are male (husband). This is due to the people of Aceh adhering to Islamic law. In the teachings of male Muslims who are leaders (priests) in making decisions about their families. In agricultural activities, men have more roles in heavy work such as land processing, plant maintenance (pesticide fertilization and spraying), and harvesting. Whereas women play a role in work that is considered light and not too difficult, such as planting, pulling grass or weeds, and eradicating rice pests such as snails.

In addition to working in the fields, women also still have to work at home such as caring for children, taking care of the house, and cooking, so that this is the basis for the division of roles in agriculture. If a woman is given heavy work in the rice field, it can result in a lack of attention to the child and not having enough time to take care of the house and cooking. Another thing according to the informant, in Islam teaches men who are more obliged to make a living for their families,

but women are allowed to help in accordance with their capacity and abilities. But there are times when women also help when the harvest arrives. This pattern of role sharing refers to unwritten habits that have become a culture of hereditary farming communities in the Blang Pala Village. All respondents said there were no written rules on this matter but they had seen from a young age how the previous generation and especially parents shared the same role in the family, so that this also became their reference or basis in acting to divide the roles between men and women in agricultural activities. This division of roles also applies to boys and girls in the family, directly they learn from parents what men should do and what should be done by women. This activity became a kind of internalization that was internalized in the children in the family.

Local wisdom is a blend of knowledge and technology that develops in society. Local wisdom can be passed down from generation to generation through the learning process. In the seven elements of culture, the technological and equipment elements are in seventh order, which means the system can be easily changed according to the conditions of society and the changes that occur. Local wisdom is culturally relevant. Culture is an idea for every human behavior in life and can become a habit for that society⁷. Local wisdom is part of the culture so that this culture becomes a habit that can be learned in a society. When the culture is still beneficial to society then the culture will continue to be used. This rules has been passed down from generation to generation through the learning process. Although this rules is still traditional but people feel not yet need more modern technology, because is enough to fulfill the needs of their life⁸.

CONCLUSION

From the results of the study can be drawn, women have a very important contribution to food security of their families and effort of providing food at the household level. The allocation of roles between husband and wife in agriculture is based on family deliberation, but still those who make decisions are male (husband). This is due to the people of Aceh adhering to Islamic law. In agricultural activities, men play a part in heavy work. Whereas women play a role in work that is considered light. This pattern refers to habits that have become a hereditary culture. Since childhood they have seen how parents share roles in the family, so this also becomes a

reference or basis for them to share the roles between men and women in agricultural activities.

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Erosion Prediction and Soil Conservation Planning in Krueng Seulimum Watershed Aceh Province, Indonesia

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ABSTRACT

The conversion of forests into agricultural land and the application of agro-technology on land without considering the capability and suitability of land will result breakdowns on Krueng Seulimum Watershed. This will obviously lead to high attrition, low land productivity in the upstream, sedimentation, and high fluctuation in the downstream. This study is aimed to: 1) predict the amount of erosion on every watershed land unit in Krueng Seulimum Watershed and 2) determine the appropriate agro technology (soil and water conservation techniques) for cocoa farms to suppress erosion ($\text{erosion} \leq \text{ETol}$). The method used in this study is a survey method with the following steps: 1) the preparation phase, 2) a preliminary survey, 3) a primary survey and 4) data analyses and result presentation. The prediction was performed on each land unit (LU) and the cocoa-based farming systems (Cocoa, Cocoa + Areca nut, and Cocoa + Banana) using USLE. The results show that the greatest erosion prediction occurred on the shrub and dry land farming use. The predictive erosion values of the land use for shrub, dry land agriculture, grazing and secondary forest ranged from 30.71 - 292.98 tons ha⁻¹ year⁻¹ (ETol 31.50 - 40.96 tons ha⁻¹ year⁻¹), 27.60 - 118.19 tons ha⁻¹ year⁻¹ (ETol 39.11-40.96 tons ha⁻¹ year⁻¹), 9.92 tons ha⁻¹ year⁻¹ - 62.98 tons ha⁻¹ year⁻¹ (ETol 22.16 - 24.20 tons ha⁻¹ year⁻¹), and 1.31 - 6.94 tons ha⁻¹ year⁻¹ (ETol 23.98 - 29.28 tons ha⁻¹ year⁻¹), respectively. The agro technologies for soil and water conservation that should be implemented on agricultural dry land (cocoa, cocoa + areca nut, and cocoa + banana) are the provision of a complete fertilizer (7% slope), bunds terracing + grass planting to amplify the terrace (14% slope) and bund terracing + grass planting to amplify the terrace + mulching 6 tons ha⁻¹ (21% slope). The forest land use is recommended to remain as forest, while the shrub land use is recommended for cocoa farming.

Keywords: *Erosion, land use, watershed, agro-technology*

INTRODUCTION

Land use changes along the watershed have been increasing due to the construction activities and a high population growth rate. It is proven that the changes of land use from forest into other land uses have created negative impacts. To make it worse, when a particular land is urgently needed, the conversion of forest cannot be avoided.

In Aceh province, until 2009, there had been approximately 266,000 hectares of forest severely damaged due to illegal logging¹. According to Walhi Aceh (2012)² the loss of forests in Aceh province is now at about 23,124.41 hectares year⁻¹ from the total forest area of 3.3 million hectares due to illegal logging and forest conversion.

The deforestation has also threatened the sustainability of the 47 watersheds and sub-watersheds in Aceh. In efforts to save the watersheds in Indonesia, the Ministry of Forestry has set 108 watersheds as the top priority to be managed in the next 5 years (2010 to 2014), while Krueng Aceh is one of the 16 watersheds located in Sumatra which is categorized into critical watershed groups in Indonesia and the top priority in handling (BPDAS Aceh, 2009).

Krueng Seulimum (25,444.35 ha) which is one of the sub-watershed of Krueng Aceh watershed has experienced an extensive conversion of forests into agricultural land. In 1977 the forest area in Krueng Seulimum watershed was 16,179.0 ha (70.86%), in 1987 it declined to 11,129.10 ha (48.75%) and in 2002

it decreased until 9,032.40 ha (39.56%)³. In 2011, the remained forest area in Krueng Seulimum watershed was 7,000.01 ha (27.51%)⁴.

This study aims to: 1) predict the amount of erosion on every land unit in Krueng Seulimum watershed and 2) determine the appropriate agro technology (soil and water conservation techniques) for cocoa-based farming to suppress erosion (erosion ≤ ETol).

RESEARCH METHOD

Venue and time

This research was conducted in Krueng Seulimum watershed which is administratively located in the sub-districts of Seulimum and Lembah Seulawah in Aceh Besar regency, Aceh province from January to August 2011.

Materials and Equipment

The materials used are maps of soil types,

topographic maps, earth maps, land use maps, rainfall data, demographic data, and certain chemicals for laboratory analyses. Equipments used in the research are equipments for survey, equipments for analyzing soil characteristics in the field and laboratory, stationery, working maps, GPS, GIS software, a digital camera, and a computer.

Research Method

This study used a survey method consisting of four phases, namely: the preparation, preliminary survey, main survey, and data analyses as well as result presentation.

Erosion Prediction

Erosion prediction on a piece of land is a method to estimate the rate of erosion that will occur on the land used within a land use. The measurement of erosion was performed on each land unit by using the Universal Soil Loss Equation (USLE)⁵:

$$A = R \times K \times L \times S \times C \times P \dots\dots\dots (1)$$

Where: A = the amount of erosion (tons ha-1 year-1), R = rainfall erosivity index, K = soil erodibility factor, L = slope length factor (m), S = slope factor (%), C = crop management factor and P = conservation treatment factor.

Rainfall Erosivity (R)

Rainfall erosivity is the amount of rainfall erosion index unit which is the product of the kinetic energy (E) with the maximum rainfall intensity for 30 minutes (I30) annually. As the daily rainfall data from the automatic measuring tool were unavailable, the value of rainfall erosivity (R) was calculated based on the Lenvain equation⁶:

$$EI30 = 2.21 (CHm) 1.36\dots\dots\dots (2)$$

Where: EI30 = the maximum rainfall intensity in 30 minutes, and (CHm) = monthly rainfall

Thus, the amount of rainfall erosivity factor (R) is the sum of the values of monthly rainfall erosion index and is calculated by the following equation:

$$R = \sum_{i=1}^{12} (EI30) I \dots\dots\dots (3)$$

in which R is the rainfall erosivity factor.

Soil Erodibility (K)

Soil erodibility value was calculated using the formula of Wischmeier and Smith (1978)¹¹:

$$100K = \{1.292 (2.1 M 1.44 (10^{-4}) (12 - a) + 3.25 (b - 2) + 2.5 (c - 3))\} \dots\dots (4)$$

where:

- K = soil erodibility,
- M = soil texture grade (% silt + % dust) (100 - % clay),
- a = percentage of organic matter,
- b = the soil structure code, and
- c = permeability code of the soil profile.

Length and Slope Factors (LS).

Length and slope factors can also be calculated directly with the following equation:

$$LS = \sqrt{X(0.0138 + 0.00965S + 0.00138S^2)} \dots\dots\dots(5)$$

Where:

X = the length of the slope (m) and S = the slope (%).

Plant Factor and Management (C)

The value of C factor is the ratio between the land losses due to erosion in an area unit (tons ha-1) in the land cultivated with a certain management system and the land loss from the standard plot in adjacent places.

Conservation Treatment Factor (P)

The value of P factor is the ratio between the land losses due to erosion in an area unit (tons ha-1) in the land using a specific soil conservation technique and the land loss from the standard plot in adjacent places.

Tolerable Erosion (ETol)

Tolerable erosion (ETol) was calculated based on the equation proposed by Wood and Dent (1983)⁷. Tolerable erosion also take into account the minimum soil depth, soil formation rate, equivalent depth, and land resource life in the following equation:

$$ETol = \frac{B - D_{min}}{UGT} + LPT \dots\dots\dots(6)$$

Where:

- ETol = tolerable erosion (mm year-1),
- DE = equivalent depth {effective soil depth (mm) x soil depth factor based on sub-soil order},
- Dmin = minimum soil depth (mm),
- UGT = soil age, and
- LPT = soil formation rate.

RESULTS AND DISCUSSION

Land Use

Land use in Krueng Seulum watershed is currently dominated by secondary forest land use for an area of 7,001.01 ha, followed by scrub area of 5,988.15 ha, dry land farming area of 5,631.19 ha, pasture area of 5,033.27 ha, rice field area of 1,455.15 ha, and residential area of 335.58 ha. In detail, from the total area of Krueng Seulum watershed (25,444.35 ha), the land use for dry land farming commonly found is the cocoa-based farming without soil and water conservation treatments (Table 1).

Table 1. Land use in Krueng Seulum watershed

No	Types of Land Use	Area	
		Ha	%
1	Settlement	335.58	1.32
2	Rice field	1,455.15	5.72
3	Grazing lands	5,033.27	19.78
4	Scrub lands	5,988.15	23.53
5	Dry Land Agriculture	5,631.19	22.13
6	Secondary Forest	7,001.01	27.51
	Total	25,444.35	100.00

Sources:⁴, Field Analysis (2012).

Erosion Prediction

Erosion Prediction in Krueng Seulum watershed was analyzed on each land unit (LU) with multiple parameter values using the USLE. The calculation and observation results indicated that the parameter value of every sample point in each land unit showed significantly varied erosion values

Sufficiently high agricultural production can continuously be maintained if erosion on each land unit is smaller than the tolerable erosion (ETol), and if erosion is greater than ETol, the land productivity will immediately decline, so that high production can only

be maintained for just a few years and eventually the agricultural land becomes unproductive or even a critical land.

On the basis of the differences of the mixed planting density and cover crop characteristics, the erosion prediction value is determined by the value of C (the level of plant management) namely the value of C factor for in which the values for cocoa monoculture (C) , cocoa + banana (CB) and cocoa + areca nut (CA) are 0.206, 0.119 and 0.114 respectively, while the value of P (without soil conservation treatment) is 1.0 to obtain the erosion prediction value on the type of cocoa-based mixed farming (Table 3 and Figure 1).

Table 2. The Summary of the Predictive Erosion Condition Existing in Krueng Seulum watershed

LU	Land Use Type	Area (Ha)	Value CP	Erosion (A) (tons ha ⁻¹ year ⁻¹)	Total Erosion (tons year ⁻¹)
1	Grazing Land	847.68	0.100	29.65	25,137.16
2	Scrub Land	972.13	0.300	87.98	85,524.70
3	Dry Land Agriculture (CA)	889.54	0.300	105.30	93,670.51
4	Secondary Forest	398.79	0.005	1.51	603.87
5	Grazing Land	2,716.15	0.100	12.48	33,885.21
6	Scrub Land	4,301.19	0.300	30.71	132,084.45
7	Dry Land Agriculture (C)	2,671.05	0.300	27.60	73,711.46
8	Secondary Forest	2,502.72	0.005	1.31	3,286.70
9	Grazing Land	834.81	0.100	9.92	8,278.30
10	Dry Land Agriculture (C)	1,687.23	0.300	29.88	50,412.49
11	Grazing Land	166.14	0.100	45.37	7,538.03
12	Scrub Land	174.09	0.300	135.39	23,569.79
13	Secondary Forest	419.87	0.005	1.26	531.07
14	Grazing Land	546.47	0.100	62.98	34,418.03
15	Scrub Land	267.87	0.300	190.63	51,064.94
16	Dry Land Agriculture (CB)	295.94	0.300	118.19	34,977.93
17	Secondary Forest	1,559.24	0.005	2.64	4,118.27
18	Secondary Forest	285.84	0.005	4.49	1,284.05
19	Scrub Land	192.59	0.300	292.98	56,424.77
20	Secondary Forest	550.12	0.005	4.87	2,677.19
21	Secondary Forest	498.09	0.005	3.68	1,833.17
22	Secondary Forest	876.06	0.005	6.94	6,078.12
Total Erosion					731,110.19

Table 3. Prediction of erosion on each type of cocoa-based mixed farming in Krueng Seulimum watershed

Slope (%)	Farming Types	CP Value	Erosion (ton ha ⁻¹ year ⁻¹)	ETol (ton ha ⁻¹ year ⁻¹)
7	Cocoa Monoculture (C)	0.206	33.41	39.11
	Cocoa + Banana (CB)	0.119	19.30	39.11
	Cocoa + Areca nut (CA)	0.114	18.49	39.11
14	Cocoa Monoculture (C)	0.206	98.27	39.78
	Cocoa + Banana (CB)	0.119	56.77	39.78
	Cocoa + Areca nut (CA)	0.114	54.38	39.78
21	Cocoa Monoculture (C)	0.206	135.89	40.96
	Cocoa + Banana (CB)	0.119	78.50	40.96
	Cocoa + Areca nut (CA)	0.114	75.20	40.96

Table 3 shows that the erosion prediction values of cocoa-based mixed farming on slopes of 14% and 21% are still above the ETol values. Therefore, to achieve sustainable cocoa-based farming in Krueng Seulimum watershed, it is crucial to implement agro technologies.

The agro technologies that can be applied at both sites are fertilizing and soil and water conservation. Complete fertilization was conducted for C, CA, and CB to increase production, so that the desired farm income can be achieved.

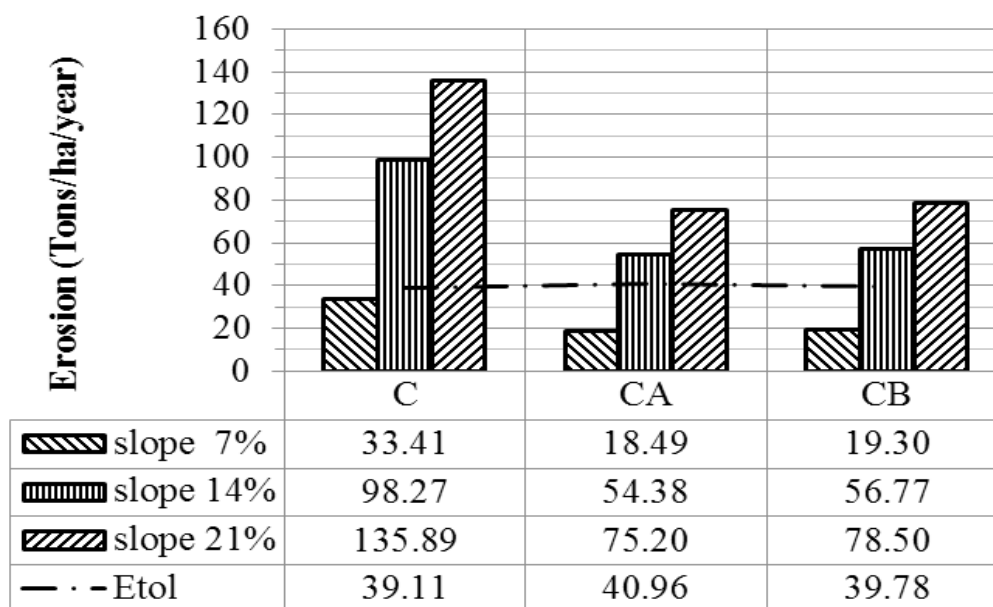


Figure 1. Erosion Prediction on various types of cocoa-based farming and land slopes.

To achieve high productivity in line with the genetic potential, fertilization is a major determinant especially on the balance dose and fertilizer type, but not on a high level dose (Thong and Ng, 1978)⁸.

The suggested agro technologies for soil and water conservation applied on cocoa monoculture (C), Cocoa+Banana (CB) and Cocoa+Areca nut (CA) are fertilization, bund terracing with terrace strengthening plants (slope 14%) and bund terracing with terrace

strengthening plants added with 6 tons of mulching ha⁻¹ year⁻¹ (slope 21%) so that the erosion obtained is less than or equal to ETol (erosion ≤ ETol). Bund terracing on slopes of 14% was able to reduce the erosion from

98.27 to 39.36 tons ha⁻¹ year⁻¹ (C), 54.38 to 27.91 tons ha⁻¹ year⁻¹ (CA) and from 56.77 to 38.64 tons ha⁻¹ year⁻¹ (CB) (Table 4).

Table 4. Erosion on the cocoa-based farming after the application of agro-technologies in Krueng Seulimum watershed

Slope (%)	Farming Types	CP Value	Erosion (tons ha ⁻¹ year ⁻¹)	
				ETol
7	Cocoa Monoculture	0.206	33.41	39.11
	Cocoa and Banana	0.119	19.30	39.11
	Cocoa and Areca nut	0.114	18.49	39.11
14	Cocoa Monoculture	0.103	39.36	39.78
	Cocoa and Banana	0.060	38.64	39.78
	Cocoa and Areca nut	0.057	27.91	39.78
21	Cocoa Monoculture	0.031	16.33	40.96
	Cocoa and Banana	0.018	16.03	40.96
	Cocoa and Areca nut	0.017	11.58	40.96

Bund terracing (P = 0.5) with 6 tons mulching ha⁻¹ year⁻¹ (P = 0.3) on a 21% slope can reduce the erosion from 135.89 to 16.33 tons ha⁻¹ year⁻¹ (C), from 75.20 to 11.58 tons ha⁻¹ year⁻¹ (CA) and from 78.50 to 16.03 tons ha⁻¹ year⁻¹ (CB) (Table 4).

Bund terracing with grass planting for terrace strengthening can technically be done in the research location. The purpose of this planting is to make terrace not easily slide by rainwater collision or runoff. *Setaria spacelata* grass species can be grown as terrace amplifier plant because this grass has low, tied and spread growth, as well as dense fibrous roots so that it can reduce runoff, and filter soil particles carried by runoff, and reduce erosion, while other uses of *Setaria spacelata* grass is as a provider of feed ingredients for cattle. Bund terracing plus mulching of 6 tons ha⁻¹ year⁻¹ on slope of 21% can protect the soil surface from direct blows of rain droplets so that it can reduce the occurrence of splash erosion in addition to reduce the rate and volume of surface runoff (Suwardjo, 1981)⁹. Abdurachman and Sutono (2002)¹¹ also added that the role of mulch in suppressing the erosion rate is determined by the mulch material, percentage of ground cover, mulch layer thickness and mulch resistance to decomposition.

CONCLUSIONS

The highest predictive erosion values of several

land uses in Krueng Seulimum watershed occur in scrub land use (30.71 - 292.98 tons ha⁻¹ year⁻¹) and in dry land agriculture (27.60 - 118.19 tons ha⁻¹ year⁻¹). The erosion prediction values on pasture and forest land uses ranged from 9.92 - 62.98 tons ha⁻¹ year⁻¹ and 1.26 - 6.94 tons ha⁻¹ year⁻¹. The suggested agro technology for soil and water conservation at the 14% slope is bund terracing + grass planting for terrace strengthening that can reduce the erosion prediction rate to be lower than that of the ETol (39.78 tons ha⁻¹ year⁻¹) that is 39.36 tons ha⁻¹ year⁻¹ for the cocoa monoculture, 27.91 tons ha⁻¹ year⁻¹ for cocoa + areca nut, and 38.64 tons ha⁻¹ year⁻¹ for cocoa + banana farming, while the suggested agro technology for soil and water conservation at the 21 % slope is bund terracing + grass planting for terrace strengthening + the provision of 6 tons mulching ha⁻¹ year⁻¹ that can also reduce the erosion prediction rate to be lower than that of the ETol (40.96 tons ha⁻¹ year⁻¹) that is 16.33 tons ha⁻¹ year⁻¹ for the cocoa monoculture, 11.58 tons ha⁻¹ year⁻¹ for cocoa + areca nut, and 16.03 tons ha⁻¹ year⁻¹ for cocoa + banana farming.

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Creative Economic Strategy Base on Local Wisdom- An Effort in Increasing Global Competitiveness in Malang Raya

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ABSTRACT

The current study aimed to update the data and identify the creative economic characteristics in Malang Raya. Objects of the research were all actors and drivers of the creative economy in Malang Raya, which composed of 16 sub-sectors. The research method used was the analysis of SWOT and IFAS-EFAS. The population and sample were MSMEs engaged in the Creative Economy in Malang Raya. Other studies results showed that the number of Creative Economy actors in Malang were 2,191 sub-sectors. Of the 16 sub-sectors of creative economy, craft, fashion, and culinary were the most potential sub-sectors to be developed whose the average number of workers was about 1-4 people. Based on IFAS and EFAS analysis, the Creative Economy strategy position in Malang Raya was in Stable Growth Strategy that is a growth required to be pursued in stages based on the priority scale.

Keywords: *Creative Economy, MSMEs, Competitiveness, Local wisdom*

INTRODUCTION

The change on the map of global economy has put creativity into the basic capital in facing global challenges. In globalization context, competitiveness is the key to success and survival¹. Creative Economy Agency (*Bekraf*) noted that it had a contribution of 8.6% to Indonesia's Gross Domestic Product (GDP) in which in 2014 was IDR 784.82 trillion to be IDR 852 trillion in 2015. Departing from this point, Creative Economy has found its existence and has been developing. Meanwhile, John Howkins in his book 'the Creative Economy: How People Make Money' firstly introduced the term of 'creative economy'. He defined Creative Economy as "economic activities in a society who spends most of times to produce ideas, not only do routine and repetitive things. The points stressed in the realm of

Creative Economy are the ideas, talents and creativity as vital elements²". The Trade Ministry of the Republic of Indonesia (2008) formulated Creative Economy as effort sustainably developing the economy through creativities by utilizing renewable resource reserves under a competitive economic climate³.

Related Researches

According to the Report of Creative Economy in 2010 issued by the United Nations Conference on Trade and Development (UNCTAD), Creative Economy is a concept that continues to grow based on the creative assets that have the potential to generate economical growth and progress. In general, in the world there has been an economic shift, from the Agricultural Economy era to the development of Creative Economy.

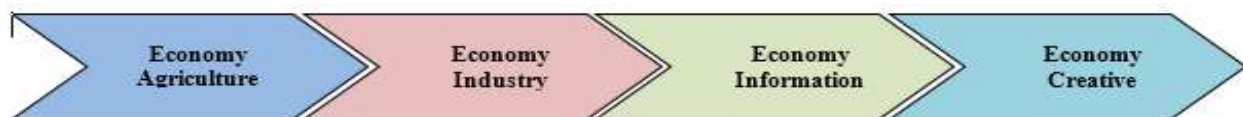


Figure 1. Economic Era Shift

Wroblewski (2014) stated that creative industries are defined as industries that come from the utilization of individual creativity, skills, and talents to create prosperity and employment by producing and empowering individual's creativity and creative power. The Creative Economy Development has been mandated through Presidential Instruction No. 6 of 2009. Indonesian President instructed 27 leaders of Ministries and Agencies as well as all leaders of governors, regents/mayors of Indonesia. Government supported Creative Economy Development policy in 2009-2015, namely the development of economic activities based on individual's creativity, skills, and talents to create individual's creativity and creative power which have economic value and influence Indonesian people welfare⁴.

A study on the Creative Economy Development has been carried out by Yuslinaini and Nasir (2017)⁵ who concluded that in increasing the competitiveness of Creative Industry, Aceh Besar Regency Government had carried out several programs for instance business assistance through entrepreneurial management training and provision of revolving funds. Meanwhile, Sumartik's research (2016) concluded that government role is very important in addition to strengthen the companion institutions of MSMEs and increase the capacity building. A research has been conducted by Utami (2014) on the Creative Economy Development in Bandung City showed that there were 15 tourism clusters potential for creative industries in Bandung City. The strategy implemented for the sake of development was to observe the readiness of region, such as the accessibility from and within the region with all its physical and non-physical facilities and supporting infrastructure.

Research Methodology

The population and sample of the present study

were MSMEs engaged in the Creative Economy in Malang Raya. It used a mixed approach which combine the quantitative and qualitative approaches. Techniques of data collection used were, a) Literature Study, b) Observation, c) Questionnaire, and d) Focus Group Discussion. Data analysis techniques used were SWOT and IFAS-EFAS analysis. SWOT analysis was used to interpret the potentials of Creative Economy in Malang Raya. The four SWOT factors consist of Strength, Weakness, Opportunity, and Threat, each of which would be analyzed based on the components of each factor for further assessment determining the research objects position on the SWOT quadrants. These analyses aimed to find out the basic strategies of problem solving that can be applied qualitatively.

IFAS (Internal Factor Analysis Summary) analysis is a summary or formulation of internal strategic factors in the framework of Strength and Weakness, while EFAS (External Factor Analysis Summary) is summary or formulation of external strategic factors in the framework of Opportunity and Threat. After all SWOT, IFAS, and EFAS analysis were carried out, the Creative Economy Development strategy was developed improving the competitiveness.

RESULTS AND DISCUSSION

According to the data, Malang City had the greatest number of Creative Economy actors compared to Malang Regency and Batu City. About 50% of total number of Creative Economy actors performed their business in Malang City. This condition was very possible to influence other regions which tried to continue developing the potentials of Creative Economy in their own regions, so that the Creative Economy growth and development can be maximized properly. The following chart is showing the number of Creative Economy.

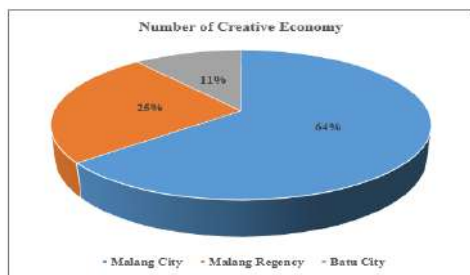


Figure 2: Number of Creative Economy

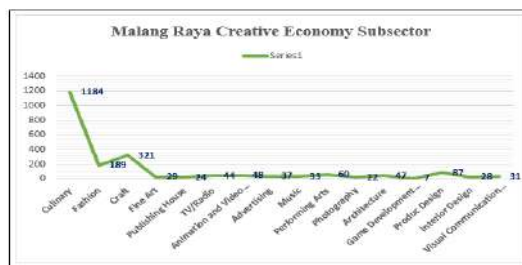


Figure 3: Creative Economy Sub-sectors in Malang Raya

In connection with the characteristics of the Creative Economy in Malang Raya, the researchers did assessment on some indicators including number of sub-sectors, workers, and marketing area. According to the figures above, it may be explained that culinary sub-sector was the most superior and desirable. The culinary development that was diverse made it always be an

alternative choice of people to start their business.

The following graph is showing the Creative Economy of each sub-sector in Malang Raya. The data processed show that in Malang City and Malang Regency, the most desirable sub-sectors after culinary were craft and fashion sub-sectors.

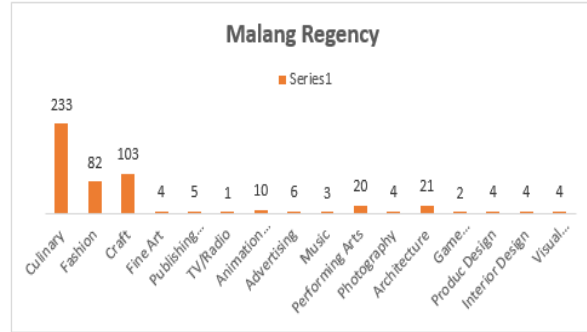


Figure 4: Creative Economy Sub-sectors in Malang City Whereas in Batu City, the most desirable sub-sectors after culinary were craft and communication design sub-sectors.



Of the 16 sub-sectors managed by the Creative Economy Agency (Bekraf), the three sub-sectors are culinary, fashion, and craft contributed to the Gross Domestic Product (GDP) of the Creative Economy by 41.69%, 18.15%, and 15.70%, respectively. According to national data, the Creative Economy actors had averagely 1-4 employees. This condition reflects that the Creative Economy actors, in general, also had the same conditions, namely those in Malang had only, on average, 1-4 employees.

Figure 6: Creative Economy Sub-sectors in Batu City

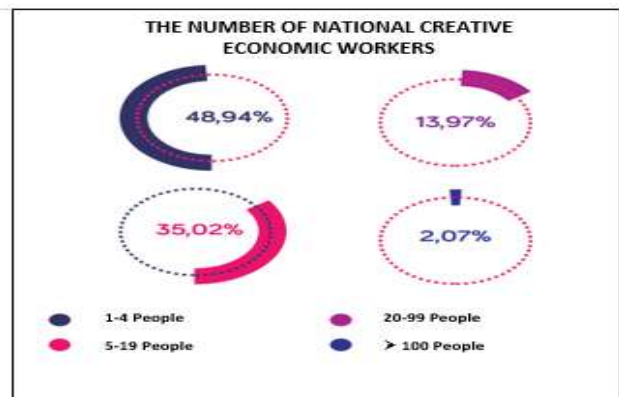
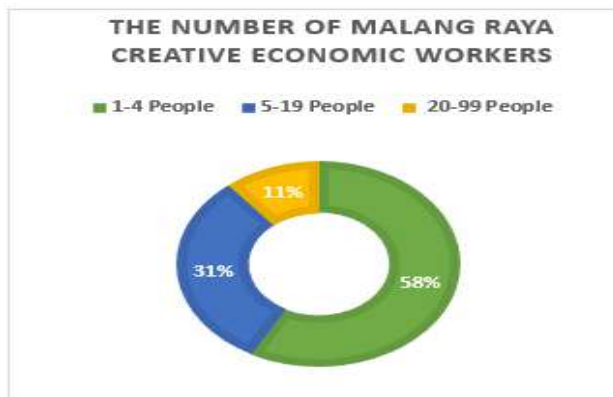


Figure 7: Numbers of Creative Economy Workers, Malang Raya and in Nationally

It is known that Malang was not much different from Indonesia as a whole in number of workers, that is, each company engaged in Creative Economy sub-sectors had 1-4 workers. Meanwhile, based on marketing characteristics in Malang Raya, it appears that both local

and regional markets are still superior. It shows that the creative economy in Malang particularly still required to be improved to be able competing in the global market. The following charts showing marketing area of Creative Economy actors in Malang Raya.

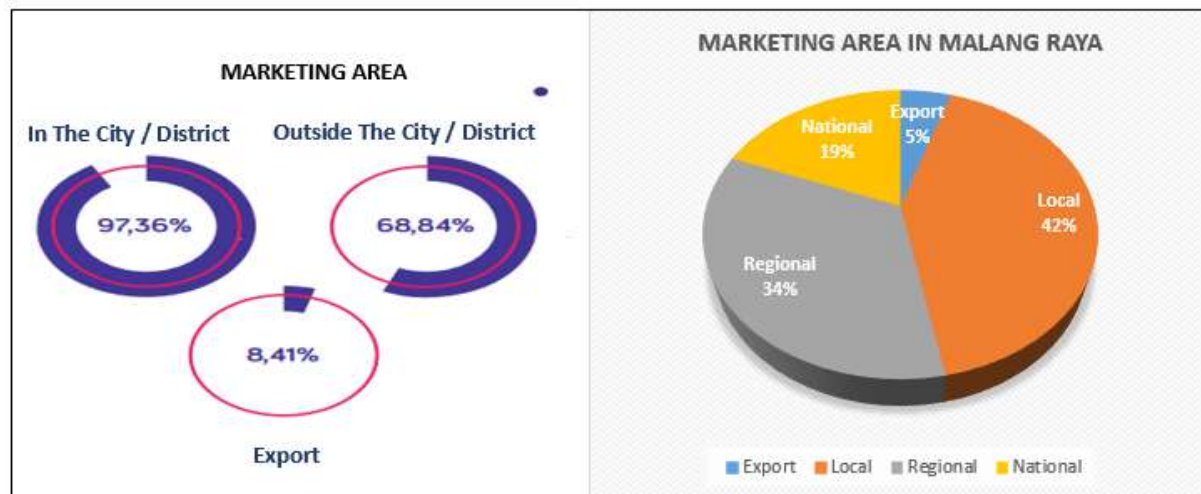


Figure 8: Creative Economy Marketing Area, Nationally and in Malang Raya

RESULTS OF SWOT ANALYSIS

The results of SWOT analysis related to the Creative Economy sub-sectors in Malang Raya showed that the craft, fashion, and culinary sub-sectors were the most potential sub-sectors to be developed. These three sub-sectors should be explored further creating a development model in accordance with local wisdom in Malang Raya. Craft sub-sector in Malang had a great potential to be developed. It, including ceramics, pottery, wood, furniture, and rattan, became into the spotlight of many researches given that it could be set as a trademark of Malang City. Ceramics from Dinoyo, for example, have long been known to have good quality amid other competitive products from other regions, especially China. In addition, what were no less interesting were *Topeng Malang* (Malang Masks), wooden furniture, and rattans which were produced into household furniture, as well as crafts which used recycled materials which were also increasingly in demand and growing rapidly in Malang City. Meanwhile, the fashion sub-sector also experienced significant growth. This potential has been getting bigger along with the proliferation

of online marketing media (internet). In addition, the development of the fashion industry, especially clothing in Malang, is very rapid in the last 10 years. The actors of the clothing and distribution industries continue to emerge in Malang, especially in Malang City which is very famous for its nickname as the city of education. Naturally, Malang City becomes a paradise and trend center for fashion enthusiasts. Finally, the culinary sub-sector had a number of creative economic actors and was most interested in because it was often visited by domestic and foreign tourists. Food business opportunity has been one of other familiar business opportunities and has become a very profitable business opportunity in Malang. The most prominent is the emergence of cafes in Malang Raya.

RESULTS OF IFAS ANALYSIS

This analysis was carried out on a current condition and situation faced by the Creative Economy actors in Malang Raya in carrying out their main activities. Following is the data from IFAS analysis.

Table .2 Internal Factors Analysis Summary (IFAS)

Question	Rating	Weight	Score
1. Strategic planning that is not too expensive and complicated	3.3	0.14	0.46
2. Low labor costs	2.8	0.12	0.33
3. The position of the company leader who comes from family members	3.15	0.13	0.42
4. Low competitiveness	2.65	0.11	0.30
5. Low skills and technology mastery	2.8	0.12	0.33
6. Low funding capacity	3.3	0.14	0.46
7. Management that is still done in traditional manner	2.9	0.12	0.35
8. Low production capacity	2.8	0.12	0.33
Total	23.7	1.00	2.98

Source: Processed data, 2018

Based on the results of the internal environmental analysis as shown in the table above, it can be seen that the total weighted value of IFAS is 2.98. This indicates that Creative Economy actors in Malang City were in a position that is good enough to further develop their business, but it can not rule out the possibility for them to remain alert to the existing weaknesses. Based on the results of the external environmental analysis as presented in the table above, it can be seen that from the multiplication of weights and ratings, the total weighted value is 3.75 for the EFAS Matrix. It depicts that Creative Economy actors in Malang City were in a very good position to further develop their business, but it can not rule out the possibility for them to remain alert to the existing weaknesses. According to the results of IFAS and EFAS analysis, strategies that can be developed for the three Creative Economy sub-sectors (craft, fashion, and culinary) to improve their competitiveness include: (1) improving human resources through training, workshops and work practices, (2) improve product branding through multimedia and social media, (3) making market center and trade center, (4) facilitation of IPR for business people, (5) facilitation of partnerships and collaboration between sectors, (6) facilitation of capital access, financing matchmaking, (7) facilitation of technology modernization, (8) making product standardization and competency certification for HR, and (9) improving competitive creative business climate

Strategic Position of Creative Economy Actors in Malang Raya

After analyzing both internal and external environment, the next step was to move the score into the IFAS-EFAS matrix. The total weighted value for IFAS is 2.98, while the EFAS score is 3.75, so that the position of the Creative Economy actors in Malang Raya in the IFAS/EFAS matrix is located at Quadrant I, at point B. At that point, the suitable strategy is Stable Growth Strategy. For more details, please look at the picture. Stable Growth Strategy is a growth that needs to be carried out in stages according to priority scale.

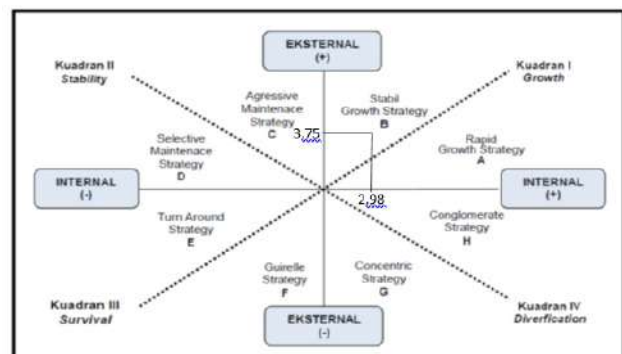


Figure 9. Position of Creative Economy Actors in Malang Raya

Based on the FGD results, it can be concluded that out of 16 creative economy sub-sectors, there are three sub-sectors that have the largest contribution in GDP, namely Craft, Fashion and Culinary. For these three sub-sectors, a strategy would be created and then the development model would be made in accordance with local wisdom in the following year. In general, the results of the FGD also concluded that the Creative Economy that will be developed in Malang Raya should be in accordance with the locality of Malang City, for

example crafts which become the hallmark of Malang is the craft of masks and batik with mask motifs. Mask is a product based on local wisdom in Malang.

CONCLUSION

Based on the discussion that has been described, it can be concluded as follows:

1. The number of MSMEs in Malang was 2,191 which were engaged in the creative economy and were distributed into 16 sub-sectors.
2. The characteristics of the Creative Economy in Malang Raya were assessed based on indicators, namely number of Creative Economy sub-sectors, number of workers, and marketing area, which show that the most potential Creative Economy sub-sectors in Malang were the craft, fashion and culinary sub-sectors whose average number of workers was 1-4 people. In addition, most of products of the creative economic sub-sectors in Malang Raya were in local markets.
3. Based on IFAS and EFAS analyses, the position of Creative Economy strategy in Malang Raya was in the Stable Growth Strategy, a growth that needed to be carried out in stages according to priority scale.
4. Strategies to increase competitiveness include: 1) Improving Human Resources through training, workshops and work practices, 2) Improve product branding through multimedia and social media, 3) Making market center and trade center, 4) Facilitation of IPR for business people, 5) Facilitation of partnerships and collaboration between sectors, 6) Facilitation of capital access, financing matchmaking, 7) Facilitation of technology modernization, 8) Making product standardization and competency certification for HR, and 9) Improving competitive creative business climate.
5. In general, the results of the FGD also concluded that the Creative Economy that would be developed in Malang should be in accordance with the locality of Malang.

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The Effect of Firm Decision Making of Risk Preference Concerning to Debt to the Firm Performance in Indonesian Stock Exchange

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ABSTRACT

How firm should act risk averse or risk taking of achieving its objective to maximize stockholder wealth is still puzzle. Firms with high financial performance may act risk averse, but underperforming firms act risk taking concerning to debt. This study proposes new approach of calculating firm risk preference concerning debt use variance of firm financial performance growth and firm leverage growth and also investigates how the effect of risk preference by the firms to the profitability i.e. earning per share (EPS). This study analyses 52 firms as sample with significance book value and the most active trading stocks of Indonesian Stock Exchange during 2007 to 2016. The result is firms with good financial performance and still act risk averse will gain increasing financial performance of earning per share (EPS). This study contributes new approach of calculating firm risk preference concerning debt use variance of firm financial performance growth and firm leverage growth. Also, it suggests that firms should always act risk averse concerning debt.

Keywords: *Risk averse, book value (BV) growth, debt to equity ratio (DER) growth, earning per share (EPS) growth*

INTRODUCTION

Firm objective should be to maximize stockholder wealth by maximize the fundamental price of the firm's common stock (equity), not just the current market price¹. There are several number of equity valuation approaches. Equity valuation methods by direct method use sales to calculate present value of future cash flows and there are also methods based on the dividend growth model or classic fundamental analysis. indirect methods are intended to rank stocks using price-earnings ratios or return-on-equity ratios combined with book-to-price ratios. Equity price-to-book value (PBV) or market-to-book ratio defined as stock price divided by stock book value². Firms that have a high market-to-book ratio tend to have lower leverage³.

When firm performance is higher than expected, firms and their managers would be risk averse⁴. A firm with better profitability, book value, and capability to pay debt has bigger chance to get or additional dent from external resources. The firm with better financial performance may have alternatives sources of debts because more external parties will offer loans, so that the firm may chose the most competitive sources

which are the less interest and the longer debt payment period. As a result, the firm may able to minimize the cost of debt and this will make the chance to get more profit will be easier. For firm with better firm financial performance should use the opportunity to expand its business, to increase profit, and to increase firm wealth value optimally. On the other hand, when firms are underperforming and threatened by bankruptcy they would be more inclined to risk taking⁵. Firms search for solutions to underperformance by using idle and potential resources⁶. The firm with poor profitability, decreasing book value, and the lowering capability to pay its debt, is difficult to get new or additional debts. The firm with poor financial performance have very limited chance to get alternative of lender which can be selected the debt with the least requirements. Because of the higher risk of not performing loans of the lender to give the loan to firm is higher so the cost of debt is higher and the more requirements. The bigger cost of debt will disturb the expected profitability of the business expansion. Therefore, firm with poor financial performance not to expand its business by acquiring new or additional debt, but they implement survive strategy by operating efficiency or other way to reduce the cost to make loss

reduction or to increase profit.

What decisions firms make when investing, and whether firms follow different decision making protocols according to industry type, following the behavioral theory of the firm⁷. McKinsey (2010) who studied of 1,000 large investment companies revealed that when companies act by reducing their bias influence during their decision making, they will get significant profit increase. However people have no ability to recognize themselves of their behavior bias when they make decision, they may realize that they make mistakes when unexpected losses or negative things have occurred. This study proposes new approach of calculating firm risk preference concerning debt by variance of firm financial performance growth and firm leverage growth and also investigates how: firm performance may be affected by book value (BV) and price to book value (PBV), and firm performance may be affected by firm risk preference of decision making under uncertainty concerning to debt. To identify how firm act risk averse or risk taking about firm leverage, this study uses the book value growth as firm performance and debt to equity growth as firm risk preference.

Theoretical Review

According to the Pecking Order Theory, firms may be financially constrained due to the information asymmetry between managers/owners and investors, and so firms adopt a hierarchy in selecting sources of finance. In the first place, firms use retained profits; if it is necessary to turn to external finance, firms use debt with little or no risk, which usually corresponds to short-term debt; and in the last place, firms will select external equity. The more profitable is the firm, the greater is its capacity to accumulate retained profits, and so there is less need to turn to external finance.

Trade-Off Theory claims that firms have an incentive to turn to debt as the generation of annual profits allows benefiting from the debt tax shields. According to static tradeoff theory, firms should continue to use debt until the marginal benefit of using debt is completely offset by its marginal cost. The benefit of using debt includes interest deduction from taxable income and alleviation of free cash flow problem arising from the agency relation between managers and stockholders. The cost of using debt includes increasing the chance of financial distress and possibly causing asset substitution

and underinvestment problem arising from the agency relation between stockholders and bondholders.⁸

Empirical studies find profitable firms were more conservative in debt use⁹ documents evidence that corporate leverage is generally below the optimal level as predicted by the static trade-off theory¹⁰. The profitable firms exhibit even more debt conservatism. The findings are called “under-leverage puzzle” because they directly contradict the static trade-off theory. The pecking order theory cannot explain the findings either because these debt conservative firms are not as conservative in issuing new equity. In their effort to explain the under-leverage puzzle, argue that firms’ market timing behavior is responsible for the observed negative correlation between leverage and profitability¹¹. A positive earnings shock lifts stock price and creates an opportunity to issuing over-valued stock, which in turn brings down the leverage. This market timing explanation is not satisfactory because it violates efficient market hypothesis.

Explain the relationship between leverage and profitability in a dynamic tradeoff model¹². They argue that more profitable firms invest more and need more financial flexibility for future investment opportunities. Therefore, they use less debt to conserve borrowing capacity. This explanation is convincing because it is derived from maximization of a firm’s objective function within the constraints realistically present in our business world. This explanation is also supported by empirical evidence that more profitable firms tend to invest more and firms with more investment opportunities tend to maintain a low leverage. While dynamic tradeoff represents one piece of the debt conservatism puzzle, it falls short of solving it completely. This is evident from empirical studies regressing leverage against profitability and a set of other proposed determinants: including current and expected investment in the set does not reverse the sign of the estimated slope on profitability; even though these variables are significantly negative and do reduce the magnitude and statistic significance of the negative slope on profitability.

Book price can be decomposed into an enterprise book-to-price (that potentially reflects operating risk) and a financial leverage component (that reflects financing risk), with differences between the book value and the price of equity attributable only to the operating component. With this accounting for net debt, the book-

to-price ratio for net debt is unity and the standard measure of “market” leverage – net debt relative to the market value of equity – is economic leverage, but only if the market prices risk appropriately¹³. study of CEO risk aversion to be more pronounced in firms with high leverage or high default probability, find that the CEOs of these firms reduce firm risk, even in the presence of strong risk-taking incentives.¹⁴

Data and Method

This study uses 52 firms as sample during period of 2007 until 2016 listed in Bursa Efek Indonesia (Jakarta Stock Exchange) which are have significance book value and the most active trading stocks. The firm act risk averse when it did not add debt to expand its business although its financial performance increased. The firm act risk taking when its add debt to expand its business although its financial performance decreased. This study use firm financial performance indicators: book value (BV), price to book value (PBV), and earning per share (EPS).

Debt to equity ratio is used as the indicator of firm leverage. The risk preference of firm management in decision making under uncertainty concerning debt calculated as follows:

$$Riskaverse = \frac{B_n - B_{n-1}}{B_{n-1}} - \frac{DER_n - DER_{n-1}}{DER_{n-1}} > 0 \quad \dots\dots (1)$$

$$Risktaking = \frac{B_n - B_{n-1}}{B_{n-1}} - \frac{DER_n - DER_{n-1}}{DER_{n-1}} < 0 \quad \dots\dots (2)$$

With PBV = Stock Price/(Total Assets – Total Liabilities) per share, DER = Total Debt/Total Equities, PBV_{tn} is price to book value in the accounting period that ending on year tn, PBV_{tn-1} is price to book value in the accounting period that ending on year tn-1, DER_{tn} is debt to equity ratio in the accounting period that ending on year tn and DER_{tn-1} is debt to equity ratio in the accounting period that ending on year tn-1.

The decision making concerning debt of the firm performance be analyzed by growth of firm earning per share (EPS growth) which be calculated:

$$\frac{EPS_{n+1} - EPS_n}{EPS_n} = EPSGrowth \quad \dots\dots (3)$$

With EPS Growth is percentage of increase/decrease of earning per share of year tn+1 compare to year tn.

RESULTS AND ANALYSES

From table 1 we find that: book value (BV) is not correlate to price to book value (PBV), book value (BV) is not correlate to debt to equity ratio (DER), book value (BV) is not correlate to price to earning ratio (PER), price to book value (PBV) is not correlate to price to earning ratio (PER), price to book value (PBV) is not correlate to debt to equity ratio (DER), book value (BV) correlate to earning per share (EPS), and price to book value (PBV) correlate to earning per share (EPS).

Table 1: Pearson correlation

		EPS	BV	PER	PBV	DER
EPS	Pearson Correlation	1	.788**	-0.053	.321**	0.017
	Sig. (2-tailed)		0	0.228	0	0.703
	N	520	520	520	520	520
BV	Pearson Correlation	.788**	1	-0.062	-0.037	0.003
	Sig. (2-tailed)	0		0.157	0.404	0.94
	N	520	520	520	520	520
PER	Pearson Correlation	-0.053	-0.062	1	0.035	-0.021
	Sig. (2-tailed)	0.228	0.157		0.425	0.628
	N	520	520	520	520	520
PBV	Pearson Correlation	.321**	-0.037	0.035	1	.104*
	Sig. (2-tailed)	0	0.404	0.425		0.018
	N	520	520	520	520	520
DER	Pearson Correlation	0.017	0.003	-0.021	.104*	1
	Sig. (2-tailed)	0.703	0.94	0.628	0.018	
	N	520	520	520	520	520
** Correlation is significant at the 0.01 level (2-tailed).						
* Correlation is significant at the 0.05 level (2-tailed).						

The effect of book value (BV) and price to book value (PBV) to the earning per share (EPS)

With 95% confidence level, from Table 3, R Square 0.74 means that 74% of firm performance are influenced by book value and price to book value and the rest of 26% are influenced by other factors. $F = 751.25$ and significance at 0.0000 less than alpha 0.05. It means that dependent variable firm earning per share (EPS) growth are affected by book value (BV) and price to book value (PBV) growth. Book value (BV) and price to book value (PBV) growth have positive effect on EPS Growth at significance 0.000 at constant = -90.418 and $b_1 = 0.181$

and $b_2 = 22.933$. This study reveals that earning per share (EPS) increase when book value (BV) and price to book value (PBV) increase.

With 95% confidence level, from Table 3, R Square 0.40 means that 40% of firm performance are influenced by risk preference by firm managements and the rest of 60% are influenced by other factors. With $F = 314.77$ and significance at 0.0000 less than alpha 0.05, it means that dependent variable firm EPS growth are affected by how risk preference by management concerning debt. Risk averse have positive effect on EPS Growth at significance 0.0000 at constant = - 0.1990 and $b = 3.0130$.

The effect of firm decision making concerning to debt to the earning per share (EPS)

Table 2. BV growth and PBV growth

Dependent variable	n		Unstandardized coefficients B	t	Sig.	R Square	F	Sig.
EPS Growth	519	Constant	-90.418	-5.049	0.000	0.744	751.25	0.000
		BV Growth	0.181	35.978	0.000			
		PBV Growth	22.933	15.735	0.000			
Confident level at 95%								

The study reveals that: firm with additional debt by less percentage than the additional performance (risk averse) will increase its earning per share, and firm with additional debt by more percentage than the additional performance (risk taking) will decrease its earning per share.

Table 3. Risk averse

Dependent variable	n		Unstandardized coefficients B	t	Sig.	R Square	F	Sig.
EPS Growth	467	Constant	-0.1990	-0.69	0.000	0.4030	314.77	0.000
		Risk averse	3.0130	17.74	0.000			
Confident level at 95%								

Interpretation

This study finds that book value (BV) and price to book value (PBV) affects earning per share (EPS). Logically we can conclude that because of two variables have significance effect to the other variable, the two variables (BV and PBV) may have correlation. We may also conclude because BV is part of PBV, which is PBV is counted by dividing stock price by book value (BV), so that BV should have correlation to PBV. But that

commonly correlation between book value (BV) and price to book value (PBV) is not occur, we predict that stock prices are the cause.

In Indonesian Stock Exchange, the stock indices are increase significantly during year 2011 (after financial crisis) until 2016 because of the large proportion amount of foreign fund entry to stock market. The stock prices have increased significantly moved beyond its fundamental value which is stock book value. This study

indicates that firm with good financial performance and still act risk averse will gain increasing its financial performance. Contrary, the firm with less financial performance and act risk taking will suffer decreasing financial performance. The firm performance is calculated by how much growth of its book value (BV) and the firm risk taking is calculate by how much growth of its debt to equity ratio (DER). When firm have positive variance of book value (BV) growth compare to the debt to equity ratio (DER) growth, it means that the firm is risk averse. Other firm which have negative variance of book value (BV) growth compare to the debt to equity ratio (DER) growth, it means that the firm is risk taking. The more positive variance of book value (BV) growth compare to the debt to equity ratio (DER) growth is the more profitable firm which reflect on increasing its profitability earning per share (EPS).

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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Analysis of Relationship Cost with Household Food Security of Farmers in Padang City

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ABSTRACT

This study aims to (1) determine the proportion of food cost to total household expenditure of farmers in Padang according to income groups, (2) determine the level of consumption of food (energy and protein) household farmers in Padang based on income level and (3) analyze conditions of household food security of farmers in Padang according to the income group. This research using survey method, whereas the data used includes primary and secondary data. Secondary data was obtained from the results of publications and information related to food security, while primary data was obtained through direct interviews with household members of farmers. The number of research samples was 60 households. Data analysis was done by disaggregation of household groups into low, medium and high groupings.

The results showed that the characteristics of household farmers in the low, medium and high groups are not significantly different. Whereas in the average proportion of food cost to total expenditure has decreased, where in the level of low income to the proportion of food cost was 64%, medium was 62% and high was 61%. The level of consumption of food (energy and protein) at home based on the low, medium and high income level are dominant in good conditions, such as 70.83%, 62.50% and 100%. The condition of household food security in the high income level group was better where there are no more households with the condition of food insecure and insufficient households. According to Engel's Law, are the higher income of a person (household), then the percentage of cost on food will be smaller as evidenced in this study.

Keywords: Food Security, Farmer's Household, Engel's Law, Disaggregation

INTRODUCTION

Food Security is divided into four levels are national, regional, household or family food security and individual food security¹. Although nationally, it has good for household food security, but it does not guarantee regional food security even households or individuals. This happens because household's level has different availability and access to food in each region. Household food security is related to the ability of households access to food adequately to fill the needs of all family members².

Household food security is reflected in several indicators, including: (1) the level of damage to crops, livestock and fisheries, (2) decreased food production, (3) the level of food availability in households, (4) the

proportion of food cost to total expenditure, (5) fluctuations in the prices of main foods commonly consumed by households, (6) changes in social life, such as migration, selling / mortgaging assets, (7) the state of food consumption of eating habits, quantity and quality of food, and (8) nutritional status³

The consumption pattern, especially household food consumption, is one of the determinants in health and intelligence levels and household productivity. Consumption and cost data can be used for a research on the application of economic law. According to Ernest Engel, in⁴ known as Engel's Law that if tastes are not different the percentage of cost on food will decrease with increasing income. Therefore, the composition of household expenditure can be used as a measurement to assess the level of welfare of the population, the

lower percentage of cost on food on total expenditure, level of the economy of the population is much better. However, increasing of food cost, it will decreasing the prosperous of the household concerned. In conditions of limited income, the fulfillment of food needs will take precedence, so in low income groups, a large part of their income will be used to buy a food.

Research Methodology

Research Location and Time

This research was conducted in 2 sub-districts of Padang City. Determination of the location of this study was carried out by purposive sampling, and the determination of the research location that was carried out purposively.

Population and Sample

The population used in this study is all farm households in 2 selected sub-districts in Padang City. The distribution of samples based on their kelurahan can be seen in the following Table 1.1:

Table 1. Distribution of Sample in 2 selected sub-districts

Sub-districts	Sub-subdistricts	Amount of Farmer Group	Distribution of Sample (%)	Amount of Sample each Sub-subdistricts
Koto Tengah	Total	67	46,85	28
	LubukMinturun Sungai Lareh	42	62,69	18
	Air Pacah	25	37,31	10
Kuranji	Total	76	53,15	32
	Gunung Sarik	27	35,53	11
	Sungai Sapih	49	64,47	21
Total		143	100 %	60

Source : Central Bureau of Statistics Padang City, 2012

Data Analysis and Processing Methods

Processing Method

The data obtained were analyzed by qualitatively and quantitatively. Qualitative analysis is used to see an overview of household characteristics of farmers / respondents based on income level and several other related things will be described descriptively. Whereas quantitative analysis is presented in the tabulation form to simplify data into a form that is easy to read in this study.

Data Analysis

Analysis of Farmer Household Income with the Household Farmer Expenditure Approach

To find out the total amount of farmer’s household expenditure can be known by calculating food and non-food expense. The formula used is:

$$TP = P_p + P_n$$

Where:

TP : Total expenditure offarmer’s household (IDR/ Month)

P_p : Food Expense (IDR/Month)

P_n : Non-food Expense (IDR/Month)

Proportion of Food Cost on Total Household Farmer Expenditures

The proportion of food expense on total household expenditure of farmers can be calculated by the following formula:

$$PF = x 100\%$$

Dimana:

PF : Proportion of food expense (%)

P_p : Food Expense (IDR/Year)

TP : Total Expense (IDR/Year)⁵

Level of Farmer Household Food Consumption (Energy and Protein Consumption)

Consumption of farmer’s household food can be seen from the quantity and quality of food consumption. Food quality reflects the ingredients of nutrients needed to body contained in food, while the quantity of food reflects the amount of each nutrient in a food. To achieve a good nutritional state, the quality and quantity must be fulfilled.

Farmer Household Food Security Analysis

The grouping of households using these two indicators can be seen in Table 2. There are four levels of food security, like: food-resistant households, food-vulnerable households, food deficiency households and food insecure households.

Table 2 Measurement of the degree of household food security

No	Energy Consumption Level	Proportion of Food Expense	
		Low (< 60% total expense)	High (≥ 60% total expense)
1	Sufficient (> 80% energy sufficiency)	Food-resistant	Food-vulnerable
2	Deficiency (≤ 80% energy sufficiency)	Food deficiency	Food insecure

Source²

RESULT AND DISCUSSION

Characteristics of Households Farmer Based on Income Level

Household Characteristics of respondent farmers covering the identity data of respondents and household members of respondent farmers. These data include age,

education level of household and housewife, number of household members, farming experience and the area of land owned.

Age

Farmer household characteristics seen from the age of farmers who are divided by income level can be seen in Table 1.3 below

Table 3: Farmer household characteristics seen from the age of farmers based on income level

Age Characteristics (Year)	Level of Income						Total	%
	Low	%	Medium	%	High	%		
29 – 44	13	54,17	5	20,83	3	25	21	35,00
45 – 60	9	37,50	14	58,34	8	66,67	31	51,67
≥ 61	2	8,33	5	20,83	1	8,33	8	13,33
Total	24	100	24	100	12	100	60	

Source: Research Result, 2013

Education

Formal education affects to a person’s knowledge and perception. The average education of farmers as a whole is 9 years, or the level of junior high school. This means that the level of education of farmers is still low. The low level of education of farmers caused by several things, including limited cost, the environment, and the lack of facilities when they should go to school. Farmer households are generally low-income families, so they sometimes prefer to only complete 9-year education

or junior high school, then they work to fulfill their needs. The environment is also as an influential factor. Someone who lives in an educated environment will be more motivated to get a higher education like people in their environment, and also.

Number of Household Members

From the data obtained in the research location the number of respondent household members can be seen in Table 4 below.

Table 4. Characteristics of the Number of Respondent Household Members in Padang City Based on Income Level

CharacteristicsJART (person)	Income Level					
	Low	%	Medium	%	High	%
2 – 3	5	20,83	2	8,33	3	25,00
4 – 5	13	54,17	13	54,17	7	58,33
≥6	6	25,00	9	37,50	2	16,67
Total	24	100	24	100	12	100

Source: Research Result`, 2013

Farming Experince

Based from the experience of farming, it can be seen that generally the respondent farmers have experience in farming between 1-17 years there are 38 people or 63.33%.

Land Area

Details about the farm land area of the respondent farmers are in general the average respondent farmer has an area of 0.1-0.5 hectares 73.33% or as many as

44 people, while the farmer respondents who have an area of more than or equal 0.6 hectares only 16 people or 26.67%.

Proportion of Food expense on Total Household Expenditures of Farmers in Padang City Based on Income Level

The proportion of food consumption expense is the percentage of food expense compared to the total expenditure. The following can be seen in Table 5 the proportion of farmer’s household expenditure

Table 5 Proportion of Food expense on Total Household Expenditures of Farmers in Padang City Based on Income Level(%)

Household Expenditures of Farmers	Income Level					
	Low	%	Medium	%	High	%
Food	1.126.825	64	1.723.008	62	2.379.950	61
Non Food	629.083	36	1.071.354	38	1.509.375	39
Total	1.755.908	100	2.794.363	100	3.889.325	100

Source: Research Result, 2013

Food Consumption Level

Food consumption is a number of food and beverages eaten / drunk by the population / individual in order to fill their physical needs. Energy and protein consumption can be used to measure food quantity. In Table 6 the following is the average energy consumption and protein of the respondent's household and the level of nutritional sufficiency

Table 6 Average of Energy and Protein Consumption and Nutrition Consumption Level (TKG) Farmer Households in Padang City Based on Income Level (Kapita / Day)

Information	Income Level					
	Low		Medium		High	
	Energy (kkal)	Protein (gram)	Energy (kkal)	Protein (gram)	Energy (kkal)	Protein (gram)
Consumption	2.096,01	45,36	2.031,82	46,65	2.029,20	47,94
AKG Recommended	2.000,00	52,00	2.000,00	52,00	2.000,00	52,00
% TKG	104,80	87,24	101,59	89,71	101,46	92,19

Source: Research Result, 2013

Household Food Security

Distribution of farmer household food security can be seen in Table 7 below

Table 7 Distribution of Food Security of Farmer Households in Padang City Based on Income Level (%)

Information	Income Level						Household Total	%
	Low		Medium		High			
	HH	%	HH	%	HH	%		
Food-resistant	8	33,33	8	33,33	6	50,00	22	36,67
Food-vulnerable	15	62,50	16	66,67	6	50,00	37	61,67
Food deficiency	0	0,00	0	0,00	0	0,00	0	0,00
Food insecure	1	4,17	0	0,00	0	0,00	1	1,66
Total	24	100,00	24	100,00	12	100,00	60	100,00

Source: Research Result, 2013

Based on the data above, it can be known the status of household farmer food security. Households with food vulnerable status have the largest distribution with a percentage of 61.67% of all farmer households. The second, households with food security status with a percentage of 36.67%, household food insecurity has a percentage of 1.66% and households food deficiency with a percentage of 0%. In other words there were no households that are in food insecure. From the information it can be seen that the majority of respondents have a proportion of food expense > 60% of total expenditure, and a sufficient level of energy consumption (> 80% of energy sufficiency).

CONCLUSION AND RECOMMENDATION

Conclusion

Based on the results of the study on the analysis of the relationship between the proportion of food expense and consumption on household farmer food security in Padang City, the following conclusions can be obtained:

Characteristics of household farmers in Padang City based on income level are : low income level, household farmer characteristics in terms of age between 29-44 years at 54.17%, education of average high school graduates at 37.50% and housewife. The average of junior high school is 41.67%, the average number of household members is between 4-5 people at 54.17%, the average farming experience between 1-17 years is 70.84% with the average land area owned 0.1-0.5 Ha as much as 79.17%. Medium income level, household farmer characteristics seen in terms of age between 45-60 years at 58.34%, education of farmers on average Elementary School / SR and Junior High School (SLTP) graduates at 33.33% and average housewife at junior high school at 41, 67%, the average number of household members is between 4-5 people at 54.17%, the average farming experience between 1-17 years is 54.17% with an average land area of 0.1-0.5 Ha as much as 66.67%. High income level, household farmer characteristics viewed from age in terms of 45-60 years of 66.67%, education of the average farmers in elementary / SR and junior high schools at 41.67% and average housewife of high school graduates at 41, 67%, the average number of household members is between 4-5 people at 58.33%, the average farming experience between 1-17 years is 66.67% with an average land area of 0.1-0.5 Ha as much

as 75%.

The size of the average proportion of food and non-food expenses of farm households based on income level are: low income level , the average proportion of food and non-food expenses is 64% and 36%. Medium income level , the average proportion of food and non-food expenses is 62% and 38%. High income level, the average proportion of food and non-food expenses is 61% and 39%.

The level of consumption of food (energy and protein) of household farmers based on income level are: in the low income strata for energy sufficiency in general it is good where 17 households or 70.83% and for protein sufficiency in general good category as many as 5 households or 20.83 % seen from $TKG \geq 100\%$ AKG. In household levels, the average energy sufficiency is in good category where 15 households or 62.50% and moderate protein sufficiency was 20 households or 83.34% seen from $TKG > 100\%$ AKG. In the high income level for energy sufficiency was 12 or 100% of households with good status seen from $TKG > 100\%$ RDA and for protein sufficiency was 11 or 91.67% of households with medium status seen from $TKG 80-99\%$ RDA.

The conditions of farm household food security based on income level are : low and medium income level in general are food vulnerable at 62.50% and 66.67% of farmer's households. The high income level is generally food resistance by 50%, vulnerable to 50% food.

RECOMMENDATION

Recommendation that researchers can submit are:

The proportion of large food expense in farmer households means that households have a low level of welfare, therefore there is a need for an effort to increase income to achieve household food.

The number of households with food vulnerable status means that households have fulfilled their energy needs, but with a high proportion of food. Therefore, to reduce the proportion of household food can be done by increasing household income. Increased income can be done, among others, through productive farm business training by the government, for example housewives, so that it will be expected to become employment

opportunities for housewives and can increase the income for their households.

It is expected that there will be research on other food security, for example in terms of availability and distribution.

Conflict of Interest: Nil

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Ethical Clearance: IJRISE Journal Reviewer Committee

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The Transformation of Free Aceh Movement (GAM) from Armed Movement into Political Movement: Strategy and Challenges of Aceh Party (PA)

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ABSTRACT

This study aims to describe the transformation process of GAM's Free Aceh Movement from armed movements to political movements after the signing of the Peace MoU between GAM and the Government of Indonesia, and to investigate the strategies and challenges of GAM through the Aceh Party (PA) in carrying out the Aceh peace vision and mission to prosper the people of Aceh. This research was conducted using a qualitative approach and analyzed interpretatively on the data collected through interviews, observation, and documentation. This study found that the transformation of GAM into PA has colored politics in Aceh where the presence of local political parties that can attract the attention of the Acehnese so far has dominated the victory both in the executive and legislative ranks. Many GAM figures occupy strategic positions in the Aceh government. The PA strategy is political empowerment from grassroots to elites at the provincial level by appointing charismatic fighters, representative political recruitment between young and old groups, as well as the right political education methods in the community to attract PA victory. However, in the 4-period political journey of PA in realizing the mandate of peace, has experienced several challenges. Internal conflicts both horizontally and vertically have colored the political dynamics of PA. The right political education is expected to realize the expectations of the people of Aceh in accordance with the mandate of the Helsinki Peace MoU.

Keywords: GAM, PA, Aceh Peace

INTRODUCTION

The prolonged conflict that occurred in Aceh was a bloody conflict that lasted more than 30 years. The post-independence conflict of the Republic of Indonesia began with Tengku Muhammad Daud Beureueh's rebellion to the proclamation of the Free Aceh Movement (GAM) led by Hasan Tiro on December 4, 1976, and ended in the signing of the Memorandum of Understanding between the Government of the Republic of Indonesia and the Free Aceh Movement (GAM) on 15 August 2005 in Helsinki-Finland.

The MoU above provides an opportunity for GAM to participate in the political process in Aceh through the establishment of local political parties. This means that GAM has gone through a process of transformation from an armed movement to a political movement. GAM for

more than 30 years has succeeded in influencing the people of Aceh, especially in rural areas. So that during the conflict, fighting for the ideology of GAM's struggle to separate itself from the Indonesian government was increasing (Stange & Patock, 2010)¹.

THEORETICAL FRAMEWORK

Some research results and theories underlying the writing of this article include:

Understanding of politics:

Politics

Misunderstanding or understanding in a narrow scope about politics will obscure political objectives and all activities that are related to politics, including political education. Etymologically politics comes from

Greek, precisely from the word “policy” which means city state. The political understanding of the experts among them was raised by Laswell & Kaplan (1950)² who gave a classic understanding that “politics as who gets, what, when, and how.”

Furthermore, according to Miriam Budiardjo (2008)³ politics is a variety of activities in a social system that involves the process of determining and implementing goals. Here are some perspectives or approaches to politics³:

1. Moral Perspective / approach (good / bad): Politics of something noble because it is an attempt to achieve a good and just social order. Politics in bad form is the struggle for power, property and throne.

2. Conflict Approach: Politics is an activity to obtain and maintain interests (material and non-material). In an effort to find and maintain interests, conflicts, conflicts (physical and non-physical) arise.

3. Functional approach: Politics is the activity of formulating and implementing general policies (concerning the allocation of importance values formulated in public policy).

4. Discourse analysis approach: Politics is an activity to discuss situations from a political phenomenon, for example, the process of selecting ministers.

Various political definitions put forward by experts with various similarities and differences in understanding. Usually differences arise from attitudes that only emphasize certain political aspects or tendencies to see the point of view of the originator himself. In the past few decades, politics was identified only by activities controlling the state. But in its development politics encompasses all political decisions and various political problems in achieving noble goals, namely people’s welfare. For example, a community group that has been made aware of the effects of pollution from factories around the settlements that have caused citizen poisoning, will trigger political problems involving company owners, the government, and the community.

In Kartono (2009)⁴, the definition of politics is more dynamic and operationally functional, namely:

1. All decisions and implementation of future community development efforts.

2. Decision concerning self-fate.

3. Dynamic activities and processes of human behavior with an emphasis on political aspects of social problems.

4. Activities to uphold or change existing social conditions by using power.

5. All efforts and struggles of individuals and groups by using various tools, ways and alternatives of behavior to achieve one goal in accordance with the ideas of individuals and groups in an integral authority system in the territory of the country.

Political Party

Political parties are generally regarded as a manifestation of a political system that is modern or that is in the process of modernizing itself. So in the new countries the party has become a political institution that can be found.

According to Budiardjo & Anwar (1998)⁵ political parties are an organized group whose members have the same orientation, values and ideals, the aim of this group is to gain political power and win political position, and implement their policies. While according to Carl J Frieddrich in Budiardjo & Anwar (1998: 160)⁵, a political party is a group of people who are organized in a stable manner with the aim of seizing or maintaining control over the government for the leadership of their party and based on this control gives the party members fair and material use. But this is not a reason for R. Soltau defines a political party that is a group of citizens who are more or less organized, who act as a political entity and by utilizing their power to vote with the aim of controlling the government and explaining their general policies.

Aceh Conflict

The conflict between Aceh and the central government is multi-dimensional and rooted, meaning that the current conflict relationship cannot be separated from the conflict that occurred before the consolidation of Aceh. Darul Islam Government / Indonesian Islamic Army (DI / TII), revival of Free Aceh (AM), Aceh as Military Operations Area (DOM), Free Aceh Movement (GAM), Implementation of Martial Law, Civil Emergency and memorandum of understanding (MoU) between government RI and GAM are coordination lines that are not interrupted from the Aceh conflict.

MoU Helsinki

The Helsinki MOU according to the Ministry of Communication and Information of the Republic of Indonesia is a memorandum of understanding or agreement between Indonesia and the Free Aceh Movement (GAM) which was signed jointly in Helsinki Finland. The Government of the Republic of Indonesia and the Free Aceh Movement (GAM) affirmed their commitment to resolve the Aceh conflict in a peaceful, comprehensive and sustainable manner for all⁶. Furthermore, the parties to the conflict are determined to build mutual trust because they believe that only with a peaceful settlement of the conflict will it be possible to rebuild Aceh.

Aceh Party (PA)

The Aceh Party (PA), formerly known as the Free Aceh Movement Party (GAM), was once transformed into the Independent Aceh Movement Party. PA is one of the local political parties in the province of Aceh, Indonesia (Wikipedia: 2018). The party first participated in the 2009 Indonesian Legislative General Election and the Aceh provincial parliamentary elections, chaired by Tengku H. Muzakir Manaf, with the attorney Kamaruddin Abubakar. In the 2009 elections, the Aceh Party won a majority of votes in the province of Aceh with 47% of the seats available but in the 2014 election it was only able to win 26 seats from 81 seats.

The vision of PA is to build a positive image in political life within the framework of the Unitary Republic of Indonesia. As well as implementing party mechanisms in accordance with existing rules, and upholding the Helsinki MoU.

Political Education

Political education in English is called political forming, the word forming refers to the desire to form political people. Political education is one form of adult education⁴. This education is not intended only to form political intellectuals that are isolated from the surrounding community, but rather to emphasize individual relations with other individuals, and individuals with society in their environment, in a political context related to socio-economic-cultural aspects, in the midst of emerging conflict situations because of various kinds of differences or plurality in society. Next we review some definitions of political

education according to experts.

According to Rusadi Kantaprawira⁹ (2004: 55) political education is to increase people's knowledge so that they can participate optimally in their political systems. In accordance with people's sovereignty or democracy, the people must be able to carry out the duties of participation. Meanwhile, according to Almond & Powell (1975)⁷, political education is a part of political socialization that specifically forms political values, which shows how each society should participate in its political system.

Method

The research approach uses qualitative approaches that describe or describe problems by looking at phenomena and problems through the actual description. The data collection techniques used interview with elements of the Aceh Transition Commission (KPA), the TNI, the Community, the Government, former GAM, and Aceh Party Candidates. Furthermore, the researchers also observed the phenomenon of the change in the Free Aceh Movement to become a political movement. The third step is to study the documents related to the research, including the Law, Perpres, and also journals about GAM's struggle.

DISCUSSION

The Process of GAM Transformation

GAM's actual transformation has begun in stages, but it always fails and leads to gunfire. But the tragedy of the December 26, 2004 earthquake and tsunami brought about a tremendous disaster but also brought extraordinary goodness. The peace that the people of Aceh craved, finally realized with all the consequences. Disputed weapons turn into arguments, the wilderness becomes the negotiating table, emotional physical change becomes rational, and selfishness becomes humanist. The transformations that occur are 2 types of segments:

GAM Transformation in Society

GAM transformation into the community was a peace process in the Helsinki MoU after the GAM signed it, requiring GAM to reintegrate into the community. After GAM was dissolved they returned to ordinary people who could live safely without being hunted by fear like during a conflict. Many of the former GAM members,

when they returned to the community, returned to their old professions that had been abandoned, for example as farmers, fishermen, builders, traders, and also taught at dayah.

Even though in the Helsinki MoU agreement it was stated that former GAM and conflict victims must be given adequate services, but most of them did not expect the government too much. They just hope that they can live in peace and harmony.

GAM Transformation in Political Movement

Changes to political movements need to be done with smart steps and a natural approach, therefore, the need for involvement of charismatic figures in the community are needed. They can bring simple political methods that can be accepted by the Acehnese who are mostly apathetic about the situation of peace.

Political movements have been carried out and have been relatively successful which is marked by the end of the physical war, followed by the formation of local political parties in Aceh, including the Aceh Party. The following is the opinion of one of the figures of PA on political development in Aceh. According to him the development of GAM in politics has experienced rapid development because political management has changed verbally and no longer on the issue of Aceh independence, but has developed on the issue of autonomy, regional development and community empowerment. Aceh's political movements highlight more peace and development in areas affected by conflict.

Political Strategy of PA

GAM transformation from an armed movement to a political movement requires a strategy in its implementation. Among the strategies that exist is to avoid throwing issues = issues with indications of thuggery and field intimidation, on the contrary, the following strategies of PA as one of the mandates of GAM:

Comply with Vision and Mission

The establishment of this party is a commitment of peace agreement between RI and GAM which is also a tangible manifestation of armed political transformation towards civilized democratic politics. The substance of the agreement provides some authority for Aceh which is explained in Law No. 11 of 2001 concerning

the Government of Aceh as the basis for running the government. But the substance is incomplete, so the PA Law is formulated as well as its implementation as aspired, namely Self Government. For this reason the PA formulates the Vision and Mission as follows:

Vision: Build a positive image of political life within the framework of the Unitary Republic of Indonesia and implement the party mechanism in accordance with the rules of the Unitary Republic of Indonesia by upholding the Helsinki memorandum of understanding signed on August 15, 2005 between the Indonesian government and the Free Aceh Movement.

Mission: Transform and / or develop a vision to think the Acehnese people from the image of the revolution to the image of party development in terms of transparency for the prosperity of the people of Aceh, especially and the Indonesian people in general.

Formulating PA Winning Steps

The followings are steps that has been formulated based on the interviewed with elements of party members, party leaders, party sympathizers, and common members of society.

At least there are 4 steps:

1. The mass base of PA is very real and heterogeneous in social status so the PA must do political empowerment from grassroots to elite. PA candidates are recruited with the sikureung team system. This system is known conventionally as PA politics. It was said that PA conveyed its political vision and mission through appropriate political education within the party and the general public, both through training of cadres and party sympathizers and also through social media to the general public.

2. PA must have a strong political engine that can work effectively and quickly without a complicated bureaucracy. The political machine is not only in the political structure, but also involves, KPA, youth, women, intellectuals and also elements of the ulama.

3. Creating a positive political atmosphere that shows the political power that is considered capable of bringing political and economic change in Aceh.

4. Creating Positive Political Culture by giving a model to society that PA is the right party controlling

Aceh. The models are elite of PA, cadres and sympathizers.

CONCLUSION AND RECOMMENDATIONS

Changing the direction of GAM's movement to politics shows that the existence of the struggle still exists and continues to grow because as long as it still does not provide justice for the people of Aceh in the economy and welfare. But the challenge ahead is that representatives of the people must explore the science of legacy and become legislators who are concerned with the people. So the task and responsibility of GAM in this case PA is able to absorb the aspirations of the people and accommodate the interests of the people.

Some recommendations are:

1. To the board members both DPRA / DPRK from PA do not forget the promises that have been given to the people

2. The management of the PA and the Council of PA cannot prioritize the interests of the group alone, but think of the interests of the people who have entrusted to represent the aspirations of the people.

3. To the regional leaders from PA for the welfare of all Acehnese people regardless of class and party.

4. Political education will be the recommended choice in spreading the PA's vision and mission.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Analysis the Competitive Advantage of Arabica Gayo Coffee Organic in Indonesia

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ABSTRACT

Coffee is one of the strategic and important commodities in Indonesia. In Aceh Province, coffee is one of the local superior commodities. Coffee production is a driving force in the economy of Aceh, particularly in the Gayo highlands. With no large private or state-owned plantations, this \$150 million export industry is built on a foundation of smallholder farmers managing small plots that average less than 1.5 hectares with few inputs. With high international demand for the high body, the coffee receives high export prices and an efficient value chain with high levels of competition for coffee at various points along the process delivers a large proportion of that to the farmers. This study takes an in-depth look at the Arabica Gayo coffee organic sector, particularly focused on the current state of the coffee value chain and its implications for the competitive advantage of Arabica Gayo coffee organic which is originated from Indonesia.

Keywords: *Arabica gayo coffee organic, value chain, farmer field school, and competitive advantage.*

INTRODUCTION

Indonesia is one of the largest coffee exporting countries in the world^{1,2}, and the Aceh province is the biggest producer of Arabica Gayo coffee organic³⁻⁵. Coffee production is a driving force in the economy of Aceh, particularly in the Gayo highlands. With no large private or state-owned plantations, this is \$150 million popular export commodity to several countries like Europe Union, USA, and Japan⁶ and built on a foundation of smallholder farmers managing small plots that average less than 1.5 hectares with few inputs and basically haven't economically income⁷.

The global coffee market is quite problematic for growers. Global coffee prices have been subject to wild fluctuations, with resulting issues for smallholder farmers reliant on this crop for their income⁸. These problems are caused by unfair trade^{9,10}, various constraints on production, processing and marketing so supply chain sustainability of arabica Gayo coffee organic is very hard to the realization^{7,11}. These days, the emergence of new paradigms and approaches of extension are shifting towards to the empowerment of farmers¹². Farmer Field

School (FFS) is one of the models and approaches widely used¹³.

The research objective are to analyse the competitive advantage of arabika Gayo coffee organic which is originated from Aceh province, Indonesia. Besides, to identify factors influencing knowledge, attitude and practice on coffee management practices among FFS participants.

Related Research

The theory of 'comparative advantage' says that any trade is better than no trade and that if everyone concentrates on the one thing that they are best at, and sells this on the market then everyone will benefit^{14,15}. However other studies show an increasing gap between poor and rich in the developing countries¹⁶. Competitive advantage generally goes to the stronger economy, not the weaker¹⁴.

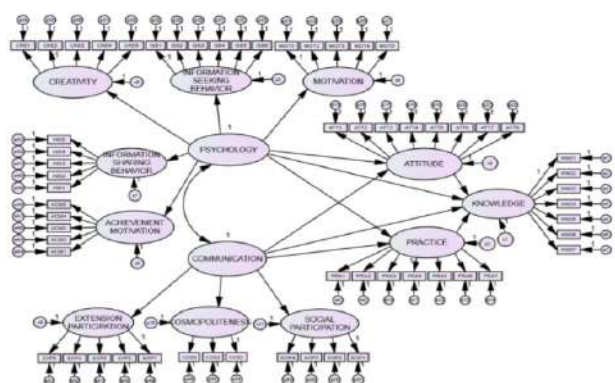


Figure 1: Conceptual framework

Clearly there is a need for an expanded research program on alternative extension model in developing countries, and yet research on extension is chronically under-funded¹⁷. The FFS approach is generally considered to build on the critical theoretical framework of ‘knowledge and human interest’.

Several studies of global value chains in the coffee and other agricultural commodities^{18, 19, 20} have highlighted the shifting nature of corporate control due to weakened state regulation and disintegration of international conventions²¹ and increased the power of large corporate roasters within their supply chains²².

Proposed Method

Structural Equation Modeling

This study uses quantitative research by blending three research methods, namely, exploratory research, descriptive research, and causal research²³. Likewise; the multivariate technique such as structural equation modeling is deployed in this study for data analysis²⁴.

System Dynamic Approach

In sustainability perspective of Arabica Gayo coffee organic, the main activities were to mapping supply chain structure which is including all actors and activities¹⁴. The output from the first step would be used as input to system dynamic approach^{14, 25}.

Research Methodology

The study has employed a descriptive research design. As far as sampling is concerned, based on the pilot learning of coffee FFSs, from Aceh Tengah and Bener Meriah district. Totally 302 respondents were selected based on the simple random sampling method²³. Data were analyzed using different quantitative and qualitative statistical procedures and methods.

RESULTS AND DISCUSSIONS

A sample of 302 participants (45.36% male, and 54.64% female) participated in the study. Age range was from 25 to 35 years old. Results suggested that individuals had a high knowledge and experience with the product category (i.e. organic coffees). The mean value for product knowledge is five on a Likert scale of seven points and the size of individual coffee fields varied between 0.5 and 10 ha; less than 1% of the members had more than 5 ha of coffee.

Knowledge and Human Interest

The theoretical model proposed in this research (see Figure 1) suggests the use of structural equations modeling. The results of the SEM model demonstrates that all of the goodness-of-fit indexes were within the recommended ranges. Thus, the result of testing the structural research model was acceptable²⁶.

Table 1. Comparisons of goodness-of-fit indices of SEM models

GOF Indices	Criterion Guidelines	SEM Results
Chi-square (χ^2)		
Chi-square		209.415
Degree of freedom		92
Probability	p>.05	.000
Absolute fit measures		
GFI	>.80	.871
RMSEA	<.10	.087
RMR	<.05	.026
SRMR	<.05	.044
Normed chi-square	<3	2.415
Incremental fit measures		
NFI	>.90	.914
CFI	>.90	.923
Parsimony fit measurement		
AGFI	>.80	.825
PNFI	>.50	.743

Based on this model, the relationships between the constructs as reflected in the hypotheses statements are shown in Table 2.

Table 2. Testing the hypotheses of the structural research model

Hypothesized Path	Std. Estimate	Critical Ratio	Hypothesis
H1: Psychology -> Attitude	0.797	16.756***	Supported
H2: Psychology -> Practice	0.606	9.564***	Supported
H3: Communication -> Attitude	-0.260	-2.709 (ns)	Not Supported
H4: Communication -> Practice	0.477	5.182***	Supported
H5: Psychology -> Knowledge	0.984	9.514***	Supported
H6: Communication -> Knowledge	0.691	11.103***	Supported
H7: Attitude -> Knowledge	0.082	1.293 (ns)	Not Supported
H8: Practice -> Knowledge	0.339	5.673***	Supported

***significant at $p < 0.01$, ns: not significant

Table 2 shows that the standardised estimate (β) of the path between psychology and attitude (0.797), psychology and practise (0.606), communication and practice (0.477), psychology and knowledge (0.984), communication and knowledge (0.691), and practice and knowledge (0.339) were significant. Therefore, Hypothesis 1, 2, 4, 5, 6, and 8 were supported. Hypothesis 3 and 7 was not supported as the p-value was not significant.

Supply Chain Structure

The value chain for Arabica Gayo Coffee Organic is difficult to generalize, as farmers, collectors, and aggregators play a broad range of roles simultaneously. Figure 2 provides a generalized picture of the flow. Core actors handle the coffee, while supporting actors provide services to core actors.

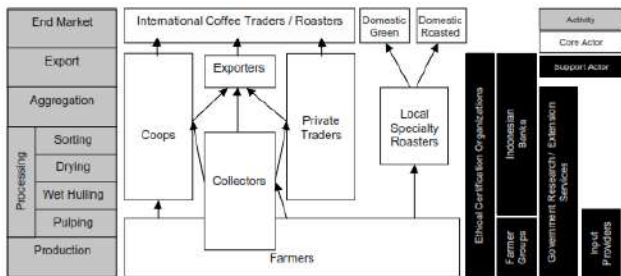


Figure 2: Arabica gayo coffee organic value chain

In this research, basic problems on arabica Gayo coffee organic supply chain structure was the gap of quality specification and benefit among each actor⁷. The business activities in the Gayo highlandshave existed in a long time, but until now it has not given better livelihood for farmers, although several certifications have been implemented, for instance, the fair-trade,

organic,geographic indicationand rain-forest.

This occurred due to the unfair trade conducted by the buyers⁹, so necessary a real effort to solve that problem by fair benefit distribution for each actor.

Most of the farmers work in a very isolated way reducing their chances to be more competitive. Social organizations try to organize them to get them certified, this statement is supported by¹⁰ while they state that most buyers collude to keep farmers isolated and hence get better prices. The Fairtrade Foundation state that the certification is needed because the little knowledge that farmers have of the market and this leaves them in disadvantage²⁷.

CONCLUSION

This research concluded that farmer’s psychology, communication, and practice in coffee management practices were the most important independent variables which had significant influence on the knowledge of Farmer Field School (FFS) members. basic problems on arabica Gayo coffee organic supply chain structure was the gap of benefit among each actor and quality specification. Most of the farmers work in a very isolated way reducing their chances to be more competitive.

One of the strengths of any research is to recognize its limitations. The first limitation relates to sampling. Thus, the sample used in this study does not represent the population of the Indonesian coffee organic. The second limitation relates to the variables contained within the research model. The study focuses on coffee industry in Indonesia area.This research could be replicated in other developing countries to find out the structure

of competitive advantage in different geographic areas. Conducting such studies could enhance the representativeness of the results in developing countries.

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An Analysis of Culture Value in Adat Bak Poe Teumeureuhom, Hukom Bak Syiah Kuala, qanun Bak Putro Phang, Reusam Bak Binatara

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ABSTRACT

The cultural unity is in the language, religion and customs of Aceh. Acehnese communicate using Acehnese language, there also containing the meaning of proverb which has cultural value. *Nariet Maja* is a word or proverb in Acehnese life. *Hadih maja* contains a philosophical element which is used as advice or explanation and warning as a guide in life. In this study the researcher would like to analyze cultural value in *Hadih maja*. The majority of Aceh's tribe is Muslim. The study is conducted to find out two objectives to point out the system of community life in Aceh based on customary and religious law and to analyze the cultural value of Aceh Community. The significance of this research is expected the culture value in *hadih maja* is clear; for example it can pointed out *hadih maja* "Adat Bak Poe Teumeureuhon" is meaningful. This study will focus on analyzing of cultural value in *hadih maja* "adat bak po teumeureuhon, hukom bak syiahkuala, qanun bak putoe phang, reusam bak bintangara" through cultural view in Aceh. The technique of data collection used in this study was document review. It states that document review is "of collecting data by reviewing existing documents". The result show that Acehnese Adat is closely related to religion as the customary law comes from the *Shari'a* and *Shari'ah* from the books of Allah. Experience of Islamic law will be smoother, if the custom and the role of indigenous institutions are improved. The community as a unity of human life interacts and behaves to obey a system of certain customs that are continuous, where every member of the community acts and behaves according to what has been outlined and set forth in the system of values and norms owned by society.

Keywprds: *Islamic law, Religion, Aceh Community.*

INTRODUCTION

One of the tribes that has many culture is Aceh. Aceh is the name of an indigenous tribe that inhabits in coastal areas and some of them life in parts of the villages of Aceh province. The majority of Aceh's tribe is Muslim. Actually, the descendant of Acehnese consists of various tribes and nation. The binding of Acehnese cultural unity is in the language, religion and customs of Aceh. Acehnese communicate using Acehnese language. In the Acehnese language, there also is containing the meaning of proverb which has cultural value. *Nariet Maja* is a word or proverb in Acehnese life. *Hadih maja* contains a philosophical element which is used as advice or explanation and warning as a guide in life.

According¹ Culture is one of the concept which is generally used for art, literature, philosophy and music

Nowadays culture is also address the values of attitude which is expressed as the form of art, stories and songs. According to Hofstede (1986)² there are two different kinds of culture: strong and weak. The value is agreed with and embedded in society, among organization, around the community which is rooted in a habit of life, belief, symbols which has certain characteristics that can be distinguished from one to another as a reference of behavior and responses of what are happening or will happen next. Indonesian is a nation that has many culture values because of the diversity of tribes in Indonesia. The variety of tribes in Indonesia makes a distinctive culture of each region. In this study the researcher would like to analyze cultural value in *Hadih maja* "Adat Bak Poe Teumeureuhon, Hukom Bak Syiah Kuala, Kanun Bak Putroe Phang, Reusam Bak Binatara".

Based on the research background, the research question on this study can be formulated. How is the system of community life in Aceh based on customary law and religious law? How to analyze the cultural value of Aceh Community is the culture in Aceh?

Research Objective concerning with the research problem, the study is conducted to find out two objectives below: To point out the system of community life in Aceh based on customary and religious law To analyze the cultural value of Aceh Community. The significance of this research is expected as below: If culture value in hadih maja is clear, It can pointed out this hadih maja Adat Bak Poe Teumeureuhon, Hukom Bak Syiah Kuala, Kanun Bak Putroe Phang, Reusam Bak Binatara” has meaningfull. Research Scope This study will focus on analyzing of cultural value in hadih maja” adat bak po teumeureuhon, hukom bak syiahkuala, qanun bak putoe phang, reusam bak bintangara” through cultural view in Aceh.

An Overview of Culture

Etymologically, in this case culture (adat) comes from Arabic meaning “custom”, so in etymology adat can be defined as a repetitive act and become a fixed and respected habit, habits become custom. Adat is a habit that grows and is formed from a society or region that is considered to have naili and upheld and in obedient community supporters.

According to Usman (2003)³ Which in his writing states that “adat” comes from the Arabic language which is the plural of “adah” which means the way or the habit. As has been explained that adat is a cultural idea that contains the values of culture, norms, customs and laws that are commonly done by a region. Well, usually when this custom is not adhered to it will be either written or direct sanctions given to the behavior that violates it. However Harjito Notopura “ Wulansari (2010)⁴ Customary law is an unwritten law, customary law with a characteristic that is the guideline of people’s life in organizing the justice and welfare of the community and is familial.

Empirical Method

The research method used in this study is descriptive qualitative. Qualitative method produces data in the form of information descriptively⁶. The data generated in qualitative research is usually expressed in prose

or written form Polkinghorne (2005)⁷ Based on the explanation above, then in this study the author intends to describe.

Technique of Data Analysis

The technique of data collection used in this study was document review. It states that document review is “a way of collecting data by reviewing existing documents”. This study also used triangulation technique i.e. the technique of checking the data validity by exploiting something else beyond that data, for data checking purposes or as a comparison of data. In qualitative research, the research instrument is the book in the library and technique of data analysis used in this study is interactive analysis.

Research instrument

Data and Sample The subject in this study is the cultural value of hadih maja“Adat Bak Poetroe Teumeureuhon, Hukom Bak Syiah Kuala, Kanun Bak Putroe Phang, Reusam Bak Binatara” with the culture value in Aceh. The subject focus on culture in Aceh. The setting of the subject is in Balai Bahasa Aceh, Banda Aceh⁸.

4 Empirical Result and Discussion

Theological construct in the hadih maja From the above definition it is clear that the hadih maja is actually a manifestation of the embodiment of local values of the Acehnese people related to the value of the substance of religiosity, which in this context is the teachings of Islam. The mention of “people’s trust” in Aboe Bakar’s definition indicates that the hadih maja are deeply rooted in the daily life of the Acehnese. The mention of “the belief of the people, also indicates that hadih maja has emerged long before Islam entered Aceh. This does not mean that Islam does not affect the content of wisdom in the hadih maja. Hadih maja is also an open and growing literature, therefore when Islam comes,

the substance of his teachings also includes a series of content of hadih maja. In Aceh appears an adage that customs and religions such as substances with their properties cannot be separated.

In this sense the customs concerning attitudes and behavior of someone followed by others in a long process of time, this shows the extent of understanding the customs. Each community or nation and state have

their own customs, one with the other must not be the same. Customs can reflect the spirit of a society or nation and is a personality of a society or nation. The degree of civilization, the way of life that a person can not eliminate the behavior or customs that live and take root in society.

Community System In Aceh

The behavior of citizens should not pass from customs that have long existed in a region, should not violate the provisions of customs that have been set. There must be manners towards others, respect for others. Because humans always interact or interpersonal relationships. The process of continuous interaction gives rise to certain patterns called way or usage, ie A uniform or customary way of beating whiting a social group⁹.

Customs have very strong ties in Aceh society, citizens support the existence of customs as long as they do not challenge with religion, Customs that do not violate the norms in Aceh. The Aceh community also organizes village administration to avoid disputes in Aceh society, Acehnese people also follow customs that have existed so far and will continue for generations. Soepomo says that between the customary legal system and the western legal system there is a fundamental difference¹⁰ this is because each system has a different background (although it is possible that there are equations, the pressure on the difference is mainly due to because western law is limited by continental European law alone, whereas there is also an Anglo-Saxon legal system which is a western legal system).

Customs in the Acehnese are very diverse and vary widely, such as peasant custom and others. The custom can be done originally not to challenge the Islamic religion and the Islamic law or the Islamic syari'at in Aceh. the custom in the Aceh has existed from their ancestors from generation to generation and until now is still in the life of Aceh society. Aceh society is included as a region that takes care of its customs, the proof of Aceh society is very identifiable with its custom and the strongest of customary customs in Aceh.

Aceh Society Based On Religious Law

Australia has experienced a massive loss of its indigenous language. It has been reported in The 2001 Australian State of the Environment Technical paper

tha Islamic legal values cannot be separated from the principles of its adoption, as well as the objectives of Islamic law itself. One of the principles in question is the use of norms as one of the considerations in establishing the law. As a habit in society, custom or 'uruf' becomes one of the social needs that is difficult to be abandoned andlounced. Implicitly implied by several verses of the law in al-quran, among others in the letter of al-Baqarah: 233: Meaning: and it is the obligation of fathers to feed and dress the mothers in a modest manner. Islamic law can be developed and applied in accordance with the tradition (adat) that has been running, the nature of Al-Quran and As-Sunnah only provide the basic principles and character of Islamic law universality.t:

The Culture of Aceh

Culture is a set of values and social beliefs that grow and are rooted in the life of society in Aceh. Customs are behavioral or behavioral practices that are further recognized, acknowledged and appreciated, but are also respected by most citizens. The customs have contributed greatly to the survival of society. The general function of custom is to realize a harmonious life in the life of society, so that in the language of hadih maja quoted earlier, "no tabeue and hana bateue" then what is called the customary institution? Technically this is answered by qanun aceh about aceh institutions, qanun no.9 year 2008 states that customary institution is one of customary community organization which in form by a society of customary law of course have certain region and own its own property, and barhak have authority to organize and manage and resolve matters relating to aceh customs.

Qanun adat institutions are derivatives of the law no.11 of 2006 on aceh government detailing clearly there are thirteen institutions in Aceh society that is:

1. The customary assembly of Aceh
2. Imeum mukim or other names.
3. Imeum chik or any other name.
4. Keuchik or another name.
5. Tuha peut or another name.
6. Tuha lapan or another name,
7. Imeum meunasah or any other name
8. Keujreun-blang or other names.
9. Panglima laot or other name.

10. Pawang Glee/ uteun or another name.
11. Petua seuneubok or any other name.
12. Haria peukan or other names, and
13. Syahbanda or any other name

The function of the above institutions is as a vehicle for public participation in governance, development, community development, and social settlement.

Discussion And Implication

The customary law is the law established by a person or group of persons in the form of rewards, assignments, or sanctions imposed on those who violate custom. The Acehese Adat is closely related to religion as the customary law comes from the Shari'a and Shari'ah from the books of Allah. Experience of Islamic law will be more smooth, if the custom and the role of indigenous institutions are improved. of Hadih Maja

Hadih maja as a 'proverb or phrase' is an oral cultural product in Aceh society may reflect the pattern of life or characteristics of Acehese society. Because, initially hadih maja is born based on one's intelligence in memaknai life experience and the wisdom-specific groups or individuals who abstracted from everyday life in a long time. Subsequently, certain phrases were created as a means of projection of 'forecasts of things to come', the endorsement of cultural institutions, education, and other functions as described above. In the life of the Acehese, hadih maja placed as a source of value and upheld its existence.

Aboe Bakar, an Acehese historian mentioned that hadih maja is a utterance originating from an ancestor that is not related to religion, but has something to do with the people's trust which can be taken to assure the serenity of life or to prevent the occurrence of disasters, such as custom at a ceremony, rules of abstinence, sayings about morals and others.

One of the most famous Acehese culturists, Ali Hasjmy, mentioned that hadih maja is a word or sentence of wisdom. While another historian, Ali, defines the hadih maja as the advice and advice of ancestors containing moral values and religious education. The elements of adat including the hadih Maja also facilitate the understanding of religious understanding in the community.

Practical Implication

Through the above rules, Islamic law can be described at the local conditions of each region. Furthermore, in the field of trade and economics, the fiqhiyah rules provide the breadth to create various transactions or cooperation, for example by the rule: The scholars classify custom ('uruf) into two kinds:

Al-'uruf Al-sahih, the correct custom, repeatedly done, accepted by the masses, not contrary to religion, in order to be manners and ancestral culture. For example give a gift to a parent or acquaintance within a certain time, halal bi halal during the feast, giving a reward or achievement prize.

Al-'uruf Al-fasit, which is a misguided custom that is practiced in a place and even its implementation, but contrary to religion, state law, and polite. For example gambling to celebrate events, as well as serving illegal drinks.

Limitation and Resulting Implication for the Future Research.

The community as a unity of human life interacts and behaves to obey a system of certain customs that are continuous, where every member of the community acts and behaves according to what has been outlined and set forth in the system of values and norms owned by society.

linguistic norms, Exonormative English, target norm the 'native speaker' and the teachers can be monolingual.' While the latter is said to 'celebrates and supports diversity, multilingual and multi-dialectical, "International": a cross-national linguistic common core, English as lingua franca, local linguistic norms, regional and national, endonormative Englishes, target norm the good ESL user, bilingual and bicultural teachers.' Therefore, by adopting this World English paradigm, it is expected to contribute a more supportive condition to the local language preservation.

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Storytelling to Narrate the Heart Through Historical Tourism to Internalize the Values of Local Wisdom

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ABSTRACT

This study examine the strategy of applying the storytelling method to narrate the heart through historical tourism visits to internalize the values of local wisdom in high school students in Langsa and the values of local wisdom as to what can be internalized in high school students. This study was designed qualitatively. Subjects in this study were three high school students in Langsa, while the objects were six historical tourist. Data collection techniques are carried out through: in-depth interviewing, direct observation, and documentation. Data analysis techniques include: collection, presentation, reduction, and verification/ drawing conclusions. Based on the results of the study, it was concluded that the strategy of applying storytelling method to narrate the heart through historical tourism visits to internalize the values of local wisdom in high school students in Langsa City in six stages, namely: 1) debriefing. 2) Visit to historical attractions. 3) Making storytelling scripts 4) Storytelling exercises. 5) Practice storytelling. 6) Evaluation and reflection. The storytelling is done by three techniques, namely: indirect monomyth, sparklines, and start false. The values of local wisdom that can be internalized in students are detailed in six historical tourist attractions, namely: Bambu Runcing's Park, Balee Juang, Tomb of Ampon Cik Banta Beurdan, Buddha Langsa Monastery, Langsa's Monument, and Rumoh Aceh.

Keywords: *Storytelling, Narrate the Heart, History Tourism, and Local Wisdom.*

INTRODUCTION

History teaching can basically be used as a medium to internalize the values of local wisdom. History is basically a way of creating wisdom¹. History, like the one launched by the Ministry of Education in Thailand since 2011, is the foundation for the formation of local wisdom². Indonesia is no exception as a diverse country. In another study, history is seen as a subject that aims to establish value and moral education. In the end, the teaching of history will lead to the development of the character of students in accordance with Pancasila³. History becomes a space for dialogue between past events and their development into the future⁴.

Historical teaching patterns can basically be done with a variety of paradigms. The teaching of history in high schools is done with a critical approach. Students are directed not only to receive historical stories textually, but also to think about curiosity about the process of occurrence of these events. Thus, the curiosity of high school tends to be higher and develop rapidly⁵. The

curiosity of high school students is the first step to direct them to understand an event. This understanding is directed as a capital for the formation of mental attitudes that are worthy of local wisdom.

Each region basically has a monumental event which is reflected in the form of historical relics. Culturally, local culture has the potential and the role of a counter culture for the domination of global culture which is posted as something cannot be avoided⁶. Each tourist area has a certain image, namely mental maps of a person against a destination which contains beliefs, impressions, and perceptions⁷. One area that has historical tourism is Langsa City. As a small city that was formed in 2001, Langsa City has its own unique and interesting aspects of its historical heritage. There are eight historical attractions that can be visited by high school students in Langsa City, namely: Bambu Runcing Park, Balee Juang, Tomb of Ampon Chik Banta Beurdan, Budha Monastery, Rumoh Aceh, and Langsa City Monument.

Serious efforts from the High School in Langsa to promote the mandatory tour program for historical tourism, will greatly play a role in internalizing the values of local wisdom from every historical event. One of them is the task and responsibility of the history teacher as the main stakeholder in history subjects. Teachers can act creatively and innovatively in packaging historical tourism visits so as not to appear boring. One of the interesting historical tour visits is through storytelling. In this method, students who have made historical tourism visits in Langsa City are required to retell the historical interesting things contained in historical buildings in Langsa City.

Related Research

Josette Frank in Asfandiyar (2007: 98)¹¹ explained that storytelling turned out to be an effective way to develop cognitive aspects (knowledge), affective (feelings), social, and conative aspects (appreciation) of children. Eck (2006: 22)⁸ also confirmed the existence of mental imagination in storytelling. This imagination is created from the relationship between: story, voice, gesture, and listener. Imagination created will form a separate learning experience between narrators and listeners. Denning (2004: 120)¹² defines stories as a narrative as one method of recapitulating past experiences by matching a verbal sequence of clauses to the sequence of events and at a minimum a sequence of two clauses which are temporally ordered. In another study, Denning (2005: 94)¹² explained that narrative or story in its broadest sense is anything told or recounted; more narrowly, and more usually, something told or recounted in the form of a causally linked set of events; account; tale; [sic] the telling of a happening or connected series of happenings, whether true or fictitious. “

Storytelling-based teaching is not only about preparation that must be done by students. Teachers are also required to plan storytelling activities. This planning is mainly done if the storytelling material is based on the environment. Heo (2004: 78)¹³ explains that there are four steps that must be done by the teacher, including: object recognition, designing learning interactions, conceptualizing stories, and making reflection of stories. In addition, there is also an emphasis on the importance of transforming the learning experience through deep reflection. According to Morgan and Dennehy (1997: 24)¹⁴, there are five components to construct an interesting story, namely as follows: determine the

setting that involves: place, time, character, and listeners who are able to build mental relationships; build interesting stories and grow the attention of listeners; build climax in storytelling; build story characters that include: behavior, curiosity, and ability to convey; and draw conclusions from the story.

In practice, the storytelling method is able to foster personal and educational / intellectual values in a person. Personal Value according to MacDonald & Read (1995: 35)¹⁵ can be seen from the ability of: a) providing pleasure and enjoyment, b) developing imagination, c) providing experiences that can truly be lived, d) developing a view towards human behavior, and e) presenting universal experiences. The educational value can be seen from the ability to: a) develop language skills, b) develop reading skills, c) develop sensitivity to stories, d) improve writing skills, e) foster social aspects, f) help develop emotional aspects, g) foster development aspects of creativity, and h) help develop cognitive aspects.

In connection with historical tourism aspects, Adi, et.al (2017: 2)¹⁶ means that historical tourism is a travel activity that aims to visit historical heritage sites. Historical tourism is very synonymous with cultural tourism. This is because, history is basically a part of the cultural side of a society. Cultural history-based tourism potential is one of the assets that has the potential to be developed by each region.

Historical tourism tends to sell characteristics that are typical of the shape and function of buildings, so that this problem poses a threat of degradation of physical values and functions that have a serious impact on the continuity of interest in tourist visits. In line with this statement, Suwantoro (2013: 22)¹⁷ writes that cultural history-based tourism is one of the potentials of each region because basically every region has a unique cultural history so that it becomes a different characteristic compared to other regions.

In connection with aspects of local wisdom, Mungmachon (2012: 3) explains that local wisdom is a way that teaches people to live in balance with nature and the environment¹⁸. Wisdom, both concretely and abstractly, becomes an important part that creates a human life experience. Wisdom is also a symbol of human strength in navigating life. Furthermore, according to Mungmachon¹⁸, “*local wisdom is basic knowledge gained from living in balance with nature. It is*

related to culture in the community which is accumulated and passed on. This wisdom can be both abstract and concrete, but the important characteristics are that it comes from experiences or truth gained from life. The wisdom from real experiences integrates the body, the spirit and the environment. It emphasizes respect for elders and their life experiences." Local wisdom is also interpreted as a view of life and science as well as various life strategies that are tangible activities carried out by local communities in answering various problems in meeting their needs¹⁹. In line with this statement, Rahyono (2012: 15) explains that local wisdom is also human intelligence possessed by certain ethnic groups obtained through community experience²⁰.

Local wisdom is also a form of knowledge, belief, understanding, or insight as well as customs or ethics that guide human behavior in life in the ecological community (Keraf, 2002: 23). Traditional communities in Indonesia have local wisdom to deal with natural disasters, such as earthquakes, floods, tsunamis, landslides and others. However technological developments in dealing with disasters, of course must be adapted to local wisdom, reading cues from our environment, animals and nature.

In people's lives, local wisdom is part of a culture that cannot be separated from the language of the community itself. The inheritance of local wisdom is usually carried out from generation to generation through word of mouth. Local wisdom is usually contained in folklore, proverbs, songs, and folk games. As a legacy of human life, the function of local wisdom becomes very important. It functions as knowledge found by local people through a collection of experiences and understanding of the culture and natural conditions of a place.

The position of local wisdom is very important, so that Law No. 32 of 2009 formulates it as noble values that apply to the system of community life which aims to protect and manage the environment sustainably. Local wisdom is an explicit knowledge that emerges from a long period and evolves together with the community and the environment in the area based on what has been experienced. This long evolution then forms a pattern called culture⁴. Therefore, local wisdom always intersects with the concept of nation building.

RESEARCH METHODOLOGY

This research was carried out in a qualitative

descriptive manner. Subjects in this study are historical heritage places in Langsa City. While the object of this study is high school students in Langsa City. The types of data used include: 1) Informants or sources consisting of: 1) High School History Teachers in Langsa City and High School Students in Langsa City. 2) Various historical attractions in Langsa City. 3) Text in the form of: archives, books, and other relevant records. Collection techniques include: in-depth interviewing, direct observation, and documentation. Data analysis techniques include: collection, reduction, presentation, and conclusion drawing.

RESULTS AND DISCUSSIONS

Strategy for Implementing the Storytelling Method to Narrate Heart Speech

The implementation of tourism trips is divided into two stages, namely: 1) Senior High School 3 Langsa and 2) Senior High School Cut Nyak Dien. Researchers invited students from Senior High School 3 Langsa to visit the following historical attractions: Bambu Runcing Park, Balee Juang, and Ampon Chik Banta Beurdan Tomb. At the first location, students are directed by researchers to observe the forms and historical symbols in the Bambu Runcing park. After that, students then make a brief note about historically interesting things in the Bambu Runcing Park building. The second location is Langsa City Juang Balee building. As is the case in Bambu Runcing Park, students also observe the shape and symbol of the Balee Juang building. In addition, because this place is used as a museum, students are also directed to observe a number of historical objects in the Balee Juang building. In addition, students are also directed to make notes about interesting things encountered, both related to the physical aspects of the Balee Juang building and the historical objects in it.

The third location is the Ampon Chik Banta Beurdan Tomb. Students are directed by the researcher to observe interesting things related to the tomb. In this place, students feel they don't find anything interesting. On the contrary, they feel disappointed because the condition of the tomb that looks unkempt. As an explanation, see the following picture. After making a tour, the students were given a month to make a storytelling script and present it by telling stories. Script writing and storytelling exercises are carried out with the help of mentoring teachers and

researchers. Students from Senior High School 3 Langsa making a storytelling script is done by referring to the method that has been chosen or determined by the researcher. The method used is Indirect monomyth (tells the story of heroism).

In indirect monomyth, students are directed to tell stories of heroism based on historical tourism aspects visited. Why is the indirect monomyth method and not direct monomyth chosen? Because in direct monomyth, students must communicate directly with historical witnesses or figures who are considered heroes. The same conditions also apply in understanding the heroic aspects of Balee Juang and the Tomb of Ampon Chik Banta Beurdan. Both places no longer leave historical witnesses who can be interviewed. Thus, researchers then take another alternative by taking the historical side based on the hero mentality. Students are no longer concerned about who, but what is the description of the mental attitude of a hero who struggles to maintain the independence of the Indonesian people. In addition, students were also directed to understand how long Ampon Chik Banta Beurdan struggled in establishing the Langsa village.

In order to facilitate students' understanding, they are directed to be able to take stories about: figures who are known/understood or heroic aspects based on historical attractions visited. Storytelling focuses on the psychological side or mentality of a hero who can inspire or inspire life. The spirit was then linked to the local wisdom that was embraced by the people of Aceh. The practice of storytelling was held on June 25, 2018 at Samudra University Hall. The students seemed enthusiastic about bringing stories made based on their interest in the theme.

The implementation of the tour for the Senior High School of Cut Nyak Dien was carried out by following the tourist route: Budha Monastery, Langsa City Monument, and Rumoh Aceh. At each location, students are directed by the researcher to observe the existing forms and historical symbols. After that, students then make a brief note about historically interesting things.

The location of the first visit was Budha Monastery. Students not only ask questions and discuss the historical aspects of monastery development, but also the values of wisdom that can be taken from the phenomenon of multiculturalism. In this case, students also think that

Langsa who is part of the Aceh region that applies Islamic Shari'a, in fact, is also able to live peacefully with adherents of other religions.

The second location is Langsa City Monument. As is done in Buddhist monasteries, students also observe the shapes and symbols found in the Elang Monument. Students are directed to observe the iconic animal-shaped monument. Students are also directed to make notes about interesting things found, both related to the physical aspects of Tugu Elang and the writings and paintings with the theme of Acehnese dances, heroes, and war that decorate the walls of the monument. The third location is Rumoh Aceh. As is the case in Buddhist monasteries and the Elang monument, students also observe the shapes and symbols found in Rumoh Aceh known as Rumoh Aceh Tengku Iman.

After making a tour, the students were given a month to make a storytelling script and present it by telling stories. Script writing and storytelling exercises are carried out with the help of mentoring teachers and researchers. For Senior High School of Cut Nyak Dien, the making of storytelling script is done by referring to the method that has been chosen or determined by the researcher. The method used is first, sparklines. Second, the start false technique. In making a story script that will be delivered in storytelling, researchers play an active role to guide and direct students. This is done so that students can make story scripts that are delivered by sparklines and start false.

The practice of storytelling was held on June 25, 2018 at Samudra University Hall. The students seemed enthusiastic about bringing stories made based on their interest in the theme. Sparklines and false start techniques provide alternative creative stories. This is because students are in direct contact with the aspects of contemporary and everyday life in the student environment. Thus, they will be easier to develop the story, without having to be very attached to the memory of the past. However, entering the past does require special techniques and a short amount of time. Because the past can be immersed in aspects of deep understanding, both factually against events and philosophically toward meaning.

Forms of Local Wisdom Values that can be Internalized in High School Students

One aspect of local wisdom found in Bambu Runcing Park is the internalization of the sentence *udeep syaree matee syahed*. Understanding the meaning of *udeep syaree matee syahed* has emerged in Aceh since the war against the Dutch. Almost all Acehnese fighters echoed this sentence as a form of resistance to Dutch colonizers. At Balee Juang, the value of local wisdom lies in the shape of the door which symbolizes the door of Aceh. This symbol is actually a historical proof that the Balee Juang building was made with a compromise of architectural values. That is, the Dutch see that Aceh has a high appeal to the beauty of art.

The value of local wisdom on Ampon Cik Banta Beurdan's tomb lies in the pilgrimage tradition which is also taught in Islam. The concept of pilgrimage, especially to the graves of pious people or scholars, teaches the human mentality to take the energy of the struggle of the deceased figures. Besides that, the pilgrimage is also a reminder that humans in time, will return to the Almighty. At Budha Monastery, the value of local wisdom that can be taken is the importance of mutual respect and respect for religious differences.

The value of local wisdom contained in Langsa's monument is included in the sentence, "*Customary Bak Po Teumeureuhom/Bak Syiah Kuala Law/Qanun Bak Putroe Phang / Reusam Bak Lakseumana*." Should have modeled Sultan Iskandar Muda as the leader of a fair and prosperous Aceh Darussalam kingdom. *Bak Syiah Kuala's* law symbolizes the application of law that should prioritize the principles of justice, honesty and religion. *Qanun Bak Putroe Phang implies* the need for an Islamic law that protects people's lives. *Reusam Bak Lakseumana* symbolizes the need for strong regional strength.

The value of local wisdom from Rumoh Aceh that can be internalized to students is about the concept of making a house that can be studied physically, spiritually, and culturally. Rumoh Aceh is a historical reality of a building that shows a mature architectural concept. In the present aspect, rumoh aceh is actually a symbol that the building that is made with careful thought will give birth to permanence. For example, Aceh rumoh is an example of earthquake and tsunami resistant buildings that have been taught by Aceh's predecessors. Rumoh Aceh is not only built physically as a place to live, but spiritually implies the meaning of majesty in the religion of Islam and local culture.

CONCLUSION

The strategy of applying storytelling method based on heart speech based on historical tourism visits to internalize the values of local wisdom in high school students in Langsa City is carried out in six stages, namely: 1) debriefing conducted by researchers assisted by supervising teachers from each school. This activity was carried out twice. 2) Field visits, namely inviting students to visit historical attractions that have been determined, namely: Taman Bambu Runcing, Tombs of Ampon Chik Banta Beurdan, Balee Juang Building, City of Langsa Temple, Rumoh Aceh, and Tugu Kota Langsa. 3) Guidance in the making of storytelling scripts carried out by researchers and tutors. 4) Storytelling exercises guided by researchers and mentor teachers. 5) Storytelling practices carried out by students. 6) Evaluation and reflection conducted by students, researchers, and mentor teachers. Evaluation and reflection is done to provide students with an understanding of the aspects of local wisdom gained after exploring and retelling historical stories based on the tourist attractions visited. The values of local wisdom that can be internalized in students are detailed in six historical tourist attractions, namely: Bambu Runcing Park, Balee Juang, Tomb of Ampon Cik Banta Beurdan, Budha Monastery, Tugu Langsa, and Rumoh Aceh.

Conflict of Interest: Nil

Source of Funding: Self

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Analysis of Productivity Measurement Using Marvien.e Mundel Method in Zakat Board of Lhokseumawe City

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ABSTRACT

The term productivity is increasingly being talked as an social and public issues. However, there are so many people do not realize the meaning of the term, it is also about knowing how is it the importance of productivity. Meanwhile, productivity can be interpreted as a compound of production and activity, where production power as the cause and productivity measure the yield of the production power. If the size of production success is only viewed from the side of the output, then the productivity is viewed from two sides at once, namely: the input side and the output side. Basically mundel model is a measurement based on the concepts of industrial management and engineering science. This model requires that the company to be measured has a standard time for operation. The Marvin E Mundel method calculates the total productivity of each measurement period, by comparing the Partial Output value with the Partial Input value. While the output and input variables that will be examined in the Baitul Mal Kota Lhokseumawe are: Output in the form of the amount of public receipt (zakat payment to the community) while input is in the form of work equipment (asset value), material (zakat input), labor cost (base salary employees), energy costs (electricity costs, generators) and equipment maintenance costs and number of working days.

Keywords: *Productivity. Marvin E.Mundel*

INTRODUCTION

Zakat is a potential source of funds that can be utilized as an effort to realize people's welfare. Implementation of zakat worship involves a number of activities related to the management of property since the collection, distribution, supervision, administration, and accountability of zakat property. Therefore the implementation of such zakat worship requires a good management so as to enhance the role and function of zakat in realizing prosperity and social justice.

Management of zakat is planning, organizing, directing, implementing and supervising the collection, distribution, utilization and accountability of zakat property so that the zakat property can be handed over to those who have the right to receive it with the rules specified in syara' so that it can be achieved the main mission of zakat is to alleviate poverty.

However, the management and good supervision will be obtained by the productivity work of zakat institutions, especially those in the city of Lhokseumawe

Aceh province, whether the performance of institutions with resources existing in Baitul Mal of Lhokseumawe city has achieved good performance or not. So in this study the author discusses the performance productivity of Baitul Mal in Lhokseumawe city using Marvin E.Mundel method.

LITERATURE REVIEW

Productivity

Definition of Productivity

According to Sinungan (1997: 12)¹ in general productivity is defined as the relationship between the real and physical (goods or services) with the actual input. Productivity is essentially human desire and effort to always improve quality in all fields. Productivity can not be separated from the quality, technology, output ratio, and other things of operations management.

Benefits of Productivity Measurement

Measurement of productivity has benefits for a

company is as follows²

A company can assess the efficient use of resources in producing goods and services.

Productivity measures are useful for resource planning, both for short and long term.

Measuring business productivity level can be used to compile returns the economic and non economic goals of the company.

The results of future productivity level measurements can be re-modified based on current productivity level measurement information.

Strategies for increasing productivity can be determined on the basis of differences between planned productivity levels and productivity levels measured.

Measurement of productivity can be used to compare the performance of management in the same company, both in the industrial sector and in the national sector.

The productivity values generated from these measurements can be used in enterprise profit planning level.

Based on the above exposure it can be seen that by measuring productivity will provide excellent benefits for those who make productivity measurements, not only the company can benefit but also other parties.

Zakat

Definition of Zakat

Zakat is the fourth pillar of Islam that is obliged to every people of the season who are considered capable of issuing it, because by issuing treasures to zakat we can clean the treasure to return to the essence of holiness. Zakat according to language can mean the name '(fertility), thaharah (holiness), barakah (blessing) and can also mean tazkiyah tathier (sanctify). Zakat according to the language (etymology) comes from the word zaka which means to grow, bless, clean, and develop, while the meaning of zakat by terminology is a certain amount of property required by Allah SWT to be given to those who are entitled to receive zakat (Muzakki)³.

Hafidhuddin (2002)⁴ explains that zakat is a part of property with certain requirements based on Al-Qur'an

and Hadith, which Allah obliges to its owner, to be handed over to persons or parties entitled to receive it.

Instruction and Law of Zakat

Zakat is one of the laws of the pillars of Islam. Therefore, it is the principal that makes upright of Islam because of its existence. On the contrary Islam will be defective when one is substantially lost. Therefore, its very basic existence became al-Quran and al-Hadist as the basis of Islam which discussed it a lot. One of the commandments listed in Q.S At-Taubah (9): 103) is:

Meaning : Take zakat from their property to clean it up, purify them and pray for them. Your prayers are indeed nurturing their souls. Allah is ever more merciful.

This verse is about Abi Lubabah's request to the Prophet. He said, O Messenger, our treasures are many, take and give it to other people in Allah name and ask forgiveness for us. Apostle replied, sorry yes Lubabah, I was not ordered by Allah swt. To take the treasure of anyone. When this verse goes down, it orders the Apostle to take the treasure of Lubabah as zakat. Thus the explanation of imam as sayuti in Lubabun Nuqul fi Asbabin Nuzul.

Besides the al-Quran, Hadith as the second hand also mentions how important the zakat, even it is the foundation of the establishment of Islam. Rasulullah Saw. That said: "Islam is affirmed in five cases, First Testify that there is no god but Allah, and that muhammad is the messenger of Allah swt. The two set up the five daily prayers, the three paid the zakat, the fourth went on pilgrimage to the Baitullah, the five fasted in the month of Ramadan.

From the description, explains that the zakat is the five pillars of Islam and one of the most crucial pillars. The Jumhur Ulama also agreed that the zakat of law is obliged ain (fardhu'ain) for every Muslim if it has fulfilled the conditions that have been determined by Islamic law⁵.

Zakat Management Institution

a. Institution Structure of Amil Zakat

1) Amil Zakat Institution consist of Advisory Council, Supervisory Commission and Implementing Agency.

2) The Advisory Council as referred to in

paragraph (1) includes the elements of chair, secretary and members.

3) The supervisory commission referred to in paragraph (1) includes the elements of the chairman, secretary and members.

4) The implementing agency as referred to in paragraph (1) includes the elements of chair, secretary, financial section, collection section, distribution section, and utilization

5) Members of the Board of Amil Zakat consist of elements of society and government elements.

Research Method

Research Field and Time

The research was conducted at Baitul Mal of Lhokseumawe city, it is located in Islamic Bureau Building center of Lhokseumawe city. The time of the research was conducted on 23 February 2018 which started with preparation of research proposal until the writing of research report is completed.

Research Instrument

Instruments used in the research, among others are the data collection from the secondary and primary sources.

The number of depreciation for equipment is obtained by using straight line method of depreciation.

$$\text{Depreciation} = \frac{\text{Beginningvalue} - \text{Endingvalue}}{\text{Equipmentusefullife}} = \frac{\text{Rp}221.850.000 - \text{Rp}17.100.000}{10} = \text{Rp. } 4.475.000 / \text{year}$$

Selanjutnya melakukan perhitungan biaya depresiasi peralatan dan fasilitas perjam.

$$\text{Depreciation per hour} = \frac{4.475.000}{5.396} = \text{Rp. } 753,87 / \text{hour}$$

Definition of Variable Operationalization

- a. Data of Working Hour
- b. Data of Depreciation Cost for Machine and Equipment
- c. Data of Material Cost/Zakat Input
- d. Data of Labor Cost
- e. Data of Energy Cost
- f. Data of Maintenance Cost
- g. Data of Price Index
- h. Number of Disbursement of Zakat by Lhokseumawe Zakat Board January 2015 Until December 2016.

RESEARCH RESULT AND DISCUSSION

Calculation of Deflator Cost

Regarding to data gathered from the prior research conducted on the baitul mall lhokseumawe city is found that the value of assets in 2015 is Rp. 221,850,000. While the book value of 2017 is Rp. 177.100.000, with estimated useful life is 10 Years.

Table 1: Depreciation per hour is used for calculating the input partial of monthly depreciation in a period

Month	Period (Rp)		
	2015	2016	2017
Jan	132.681,12	120.619,20	132.681,12
Feb	114.588,24	114.588,24	120.619,20
Mar	132.681,12	126.650,16	132.681,12
Apr	126.650,16	126.650,16	120.619,20
May	114.588,24	126.650,16	120.619,20
Jun	126.650,16	132.681,12	102.526,32
Jul	114.588,24	108.557,28	126.650,16
Aug	120.619,20	132.681,12	132.681,12
Sep	126.650,16	126.650,16	114.588,24
Oct	132.681,12	126.650,16	132.681,12
Nov	126.650,16	132.681,12	132.681,12
Dec	126.650,16	126.650,16	108.557,28

Depreciation = (Available hour x Equipment depreciation per hour)

$$= 176 \times 753,87 = \text{Rp. } 132.681,12$$

Deflator Calculation

Deflator Calculation for Depreciation Cost

$$\text{Deflator February 2015} = \frac{1.HFeb15 - 1.HJan15}{1.HJan15} = \frac{104,28 - 103,9}{103,9} = 0,0036$$

Figure 2 calculation of deflator on the material, labor, energy and maintenance

Period 15	Price Index	Deflator	Period 16	Price Index	Deflator	Period 17	Price Index	Deflator
Jan	103,9	0	Jan	105,74	0	January	110,96	0
Feb	104,28	0,0036	Feb	105,79	0,0005	February	110,94	0,0002
Mar	104,85	0,0054	Mar	106,12	0,0031	March	111,34	0,0036
Apr	105,31	0,0044	Apr	106,12	0	April	111,55	0,0019
May	105,38	0,0007	May	106,06	0,0006	May	111,55	0
Jun	105,91	0,0050	Jun	106,59	0,0050	Jun	111,56	0,0001
Jul	105,84	0,0007	Jul	106,58	0,0001	July	111,59	0,0003
Aug	105,84	0	Aug	106,75	0,0016	August	111,44	0,0013
Sep	105,84	0	Sep	106,9	0,0014	September	111,54	0,0009
Oct	105,97	0,0012	Oct	107,15	0,0023	October	111,53	0,0001
Nov	105,79	0,0017	Nov	107,15	0	November	111,74	0,0019
Dec	106,04	0,0024	Dec	107,15	0	December	111,69	0,0004

Examples of calculations above the value of depreciation for February 2015, then it can be used for the calculation of constant prices of materials, labor, energy, maintenance.

Constant Price Calculation

The constant price will be calculated using the formula as follows:

$$\frac{\text{Priceint@ecurrentperiod} \times 100}{100 + \text{Deflator}} = \frac{\text{Rp. } 132.681,12 \times 100}{100 + 0,0037} = \text{Rp. } 132.681$$

Figure 3 The Calculation of Constant Price Depreciation (RIP1).

Month	Constant price of Depreciation Cost (Rp)		
	2015	2016	2017
January	132.681	120.619	132.681
February	114.584	114.588	120.619
March	132.674	126.646	132.676
April	126.645	126.65	120.617
May	114.587	126.649	120.619
Jun	126.644	132.674	102.526
July	114.587	108.557	126.65
August	120.619	132.679	132.679
September	126.65	126.648	114.587
October	132.679	126.647	132.681
November	126.648	132.681	132.679
December	126.647	126.65	108.557

Calculation Resources of Input Partial (RIP Total) For example, the total RIP calculation for January 2018 is as follows:

$$\text{RIP Total} = \text{RIP1} + \text{RIP2} + \text{RIP3} + \text{RIP4} + \text{RIP5} = \text{Rp. } 132.681 + \text{Rp. } 663.990.542 + \text{Rp. } 6.937.982 + \text{Rp. } 7.396.627 + \text{Rp. } 3.543.014 = \text{Rp. } 682.000.846$$

Figure 4 Calculation Resources of Input Partial (RIP Total)

Month	Resources Input Partial in Total (Rp)		
	2015	2016	2017
January	682.000.846	602.674.794	348.388.003
Febuary	320.331.398	609.225.074	374.013.971
March	358.551.950	430.275.571	703.376.911
April	353.707.425	477.709.119	377.566.304
May	360.981.724	439.357.768	733.089.317
Jun	1.004.888.707	1.435.473.773	660.842.515
July	442.721.170	521.854.164	675.039.616
August	417.219.793	472.618.783	536.507.135
September	740.815.679	827.264.395	272.395.002
October	405.395.588	498.168.856	401.208.256
November	536.453.955	830.993.551	483.790.565
December	2.194.279.602	579.057.699	707.293.335

Calculation of Agregat Output.

Aggregate Value Output every month from 2015-2017 is obtained from the distribution of zakat to the society

Figure 5 Calculation of Agregat Output.

No	Month	Agregat Output (Rp)		
		2015	2016	2017
1	January	667.483.399	364.500.000	488.150.000
2	Febuary	667.483.399	364.500.000	488.150.000
3	March	667.483.399	364.500.000	488.150.000
4	April	667.483.399	364.500.000	488.150.000
5	May	667.483.399	364.500.000	488.150.000
6	Jun	667.483.399	364.500.000	488.150.000
7	July	667.483.399	364.500.000	488.150.000
8	August	667.483.399	364.500.000	488.150.000
9	September	667.483.399	364.500.000	488.150.000
10	October	667.483.399	364.500.000	488.150.000
11	November	667.483.399	364.500.000	488.150.000
12	December	667.483.399	364.500.000	488.150.000

Calculation of Partial Productivity Index

Productivity Depreciation

$$\text{Partial Index} = \times 100 = 115,79\%$$

Furthermore, it can be used for value calculation of material, labor cost, energy, maintenance.

Figure 7 Productivity Depreciation

Month	Depreciation Output (Rp)	Index Output	Depreciation Input (Rp)	Index Input	Productivity Index (%)
Jan-16	364.500.000	0,546	120.619	0,952	57,34
Feb-16	364.500.000	1,000	114.588	0,950	105,26
Mar-16	364.500.000	1,000	126.646	1,105	90,48
Apr-16	364.500.000	1,000	126.65	1,000	100,00
May-16	364.500.000	1,000	126.649	1,000	100,00
Jun-16	364.500.000	1,000	132.674	1,048	95,46
Jul-16	364.500.000	1,000	108.557	0,818	122,22
Aug-16	364.500.000	1,000	132.679	1,222	81,82
Sep-16	364.500.000	1,000	126.648	0,955	104,76
Oct-16	364.500.000	1,000	126.647	1,000	100,00
Nov-16	364.500.000	1,000	132.681	1,048	95,45
Dec-16	364.500.000	1,000	126.65	0,955	104,76
Jan-17	488.150.000	1,339	132.681	1,048	127,84
Feb-17	488.150.000	1,000	120.619	0,909	110,00
Mar-17	488.150.000	1,000	132.676	1,100	90,91
Apr-17	488.150.000	1,000	120.617	0,909	110,00
May-17	488.150.000	1,000	120.619	1,000	100,00
Jun-17	488.150.000	1,000	102.526	0,850	117,65
Jul-17	488.150.000	1,000	126.65	1,235	80,95
Aug-17	488.150.000	1,000	132.679	1,048	95,46
Sep-17	488.150.000	1,000	114.587	0,864	115,79
Oct-17	488.150.000	1,000	132.681	1,158	86,36
Nov-17	488.150.000	1,000	132.679	1,000	100,00
Dec-17	488.150.000	1,000	108.557	0,818	122,22

Calculation of Total Productivity Index.

Total of Partial Index = x 100 = 89,3

Figure 8: Calculation of Total Productivity Index

Month	AOP Total (Rp)	RIP Total (Rp)	Productivity Index (%)
Jan-16	364.500.000	602.674.794	98,9
Feb-16	364.500.000	609.225.074	141,6
Mar-16	364.500.000	430.275.571	90,1
Apr-16	364.500.000	477.709.119	108,7
May-16	364.500.000	439.357.768	30,6
Jun-16	364.500.000	1.435.473.773	275,1
Jul-16	364.500.000	521.854.164	110,4
Aug-16	364.500.000	472.618.783	57,1
Sep-16	364.500.000	827.264.395	166,1
Oct-16	364.500.000	498.168.856	59,9

Cont... Figure 8: Calculation of Total Productivity Index

Nov-16	364.500.000	830.993.551	143,5
Dec-16	364.500.000	579.057.699	222,6
Jan-17	488.150.000	348.388.003	93,1
Feb-17	488.150.000	374.013.971	53,2
Mar-17	488.150.000	703.376.911	186,3
Apr-17	488.150.000	377.566.304	51,50
May-17	488.150.000	733.089.317	110,9
Jun-17	488.150.000	660.842.515	97,9
Jul-17	488.150.000	675.039.616	125,8
Aug-17	488.150.000	536.507.135	197,0
Sep-17	488.150.000	272.395.002	67,9
Oct-17	488.150.000	401.208.256	82,9
Nov-17	488.150.000	483.790.565	68,4
Dec-17	488.150.000	707.293.335	68,4

Productivity Index Calculation Graph

Productivity Total Calculation Graph

CONCLUSION AND SUGGESTION

Conclusion

Regarding to the calculations and analysis of productivity measurement results using Marvin.E Mundel method on Baitul Mal of Lhokseumawe city, it can be concluded that the productivity of Baitul Mal Lhokseumawe city increased and decreased productivity, the lowest productivity decrease occurred in November 2015 of 24.4% and increased in the following month by 198.8% in December 2015. The highest increase in productivity in June 2016 was 275, 1% from the previous month amounted to 30.6%.

Suggestion

Some people is not willing to pay zakat, it is better for zakat management institution to promote and socialization how important paying zakat for poverty eradication and improve work productivity from society

tself.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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The Effect of Islamic Work Ethic and Motivation through the Organizational Citizenship Behaviour and Employee Performance at Bank Aceh Syariah

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ABSTRACT

This study aims to determine how much influence the Islamic work ethic and motivation through organizational citizenship behaviour (OCB) and its impact on the employee performance of Bank Aceh Syariah. The data used is the data by distributing questionnaires to 168 employees of Bank Aceh Syariah. To analyze the data, the statistical analysis used two-track equipment and processed with the help of the application program analysis moment of structural (AMOS). The variables measured include Islamic work ethic (IWE), work motivation effect toward organizational citizenship behaviour (OCB) and employee performance of Bank Aceh Syariah. Based on the analysis of statistical test is Islamic work ethic (IWE) and work motivation affect the employee performance at mediated organizational citizenship behaviour (OCB). The result organizational citizenship behavior (OCB) variable effect of full mediated on Islamic work ethic (IWE) and work motivation toward employee performance of Bank Aceh Syariah.

Keywords: *Islamic Work Ethic Motivation, Organizational Citizenship Behaviour (OCB) and Employees Performance.*

INTRODUCTION

PT. Bank Aceh Syariah is a public bank owned by the Aceh government with funding activities, providing loans to the community (lending) and providing service delivery services, currently the role of Bank Aceh as a financial intermediary institution also serves as an agency of trust, as an agent of development and an agency of services, which participates in the framework of economic development of Acehese society in general.

In the banking industry, Employees Performance plays an important role in improving organizational performance, where motivation is the degree to which an individual wants and strives to carry out a task or job well and a willingness to put a high level of effort toward an organizational goal, conditioned by ability that effort to meet an individual need. The Organizational Citizenship Behaviour (OCB) element of a person performs a certain act because it is driven by his instinct, the desire to achieve satisfaction or perhaps the need of life is very urgent Robbin¹. According to Dharma² motivation is a set or set of behaviors that provide a basis for someone to act in a way directed to a specific goal (specific goal directed way).

On the other hand, organizational social behavior is often referred to as the organization citizenship behavior (OCB), which is the attitude of Bank Aceh Syariah employees who are very famous in the organization with the main dimension of altruism (eg, helping when unhealthy partners), seriousness (eg, overtime to complete the work, for example, willingly representing the company for a joint program, and a sportive attitude (eg, contributing to the failure of teamwork). According to Luthans (2011)³, Organizational Social Behavior (OCB) is covering personality and attitudes, is the behavior of organizational members / prosocial, or in short OCB (Organizational Citizenship Behavior).

According to Bangun and⁴ performance (performance) is the result of work achieved by someone based on job requirements (job requirement). A job has certain requirements to be done in achieving a goal that is also called a standard job (job standard) so the standard of work is the high expected of a particular job to be completed properly by employees in the organization. Bank Aceh Syariah Lhokseumawe has several benchmarks in evaluating its employees among others by evaluating the quantity of work in each work

unit as well as paying the quality of work produced by each employee, then employee work is very important to do because Bank Aceh Sharia is a public trust agency, other cooperation between bank employees need to be maintained and continue to be fostered to achieve the vision and mission of the organization of Bank Aceh Syaria. Based on the phenomenon and background of the problem then the authors want to examine “The Influence of islamic work ethic, Work Motivation To Employee Performance With Organization Citizenship Behaviour as Intervening Variable At Bank Aceh Sharia. The formulation of research problems can be formulated as follows:

1. How is the influence of islamic work ethic to organization citizenship behaviour at PT. Bank Aceh Syariah ?
2. How is the influence of motivation to organization citizenship behaviour at PT. Bank Aceh Syariah?
3. How is the influence of islamic work ethic to employee performance at PT. Bank Aceh Syariah ?
4. How is the influence of motivation to employee performance at PT. Bank Aceh Syariah?
5. How is the influence of organization citizenship behaviour to employee performance at PT. Bank Aceh Syariah

RESULTS AND DISCUSSION

Measurement Model Analysis Results

Ferdinand¹³ convergent validity part of the measurement model within SEM and is usually referred to as measurement model while the covariance-based SEM-called confirmatory factor analysis (CFA) in Ferdinand,¹³. There are two criteria to assess whether the measurement model is eligible to construct reflective convergent validity, namely (1) loading factor should be above mimimim > 0,50 or ideal >0.70 and (2) P_{value} a significant <0.05 in the study of these requirements have all been fulfilled,¹⁴. Then to test validity Contract can be seen at confirmatory factor analysis (CFA) in Figure 2 and Table 1 below are as follows:

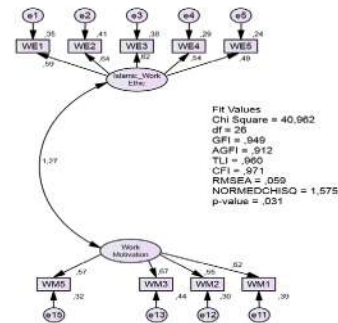


Figure 1. Confirmatory Factor Analysis Exogen Contract

Table 1: Loading Estimates of Exsogen Contract

Indicator			Loading Factor	Cut Off Value	Results
WE2	<---	Islamic_Work_Ethic	,639	≥0,50	Valid
WE3	<---	Islamic_Work_Ethic	,617	≥0,50	Valid
WE4	<---	Islamic_Work_Ethic	,539	≥0,50	Valid
WM3	<---	Work_Motivation	,666	≥0,50	Valid
WM5	<---	Work_Motivation	,569	≥0,50	Valid
WM1	<---	Work_Motivation	,622	≥0,50	Valid
WM2	<---	Work_Motivation	,546	≥0,50	Valid
WE5	<---	Islamic_Work_Ethic	,493	≥0,50	Valid
WE1	<---	Islamic_Work_Ethic	,592	≥0,50	Valid
WE2	<---	Islamic_Work_Ethic	,639	≥0,50	Valid

Source : Amos Analysis 2018

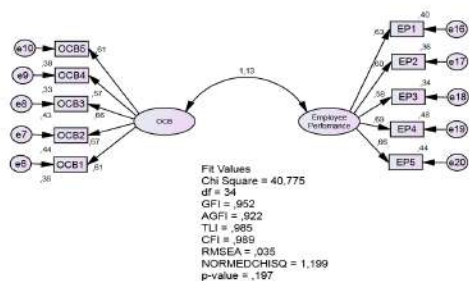


Figure 2. Confirmatory Factor Analysis Endogen Contract

Table 2: Loading Estimates of Exsogen Contract

Indicator	Loading Factor	Cut Off Value	Results
OCB1	,614	$\geq 0,50$	Valid
OCB2	,666	$\geq 0,50$	Valid
OCB3	,656	$\geq 0,50$	Valid
OCB4	,570	$\geq 0,50$	Valid
OCB5	,615	$\geq 0,50$	Valid
EP1	,634	$\geq 0,50$	Valid
EP2	,600	$\geq 0,50$	Valid
EP3	,585	$\geq 0,50$	Valid
EP4	,691	$\geq 0,50$	Valid
EP5	,661	$\geq 0,50$	Valid

Source : Amos Analysis 2018

Based on testing confirmatory factor analysis, the value of loading factor estimates suggested is above 0.50 and convergent validity significant $< 0,05$ then the results of the analysis of reliability evaluation by construct reliability (CR) $> 0,70$ the value of Variance Extracted (AVE) suggested is above 0.50 based on Table 1 and 2 above Ferdinan¹³.

STRUCTURAL MODEL ANALYSIS RESULTS

The analysis results of structural equation modelling are presented in the table and the picture as follows as shown in Figure 4 and Table 3 : Based on figure 5 and Table 4 Goodness of Fit Indexs Full Model, it is found out that the whole parameters have already met the threshold requirements, so that the model is feasible to be used for hypothetical testing.

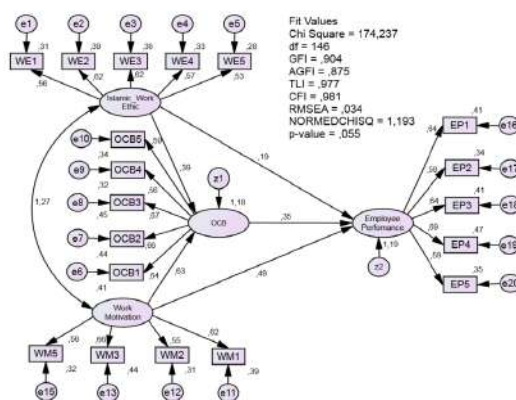


Figure 3. Outputs Structural Model Before Modification

Table 3: Goodness of Fit Indexes Full Model Before Modification Indices

Goodness of Fit Index	Cut-off Value	Result Analysis	Model Evaluation
χ^2 Chi-Square Statistik	expected small	174.237	Good
Probability	$\geq 0,05$	0.055	Good
CMIN/DF	≤ 2.00	1.193	Good
GFI	≥ 0.90	0.904	Good
AGFI	≥ 0.90	0.875	Marginal
TLI	≥ 0.95	0.977	Good
CFI	≥ 0.95	0.981	Good
RMSEA	≤ 0.08	0,034	Good

Source : Amos Analysis 2018

Table 4 : Regression Weights Laten Variabel

Latent Variable			Std. Est	S.E.	C.R.	P
OCB	<---	IWE	,389	,090	4,574	***
OCB	<---	WM	,634	,112	5,942	***
EP	<---	IWE	,193	,076	3,144	,002
EP	<---	OCB	,353	,190	2,184	,029
EP	<---	WM	,486	,167	3,574	***

Source : Output Amos 2018

CONCLUSION

Based on the results of research and discussion, it can be concluded as follows: variables Islamic work ethic, work motivation and organizational citizenship behaviour simultaneously and partially have a significant effect on employee performance at Bank Aceh Syariah.

H₁ There is a positive and significant effect of Islamic work ethic on job satisfaction at the organization citizenship behaviour at Bank Aceh Sharia.

Based on Table 4, the known value of P-value between Islamic work ethic (IWE) on organization citizenship behaviour (OCB) was 0.000, which is smaller than the significance level of 0.05. These results can be concluded that the Islamic work ethic (IWE) variable significantly influences the organization citizenship behaviour (OCB) of the Bank Aceh Sharia. Based on the results of path coefficient value of the Islamic work ethic (IWE) on organization citizenship behaviour (OCB) is 0.389 positive coefficient path meaning the Islamic work ethic (IWE) on organization citizenship behaviour has a positive effect on the Bank Aceh Sharia. Hypothesis 1 in this research is the influence of Islamic work ethic

(IWE) on organization citizenship behaviour (OCB) on Bank Aceh Sharia is accepted. Worth mentioning that the research results are consistent with studies conducted by Ali⁵ and Ali⁶, the research results show that the Islamic work ethic (IWE) characteristic has an effect on the organization citizenship behaviour (OCB).

H₂ There is a positive and significant effect of work motivation on organization citizenship behaviour at Bank Aceh Sharia.

Based on Table 4, the known value of P-value between work motivation on organization citizenship behaviour (OCB) was 0.000, which is smaller than the significance level of 0.05. These results can be concluded that the work motivation variable significantly influences the organization citizenship behaviour (OCB) of the Bank Aceh Sharia. Based on the results of path coefficient value of the work motivation on organization citizenship behaviour (OCB) is 0.634 positive coefficient path meaning the work motivation on organization citizenship behaviour (OCB) has a positive effect on the Bank Aceh Sharia. Hypothesis 2 in this research is the influence of work motivation on organization citizenship behaviour (OCB) on Bank Aceh Sharia is accepted. Worth mentioning that the research results are consistent with

studies conducted Dharma¹⁵ and Organ¹⁶, the research results show that the work motivation characteristic has effect on the organization citizenship behaviour (OCB).

H₃ There is a positive and significant effect of the islamic work ethic on employee performance at Bank Aceh Sharia.

Based on Table 4, the known value of P-value between islamic work ethic (IWE) on employee performance was 0.002, which is smaller than the significance level of 0.05. These results can be concluded that the islamic work ethic (IWE) variable significantly influences the employee performance of the Bank Aceh Sharia. Based on the results of path coefficient value of the islamic work ethic (IWE) on employee performance is 0.139 positive coefficient path meaning the islamic work ethic (IWE) on employee performance has a positive effect on the Bank Aceh Sharia. Hypothesis 3 in this research is the influence of islamic work ethic (IWE) on employee performance on Bank Aceh Sharia accepted. Worth mentioning that the research results are consistent with studies conducted Ali⁵ and¹⁷ Ali and organ⁸, the research results show that the islamic work ethic (IWE) characteristic has effect on the employee performance.

H₄ There is a positive and significant effect of the work motivation on employee performance at Bank Aceh Sharia.

Based on Table 4, the known value of P-value between work motivation on employee performance was 0.000, which is smaller than the significance level of 0.05. These results can be concluded that the work motivation variable significantly influences the employee performance of the Bank Aceh Sharia. Based on the results of path coefficient value of work motivation on employee performance is 0.486 positive coefficient path meaning the work motivation on employee performance has a positive effect on the Bank Aceh Sharia. Hypothesis 2 in this research is the influence of work motivation on employee performance on Bank Aceh Sharia accepted. Worth mentioning that the research results are consistent with studies conducted Dharma¹⁵ and organ⁸ and Robbin¹ and Luthans³, the research results show that the work motivation characteristic has effect on the employee performance.

H₅ There is a positive and significant effect of the organization citizenship behaviour on employee performance at Bank Aceh Sharia.

Based on Table 4, the known value of P-value between organization citizenship behaviour (OCB) on employee performance was 0.029, which is smaller than the significance level of 0.05. These results can be concluded that the organization citizenship behaviour (OCB) variable significantly influences the employee performance of the Bank Aceh Sharia. Based on the results of path coefficient value of the organization citizenship behaviour (OCB) on employee performance is 0.353 positive coefficient path meaning the organization citizenship behaviour (OCB) on employee performance has a positive effect on the Bank Aceh Sharia. Hypothesis 5 in this research is the influence of organization citizenship behaviour (OCB) on employee performance on Bank Aceh Sharia accepted. Worth mentioning that the research results are consistent with studies conducted Dharma¹⁵, Organ¹⁶ and Luthans³ and Yunina¹⁸, the research results show that the organization citizenship behaviour (OCB) characteristic has effect on the employee performance.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Development of a Creative Economy Model as an Alternative in Poverty Alleviation

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ABSTRACT

This study aims to build a creative economic model to be applied in poverty alleviation. This model is built based on four stages, namely the determination of creative economic vision, problem identification, application of the Triple Helix concept and Identification of performance indicators. This model is supported by People, the five main pillars (industry, technology, resources, institutions, financial intermediary institutions), and is organized by three main actors, namely intellectuals (creative oriented and entrepreneurship curriculum, press freedom and academic, innovative research multidisciplinary, educational and training institutions, research and development institutions), business elements (entrepreneurship, business coaching & mentoring, financing schemes, marketing and business matching, creative communities), and government (incentives, awards for creative people and conservation, a conducive business climate, educational direction).

Keywords: Poverty, Creative Economy and The Triple Helix

BACKGROUND

Poverty is a problem faced by every country. Poverty has a very broad impact on various aspects of people's lives and disrupts the economic growth of a region. Subsidies become an important slogan for countries that adhere to the welfare state system. The assumption that subsidies act as tangible evidence of the government's responsibility in the welfare of its people. Without realizing the provision of subsidies, such as providing direct cash assistance to the community has resulted in the emergence of a lazy attitude some people to try, lack of motivation to move and a sense of indulgence. The community is given assistance without conditions for repayment which has an impact on indulgence and the attitude of waiting for similar assistance at the next opportunity. It's easy for people to get help so they feel like trying and struggling with hard work to fade.

Starting in 2015 the Indonesian government has provided village financial assistance and each village can obtain Rp. 1 billion per year. If the village does not have a pattern and attitude of independence in managing these funds, it will have an impact on the increasing number of people who depend on government assistance. Therefore, in order to anticipate these impacts, there needs to be a

creative economic model design. The design is used as a guide for the community to manage village assistance funds that can add value. Creative economic design can be a guide for people to produce creative products that can be traded widely. Thus, it will increase business opportunities and ultimately will increase income and community welfare.

Theoretical Study

Basic Concept of Creative Economy

Howkins (2001)¹ first introduced the term creative economy in his book *The Creative Economy: How People Make Money from Ideas*. Creative economy is a concept in a new economic era that intensifies information and creativity by relying on ideas and knowledge from human resources as the main factors of production. This concept will usually be supported by the existence of a creative industry that becomes its embodiment. Over time, economic development reached the level of the creative economy after some time before, the world was faced with the concept of information economy in which information became the main thing in economic development. The creative economy cannot be separated from the creative industry.

Broadly speaking, the creative industry is divided into two, namely (1) creative products directly to customers, such as film, music, games, media and performances, (2) Creative Services to other industries, such as design, advertising, architecture and others. (Simatupang, 2012). There are 4 components of the creative industry (intellectual capital), namely technology, business, art and culture.

The creative economic benefits include (1) economic contribution, such as increasing Gross Domestic Product, creating jobs and increasing exports, (2) Social impacts, such as improving quality of life, equal distribution of welfare, and increasing social tolerance, (3) The emergence of innovation and creativity, for example the emergence of ideas and ideas and the creation of value, (4) renewable resources, for example knowledge-based businesses, green community, (5) the creation of a business climate, for example the creation of business fields, impacting the development of other sectors, impacting marketing efforts, (6) The development of national image and identity, such as increasing tourism, national icons, building culture, cultural heritage and local values.

Creative Economy Model

There are several models of creative economic development, one of which is the Triple Helix approach introduced by Etzkowitz and Leydersdorff (2000)². This model emphasizes the role and close relationship between three actors, namely government, industry and universities (academics) or known ABG. Universities (academics) can become innovation leaders in a knowledge-based economy, while NIS (National Innovation System) emphasizes the importance of the role of companies in innovation. Regulating ABG relations in Triple Helix is the result of communication and expectations at the network level². The relationship that appears in the Triple Helix, generally starts from problem solving efforts and produces strategies when facing problems in innovation, not determined by a particular pattern. Through this interaction process, there will be changes in actors and the roles they play². Thus, the triple helix pattern of innovation is dynamic as time changes.

This model was later developed by Pangestu (2008)³. He explained that the success of developing creative industries must be supported by (1) People (people) as

the main foundation of individuals or creative human resources. Then it must be supported by (2) the five main pillars, namely (1) industry (a collection of companies engaged in creative economy), (2) technology (Enabler to realize individual creativity in the form of real work), (3) resources (Input other than individual creativity and knowledge needed in creative processes, such as natural resources and land, (4) institutions (social order such as norms, values, and laws, including industry associations, professional associations and other creative communities, and (5) financial intermediary institutions (financial intermediary institution). Furthermore, it must be accommodated by (3) Three main umbrella (actors), namely (1) intellectual circles (Creative and Entrepreneurship-oriented curriculum, press freedom and academic, multidisciplinary innovative research, education and training institutions, research and development institutions), (2) elements of business (Entrepreneurship, business coaching & mentoring, financing schemes, marketing and business matching, creative community) and (3) government tah (incentives, appreciation of creative and conservation people, conducive business climate, educational direction).

Strategies for Creative Economy Development

The creative economic development strategy as presented by Simatupang (2012) consists of several stages, namely (1) Identification of the problem, is an activity to identify the problem of what is being faced and the gaps that occur. (2) The maturation of the creative industry is the activity of awareness and understanding of the need for a creative economy, commitment to capacity building and empowerment in the capitalization of creativity. (3) creating creative economic ecosystems such as creative products, creative businesses and creative people.

Concept of Creative Economy Development

The concept of creative economic development as stated by Simatupang (2012) explains that it is fitting that the creative economy must be a joint and comprehensive effort from various levels with the ultimate goal of the creative economy able to penetrate the international market. The creative economy at the city level must be supported by adequate capacity and resources as well as creative or inter-city products. The creative economy at the city level must be able to penetrate the provincial level and so on in stages.

Creative economy is a business activity that must always innovate, through business and innovation, entrepreneurial talents will grow. Entrepreneurs can develop creative workers and trained creative communities. Creative workers consist of skilled individuals, while creative communities can be in the form of developing creative markets.

Empowerment of the Creative Economy

For the sustainability of creative economic development, it is necessary to empower the creative economic activities. The creative economy empowerment model needs to take several steps, namely (1) preparing talented people (2) developing talent search mechanisms, (3) developing mechanisms for the development of creative workers, and (4) developing mechanisms for developing creative entrepreneurs.

Poverty

Poverty can be absolute poverty or relative poverty. Poverty can also be interpreted narrowly or broadly. But the point is that poverty is an unsatisfactory condition or an undesirable condition that has indicators that cause powerlessness. According to Bapenas (2002)⁴ as quoted by Yudhoyono and Harniati (2004) poverty is a situation or condition experienced by a person or group of people who are unable to carry out their lives to a level considered humane.

The main factor of poverty in Indonesia according to BPS (2004)⁵ in Sahdan (2005)⁶ are: (1) limited adequacy and quality of food; (2) limited access and low quality of health services; (3) limited access and low education services; (4) limited employment and business opportunities; (5) weak protection of business assets, and wage differences; (6) limited housing and sanitation services; (7) limited access to clean water; (8) lack of certainty of ownership and ownership of land; (9) deteriorating environmental conditions and natural resources, as well as limited public access to natural resources; (10) weak guarantee of security; (11) weak participation; (12) the size of the population burden caused by the size of the family burden; (13) poor governance causes inefficiency and ineffectiveness in public services, widespread corruption and low social security for the community.

One of the roles of government in alleviating poverty is in 2002 the government formed the KPK

(poverty reduction committee) with Presidential Decree No. 124 of 2002 in the form of reducing poverty by: (1) Increasing the income of the poor so that the poor have opportunities, management capabilities and protection to obtain better results, in various economic, socio-cultural, political, legal and security activities; (2) Reducing the expenditure of the poor in accessing basic needs such as health, education, health, and infrastructure that facilitate and support socio-economic activities.

The government in tackling poverty in Indonesia holds a BLT program. The BLT program is one of the Oil Fuel Subsidy Reduction Compensation Programs (PKPS-BBM). The program is intended by the government to help the poor after an increase in fuel prices which results in an increase in living costs. Residents belonging to poor families are considered eligible to receive Rp. 1.2 million in cash per family per year (Rp. 100,000 per month) and Subsidies were first used in England in the 10-11 century under the rule of King Charles II. However, subsidies only developed or expanded in the 20th century. From now on subsidy programs have become a method commonly used by the government in its financial budget⁷. According to Dartanto (2006)⁷ some of the basic principles in the application of subsidies include:

A useful assistance provided by the government to groups or individuals who are usually in the form of cash payments or tax deductions.

Given with the intention to reduce some of the burden and focus on the benefits or benefits for the community.

Subsidies obtained from taxes. So, the tax money collected by the government will return to the people through the provision of subsidies.

Research Methods

This research is a library research which is the collection of data and information in the form of scientific references or theories related to the concept of creative economy which aims to create a creative economic model. The method used is a qualitative method.

Research Results

Creative Economy Model

The Creative Economy Model of Lhokseumawe

City basically consists of 4 stages, namely the stage of determining the creative economic vision, (2) Problem Identification, (3) Application of the Triple Helix

Concept (4) Identification of performance indicators. This model is shown in Figure 1.

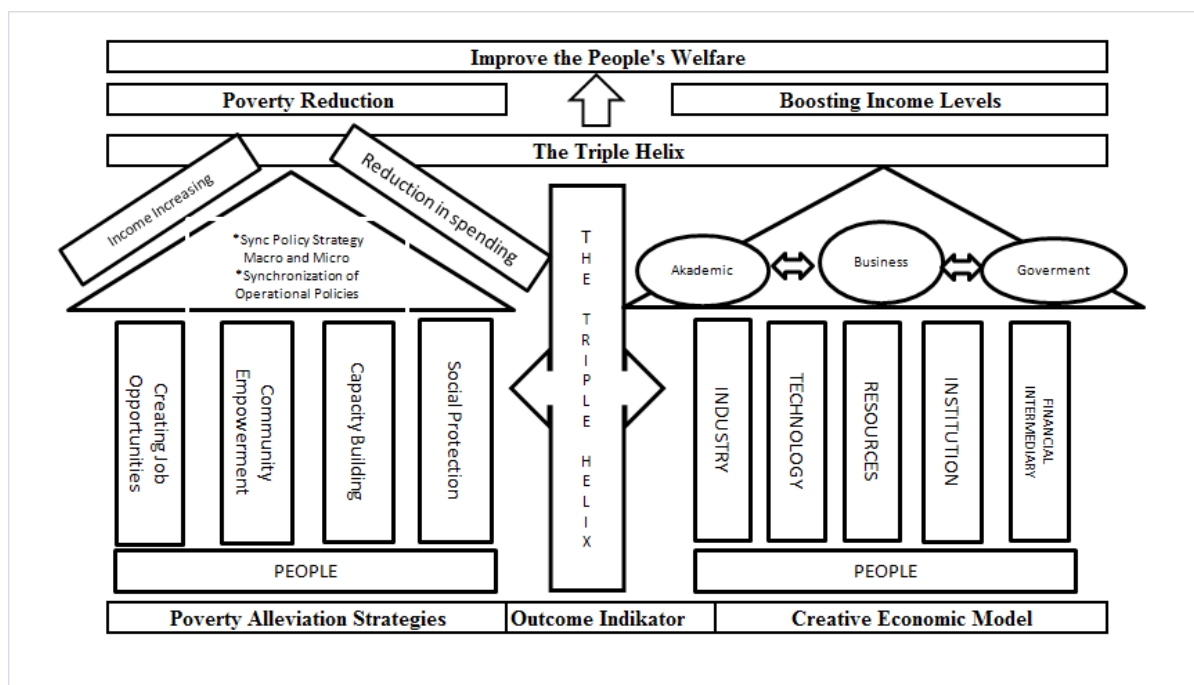


Figure 1' Creative Economy Model of Lhokseumawe City

Figure 1 explains that in order to build a creative economy in the city of Lhokseumawe several stages are passed, namely:

(1) Determination of the Vision and Mission of the Creative Economy

This stage is very important, namely setting the vision, mission, goals, objectives and strategies for achieving the goals.

(2) Analysis of problems and identities

Problem analysis is a step to identify the problems being faced related to the development of the creative economy, including the quality and quantity of human resources, conducive climate, financing institutions. In addition, it is also necessary to identify facilities and infrastructure availability, city or village identity, creative capital policies, creative communities, creative workers, creative entrepreneurs and creative education.

(3) Application of the Triple Helix Concept

The success of developing the creative industry

according to The Triple Helix concept is to be supported by (1) People as the main foundation of individuals or creative human resources. Then it must be supported by (2) the five main pillars, namely (1) industry (a collection of companies engaged in the creative economy), (2) technology (Enabler to realize individual creativity in the form of real work), (3) resources (Input other than creativity and individual knowledge needed in creative processes, such as natural resources and land), (4) institutions (social order such as norms, values, and laws, including industry associations, professional associations and other creative communities, and (5) financial intermediary institutions (financial intermediary institution). Furthermore, it must be accommodated by (3) Three main umbrella (actors), namely (1) intellectual circles (Creative and Entrepreneurship-oriented curriculum, press freedom and academic, multidisciplinary innovative research, education and training institutions, research and development institutions), (2) elements of business (Entrepreneurship, business coaching & mentoring, financing schemes, marketing and business matching, creative community) and (3) government tah (incentives, appreciation of

creative and conservation people, conducive business climate, educational direction).

(4) Identification of Achievement Indicators

Identification of performance indicators is the activity of seeing the impact of the implementation of the creative economy. Performance indicators can be in the form of; (1) The growth of a national scale industry, (2) the development of a provincial scale industry, (3) the development of a Regency / City scale industry, (4) the development of digital creative, (5) the development of creative communities, (6) publication of creative industries in the media.

CONCLUSION

Lhokseumawe city still has villages that are vulnerable to poverty. Lhokseumawe City also has creative talents that are very potential in the development of creative economy. The Creative Economy Model of Lhokseumawe City basically consists of 4 stages, namely the stage of determining the creative economic vision, (2) Problem Identification, (3) Application of the Triple Helix Concept (4) Identification of performance indicators.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Effect of Highway Network Connectivity on Regional Development in the North Zone of Aceh

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ABSTRACT

The geographical area of the province of Aceh which is bordered by the oceans and only has land connection with the province of North Sumatra has made Aceh depends greatly on this neighboring province. In fact, The north zone of aceh covering Lhokseumawe City, North Aceh Regency and Bireuen Regency crossed by Sea Lane of Communication (Sloc), the Malacca Strait has geo-economic advantages. This study aims to analyze and assess the correlation between Highway Network Connectivity with Regional Development of the zone. This research was done by conducting field surveys, interviews, questionnaires and data analysis on the The north zone of aceh, covering Lhokseumawe, North Aceh, Bireuen, Bener Meriah and Central Aceh districts. The analysis was done by using Structural Equation Modeling / SEM. Regression Weight results show that the relationship between Highway Network Connectivity variable and Region Development is 0.546. This study concludes that the Highway Network Connectivity has the strongest or most significant relation to Regional Development activities, therefore it can be suggested for the Aceh provincial, district and municipal governments in the zone to make highway network policies to be oriented towards the development of new economic zones and supporting the implementation of Special Economic Zones of Arun Lhokseumawe.

Keywords: Sloc, Aceh, Arun Lhokseumawe.

INTRODUCTION

Aceh is one of the provinces in Indonesia which has special autonomy status in 2001 through Law No. 18 of year 2001 on Special Autonomy for the Province of Nanggroe Aceh Darussalam. Currently, Aceh is highly dependent on the province of North Sumatra. Not only in the aspect of connecting transportation through the highway network, but also almost in all aspects of economy. This can be seen from the fact that Aceh plays a role more as a consumer rather than a producer. Food, clothing, housing, and industrial needs are still imported from Medan by trucks. Aceh as an agricultural and fishery area also sends the products by trucks¹.

Therefore the movement of goods in Aceh is dominated by highway mode (up to 95%), while the rest transported by using sea and air transportation due to the lack of availability of infrastructure and facilities and

the weakness of the system and regulation which made the movement of goods through highway considered as more efficient option².

Aceh to date has a national highway length of about 1,803,354 km consisting of 538,251 km of arterial highway, and 1,265,103 km of primary collector highway. The 640,5 km of westbound highway, the 469.98 km of central highway and 532.2 km of eastern route and 161.7 km of the cross diagonal and non cross. Stability of highways in Aceh is quite high at 94.62%. Therefore, connectivity becomes a key element of development strategy in Aceh. In addition to the highway, other infrastructure projects should be further developed to improve connectivity between regencies in Aceh.

To support the future economic growth in Aceh, especially in The north zone of aceh, one of the indispensable factors is good highway network

connectivity in order to accelerate the development of the region. The highway network connectivity located in Aceh's North Zone is divided into 3 main groups: (1) Highway connection of KruengGeukueh - Sp. KKA - Jamuan - Sp. TigaRedelong - Takengon, (2) KruengGeukueh - Bireuen - Takengon, (3) KruengGeukueh - Lhokseumawe - Lhoksukon - Pantan Labu.

General Description of the North Zone of Aceh

In developing the transportation system in the Aceh region (Figure 1), based on its geographical location and strategic development plan of Aceh region, several working zones (Transportation Authority) were set as can be seen below

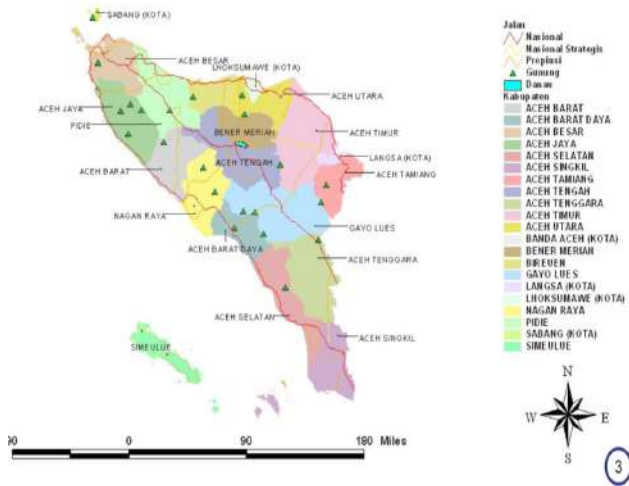


Figure 1. Map of Aceh

1. Central Zone, consisting of SabangMunicipality, Aceh BesarRegency, PidieRegency, Pidie Jaya Regency and Banda Aceh Municipality;
2. North Zone, consisting of Aceh UtaraRegency, LhoksumaweMunicipality, BireuenRegency, BenerMeriah Regency and AcehTengah Regency;
3. East Zone, consisting of Aceh Timur Regency, LangsaMunicipality and Aceh Tamiang Regency;
4. West Zone, consisting of Aceh Barat Regency, Nagan Raya Regency and Aceh Jaya Regency;
5. South - Southwest Zone, consisting of Aceh Selatan Regency, Aceh Barat Daya Regency, Simeulue Regency, GayoLues Regency, Aceh Tenggara Regency, Subulussalam Municipality and Singkil Regency.

Based on the purpose of this study, the highway network for the development of the area in the north zone of aceh will be centred at KruengGeukueh Port to support the ArunLhokseumawe Special Economic Zone.

METHODOLOGY

This study analyzed the existing highway network connectivity in the north zone of aceh, covering Lhokseumawe, Aceh Utara, Bireuen, Bener Meriah and Aceh Tengah regency by taking into consideration several aspects including performance of structurepavement, geometric design of the highway, highwaymaintenance, traffic volume, traffic flow, and supporting infrastructure.

The development of the area that occurs with existing highway network connectivity and transportation of goods isbased on the aspect of economic growth, human resources improvement, management of land use and environmental harmonization. This regional development approach is used in order to find out the connection between the two variables. Figure 2 below is a conceptual framework of research.

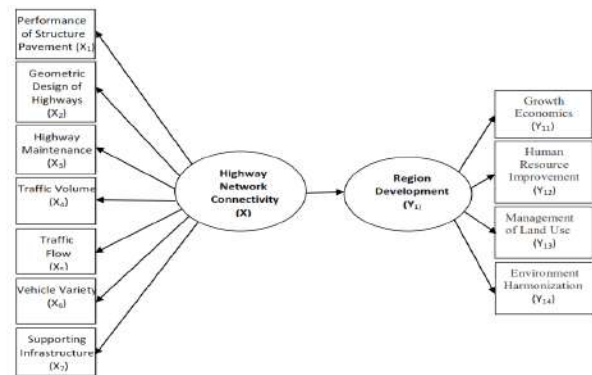


Figure 2. Conceptual research framework

Source : Researcher

Research Design

This research is explanatory research in design, that is conducted by explaining the symptoms caused by an object of researchand aims to explain causal relation to know if there is relationshipbetween highway network connectivity and development area in the north zone of Aceh³.

Futhermore, this research used a combination of quantitative and qualitative method. Quantitative method is used when the problem investigatedis more common with large scope and complex level of variation.

With a quantitative approach, this study is a causaleffect study, in which research is conducted to the facts to prove empirically⁴ that Performance of Structure Pavement, Geometric Design of Highways, Highway Maintenance, Traffic Volume, Traffic Flow, and Supporting Infrastructure, Supply and demand are predictors forhighwaynetworkconnectivity in The north zone of aceh. While the aspect of economic growth, human resources improvement, management of land use and environmental harmonization are predictors for regionaldevelopment.

Sample and Population

The population in this studywas business people in the field of goods transportation by using the trucks, and in the field of construction. In addition, entrepreneurs, traders, and truck driversin the area of Lhokseumawe, North Aceh, Bireuen, Bener Meriah and Aceh Tengah were also involved. The population used for this study was the population of the north zone of aceh in 2015(1,547,832 people)⁷⁻¹². The following are tabulated samples selected from each municipality and district in the the north zone of aceh:

Table 1. Population and sample

No.	Regency/ municipality	Population	Sample
1	Lhokseumawe	191,407	37
2	Aceh Utara	583,892	113
3	Bireuen	435,300	89
4	Bener Meriah	136,821	27
5	Aceh Tengah	200,412	39
Total		1, 547,832	300

Source: *Statistic data, 2015 (Calculated by the researcher)*

Research Indicators and Variables

This research involved 2 (two) variables -Highway Network Connectivity (X) as exogenous latent variable (independent variable not directly measured) and Regional Development (Y1) as endogenous latent variable (dependent variable not directly measured) .

Highway Network Connectivity Variable (X)

Chourmain (2008)³ defines conceptual variable a as brief, clear and decisive definition of research variable. The Highway Network is a major infrastructure system that is part of a land transportation network system. The highwaynetwork is also called a milestone for regional economy, because it can increase economic growth and reduce regional disparities. The existence of the highway network will create inter-regional connectivity. The term connectivity is used to describe the connection and density between links (highways) on the highway network. Connectivity is the key to success in the north zone of aceh to build a good system with three important dimensions: poverty reduction, regional development and increased competitiveness.

Regional Development Variable (Y1)

Regional development is defined operatively as an effort to spur socio-economic development in connection to spatial and regional arrangements, reduce inter-regional disparities and preserve the environment of a region that emphasizes on strengthening endogenous factors of the region (economic growth, human capital improvement, , environmental protection) as a driver of the region’s competitiveness.

Analysis and Results

Analysis of Respondents’ Response against Highway Network Connectivity Variable

Responses of respondents to highway network connectivity variable measured from six (6) indicators, namely: Stability of Highway Structure; Highway Trajectory; HighwayMaintenance; Traffic Volume; The Supporting Infrastructure and Supply and Demandwhich are shown in table 2. Below.

Table 2. Analysis of respondents’ responses against highway network connectivity variable

No	Indicator	Category										F	Mode	Mean score
		STS		TS		R		S		SS				
		F	%	F	%	F	%	F	%	F	%			
1	Stability of highway structure	9	3.0	84	28.0	79	26.3	110	36.7	18	60	300	4	3.15
2	Highway trajectory	0	0	6	2.0	164	54.7	130	43.3	0	0	300	3	3.41
3	Highway maintenance	0	0	16	5.3	170	56.7	114	38.0	0	0	300	3	3.33
4	Traffic volume	1	3.0	57	19.0	185	61.7	57	19.0	0	0	300	3	2.99
5	Supporting infrastructure	14	4.7	145	48.3	105	35.0	36	12.0	0	0	300	2	2.54
6	Supply and demand	1	3.0	7	2.3	35	11.7	105	35.0	152	50.7	300	5	4.33
Total of Mean Score														3,29

Source: (Calculated by the researcher)

Respondents’ Response Analysis against Regional Development Variable

Responses to regional development variable which were measured from four (4) indicators, namely: economic growth; human resource Improvement; improved land use; and environmental protection are shown in table 3 below.

Table 3. Respondents’ response analysis against regional development variable

No	Indicator	Category										F	Mode	Mean Score
		STS		TS		R		S		SS				
		F	%	F	%	F	%	F	%	F	%			
1	Economic growth	1	3.0	7	2.3	122	40.7	159	53.0	11	3.7	300	4	3.57
2	Human resource	11	3.7	69	2.30	113	37.7	94	31.3	13	4.3	300	4	3.16
3	Improvement Improved land use	1	3.0	7	2.3	108	36.0	143	47.7	41	13.7	300	4	3.72
4	Environmental protection	3	1.0	8	2.7	109	36.3	122	40.7	58	19.3	300	4	3.75
Total of Mean Score														3,55

Source: (Calculated by the researcher)

CFA Confirmatory Analysis of Highway Network Connectivity Variable

An analysis of the confirmatory factor in the latent variable of highway network connectivity was carried out to be able to confirm all indicators that make up the latent construct of highway network connectivity. Figure 3 shows the results of confirmatorial data analysis of highway network connectivity.

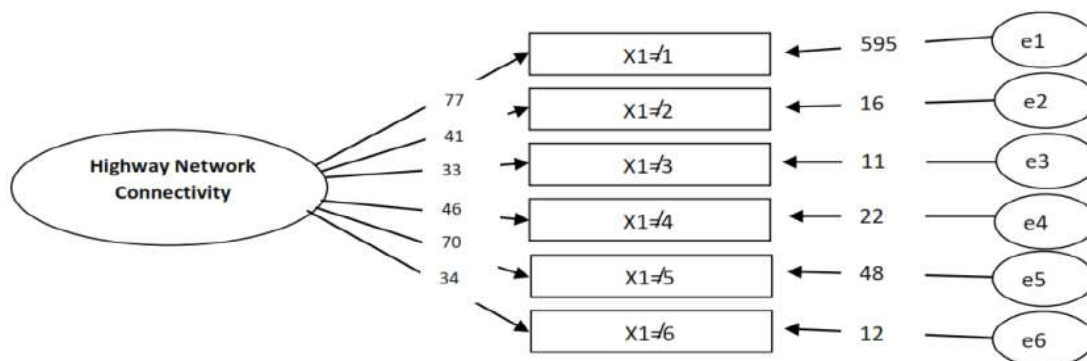


Figure 3. Confirmatory analysis network connectivity variable

It is found out from CFA analysis result that CFA model for highway network connectivity considered fit. All indicators were declared valid and trusted to measure highway network connectivity variable. The highway structure stability indicator is the largest loading factor and subsequent supporting infrastructure. Output result of CFA analysis of connectivity of the highway network variable is shown in table 4.

Table 4. Output of CFA analysis of connectivity of the highway network variable
Standardized Regression Weights : (Group number 1 - Default model)

			Estimate
x1#1	←---	Highway_network_connectivity	0.768
x1#2	←---	Highway_network_connectivity	0.406
x1#3	←---	Highway_network_connectivity	0.334
x1#4	←---	Highway_network_connectivity	0.465
x1#5	←---	Highway_network_connectivity	0.696
x1#6	←---	Highway_network_connectivity	0.344

Source: (Analysis)

CFA of Regional Development Variable

The analysis of the confirmatory factor in the latent variable of Region Development was done to confirm all the indicators that make up the latent construction of Regional Development. The results of CFA analysis can determine whether or not the CFA model for Regional Development fit^{5,6} Figure 4 below shows the results of data processing, the results of Confirmatory analysis of Regional Development.

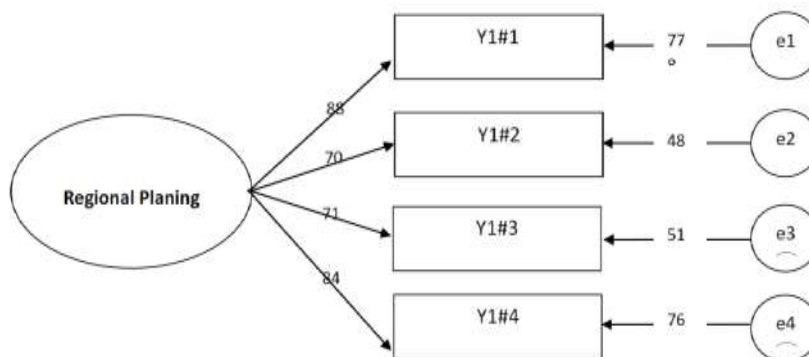


Figure 4. Analysis of regional development confirmatory

Based on the results of CFA analysis, it is known that CFA model for the development of the region is considered fit. All indicators were declared valid and were believed to measure the variable of Regional Development. The Economic Growth Indicator is the greatest loading factor value and subsequent Environmental Protection. Results of Output of The CFA Analysis of Region Development Variable are shown in table 5.

Table 5. Output of the CFA analysis of region development variable
Standardized Regression Weights : (Group number 1 - Default model)

			Estimate
y1#1	←---	Regional_development	0.882
y1#2	←---	Regional_development	0.695
y1#3	←---	Regional_development	0.712
y1#4	←---	Regional_development	0.835

Source: (Analysis)

There are four indicators that were declared entirely capable of measuring regional development variable because it has a value loading factor of > 0.30 ie Y1.1 (economic growth) with the value of (0.882); Y1.2 (Human Resource Improvement) with the value of 0.695; Y1.3 (improvement of land use) with the value of (0.712); Y1.4 (environmental protection) with the value of 0.835. Therefore, all variable-building factors would be used in the next full SEM processing.

Result of Feasibility Analysis of Research Model

Analysis of research model was done using the criteria of Goodness of Fit (GoF), which is summarized in table 6 below. Results obtained were according to desired criteria. GoF model has been fulfilled in its entirety, and it is concluded the model is fit with the data used.

Table 6. Index of modification of SEM model after modification

Goodness of Fit Index	Cut-off Value	Analysis Results	Evaluation Model
χ^2 - Chi - square	Expected to be low (df=116)	532,862	Good
Probability	$\geq 0,05$	0,01	Marginal
RMSEA	$\leq 0,08$	0,014	Good
GFI	$\geq 0,90$	0,889	Marginal
AGFI	$\geq 0,90$	0,861	Good
TLI	$\geq 0,90$	0,884	Marginal
CFI	$\geq 0,90$	0,915	Good

Source: (Analysis)

The table above shows that the criteria for assessing the feasibility of SEM model consisting of χ^2 - Chi-square, probability, RMSEA, GFI, AGFI, TLI and CFI generally indicate that the model is fit with the data because in general, it is considered meeting GOF criteria and next it can be continued on the next data processing.

Furthermore, the calculation of the coefficient of influence through regression weight was done which would be used as the basis for answering hypotheses in this study. The results of data processing are shown in table 7.

Table 7. Regression weight

Relation between variables		Estimate	P	Result
Highway Network Connectivity	Region Development	0.546	0.014	Significant

Source: (Analysis)

Based on the results of regression weight, it can be seen the results of the significance of the influence of each variable that impact on the development of the region in the North Aceh Zone. Highway Network connectivity has also proved to have a significant effect on the success of the Region Development in the The north zone of aceh. Data on the regression weight table shows that the significance value obtained is p (0.014) and it fit the criteria that is at the standard of $p < 0.05$. This means that Highway Network Connectivity has a very strong relationship and significantly influences the activities and success of the Region Development in the The north zone of aceh. Highway Network connectivity has a role or contributes to the success of the Region Development activity (0.546). So the Highway Network Connectivity has a significant effect on the development of the region seen from economic growth, human resource development, land use improvement and environmental protection.

CONCLUSIONS

Based on the field data analysis and discussion of results, it can be concluded that:

The variable of highway network constancy (X) is formed from the highway structure consistency indicator (X1), highwayway condition (X2), highway maintenance (X3), traffic volume (X4), supporting infrastructure (X5) and supporting infrastructure (X6) indicators that are proven to be valid and reliable in measuring their influence on regional development;

Yield variables (Y1) formed from indicators of economic growth (Y11), improvement of human resources (Y12), improvement of land use (Y13) and environmental protection (Y14) are proven valid and reliable indicators in measuring their relation to highway network connectivity and transportation of goods;

Highway network connectivity has also proved to have a significant effect on the success of Regional Development in the The north zone of aceh.

Recommendation

Based on the discussion of results and conclusions of this study, some suggestions may be given as recommendations:

The results of this study may serve as a reference for Aceh provincial and district/municipality governments in The north zone of aceh in making highway network policy, territorial development and transportation of goods;

The results of this study can also be meaningful inputs for the Aceh government, the Lhokseumawe city government and the North Aceh district government in formulating the policy of the Special Economic Zone of ArunLhokseumawe, especially in preparing the development of a new economic region.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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The Existence of Keujruen Blang in the Management of Water Resources as Local Wisdom in Rice Farming in Sawang Sub-District

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ABSTRACT

Keujreun Blang is a customary institution that functions and is authorized to manage paddy farming. This customary institution is in accordance with the mandate of Article 98 paragraphs (1) and (4) of Law Number 11 of 2006 concerning the Government of Aceh (UUPA) and strengthened in Qanun Number 10 of 2008 concerning Customary Institutions. In carrying out the emergency task, it has not been supported by Governor Regulation No. 45 of (2015) concerning the Role of Keujreun Blang in Irrigation Management. This study aims to analyze the management of water resources by Keujruen Blang as a local wisdom of the people of Aceh in Rice Farming. This study is a legal research with an empirical juridical approach in obtaining data in Sawang District, North Aceh. The results of the study that, the Keujruen Blang has done, namely: First, coordinating farmers to cultivate rice fields to conduct irrigation cooperation from upstream to downstream, and for those who are not sanctioned; Secondly, to urge the public not to dispose of waste in irrigation; Third, keep the irrigation from being shallow and dirty; and Fourth, arranging the distribution of water to each rice field based on the schedule; Fifth, keep irrigation channels from being damaged or leaking. Therefore, their togetherness in maintaining and cleaning the waterways to get abundant rice yields under coordination of Keujreun Blang is a local wisdom in Aceh society. The existence of Keujruen Blang in managing of water resources paddy agriculture for farmers in Aceh is not due, but also to preserve the culture of the Aceh society in maintaining communal water resources.

Keyword: *keujruen blang, water resources, local wisdom, Sawang*

INTRODUCTION

Customary institutions in Aceh have been reaffirmed by Law No. 11 of (2006) concerning the Government of Aceh (UUPA), including the customary institutions of Keujruen Blang. This has been affirmed in Article 98 of UUPA, that customary institutions function and act as a vehicle for public participation in the administration of the Aceh Government in the fields of security, peace, harmony and public order. Customary institutions in Aceh are one of the local wisdoms in Aceh society^{1,2}.

Customary institutions are part of customary law. The existence of customary law has also been recognized and affirmed in the constitution of the Indonesian state³. Customary law is a law that is laden with certain values in society⁴, including in Aceh society. The existence of customary institutions is also in carrying out values

including values in the management of water resources by intelligence as a customary institution. The existence of intelligence is not confirmed in Qanun Number 10 of 2008 concerning Customary Institutions (Qanun of Customary Institutions at the level of Regional Regulations). Article 1 paragraph 22 of the Qanun of Customary Institutions states that the keujreun blang is the person who leads and regulates activities in the field of rice cultivation.

Keujruen is one of the customary institutions in the traditional institutions' Qanun, namely the Majelis Adat Aceh, Imum Mukim, Imum Chik, Keuchik, Tuha Peut, Tuha Lapan, Imum Meunasah, Keujruen Blang, Panglima Laot, Pawang Glee, Peutua Seuneubok, Haria Peukan, Syahbanda and customary institutions are called by other names, but have the same functions and objectives as customary institutions stated in Article 2

paragraph (2) of the Qanun of Customary Institutions. That is, the weakness is part of the customary institution which has a role in the administration, development, community development, especially rice farmers and the settlement of social problems is affirmed in Article 2 paragraph (1) of the Qanun of Customary Institutions.

Related Research

Research related to this, there has been a study by Andrian Wira Syah Putra et al with the title *Peran Kejreun Blang Terhadap Perilaku Petani Dalam Pengelolaan Air Pertanian Di Nanggroe Aceh Darussalam*. In this study concluded that the Acehnese people still desperately need the existence of customary institutions in the implementation of rice farming activities including in the management of water resources in Aceh Province. The behavior of farmers in carrying out normal conditions does not affect the capacity of agricultural water management⁸.

Rusli Yusuf has also studied *Keujruen Blang Dan Pemberdayaan Perkumpulan Petani Pemakai Air Irigasi (Suatu Penelitian Aspek Sosiobudaya)*. This study concludes that the existence of technical irrigation and chaos is unbearable, in the order of Aceh's cultural values and at the level of government policy united in the Water User Farmers Association (P3A) can be accepted by most of the rice farming community. The role of intelligence is not quite dominant in empowering farmers in the implementation of agricultural activities⁹.

Abubakar et al, Also conducted research on *Peran Lembaga Adat Keujreun Blang Dalam Peningkatan Kesejahteraan Petani Sawah Di Kabupaten Bireuen*. In the study concluded that Bireuen District theoretically has empowered the Keujruen Blang of customary institutions which are also called Water User Farmers Association (P3AI). The farmers are grouped in these containers to suit the rice farmer associations nationally, although this association can reduce the meaning of customary institutions¹⁰.

Edy Juanda has conducted a study on *Peranan lembaga adat Keujruen Blang dan manfaatnya bagi keberdayaan masyarakat tani dalam pengelolaan pertanian sawah (Studi kasus di desa Keude Linteung Kecamatan Seunagan Timur Kabupaten Aceh Darussalam)*. In this study, it was concluded that the role carried out in coordinating cooperation with the farming community was less effective in overcoming the problem

of decreasing mutual cooperation. Keujruen Blang is not only carrying out routine tasks that are pragmatic, so as not to touch the subject of declining mutual cooperation, namely: the non-optimal service provided by the wind is not enough in the availability of agricultural water and weak institutional values are weak¹¹.

Research Methodology

This research is a legal research using an empirical juridical approach. The focus of the location of the study was on 4 (four) Village, namely Blang Teurakan Village, Jurong Village, Babah Krueng Village and Lancok Village. Primary data collection was carried out through structured interviews with respondents (kejreun blang) and informants (community and village heads) who were determined by purposive sampling, through observation, and Focus Group Discussion with the continuity of the Sawang District. Conclusion of secondary data by visiting libraries and internet media. The collected data is verified and categorized in a simple taxonomic process involving several issues in water resources management. Then the data is reduced and conclusions are drawn.

RESULT AND DISCUSSION

The existence of Keujruen Blang as a Customary Institution

In Sawang Subdistrict, Keujruen Blang was blunted as one of the customary institutions was chosen and appointed in the village community meeting. Keujruen Blang who is chosen is a person who is experienced in paddy fields and can communicate well with the community and be responsible. However, there are also appointments made in the village of Lancok appointed directly by the Geuchik (Village leader) after asking for their willingness in advance. This appointment was made after the Geuchik (Village leader) considered the experience of farming and communicating in the community. In carrying out their duties, they are not responsible to the Geuchik (Village leader).

Keujruen Blang will not be dismissed on the grounds that he died, filing an application to stop at his own accord, neglecting his duties as a fraud and committing a disgraceful act that is contrary to the Shari'a and customs. As such, the working period is not a specific period of time. In Blang Teurakan and Jurong villages, the work period is not more than 5 (five) years and the previous job has been resigned because he is

old. In Babah Krueng and Lancok Village, the period of work is not within 2 (two) years and the previous months have died. So, it can be seen that the existence of intelligence is not as a customary institution that has been determined democratically with local wisdom and meets certain requirements.

Keujruen Blang Duties and Authorities

Article 25 of the Customary Institution Qanun affirms the task of emergency, namely: (a) determining and coordinating procedures for going down to the fields, (b) regulating the distribution of water to farmers' fields, (c) assisting the government in agriculture, (d) coordinating festivities or ceremonies other matters relating to adat in paddy farming, (e) giving reprimands and sanctions to farmers who violate 'meugoe' (paddy) customary rules or not carrying out other obligations in the customary paddy farming system, and (f) resolving disputes among farmers related to the implementation of rice farming.

Management of Water Resources by Keujruen Blang

Water resources are very important for human life, nowadays drought and water crisis are important discussions in the international world¹². Water needs for human life are increasing, but people's access to water is decreasing both because the amount of water discharge is reduced due to the disappearance of the forest as a barn, as well as increasing population growth¹³. Therefore, it is necessary to regulate the water resources available for human life, including rice fields that support food availability.

In Aceh society, the management of water resources in paddy farming is carried out by uniqueness as a customary institution. Keujruen Blang has no obligation to utilize irrigation as the main irrigation of rice fields in Sawang Sub-District, which includes supervising, regulating and implementing water irrigation to farmers' fields, periodically inspecting water channels including drainage channels to prevent water theft.

The main irrigation in Sawang Sub-District is drained from the Sawang River and flows to another sub-district, managed by a Keujruen Blang Chik who is mandated by Article 4 Number (2) Regulation of the Governor of Aceh Number 45 of 2015 concerning the Role of Keujreun Blang in Irrigation Management (2015

Pergub Aceh as implementing regulation) the task is honest that, Keujreun Blang Chik should responsible for coordinating water management, maintaining irrigation networks and enforcing custom in the area of rice fields in the Sub-district area. Furthermore, in Article 4 paragraph 3 the Aceh Governor Regulation of (2015), the Keujruen Blang Chik has functions, namely: (a) coordination of the distribution of water between regions of the Keujruen Blang, (b) the implementation discussion of Keujruen Blang at the level of the mukim region; (c) supervision of the implementation of customary practices, (d) supervision of the implementation of the tasks of the windbreaker, (e) enforcement of customary practices, (f) facilitating the relations of rice farmers with relevant agencies, (g) custom socialization to the community, and (h) dispute resolution water utilization among rice farmers.

Village waterways (Lueng) are managed by Keujruen Blang Muda in Blang Teurakan Village, Jurong and Babah Krueng Village. Keujruen Blang Muda is coordinating smallholder farmers to clear the canals from the village waterways (Lueng) to the small waterways that flow into the farmers' fields. This cleaning activity is carried out by dividing the plots of water that must be cleared by tenants. Meanwhile, the Keujruen Blang Muda of village of Lancok coordinated sharecropping farmers in the provision of water for irrigating rice fields with boreholes. They deliberated in the availability of water machine equipment so that water could flow into the waterways so that it reached the farmers' fields. Then, honesty does not make a schedule for the distribution of water for each water channel. This is in accordance with Article 5 number (2) of the (2015) Aceh Governor Regulation, the role of Keujruen Blang Muda has functions, namely: (a) regulation of the distribution of water to farmers, (b) supervision of water availability for farmers, (c) supervision of channels and use of water by farmers, (d) settlement of disputes over water utilization among farmers, (e) supervision of the implementation of custom in the use of water, and (f) implementation and enforcement of customary practices.

In addition, they work together to clean water lines so that water can flow smoothly into the rice fields. This activity was carried out after a feast, it was believed that after reading the prayers in festivity, the field activities would go smoothly and get abundant harvests. Thus, in this situation, intelligence is a water manager for farmers working on rice fields. Keujreun Blang as a customary

institution has a strategic task in paddy farming. Just as in Aceh, in Klaten, Central Java in irrigation management also involves stakeholders and farmers ¹⁴.

On the other hand, the availability of abundant water does not reflect the adequacy of water in paddy farming¹⁵. For example, the harvest of farmers does not require water, but abundant water causes crop damage. In the season the water is planted a little so the rice that has been planted becomes dry. This situation is experienced by people in other parts of Indonesia, who have difficulty in fulfilling their lives⁸, including for agriculture. Therefore, Indonesia needs effective water management⁶. Water management by windfall is also influenced by strong cooperation among smallholders so that maximum water management can be carried out ⁹.

In Sawang Sub-District, during the dry season there is also a lack of water, where the discharge of river water becomes low so it cannot continue to flow into irrigation and village drains. Then the team did not coordinate the cultivator farmers to raise the water debit by making a stone dam together. When the dam's water does not flow again, it is done by using a water machine.

Procurement of water machines is requested by the district officials and from the collection of funds at the level of farmers who use the water resource. Usually the collection of funds to farmers is paid with the harvest so that the funds need to be bailed out first by capable parties. Likewise, if there is irrigation that is damaged, the accident does not coordinate irrigation repairs jointly by farmers who take water from the irrigation.

Keujruen Blang as a customary institution in carrying out its duties does not get a salary, but they will get the right after the harvest, that is the farmers will give rice called "Bruek umeng" ¹. The results of "Bruek umeng" that are collected give part for unrestricted money and some for saving "Meunasah" (savings for muslim places of worship in the village), which will be managed for the purposes of Meunasah (Muslim places of worship in the village). This is their togetherness in safeguarding and cleaning the waterways to get abundant rice yields under the coordination of windiness is a local wisdom in Aceh society. The existence of irregularities in managing paddy agriculture water resources for farmers in Aceh is not due to the task mandated in the qanun, but also to preserve the culture of the Acehnese in maintaining communal water sources. Therefore, the existence of Keujruen Blang as the customary institutions in

managing water resources as local wisdom in Aceh society.

CONCLUSION

Keujruen Blang, who is in Sawang Sub-District, has carried out the task by coordinating the cultivator farmers to cooperate in cleaning irrigation from upstream to downstream, and those who do not participate will be subject to sanctions. Keujruen Blang did not forbid people from dumping garbage into irrigation and did not close irrigation without permission. Then the weather does not check irrigation so that it is not shallow and damaged and regulates the distribution of water to prevent theft. In carrying out their duties, the month is not given a salary but will be given a harvest every time. Therefore, the existence of Keujruen Blang as a customary institution in the management of water resources is a local wisdom in the Aceh society.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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The Influence of Transformational Leadership and Organization Commitment on the Job Satisfaction and the Employees Performance of City Council Secretaries in Bireuen District

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ABSTRACT

This study aims to determine how much influence the transformational leadership and organization commitment through job satisfaction and impact on the employee performance of City Council Secretaries Of Bireuen District. The data used is the data by distributing questionnaires to 70 civil servants Bireuen. To data analyze, the statistical analysis used two-track equipment and processed with the help of the application program Statistical Package for Social Science (SPSS). The variables measured include transformational leadership, organization commitment, job satisfaction effect to ward employee performance of City Council Secretaries. The result the analysis of statistical test is transformational leadership and organization commitmen affect the employee performance at mediated job satisfaction. The result job satisfaction variable effect of full mediated on transformational leadership and organization commitment toward employee performance of City Council Secretaries in Bireuen District.

Keywords: *Transformational Leadership, Organization Commitment, Job Satisfaction and Employees Performance.*

INTRODUCTION

The success the employee performance at City Council secretariat of Bireuen District lies on empowering human resources, in order to improve the employee performance. Different Characteristics among individual employees of City Council secretariat of Bireuen District should be able to synergize with the transformational leadership style, so that institutaion leaders are able to organization commitment the employees to achieve organizational performance. The concept of employee performance applied to City Council secretariat in Bireuen District would provide guidance for secretariat on DPRK employees about important things to be done to improve job satisfaction and employee performance in secretariat DPRK Bireuen District.

The purpose of this research was to know and analyze the effect of transformational leadership and organizational commitment on job satisfaction and the, the effect of transformational leadership, organizational

commitment and job satisfaction to ward employee performance of City Council Secretariat.

Theoretical Background

Transformational Leadership

Transformational Leadership style is developed in the context of the organization, where transformational leadership cares to the improved performance, and develops followers to the maximum potential Avolio¹; Bass & Avolio¹, in Northouse². Burns³ suggested that transformational leaders are a process in which leaders and subordinates lift each other to the degree of morality and motivation higher."Leaders and followers raise one another to higher levels of morality and motivation", where leaders are trying to change the followers' consciousness on ideals and moral values such as equality, justice, peace, as well as humanitarian and instead is based emotions, such as fear, jealousy, or hatred.

Organization Commitment

Organizational commitment is an important employee behavior in city council secretariat Bireuen which to assess employee propensity to survive city council institutions as an employee who are loyal to the organization. According to the opinion of Luthans⁵, organizational commitment is an feelings of identification and loyalty to organization and the ongoing process in which members of the organization express their attention to the organization and its sustainable success and progress.

Job Satisfaction

Job satisfaction of secretariat DPRK employee can feel his job whether fun or not fun to do, in an organization of city council secretariat in doing its functions and serving the community especially in the field of financial services, employee satisfaction in performing everyday tasks are indispensable. There are some of definition the job satisfaction, according to Robbins⁴, job satisfaction is a positive feeling about the work as a result of evaluation of the characteristics. Luthans⁵ defines job satisfaction as a result of employee perceptions of how well their work delivers what is important.

Performance

Bernadin explain that performance⁷ provides limitations on the performance as a “record of outcome produced on a specified job function or activity during, a specified time period”. Then, the appraisal of performance is” a way of measuring the contributions of individuals to their organization”. Bernadin⁷ proposed six criteria for measuring the performance of employees, namely is Quality, Quantity, Timeliness, Cost-Effectiveness, Need for Supervision and Interpersonal Impact.

Research Method

Location And Time

The subjects in this study were employees of City Council Secretaries in Bireuen District, the location was done in DPRK of Bireuen District at Malhayati St. No. 1, Bireuen.

Types And Sources of Data

The type of data in this research is quantitative data. The data used in this study are primary data from the respondents' perception of the variables used. Any form

of communication with the respondents in this study used questionnaires submitted directly to the respondent⁸.

Population

Populations a combination of all the elements that have a series of similar characteristics which include the benefit of the research problem. Target population in employees of City Council Secretaries in Bireuen District was 70 employees, who are on of Secretariat DPRK of Bireuen District, with a total population of 70 people.

Samples

The amount of samples taken off in Bireuen District by total population, based on the total population of City Council Secretaries in Bireuen District were 70 employees, who are on of City Council Secretaries in Bireuen District, with a total population of 70 people.

Data Collection Techniques

Data collection method used in this research is by using questionnaire instrument, which is a set of written questions to elicit information from respondents. In this study a questionnaire sheet, there are two types of statements / questions: (1) statements relating to the measurement of the variables; (2) questions relating to the respondent data Sekaran⁹.

Data Analysis Techniques

Inferential statistic is a method related to sample analysis to draw conclusions about the characteristics of the population. After collecting the data and information in the field, then to manage data and information, the writer used the path analysis in the model and hypothesis testing uses the SPSS program for data analysis, Ghazali¹⁰.

RESULTS AND DISCUSSION

A total of 70 copies of questionnaire were analyzed and a research model in this study was used for understanding correlation between different variables. The result of hypothesis validation in this study, reality and validity of instrument had to be verified first. To compare with the independent and similar factors studied in previous studies and examine the variable validity of subjective measurement tool this research used SPSS 19.0, Ghazali¹⁰

Table 1. Regression Structure 1

Model	B	Unstandardized Coefficients			Std. Coeff	t	Sig.
		Std. Error	Beta				
1	(Constant)	6.026	2.441		2.468	.016	
	Transf. Leadership	.337	.139	.307	2.422	.018	
	Org. Commitment	.332	.139	.304	2.394	.019	

a. Dependent Variable: Job Satisfaction

Table 2. Regression Structure 2

Model	B	Unstandardized Coefficients		Std. Coefficients	t	Sig.
		Std. Error	Beta			
1	(Constant)	7.255	1.722		4.214	.000
	Transf. Leadership	.356	.098	.400	3.636	.001
	Org. Commitment	.220	.098	.248	2.254	.028
	Job Satisfaction	.176	.082	.216	2.132	.037

Dependent variable : Employee Performance

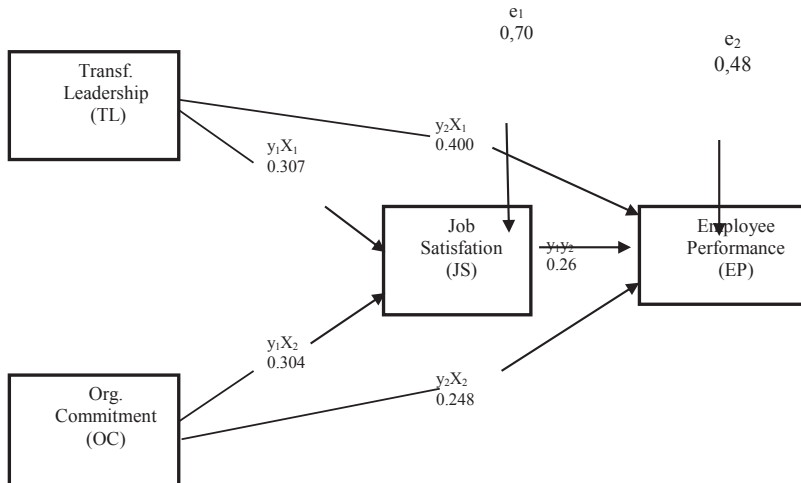


Figure 1 : Path Analysis Model

The path analysis model for this study can be seen in figure 1 above the results of calculation with path analysis shows the transformational leadership and organization commitment significantly influence on job satisfaction and employee performance (direct and indirect) at employee of City Council Secretaries in Bireuen District.

Effect Transformational Leadership to Job Satisfaction

Transformational leadership factor significantly influence on the job satisfaction. It can be seen from the results of path coefficient value 0.307 with a significance value of 0.016. These results prove that transformational leadership is one of the implementation of leadership

which has significant influence on the job satisfaction at City Council Secretariat in Bireuen District.

Effect organization Commitment to Job Satisfaction

Organization commitment factor significantly influence on the job satisfaction. It can be seen from the results of path coefficient value 0.304 with a significance value of 0.019. These results prove that organization commitment is one of the implementation of commitment of organization which have significant influence on the job satisfaction at City Council Secretariat in Bireuen District.

Effect transformational leadership to employee performance

Transformational leadership factor significantly influence on the employee performance. It can be seen from the results of path coefficient value 0.400 with a significance value of 0.001. These results prove that transformational leadership is one of the implementation of leadership which has significant influence on the employee performance at City Council Secretariat in Bireuen District.

Effect organization Commitment to employee performance

Organization commitment factor significantly influence on the employee performance. It can be seen from the results of path coefficient value 0.248 with a significance value of 0.028. These results prove that Organization commitment is one of the implementation of commitment which has significant influence on the employee performance at employee of City Council Secretariat in Bireuen District.

Effect Job Satisfaction to employee performance

Job satisfaction factor significantly influence on the employee performance. It can be seen from the results of path coefficient value 0.216 with a significance value of 0.037. These results prove that job satisfaction is one of the implementation of employee satisfaction which have significant influence on the employee performance at City Council Secretariat in Bireuen District.

CONCLUSION

Base on the results of research and discussion, it can be concluded as follow variable transformational leadership, organizational commitment, job satisfaction

simultaneously and partial have significance effect on employee performance of City Council Secretariat in Bireuen District.

H₁ There is a positive and significant effect of the transformational leadership on job satisfaction at the employee performance of Secretariat DPRK Of Bireuen District.

Based on Table 1, the known value of coefficient between transformational leadership on job satisfaction was 0.307, which is smaller than the significance level of 0.018. These results can be concluded that the transformational leadership variable significantly influences the job satisfaction of the employee performance of City Council Secretariat of Bireuen District. Based on the results of path coefficient value of the transformational leadership on job satisfaction is 0.307 positive coefficient path meaning the transformational leadership on job satisfaction has a positive effect on City Council Secretariat of Bireuen District. **Hypothesis 1** in this research is the influence of transformational leadership on job satisfaction on City Council Secretariat of Bireuen District **accepted**. Worth mentioning that the research results are consistent with studies conducted¹¹, the research results show that the transformational leadership has effect on the job satisfaction, Lumbanraja¹².

H₂ **There is a positive and significant effect of the organization commitment on job satisfaction at the employee performance of Secretariat DPRK Of Bireuen District.**

Based on Table 1, the known value of coefficient between organizational commitment on job satisfaction was 0.304, which is smaller than the significance level of 0.019. These results can be concluded that the organization commitment variable significantly influences the job satisfaction of the employee performance of City Council Secretariat of Bireuen District. Based on the results of path coefficient value of the organizational commitment on job satisfaction is 0.304 positive coefficient path meaning the organizational commitment on job satisfaction has a positive effect on the City Council Secretariat of Bireuen District. **Hypothesis 2** in this research is the influence of organizational commitment on job satisfaction on City Council Secretariat in Bireuen District Lhokseumawe **accepted**. Worth mentioning that the research results are

consistent with studies conducted¹¹, the research results show that the organizational commitment has effect on the job satisfaction, Yunina¹⁹.

H₃ There is a positive and significant effect of the transformational leadership on employee performance at Secretariat DPRK of Bireuen District.

Based on Table 1, the known value of coefficient between transformational leadership on employee performance was 0.400, which is smaller than the significance level of 0.001. These results can be concluded that the transformational leadership variable significantly influences the employee performance of the employee performance at City Council Secretariat of Bireuen District. Based on the results of path coefficient value of the transformational leadership on employee performance is 0.400 positive coefficient path meaning the transformational leadership on employee performance has a positive effect on City Council Secretariat of Bireuen District. **Hypothesis 3** in this research is the influence of transformational leadership on employee performance on City Council Secretariat of Bireuen District **accepted**. Worth mentioning that the research results are consistent with studies conducted¹¹ and ¹³, the research results show that the transformational leadership has effect on the employee performance, Siahaan ^{14, 18}.

H₄ There is a positive and significant effect of the organization commitment on employee performance at Secretariat DPRK Of Bireuen District.

Based on Table 1, the known value of coefficient between organizational commitment on employee performance was 0.248, which is smaller than the significance level of 0.028. These results can be concluded that the organization commitment variable significantly influences the employee performance of the employee performance at City Council Secretariat of Bireuen District. Based on the results of path coefficient value of the organizational commitment on employee performance is 0.248 positive coefficient path meaning the organizational commitment on employee performance has a positive effect on the City Council Secretariat of Bireuen District. **Hypothesis 4** in this research is the influence of organizational commitment on employee performance on City Council Secretariat of Bireuen District Lhokseumawe **accepted**. Worth mentioning that the research results are consistent with

studies conducted¹⁵, the research results show that the organizational commitment has effect on the employee performance¹⁶.

H₅ There is a positive and significant effect of the job satisfaction on employee performance at Secretariat DPRK Of Bireuen District.

Based on Table 1, the known value of coefficient between job satisfaction on employee performance was 0.216, which is smaller than the significance level of 0.037. These results can be concluded that the job satisfaction variable significantly influences the employee performance of the employee performance of City Council Secretariat of Bireuen District. Based on the results of path coefficient value of the job satisfaction on employee performance 0.216 positive coefficient path meaning the job satisfaction on employee performance has a positive effect on the City Council Secretariat of Bireuen District. **Hypothesis 5** in this research is the influence of job satisfaction on employee performance on City Council Secretariat of Bireuen District Lhokseumawe **accepted**. Worth mentioning that the research results are consistent with studies conducted¹¹, the research results show that the job satisfaction has effect on the employee performance⁴ and ¹⁷.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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The Impact of Sulfur Dioxide and Dust Pollutant Emission from Industrial Area Toward the Ambient Air Changes in Cilegon City

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ABSTRACT

The amount of concentration and distribution length of air pollutant discharged from industrial area has consequences for fluctuations in ambient air. The objective of the research was to figure out the alteration of ambient air in Cilegon city. To achieve this objective, the research was conducted by analyzing the emission and circulation of SO₂ and dust pollutants emitted from the industrial estate. Hence, the researchers analyzed the distribution of industrial pollutants using Screen3 software whereas the distribution used is Lagrangian model. To validate the change of ambient air in Cilegon city, the measurement completed on 18 samples points. The results confirm that the amount of concentration of SO₂ pollutants had an impact on the change of ambient air in Taman Sari Village, Pulomerak District. Meanwhile, the impact of dust pollution changes the ambient air in Kotabumi village, the district of Purwakarta and Gerem Village in Grogol District.

Keywords: industrial area, concentration and distribution, SO₂ and dust pollutant, lagrangian model, impact on the change of ambient air

INTRODUCTION

Cilegon city has an industrial zone consisted of three zones, namely: Ciwandan, Krakatau Steel (KS) and Pulomerak. The amount of large and medium industries in the three regions, 81 industries¹. Meanwhile, the fuel usage varied according to the type of production². The Industry of Cilegon city there are five kinds of fuel consumed: coal, residue, diesel fuel, High Speed Diesel (HSD), Pyrolysis Fuel Oil (PFO) and Marine Fuel Oil (MFO)³. The variety of fuel consumption has consequences for various types of pollutants discharged⁴. Based on the results of the air emissions test, the type of air pollutant discharged from the industrial zone of Cilegon consists of: nitrogen dioxide (NO₂), particles/dust, sulfur dioxide (SO₂), carbon monoxide (CO), hydrocarbon (HC), and lead (Pb). The emission concentrations emitted vary be subject to the fuel volume used. The larger the fuel volume consumed, the larger the concentration of pollutants discharged⁵. The fuel volume used in Cilegon varies between 0.00237 to 255,000 kg/hour. The fuel volume sequence was used

as follows: HSD 2.37x10⁻³ kg/hour, diesel fuel 1.00x10³ kg/hour, PFO 3.72x10³ kg/hour, MFO 3.76x10³ kg/hour, and 80x10³ kg/hour residue. Fuel with large volume mainly coal with usage volume (170-255)x10³ kg/hour. The fuel was also used by the steam power plant industry located in Pulomerak zone³. The amount of brick fuel volume used has consequences on the amount of SO₂ and dust pollutants emitted from the industry⁶. SO₂ pollutants and dust emitted from the industrial zone of Cilegon dispersion beyond the industrial zone. This is as the implication of the height of the chimney used⁷.

RESEARCH METHODS

To know the emission and distribution length of air pollutant from industrial zone is done by modeling through several stages. The first stage was analyzing the type of pollutants and emission discharge of each source. The second stage was an analysis of the dispersion of air pollutants from each stack using Screen3 software. The third stage was analyzing the amount of air pollutant concentration in each region using Lagrangian model. Lagrangian model examines the flow model in particle

concept¹⁷. Emission discharge was calculated by using the general formula as follows:

Furthermore, to know the ambient air in Cilegon city, the researchers conducted by measurement. Meanwhile, to control the changes in ambient air, the comparison of ambient air measurement results in a quarterly period. Ambient air measurements were performed at 18 samples points using high volume sampling and paper tape sampling methods. The high capacity sampler method is used to measure the suspended concentration in ambient air by weighing the particulate matter retained on the filter surface by calculating the volume of inhaled air. The sample was used for both qualitative and quantitative analyzes of compounds present in particle form. The sampling was completed for 24 hours with air flow rate of 1.70 m³/

min. Furthermore, the paper tape sampling method was based on the measurement of light transmission due to precipitation (soiling) or darkening of the previously clean filter. The measurements were done by separating big particles from the atmosphere by the expanse and speed of certain airflow. To figure out the tendency of ambient air change measurement result done by using regression equation.

RESULT AND DISCUSSIONS

Emission and Dispersion Pollution of SO₂ and Dust

To figure out the pollutant discharge emitted from the industry, equation (1) was used. The results of the analysis with these equations were shown in Table 1.

Table 1. Air pollutant emissions from industrial zone in Cilegon city

No	Company	Type of fuel	Number of fuel 10 ³ (kg/h)	Element of content		Efficiency		Emission		
				SO ₂ (%)	Dust (%)	SO ₂ (%)	Dust (%)	SO ₂ (gr/sec)	Dust (gr/sec)	
1	Krakatau Daya Listrik	Residue	80.00	0.08	0.02	0.00	0.00	33.33	4.44	
2	Chandra Asri	Diesel fuel	1.00	0.05	0.00	0.00	0.00	0.25	0.00	
		PFO	3.72	0.01	0.00	0.00	0.00	0.27	0.00	
		MFO	3.76	0.01	0.01	0.00	0.00	0.21	0.10	
3	Port of Cigading	Residue	80.00	0.05	0.02	0.03	0.00	22.22	4.44	
4	Indonesia Power									
		Unit 1 – 4	Coal	680.00	0.30	6.00	0.00	99.50	1133.33	56.67
		Unit 5 – 7	Coal	765.00	0.30	6.00	0.00	99.50	1275.00	63.75
5	Krakatau Steel	HSD	170.70	0.00	0.00	0.00	0.00	0.00	0.00	
		MFO	444.44	0.01	0.01	0.00	0.00	24.69	12.35	

The screen3 software used the following inputs such as; pollutant emission, temperature, wind speed and height of stack. The output of the software will be obtained the distance of air pollutant distribution in various atmospheric stability. Therefore, it was conducted the measurement of wind velocity and temperature zone. Wind speeds in industrial estates range from 0.2 to 4.0 m/s with temperatures ranging from 21.0 to 34.4°C. Average wind speed and ambient temperature in Cilegon industrial zone are: 2.5 m/s and 30°C, the result of model ruuning under those conditions, for SO₂ and dust pollutants are shown in Table 2 below.

Table 2. Distances of air pollutants with screen3

Atmospheric stability	KS zone			Ciwandan zone			Pulomerak zone		
	Concentration ($\mu\text{g}/\text{m}^3$)		Space of distance (m)	Concentration ($\mu\text{g}/\text{m}^3$)		Space of distance (m)	Concentration ($\mu\text{g}/\text{m}^3$)		Space of distance (m)
	SO ₂	Dust		SO ₂	Dust		SO ₂	Dust	
A	54.33	27.18	1000	49.52	9.89	1000	592.40	33.32	1155
B	53.38	26.70	1387	47.12	9.42	1377	237.20	13.34	4320
C	40.69	20.35	2595	36.21	7.24	2566	148.90	8.37	9876
D	16.19	8.10	8632	14.62	2.92	8356	4.82	0.27	18800
E	9.16	4.58	10371	11.99	2.40	8707	1.07	0.06	18800

Based on Table 2 above, the results of Screen3 SO₂ pollutant software and dust on various atmospheric stability with the same wind and temperature speeds showed the amount of concentration and spacing of different distances. Turner’s atmospheric stability consists of: highly unstable (A), medium unstable (B), slightly unstable (C), neutral (D), somewhat stable (E), and stable (F) [19]. Based on the results of the analysis, the atmospheric stability in Cilegon city in the morning, noon, afternoon and evening has variations between A-E. This phenomenon shows that the air condition in Cilegon city is between steady stable until quite stable. The distance distribution between atmospheric stability

E and A, SO₂ and dust pollutants in each zone varies. The ratio of the distribution of SO₂ and dust pollutants in the KS Zone between the stability of E and A is 10.37, in the KS zone of 8.71, while in the Pulomerak zone of 16.28. Meanwhile, the concentration of pollutants emitted is getting smaller. The amount of pollutant emitted from Pulomerak zone due to a very high stack used, so emissions dispersion beyond the industrial zone. To know the distribution of contaminants SO₂ and the dust that spread in Cilegon city used equation (4). The result of running the program using the equation, the distribution of pollutants in Cilegon city is shown in Figure 1.

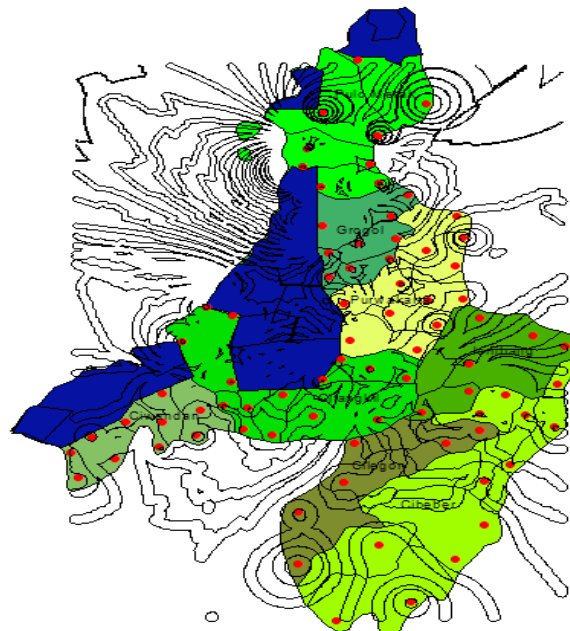


Figure 1. Distribution of pollutants SO₂ and dust in Cilegon city

Based on Figure 1, it shows that the concentration of SO₂ and dust spread in Cilegon city emitted from the industrial estate, with an average wind speed of 2.5 m/s with wind direction from West to East. The analysis results showed that with wind velocity 2.5 m/s SO₂ and dust spread from Tamansari village towards Suralaya Village, Pulomerak district. Then from the village of Kotasari, Grogol district SO₂ spread to the village of Kotabumi

village of Purwakarta district. The concentration of SO₂ ranged from 21.843 to 24.573 µg/m³ whereas in Pulomerak subdistrict spread from Tamansari Village to Suralaya Village ranged from 40.228 to 45.256 µg/m³. While dust pollutants, concentrations in the same place between 97 to 277 µg/m³ and 259 to 629 µg/m³, the second distribution of pollutants, is shown in Figure 2.

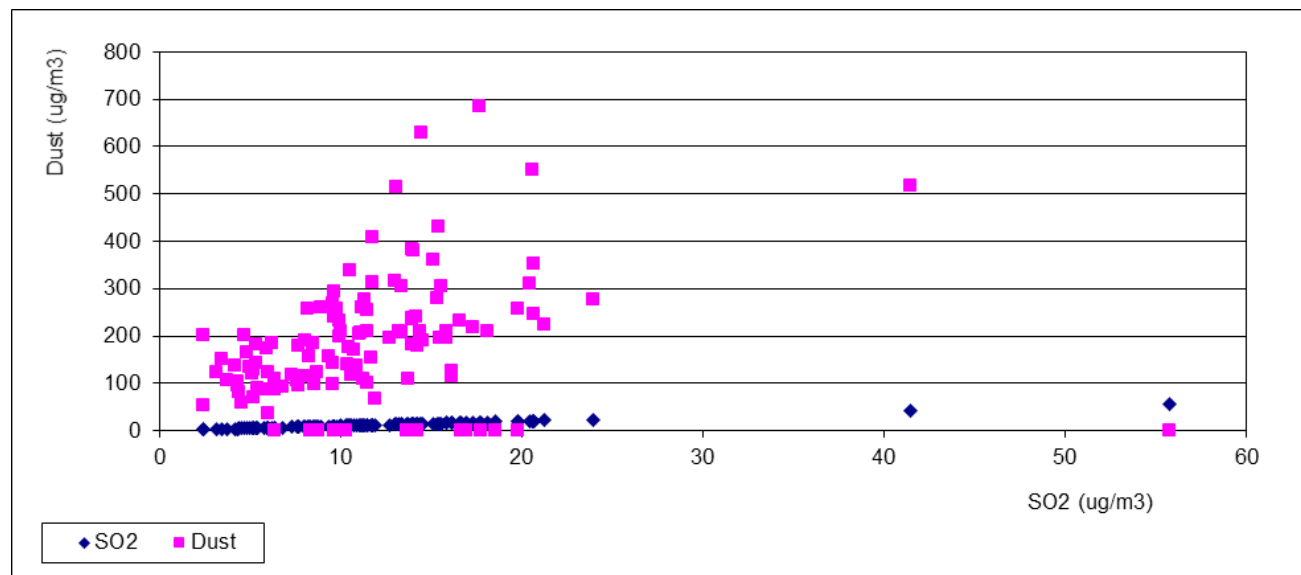


Figure 2. Dispersion of SO₂ and dust in Cilegon city

The measurement of Ambient air

Measurements of air pollutant concentrations were carried out over five periods in November (2015) and then July and November (2016) and July and August (2017). Monitoring was conducted at 18 sample points spread throughout the Cilegon city. Monitoring the concentration of SO₂ and dust pollutants at each sample point, the monitoring results were shown in Table 3.

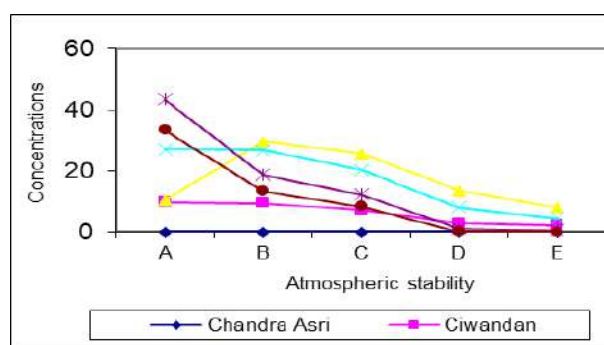
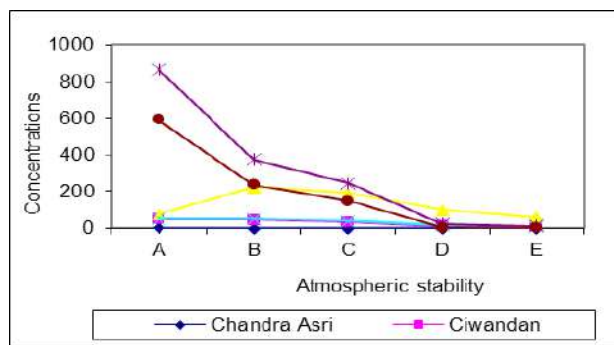
Based on the table, it is generally seen that the concentration of SO₂ and dust at each sample point has increased. Measurements were made at 18 samples points in a quarterly period, in this research, it was conducted four times for the measurement. The measurement results at the sample point, the concentration range of SO₂ between 3.45 to 55.75 µg/m³ while the dust concentration between 37 to 518 µg/m³. Changes in

ambient air, as a result of SO₂ pollutants occurred in Taman Sari village, Pulomerak district, while the change of ambient air, as a result of dust pollutants occurred in the Village of Kotabumi, district of Purwakarta and Gerem Village, Grogol district.

The amount of coal fuel volume and the height of the chimney used has implications for the concentration and distribution lengths of SO₂ and dust emitted. The concentration of SO₂ and dust is inversely proportional to the spreading distance emitted. The farther the emission distance the less concentrated pollutants emitted. Another thing related to the distribution of air pollutants is the stability of the atmosphere. Cilegon city has A-E stability, SO₂ and dust concentration changes in each atmospheric stability shown in Figure 3 below.

Table 3. The result of measurement of ambient air in Cilegon city

No	Location of measurement			Concentration SO ₂ (µg/m ³)				Concentration dust (µg/m ³)			
	Locations	Village	Districts	P-1	P-2	P-3	P-4	P-1	P-2	P-3	P-4
1	Kelapa Tujuh	Suralaya	Pulomerak	3.90	6.30	6.36	6.39	107	121	130	109
2	Pasar Merak	Taman Sari	Pulomerak	9.35	13.93	11.19	16.93	156	264	201	260
3	ASDP Merak	Taman Sari	Pulomerak	14.20	13.75	20.69	55.75	240	385	235	247
4	Cikuasa Baru	Gerem	Grogol	11.41	13.39	15.23	16.25	126	135	144	213
5	Cikuasa Lama	Gerem	Grogol	8.07	13.88	13.98	15.88	190	205	157	183
6	Depan PENI	Gerem	Grogol	15.38	11.42	20.69	41.42	432	518	306	352
7	Kruwuk	Rawa Arum	Grogol	6.22	10.73	11.11	13.73	186	109	136	207
8	Komp. Arga Baja Pura	Kota Sari	Grogol	5.14	11.26	5.21	11.26	120	108	108	153
9	Perum KS	Kota Bumi	Purwakarta	11.74	4.85	5.89	14.75	409	412	432	452
10	Palem Hills	Kota Bumi	Purwakarta	5.42	7.65	4.43	7.65	90	96	52	82
11	Rel KA	Kebon Sari	Citangkil	3.55	3.68	3.79	4.23	125	131	132	145
12	Telkom Warna Sari	Warna Sari	Citangkil	11.23	11.24	12.72	21.24	226	223	87	196
13	Pelindo	Tegal Ratu	Ciwandan	8.15	8.25	14.04	13.25	210	209	209	381
14	Randakari	Randakari	Ciwandan	3.45	8.85	5.00	10.85	150	138	94	134
15	Pengabuan	Kepuh	Ciwandan	9.91	9.94	5.98	11.94	68	67	93	37
16	Cilodan	Gunung Sugih	Ciwandan	10.12	10.12	10.42	16.12	126	125	97	177
17	Kedung Bulus Pabuaran	Ciwedus	Cilegon	15.37	8.61	17.32	14.57	281	191	113	217
18	PCI	Kedaleman	Cibeber	7.26	7.62	14.25	13.34	198	207	211	235



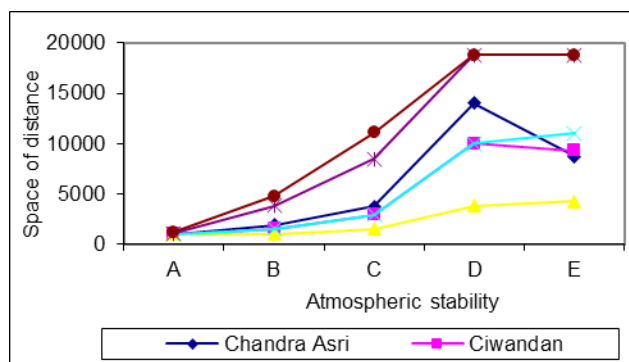
concentration SO₂

(b) dust concentration

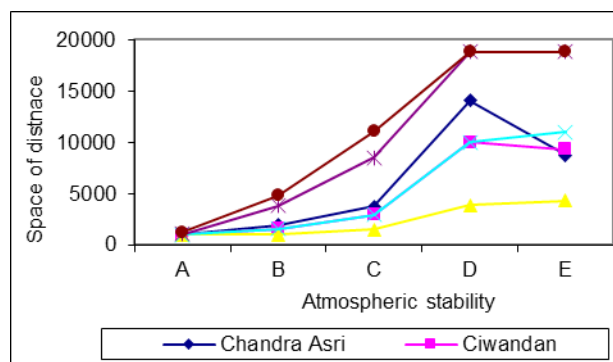
Figure 3. Relationship between concentration SO₂ and dust with atmosphere stability

Furthermore, the distance of the pollutant distribution is inversely proportional to the concentration, the highest concentration in stability A while at stability E is small concentration. Meanwhile, the farthest distance occurs at the stability of E while the closest distance

occurs to the stability of A, as shown in Figure 4. The large amount of SO₂ pollutants and dust emitted from the industry had implications for changes in ambient air outside industrial zones.



Pollutant SO₂



(b) Dust pollutant

Figure 4. Relationship between distribution distance of SO₂ with atmosphere stability

CONCLUSIONS

The concentration of SO₂ and dust contaminants emitted from the industry spread to the outside of the industrial estate due to the changes in ambient air in some zones of Cilegon city. The results showed that SO₂ concentration had an impact on ambient air change in Taman Sari Village, Pulomerak district. Meanwhile, the impact of increased concentration of dust pollutants occurred air changes in the Village of Kotabumi, Purwakarta district and Gerem Village, Grogol District.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Uterine Inversion After Normal Delivery; A Case Report

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ABSTRACT

Uterine inversion is a rare case in Obstetrics and Gynecology field, but the incident can be a life threatening event. The incident was obtained 1 in 20,000 of normal deliveries. We present a case of woman with postpartum hemorrhage after delivery in obstetric clinic with active bleeding. On the vaginal toucher examination, there was a palpable lump and during massage, the uterus was difficult to assess. Postpartum hemorrhage is one of the biggest causes of maternal death until this date. One of the rarest causes of postpartum hemorrhage is uterine inversion, a rare and life threatening case in which the uterus is rotated partially or completely. This is a case about a woman, 29 years, with postpartum hemorrhage with loss of consciousness et causa hypovolemic shock since 2 hours before hospital admission. The patient has just given birth of her third child, with birth weight of 3500 grams. In the third stages of delivery, the placenta was not born immediately and the uterus is protruding into the vaginal cavity with active bleeding.

Keywords: Uterine inversion, Obstetrics, Gynecology

INTRODUCTION

Uterine inversion is a rare case in Obstetrics and Gynecology field, but the incident can be a life threatening event. The incident was obtained 1 in 20,000 of normal deliveries. We are presenting a case of a woman with postpartum hemorrhage after giving delivery on a midwife clinic with active bleeding. On the vaginal toucher examination, there was a palpable lump and during massage, the uterus was difficult to assess.^{1,2}

When inversion occurs, the adnexa and ligament are pulled into the fundus of the uterus and become more stretched. This can cause an extreme pain and lead into neurological shock. As the uterus is inverted and trapped inside the cervix, it causes progressive edema and congestion due to impaired venous and lymphatic drainage. Edema and congestion will increase the constancy of the inverse segment, making reduction more difficult. Impaired venous drainage will cause a lot of bleeding³.

The cause of acute uterine inversion is usually due to an error of the third stage of labor, with traction on the umbilical cord and fundal pressure before the placenta was separated. Another factor is the use of magnesium

sulfate during labor, manual release of the placenta after vaginal delivery or Caesarean section before the placenta is incompletely separated, increased abdominal pressure as coughing and sneezing or pushing, short umbilical cord and abnormalities of connective tissue⁴.

Case

A woman, 29 years old, came from a clinic with postpartum hemorrhage since 2 hours before hospital admission. Patient with decrease of consciousness and pale face, along with active bleeding from birth canal et causa uterine inversion. The patient has just given birth of her third child, with birth weight of 3500 grams. In the third stages of delivery, the placenta was not born immediately and the uterus is protruding into the vaginal cavity with active bleeding. The clinic where patients giving birth refers the patients directly into a type B hospitals, but because there is no availability of equipment, then the patient is referred to Zainoel Abidin General Hospital.

On physical examination obtained somnolen consciousness with GCS of 10, blood pressure 70/50 mmHg, heart rate 140 beat/minute, respiratory rate 38 breath/minute. Left and right conjunctiva was anemic,

whereas heart and lungs sound no abnormalities were found.

On obstetric examination, uterus fundus was difficult to assess, and on inspection there was active bleeding from birth canal, on vaginal toucher the uterus was protruding into vaginal cavity with active bleeding.

On laboratories examination, Hemoglobin is 4,8 g/dL and hematocrit 15%, thrombocyte 303.000/ mm³ and leucocyte 32.800/ mm³, MCV, MCH, MCHC is 76, 25, 33 simultaneously. It was concluded with Hypochromic Microcytic Anemia etcausa Bleeding with reactive leukocytosis.

The patient then had uterus reposition and continued with bimanual compression with administration of uterotonic (oxytocin 40 IU, Methergin 2 ampules, Misoprostol 600 mcq per rectal). However, the contraction was not adequate and so the patient were

decided for Laparotomy Hysterectomy.

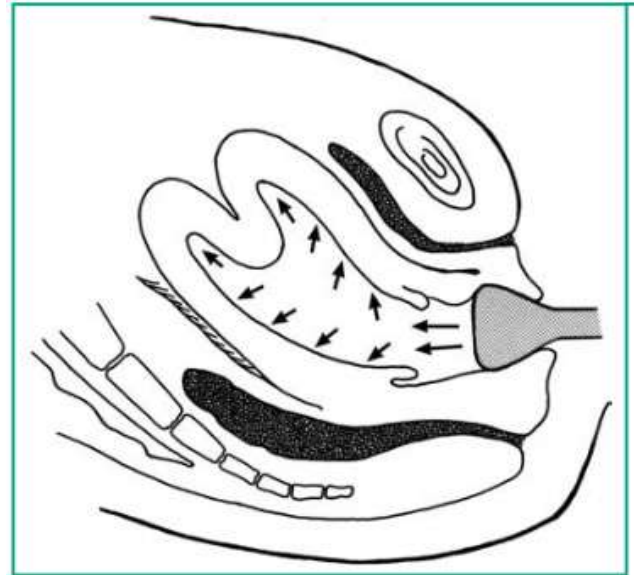


Fig 1: Cardiac Arrest Due to Uterine Inversion During Caesarean Section. Int J ObstetAnesth. 2009¹¹

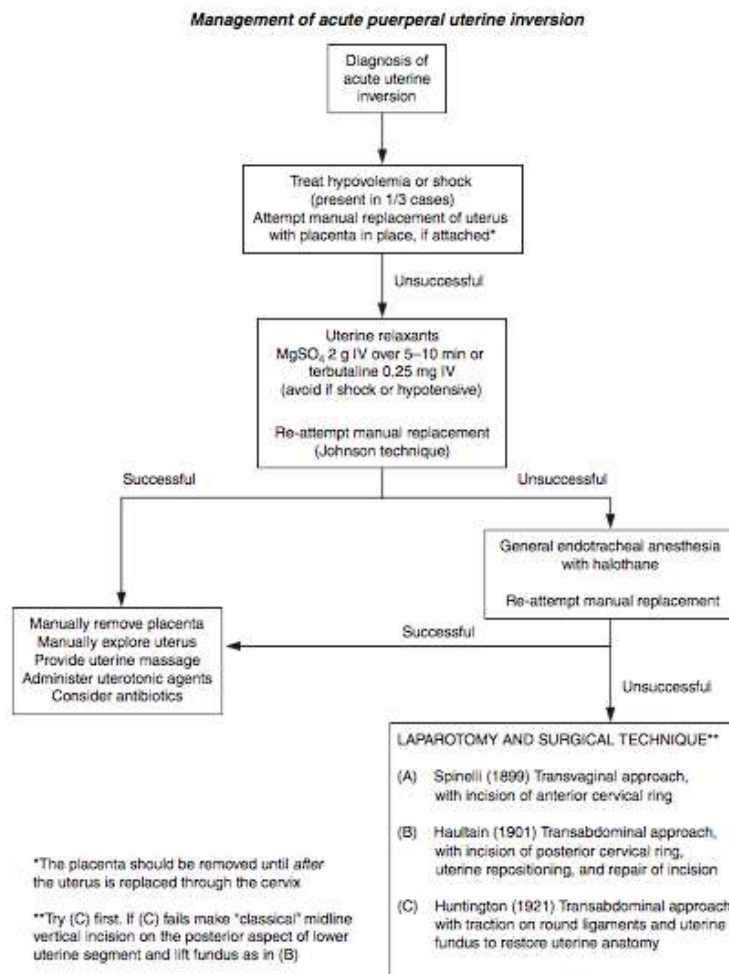


Fig 2 Uterine Inversion Algorithm. Picture taken from Clinical Protocols in Obstetrics and Gynecology¹⁵.

DISCUSSION

Uterine inversion is defined with fundus discharge into the uterine cavity. Uterine inversion divided into 4 degrees. 1st degree the fundus is rotated but does not reach the introitus. 2nd degree fundus rotates into vaginal introitus. 3rd degree fundus rotates and appears in the vaginal introitus, and 4th degree fundus rotates completely.^{3,5} Uterine inversion divided according to the distance of onset and delivery: acute inversion occurs 24 hours after delivery; subacute inversion occurs 24 hours to 1 month after delivery; and chronic inversion occurs >1 month after delivery⁶. Uterine Inversion symptoms characterized with abdominal pain, bleeding from the birth canal, along with decrease of hemodynamics².

Mismanagement of the third stage was recognized as the main cause of uterine inversion, although 50% of the case had no identifiable cause⁷. The most common factor seems to be the traction strength of placenta implantation at fundus with non adequate contraction of the uterus.

The application of uterine relaxation can be helpful such as β Sympathomimetic agents, Magnesium sulfate or low dose nitroglycerin^{8,9,10}.

After improving general condition and administer of antibiotic to prevent sepsis, manual reposition or hydrostatic method can be used as an option, if the manual treatment fails, repositioning can be done abdominally¹.

Hydrostatic method with silastic cup. Image taken from Cardiac Arrest Due to Uterine Inversion During Caesarean Section. *Int J ObstetAnesth*. 2009¹¹.

There is several ways of abdominal management of uterine inversion, Johnson's maneuver, where the operator insert two-third of the forearm into the vagina and spread the arms to lift the uterus above umbilical level to create tension and the fundus back to its normal position. If the uterus does not respond, addition of tocolytic can be considered.

Another alternative of uterine inversion is surgical methods, Huntingdon Technique, using 2 Allis forceps, uterus is pulled out and returned to its normal position.

Another surgical methods is the Haultain Technique, incisions is made in the posterior cervix with a longitudinal incision and with finger inserted into the

uterine incision area, the uterus is returned to its normal shape, incision closed with interrupted suturing³. The Matsubara-Yano suture technique is useful for deep hemostasis on postpartum hemorrhage, and it also can be used for prophylactic actions of uterine inversion recurrence¹².

Controversial occurs when removing the placenta. Uterine inversion with placenta left off during vaginal delivery will result in considerable blood loss. On the other hand, the presence of placenta will complicate the process of returning uterus position^{13,14}.

Uterine inversion can returned to its normal position with a sufficient team along with anesthetic and obstetric consultants within 45 minutes².

CONCLUSION

Uterine inversion can be managed properly, if it is known and managed immediately. The key of uterine inversion management is teamwork. In addition of uterine inversion risk factors, the process of placenta birth should be cared with cautions. Experts in labors process must paid more attention to assist when emergencies occur.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Prospect of Minapolitan Area Development in Aceh Timur Regency

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ABSTRACT

The study aims to determine the prospects for developing minapolitan area in Aceh Timur Regency. The method used in this study is survey method. The determination of the regency was carried out purposively, Aceh Timur Regency as an area of fisheries and cultivation minapolitan based on the decision of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number 35 / KEPMEN-KP / 2013. The results showed that the development of the minapolitan area in Aceh Timur Regency has potential to be developed based on the position of fisheries is on the international sea area, in the Indonesia-Thailand-Malaysia Cooperation Growth Triangle Area (IMT-GT) and the territorial waters including Fisheries Development Area I (FDA I) Andaman Sea-Malacca Strait, as well as fishery potential and fishery resources both in terms of fisheries area, infrastructure availability, fish resources, fisheries human resources, fishing facilities, availability of cultivated land, markets, processing, institutions, and the opening of fishery product export market opportunities. Integration of government, banking and private institutions was expected to be able to solving the problems of fisheries and fishermen, empowerment of fishermen and fish farmers, and encourage the development of integrated fisheries agroindustry in the minapolitan area.

Keywords: *fisheries development, fisheries resources, poverty*

INTRODUCTION

Minapolitan is a concept of maritime and fisheries development based on regional economic management with the driving force of the marine and fisheries sector. Minapolitan program begin in 2009 and it is a realization of the blue revolution program promoted by the Ministry of Fisheries and Maritime Affairs Republic of Indonesia to change the land mindset to maritime, by emphasizing the use of superior and competitive local resources. Development of the minapolitan area includes production, processing and marketing of fisheries and marine products. Through the minapolitan program, it is expected to increase various fisheries and coastal communities. The problem are: (1) the area inhabited by fishermen is generally isolated, (2) access to roads, markets and communication networks is not available, (3) knowledge and skills are very low so that they do not master capture fisheries technology and cultivation, and anticipatory thinking skills are low, (4) low ability to handle and process fisheries and marine products, (5) limited facilities and infrastructure, and (6) do not have venture capital. ¹

Aceh Timur Regency has 1,683.5 km² of marine waters, 46.4 km of coastline, and a fisheries strategic position in the Indonesia-Thailand-Malaysia cooperation growth triangle (IMT-GT) and marine waters including Fisheries Development Area I (FDA I) Andaman Malacca Strait. The fishing facilities and infrastructure owned by Unit 1 of the Nusantara Fisheries Port (PPN) in Idi Port Fish Landing (PPI) in Kuala Idi Cut and Kuala Bagok plus traditional port spread, and 43.4 km of national roads. Productive ponds have traditionally cultivated cover an area of 3,787 hectares and a freshwater pond of 2.6 hectares, non-productive ponds (idle) of 2,272.2 hectares and a pool of 3.9 hectares. Based on the fisheries potency and fisheries resources, Aceh Timur Regency is designated as a minapolitan area based on the Decree of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number: 35 / KEPMEN-KP / 2013, dated: 2 July 2013 Minapolitan Aquaculture.

The Minapolitan area in Aceh Timur Regency consists of 6 Sub-districts, 15 Mukim and 110 Villages with a total area of 755.47 km², 53 villages of which are

coastal villages covering an area of 137.66 km² (18.22%) which become the Core and Supporting Regions, while the villages non-coastal areas become buffer zones plus coastal villages that are not included in the Minapolitan development area of East Aceh Regency. The coastal area of the Minapolitan Region is formed from the limit of 4 nautical miles (1 mil sea = 1.85 km) from the coast and coastal sub-district boundaries.

Related Research

The poverty trap that hit fishermen's life was caused by complex factors. These factors are not only related to fluctuations in fish seasons, limited human resources, capital and access, fish trade networks that are exploitative of fishermen as producers, but also due to the negative impacts of fisheries modernization that encourage excessive drainage of marine resources³.

Proposed Method

The determination of the location of the research was carried out purposively, is the Aceh Timur Regency as an area of capture fisheries minapolitan based on the decision of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number 35 / KEPMEN-KP / 2013.

Research Methodology

The study used a survey method (survey method) with a qualitative and quantitative descriptive approach.

RESULTS AND DISCUSSIONS

Fisheries Resources

Aceh Regency Timur is a center for fisheries production and development in Aceh Province. Fish Resources (SDI) are relatively abundant, with superior commodities of various types of pelagic and demersal fish, such as komo cobs, layang deles, madidihang, skipjack tuna, lisung, cotton, albacora, black pomfret, machetes and other types of non-fish such as crustaceans (crustaceans) with hard skin or soft skin such as squid, cuttlefish and others. In 2014, fish production for fishing reached 16,620.61 tons increasing to 27,474.29 tons in 2016 with a production value of Rp. 599,565,982.30. Of these values, Idi Rayeuk Subdistrict is the highest contributor to the fisheries sector, namely fish production reaching 23,738.11 tons and a production value of Rp. 511,395,991⁴.

Ownership of fisheries resources and strategic location of fisheries in the Indonesia-Thailand-Malaysia Cooperation Growth Triangle Area (IMT-GT) is a potential for fisheries development and regional economic growth. To support the development of fishing, the regency has 1 unit of Coastal Fisheries Port (PPP) in Idi Rayeuk District; 5 units of Fish Auction Places (TPI) and traditional ports scattered in several sub-districts, such as Simpang Ulim, Julok, Darul Aman, Kuala Bugak Peureulak, and Rantau Selamat Districts; 1 unit of Beach Seed Hall in Alue Bu Village, Peureulak Barat District; and many traditional hatcheries. Fishing facilities in the 61 outboard motor fleets and 1,253 motorized fleets. The type of fishing equipment that is in the Idi Fishing Port is mostly in fishing rods and purse seines. The utilize of technology can also indicate the ethics of fisheries managers in utilizing fish resources. The use of inappropriate technology can trigger environmental damage or can lead to social conflicts between fish resource users. Some criteria for environmentally friendly fishing technology are high selectivity, non-destructive to habitat, do not endanger fishermen, produce good quality fish, products do not endanger the health of consumers, fish catches that are minimized, have a minimum impact on biodiversity diversity, do not catch species protected or endangered, and socially acceptable⁵.

Market and Marketing

The existence of markets and banks is very crucial, especially in the areas of fisheries production centers. In Aceh Timur Regency, in the Minapolitan development area, there are several market locations that spread in almost every sub-district as shown in Table 1. Most markets are concentrated in Idi Rayeuk District. This will make it easier for fishermen to market fish and get the raw materials needed to go fishing. Until now, coastal communities do not have microfinance institutions at the level of fishermen to facilitate access to capital loans. Microfinance institutions are able to provide credit services on a large enough scale without collateral, without strict rules and intensity of mentoring is higher than commercial credit patterns⁶. Microfinance institutions implement various systems in an effort to empower people. The system applied has its own advantages in order to help alleviate poverty⁷.

In order to support the marketing of fishery products, Aceh Timur Regency has provided 1,797.4 Km of road

network consisting of 112 Km of state roads, 116.8 Km of provincial roads and 1,568.60 Km of district roads.

Table 1 Marketing and Banking Facilities in the Minapolitan Area of Aceh Timur Regency, 2017

Amenities	Districts					
	Darul Aman	Peureulak Barat	Peudawa	Idi Rayeuk	Idi Timur	Peureulak
Traditional market	0	17	8	4	0	
Permanent Market	1	5	2	19	0	2
Store	50	97	34	277	31	165
Stalls	30	91	50	146	37	46
Cooperative	4	0	5	6	2	4
Bank	0	0	0	1	0	1

Abundant fish resources and open international market opportunities provide export opportunities for fishery products. Marketing of fish is mostly carried out outside East Aceh District, even some of which are exported to Malaysia. However, the amount of fish exported and the export value has not been accurately recorded. The marketing of fish in the Aceh Timur District reached 6,749,713 kg or around 40% of the total fresh fish marketed in 2015, which was 16,874,282 kg. Marketing outside the district ranges from 60% of the total fresh fish marketed to Medan and Padang cities and exported to Malaysia. Only a small portion of fresh fish is processed into wooden fish (drying), salted fish, shrimp paste, and shredded fish. Until now there is no fast food fish processing (canned fish) agro-industry.

Fish Processing Facilities

Generally in the coastal community, their daily life other than fishing, fishermen also do fish processing, because not all catches can be absorbed directly by the market. Fish processing activities are generally carried out during a decline in fish prices due to abundant fish production. The fish processing is in the form of salted fish, wooden fish, abonikan, terasi / belacan, and making pindangikan presto. Making salted fish is a process of processing or preserving fish by using salt so that the fish does not rot quickly and can be consumed for a long time. Fish processing units are scattered in several sub-districts as shown in Table 2.

Table 2: Fish Processing Unit (UPI) in East Aceh District

Districts	Location of Fish Processing Unit	type
Darul Aman	Seuneubok Baro	Fish salting
	Blang Geulumpang	Salting fish & fish shrimps
Idi Rayeuk	Ketapang mameh	Salting fish & shredded fish
	Calok Geulima	Salting fish & making shrimp paste / belacan
	Kuala Peudawa Puntong	Fish salting
Idi Timur	Matang Rayeuk PP	Fish salting
Peudawa	Kuala Peudawa	Fish salting
	Kampung Keudee	Fish salting

Going forward, as part of the Minapolitan development area, Idi Rayeuk District is expected not only to rely on the economy from selling fresh fish but will gradually be directed to the development of fish-based agroindustry to produce processed fish, increase added value and create jobs for the community. The existence of the fish processing industry certainly requires a large and continuous supply of fish that can be achieved by facilitating large vessels to be able to lean on the Nusantara Fisheries Port (PPN) Idi.

Institutional

The dominant institution in managing the minapolitan area is the East Aceh Regency government organization. Besides stakeholders from the East Aceh District Government officials need to also include existing institutions in the community, in this case that are closely related to the fisheries sector such as the HukomLaot Institution / East Aceh Commander from District level to Lhok (District) level and professional

groups such as Groups Mainstay Farmers and Fishermen, as well as Fishermen Association of Indonesia as partners in program implementation.

The dominant institutions in managing the minapolitan area involve the government, the private sector and the community as shown in Figure 1. Specifically, the government plays regulatory and development functions simultaneously ⁸. The local government acts as the regulator or facilitator in building and managing facilities in the Minapolitan area, such as the fish processing industry, ice block industry, shipyards. In its implementation it is left to the public or private parties; while the government regulates policies regarding location and provisions relating to public interests. However, for the provision of basic needs that are not economically efficient, it must remain the responsibility of the regional government, for example. fishing housing, fish culinary center, fish seed hall, health center and others.

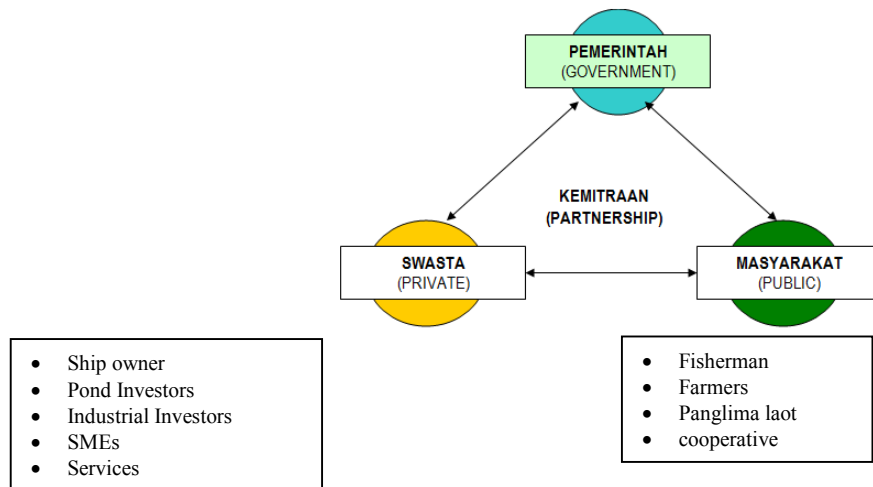


Figure 1: The partnership pattern for the Management of the Minapolitan Area, Aceh Timur Regency

Infrastructure Development in Minapolitan Areas

Infrastructure development is an indicator that can be used as a benchmark for developing a region. This condition is quite visible in East Aceh District since it was established as a minapolitan area. The center of fishing production and trade that can be used as the main driver of the economy in the Minapolitan area is the fishing port or fish landing site. In the Minapolitan

Development Area of Aceh Timur Regency as a support of fishing in Aceh Timur Regency, has several facilities to serve loading and unloading of fishing goods and products, a fairly representative port is in the Nusantara Fisheries Port (PPN) Idi located in the Geumpang Village, Idi District Rayeuk. Some infrastructure that has been built in the Minapolitan Area as shown in Table 3.

In the development of the Minapolitan area infrastructure, the priority programs are the development

of road and drainage networks, electricity networks, public facilities and means of transportation. Development in the Minapolitan area is seriously carried out by the local government for the improvement of people's lives and the development of the pre-planned Minapolitan area.

Table 3: Infrastructure Development in Minapolitan Areas

No.	Infrastructure development	Location	Benefit	Implication to the community
1	Beach Seed Center	Peureulak Barat Districts	Availability of Shrimp Seeds	Qualified Seed Availability is fulfilled
2	Production Road	All Sub-Districts Minapolitan area	distribution and transportation smoothly	Saprodi Distribution Activity and Harvest Results went smoothly
3	Production Bridge	All Sub-Districts Minapolitan area	distribution and transportation smoothly	Saprodi Distribution Activity and Harvest Results went smoothly
4	Pond Channels	All Sub-Districts Minapolitan area	Water distribution smoothly	Fulfillment of water needs for cultivation activities
5	Ice Factory	Idi Rayeuk Districts	Availability of Ice Needs at the Port	Fulfillment of ice needs for post-harvest / catch of fishermen
6	Cool Storage	Idi Rayeuk Districts	availability of Fish Storage	Stable Fish Sales Cost is stable
7	Dermaga	All Sub-Districts Minapolitan area	Availability of Boat / Boat Ropes	The loading and unloading process runs smoothly
8	PPI/TPI	All Sub-Districts Minapolitan area	Availability of an auction place	Availability of Transaction Points for Products and Other Supporting Needs
9	Fisherman's Hall	All Sub-Districts Minapolitan area	Availability of meeting places for farmers and fishermen	Ease in making decisions
10	Main Transit Building	All Sub-Districts Minapolitan area	Availability of Temporary Parent Shelter	A quality parent is accommodated
11	SPBN	Idi Rayeuk Districts	Availability of Fuel Needs	Fulfilled Supply of fuel for raw materials
12	Hatchery	All Sub-Districts Minapolitan area	Availability of Shrimp Seeds	Fulfillment of Seed Availability
13	Gudang Garam	Darul Aman Districts	Availability of salt storage infrastructure	Salt marketing runs smoothly and processing raw materials are fulfilled
14	Concrete Plate Titi	All Sub-Districts Minapolitan area	Easy distribution and transportation	The smoothness of Saprodi Distribution Activities and Harvesting Results

Contribution of Fisheries Subsector to Regional Economy

The development or dynamics of the fisheries sector can be seen from the contribution of the fisheries subsector to the GRDP of Aceh Timur Regency. If in the area / unit analyzed by the fisheries sector, it is relatively contributing to a larger economy (as seen from the contribution to GRDP), the stakeholders' attention to the sustainability of capture fisheries will be even

higher. GRDP data in Aceh Timur Regency shows that the agricultural sector still dominates the economy of the Aceh Timur Regency.

Although the use of these resources has shown significant contribution to the region, some people, especially fishermen, have not enjoyed it well. The potential of large fishery resources indicated has not been used optimally. This can be seen from the high rate of poverty of fishermen in the coastal areas of Aceh

which is reflected in the unhealthy housing environment, limited health facilities and lack of educational facilities.

CONCLUSIONS

The development of the minapolitan area in Aceh Timur Regency has the potential to be developed based on the position of fisheries on the international sea, namely in the Indonesia-Thailand-Malaysia Cooperation Growth Triangle Area (IMT-GT) and the marine waters including in the Fisheries Development Area I (WPP I) Malacca-Sea Strait Andaman, as well as fisheries potential and fishery resources both in terms of the area of fisheries, availability of infrastructure, fish resources, fisheries human resources, fishing facilities, availability of cultivated land, markets, processing, institutions, and open market opportunities for fishery product exports.

Integration of government, banking and private institutions is expected to be able to overcome the problems of fisheries and fishermen, empower fishermen and fish farmers, and encourage the development of integrated fisheries agroindustry in the minapolitan area.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Credibility-Profit Chain in Indonesian Islamic Banking Industry

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ABSTRACT

The purpose of this research is to examine the influence of credibility toward satisfaction, customer loyalty and Islamic banks performance. It is also to know whether the satisfaction and customer loyalty mediates the effects of credibility toward performance of Islamic banks in Indonesia. The sample of this research is 269 respondents that taken using purposive sampling technique. The data analysis method is Structural Equation Modelling (SEM) using AMOS. The results showed that the credibility of Indonesian Islamic banks influenced significantly toward the satisfaction and customer loyalty. The customer satisfaction influences significantly toward the customer loyalty. The satisfaction and loyalty influence significantly toward the performance. Moreover, the satisfaction and loyalty can mediate the effect of credibility toward the performance. Unfortunately, the credibility has not direct effect on the performance. However, the credibility is the key driver for increasing perception of customer and profitability.

Keywords: *credibility, customer satisfaction, customer loyalty, Islamic bank performance*

INTRODUCTION

This study is based on the concept of the service-profit chain (SPC). It is developed by Heskett *et al.* (1994)¹. SPC is an integrated framework for understanding behaviours and perceptions of employee and customer in generating profits for the corporate. This study is also called a model of integrated corporate performance. Several studies have revised and developed this model. Anderson & Mittal (2000)² examine the attribute performance can create the customer satisfaction and retention and also can increase the profitability of the corporate. This study is known as the Satisfaction-Profit Chain concept. Some studies related to satisfaction are also reviewed by Xu & Geodegebuure (2005)³. They only see the relationship of satisfaction between employees and customers. In addition, Walker *et al.* (2006)⁴ do not only use satisfaction but also use the variable of internal service quality, customer value and the customer loyalty in the SPC model. The variables used by Walker *et al.* (2006)⁴ are the important factors in increasing the growth of the company.

SPC is viewed from a public point of view by Davis (2006)⁵. This study uses the ethical and organizational values in achieving organizational goals. This concept

is known as Public-Profit Chain. Furthermore, Zigarmi *et al.* (2009)⁶ explain that maintaining the quality of culture, managing quality, and setting initiative as corporate leadership strategy can ensure the effectiveness and productive behavior of employees that affect the effectiveness of the corporate. This study is known as a Leadership-Profit Chain concept. In addition, technology information system plays an important role in the SPC model of a competitive performance^{7,8}. All of the studies above do not consider the credibility as an important element in improving the integrated corporate performance model. Credibility is a major factor that can change the customer behavior and attitudes and can improve the corporate performance^{9,10}. Based on the previous studies, there are insufficient shreds of evidence to explain the affecting factors of the corporate performance which can be seen from the aspects of corporate credibility and the customer behavior.

LITERATURE REVIEW

Service-Profit Chain

Service-Profit Chain is a concept that looks at the perception of employees and customers for the profit of corporate in a long time. The profits and growth of the corporate are caused by customer loyalty. Customer

loyalty is the output of direct satisfaction. Satisfaction is largely effected by the value of services provided to consumers. The perceived value is affected by satisfaction and loyal employees. Satisfaction of employee results from services of high-quality and policies that allow employees to deliver results to the customers.

Performance

Performance is a measure of success that has been achieved by a corporate measured every time period¹². Stoner *et al.* (1995)¹³, firm performance is a measure of how well the organization does its work. Performance measures can be defined as an assessment of organizational behavior and a parameter used to quantify the efficiency and effectiveness of past actions¹⁴.

In addition, Venkatraman & Ramannujam (1986)¹⁵ classify two corporate performance, financial performance, and non-financial or operational performance. Operational performance is a company performance that is seen from a market perspective about the corporate activities. Ahmad *et al.* (2011)¹⁶ classify several indicators to measure company performance such as product quality, market share, internal process coordination, personal rotation, and profit. Wheelen & Hunger (2006)¹⁷, corporate performance can be measured by indicators of sales volume, market share, and profitability. Denison *et al.* (2017)¹⁸ explain that the corporate performance can be seen from the profitability, main corporate achievement, growth, innovation, and the rate of return on assets.

METHODOLOGY

In analyzing the relationship between credibility and Islamic bank performance, this research takes 269 customers of Islamic bank as the respondent taken by using purposive sampling technique. Purposive sampling

technique refers to the technique of collecting samples that appropriate with the purpose of the research based on certain characteristics such as their minimum age is 18 years old, have been the customer at least for one year, and have more than three times banking transactions within the last three months. The data collection is conducted by distributing the structured questionnaires during the period October to November 2017.

To measure credibility, we adopt and adapt the work of Oliver *et al.* (1997)³⁴ and Keller & Aaker (1998)²⁴ which has three dimensions, i.e. reliability, expertise, and attractiveness. These dimensions are measured in twenty indicators. Customer satisfaction has seven indicators. We adopt and adapt the study of Saad (2012)³³. Meanwhile, to measure customer loyalty, we adopt and adapt the work of Oliver *et al.*, (1997)³⁴. Customer loyalty has four dimensions, i.e. cognitive loyalty, affective loyalty, conative loyalty, and actions loyalty. These dimensions are quantified in eight indicators. We use the study of Ahmad *et al.*, (2011)¹⁶. to measure Islamic bank performance we use five indicators. The measurement scales, this study uses five-points Likert, ranging from 1 (strongly disagree) to 5 (strongly agree).

Result and Discussion

Demography

Table 1 show the respondent descriptive statistic in this research. A total of 280 questionnaires are distributed to customers but there are only 269 samples that can be used (96.1 percent of response level). In the case of genders, men are more dominant than women which are by 62.1 percent. The most dominant age is 41 until 50 years old which is by 31.6 percent. The most dominant professions are entrepreneurs and lecturer/teacher around 29.4 percent and 19.3 percent, respectively.

Table 1: Respondents Demography

Characteristics	Frequency	Percentage	Cumulative percentage
Gender			
Men	167	62.1	62.1
Women	102	37.9	100
Age (years old)			
18-20	23	8.6	8.6
21-30	44	16.3	24.9
31-40	66	24.5	49.4

Cont... Table 1: Respondents Demography

41-50	85	31.6	81.0
More than 50	51	19.0	100
Occupations			
Civil Servant/ Government	27	10.0	10.0
Private workers	39	14.5	24.5
Lecturers/ teachers	52	19.3	43.8
Police/ Indonesian Army	11	4.1	47.9
Entrepreneurs	79	29.4	77.3
University Students/ students	44	16.4	93.7
Others	17	6.3	100

RESULTS

The normality of research data can be examined by seeing the value of the critical ratio for skew and kurtosis. All values in the critical ratio for skew and kurtosis are in the range between 2.580 and + 2.580³⁶. It means that the data have distributed normally. In this research, there is no outlier data. However, normality and outlier tests have fulfilled the requirement of SEM

AMOS. The measurement model test is analyzed to know the accuracy of all combined constructs. Based on the Goodness of Fit Test criteria, it consists of the value of Goodness of Fit Index, Adjusted Goodness of Fit Test, Tucker-Lewis Index, Comparative Fit Index, Root Mean Square Error of Approximation, CMIN, and P-Value ³⁶. The measurement model indices reveal that the proposed model is fit and parsimony. It can be seen in Table 2.

Table 2: Goodness of Fit Test for Measurement Model

Criteria	Cut Off	Results	Conclusion
Chi-Square	-	95.275	Good
The Degree of Freedom	-	104	Good
The Goodness of Fit Index (GFI)	≥ 0.90	0.961	Good
Adjusted Goodness of Fit Index (AGFI)	≥ 0.90	0.942	Good
Tucker Lewis Index (TLI)	≥ 0.95	1.006	Good
Comparative Fit Index (CFI)	≥ 0.95	1.000	Good
Root Mean Square Error of Approximation (RMSEA)	≤ 0.08	0.000	Good
CMIN	≤ 2.00	0.916	Good
P-Value	≥ 0.05	0.718	Good

Thus, all variables can be measured in the proposed model. The results can be viewed in Figure 2.

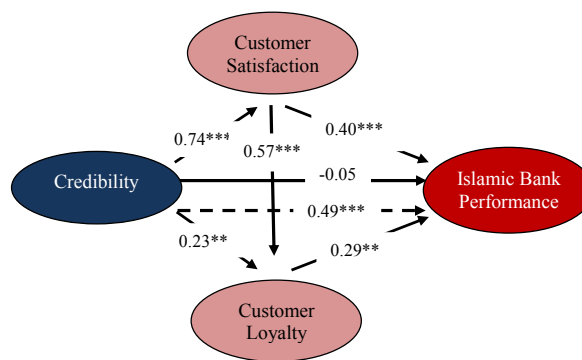


Fig. 2, Estimation of Relationships
 Note: ***Prob.<0.01; **Prob.<0.05; *Prob.<0.10

DISCUSSION

In this study, the result of the first hypothesis test shows that credibility has no effect on the Islamic bank performance ($\beta = -0.49$, Prob. > 0.10). This result is contrary to the work of Cretu & Brodie (2009)³⁷ and Alam *et al.* (2012)³⁸ in which corporate credibility affects directly on the corporate performance. We argue that the Indonesian Islamic banks are more focused on the profit orientation than the customer orientation. Islamic banks implement a network expansion strategy to other regions so that they cannot focus on the existing customer services. Meanwhile, the key to the success of a service company is the focus on customers.

The result of the second hypothesis test reveals that credibility affects significantly on the customer satisfaction ($\beta = 0.74$, Prob. < 0.01). This finding is in line with the studies of Goldsmith *et al.* (2000)²⁰; Ghorban & Tahernejad (2012)³⁹; Ballentine (2006)²². The credible company increases the customer satisfaction. The customer measures positively the Islamic bank credibility and they are satisfied with the service and product of Islamic bank. The satisfied customer will maintain to continue to use the product²⁴. In prior finding, satisfaction is a strong desire to maintain a valuable relationship⁴⁰. The bank which has the expertise, reliability, and attractiveness can strengthen the trust of the customer on the bank. Furthermore, the high trustworthiness can maintain the valuable relationship.

The third hypothesis test reveals that credibility affects significantly on the customer loyalty ($\beta = 0.23$, Prob. < 0.05). This result is in line with the works of Kemp & Bui (2011)⁴⁰; Sallam (2014)³⁵; Matthews (2012)⁴¹. The credible Islamic bank will continue to conduct transactions in the long term and do anything for the bank. It is because the customer has the sense of caring. Therefore, the bank will feel proud and confident in the competition if it has loyal customers. Cretu & Brodie (2009)³⁷ argue that customer loyalty is the results of a highly credible bank. Furthermore, the customer will always loyal to the bank in long-term, convey positive information to others and recommend the others to use the product.

The fourth hypothesis test reveals that the customer satisfaction affects significantly on the customer loyalty. This result is in line with the study conducted by Akarapanich (2006)⁴². Customer satisfaction is predictor

variable for customer loyalty. If the customer is satisfied with the product or service provided, this will lead to the customer loyalty so that the customer makes a repeat purchase in the future. Customer satisfaction will reduce price elasticity, prevent competitors from attracting customers because they are reluctant to move and reduce costs and in the next transactions⁴³.

The fifth hypothesis reveals that customer satisfaction is significantly on the Islamic bank performance ($\beta = 0.40$, Prob. < 0.01). This is in line with the works of Keisidou *et al.* (2013)²⁹; Matthews (2012)⁴¹. Customer satisfaction can affect the company performance. Satisfaction as the ability of the organization to provide service performance that exceeds the customer expectations. Wills (2009)²⁹ added that customer satisfaction is the key to future business success in the long run. To build and gain the reputation of a corporation will take a long time and large investments are needed in a series of business activities to make the customers happy.

The sixth hypothesis test reveals that the customer loyalty affects significantly on the Islamic bank performance ($\beta = 0.29$, Prob. < 0.05). This result is in line with the works of Heskett *et al.* (1994)¹; Spiteri & Dion (2004)⁴⁴. Faithful customers will do word of mouth so that this condition can reduce some marketing costs and attract new customers, and finally the corporate makes profits.

The final hypothesis testing demonstrates that customer satisfaction is a mediator variable. The indirect effect of credibility on Islamic bank performance is 0.30 (0.74×0.40). This indirect effect is greater than the direct one, i.e. 0.05. Likewise, customer loyalty is a mediator variable. The indirect effect of credibility on the Islamic bank performance is 0.07 (0.23×0.29). This indirect effect is greater than the direct one, i.e. 0.05. In the context of Islamic bank industry, Islamic bank performance is not affected directly by credibility. Banks must carry out customer-oriented strategies and redevelop employee competencies regarding Islamic products.

Research Implication

The results of the study can provide an impact. It implies that to build the credible corporate, the bank should upgrade a set of employee programs to increase expertise and trustworthiness. The bank also should design products to attract the potential and innovative

customers. Moreover, the bank also leads to the employee to orientate for the customer. Besides, the results of this study have implications for the development of integrated corporate performance theories. By adding credibility to the SPC model, it can increase knowledge in the field of banking marketing. Credibility can affect the performance of Islamic banking through customer satisfaction and loyalty. The development of this theory is called Credibility-Profit Chain.

CONCLUSION

This paper examines the relationship between credibility and corporate performance in Islamic banking. By using customer satisfaction and customer loyalty as the mediator variables, this study confirms that credibility does not affect directly on the Islamic bank performance. Credibility affects positively and significantly on the customer satisfaction and customer loyalty. Customer satisfaction affects positively and significantly on the customer loyalty and Islamic bank performance. Customer loyalty affects positively and significantly on the Islamic bank performance. Meanwhile, the indirect effect of credibility on the Islamic bank performance through satisfaction and loyalty is higher than its direct effect of credibility on the customer satisfaction and loyalty. We argue that the Islamic bank in Indonesia is more profit-oriented than social orientation. Ayub (2007)⁴⁵, claims that the main purpose of Islamic banks is social.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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An Analysis of the Potentiality (Loan Repayment Capacity) of Unorganised Sector Employees on the basis of Ratio Analysis Related to their Disposable and Discretionary Income

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ABSTRACT

The purpose of this study is twofold: 1. to ascertain the potentiality of the unorganised sector employees for the repayment of the EMI of housing loan. 2. to calculate the disposable and discretionary income of the unorganised sector employees. The current paper studies the influence of various factors related to household monthly expenses on the discretionary income. The study was conducted on the unorganised sector employees working in NCR, Delhi. MHFIs face problems while deciding the potentiality of the unorganised sector employees for the repayment of the EMI of housing loan. The present study focus on the issue faced by MHFIs and attempted to solve it by proposing most logical and pragmatic solutions of ascertaining the potentiality of the unorganised sector employees for the repayment of the EMI of housing loan. This study is helpful for both the MHFIs and the unorganised sector employees also. Ratio analysis was used for ascertaining the potentiality on the basis of disposable and discretionary income of the unorganised sector employees.

Keywords: *Micro housing finance, Potentiality, unorganised sector employees, disposable and discretionary income.*

INTRODUCTION

1.1 Context

Now a days the basic necessities of life – food, clothing, and shelter – are increasingly becoming a luxury and unaffordable, however luxury items such as televisions, mobile phones, refrigerators, etc. are becoming affordable...! We are often amazed at the progress our country has made when we see an auto rickshaw driver with a mobile phone; however we fail to notice that he is still living in a slum-like dwelling. Shelter is the basic human need, and owning a house can raise the productivity, social acceptability and efficiency of the family members who are staying in that.

It is understandable that economic growth leads to rise in income but this has led to even faster rise in property prices leaving it unaffordable for majority of population. Affordable housing is expected to have a positive impact by improving basic quality of life. Problems like traffic congestion, air quality, commute times, etc. can be resolved by providing proper housing facilities to the weaker sections of the society.

As housing requires huge capital that too for long term, hence the growth of this sector was real slow till now. Though it has always been remained as one of the most important economic factor, as apart from providing shelter, it raises an environment conduct for good health and sanitation, creating more employment across various industries like cement, steel, brick, and daily wage labourers. Shelter along with food and clothing, is one of the most important factor which has an intense influence on the socio-economic and physio and psychological development of human kind. Housing is not only a consumption good but also a productive investment.

1.2 Justification of the Research

The Indian housing finance sector has come a long way from its earlier phase of government domination to an increasingly market oriented system in the present times¹. In the 1990s, the process of liberalization of the financial sector provided much needed impetus to the housing finance sector with the entry of private financial institutions and banks, and propelled the system into a

higher growth trajectory. Infusion of competition and supportive regulatory changes enabled the development of a more market driven sector. The market orientation has improved the accessibility and affordability of housing, making possible the dream of home-ownership of many a households to come true. Lower lending rates, stable property prices, rising personal incomes, and fiscal incentives for owner occupied homes have contributed to the increase in the demand for housing finance. The sharp growth of the housing finance sector, particularly in a short span of one decade, also raises concerns regarding financial stability of the system in the context of macro economic and global economic developments. Although the Indian financial sector has reasonably withstood the repercussions of the recent global financial crisis, there is a need for a cautious and prudent approach on the part of the financial institutions².

LITERATURE REVIEW

In general, poor needs a wide range of financial services not just loans⁴ that are convenient, flexible, and reasonable interest rate. Depending on their circumstances, poor people need, not only credit, but also savings, cash transfers, and insurance. Microfinance is a powerful instrument against poverty⁵. The microfinance is the key factor for reducing poverty and generating self-employment among the poor. Microfinance is the provision of a broad range of financial products and services. It includes the products like life insurance, live-stock insurance, bank accounts, payment services, financial advisory services, micro-leasing, micro-insurance, money-transfer to assist the very or exceptionally poor in expanding or establishing their businesses, non-life insurance products, saving products, credit products, insurance products and remittance products. Therefore, microfinance is defined as financial products and services provided to poor and low income clients so as to help them raise their income, thereby improving their standard of living.

Successful microfinance can be defined by three main characteristics: sustainability, outreach, and impact⁶. Sustainability refers to the ability of a program to continue over time, preferably without ongoing subsidies. Outreach refers to the number of clients reached and targeting of the poor. Impact refers to the ability of a program to assist poor households and individuals to move out and remain out of poverty, and is the ultimate objective of microfinance provision. The

basic features of microfinance are as follows:

1. Microfinance plays a vital role in rural and urban village (slums) finance.
2. The borrowers are from the low income group.
3. Loans are of small amount – micro loans.
4. It is short duration loans with frequency of repayment.
5. Loans are offered without collaterals and are generally taken for income generation purpose. 6. It is not profit oriented rather more service-oriented.
7. It motivates to take hold of the self-employment opportunities.
8. The two main mechanisms for the delivery of financial services to such clients are: (a) relationship-based banking for individual entrepreneurs and small businesses; and (b) group-based models, where several entrepreneurs come together to apply for loans and other services as a group.
9. It deals in multiple services such as loans, savings, insurance, transfer services, micro credit loans etc.
10. It is not profit oriented rather more service-oriented.
11. It is one of the most effective and necessary Poverty Alleviation Strategies.
12. It is basically supply to the poor households and small entrepreneurs.

RESEARCH METHODOLOGY

This heading defines the research design, research objectives, population samples, data collection procedures and the techniques of data analysis to ascertain the potentiality of the unorganised sector employees for the repayment of the EMI of housing loan and to calculate the disposable and discretionary income of the unorganised sector employees. The current paper studies the influence of various factors related to household monthly expenses on the discretionary income. The study was conducted on the unorganised sector employees working in NCR, Delhi. Ratio analysis was used for ascertaining the potentiality on the basis of disposable and discretionary income of the unorganised sector employees. This research is exploratory in nature.

A survey was designed to measure the potentiality of the unorganised sector employees. To collect information / data for the research purpose we have used **convenient sampling**. The target population, to which we would like to draw inferences, comprises the unorganised sector employees working in NCR, Delhi. The survey was conducted of the unorganised sector employees to collect the data. The total Sample size was of 500 unorganised sector employees. For the analysis of the data, IBM SPSS STATISTICS 21 version software has been used to perform Ratio Analysis and chi square analysis.

3.1 Research Questions

- What is the demographic profile and socio-economic status of the respondents?
- How can the researcher analyse the potentiality (loan repayment capacity) of unorganised sector employees on the basis of ratio analysis related to their disposable and discretionary income?

3.2. Research Hypotheses & Objectives

Following research hypotheses & research objectives are developed to address the research problem.

3.3.1. Research Objectives

Research Objective: To analyse the potentiality (loan repayment capacity) of unorganised sector employees on the basis of ratio analysis related to their disposable and discretionary income.

4. DATA ANALYSIS, INTERPRETATION & FINDINGS

4.1 Demographic Analysis

Frequency analysis was done to study the demographic profile of the respondents. Following are the findings of the analysis-

Findings: It was found that there were total 500 respondents out of which, 91.6% respondents were Males and 8.4% respondents were Females.

Findings: It was found that out of total 500 respondents, 16.6% respondents belong to the age group of 20 to 30 years, 67.4% respondents belong to the age group of 31-40 years and 16.0% respondents belong to the age group of 41-50 years.

Findings: It was found that out of total 500

respondents, 9.0% respondents were single, 84.6% respondents were married and 6.4% respondents belonged to other marital status.

Findings: It was found that out of total 500 respondents, 5.4% respondents were illiterate, 13.2% respondents had a middle school certificate, 13.8% respondents had a high school certificate, 36.2% respondents were intermediate, 13.2% respondents were graduate or post graduate and 18.2% had done a professional course.

Findings: It was found that out of total 500 respondents, 11.6% respondents had agriculture as an occupation, 18.0% respondents had business as an occupation, 39.8% respondents were skilled labours, 21.8 were unskilled labour and 8.8% respondents had a regular service.

Findings: It was found that out of total 500 respondents, 20.0% respondents had a monthly income less than 10000, 35.0% respondents had a monthly income between 10001 to 15000 and 45.0% respondents had a monthly income between 15001 to 20000.

Findings: It was found that out of total 500 respondents, 6.0% respondents had a house hold monthly income of less than 10000, 8.6% respondents had a house hold monthly income between 10001 to 15000, 30.4% respondents had a house hold monthly income between 15001 to 20000, 29.0% respondents had a house hold monthly income between 20001 to 25000, 19.4% respondents had a house hold monthly income between 25001 to 30000 and 6.6% respondents had a house hold monthly income between 30001 to 35000.

Findings: It was found that out of total 500 respondents, 6.0% respondents rarely saved, 86.2% respondents occasionally saved and 7.8% respondents regularly saved.

Findings: It was found that out of total 500 respondents, 71.8% respondents had discretionary monthly income of less than 5001, 15.2% respondents had discretionary monthly income between 10001 to 15000, 10.6% respondents had discretionary monthly income between 10001 to 15000, and 2.4% respondents had discretionary monthly income between 15001 to 20000.

Findings: It was found that out of total 500 respondents, 6.4% respondents wanted a loan amount of

less than 2 lac, 34.4% respondents wanted a loan amount between 2 to 4 lac, 33.6% respondents wanted a loan amount between 4 to 6 lac, 10.6% respondents wanted a loan amount between 6 to 8 lac, 6.2% respondents wanted a loan amount between 8 to 10 lac and 8.8% respondents wanted a loan amount Above 10 lac.

Following two amounts of loan were most wanted by the respondents-

Rs. 400000/-

Rs. 600000/-

Hence, the most prevalent average amounts of the expected housing loan were- **Rs. 4,00,000/- and Rs. 6,00,000/-**.

So, both the average amounts of loan were considered for the further Ration Analysis.

Findings: It was found that out of total 500 respondents, 40.8% respondents wanted loan for 5y to 9y tenure, 44.2% respondents wanted loan for 10y to 14y tenure & 15.0% respondents wanted loan for 15y to 20y tenure.

It was found that most of the respondents had chosen two categories-

5 years - 9 years

10 years -15 years

Finally, **10 years** was taken as **average tenure of loan** for further analysis.

- **Findings:** It was found that out of total 500 respondents, 14.0% respondents lived in a nuclear family and 86.0% respondents lived in a joint family.
- **Findings:** It was found that out of total 500 respondents, 18.2% respondents had 1 dependent in their family, 60.0% respondents had 2 dependents in their family, 60.0% respondents had 2 dependents in their family, 21.0% respondents had 3 dependents in their family and 0.8% respondents had 4 dependents in their family.
- **Findings:** It was found that out of total 500 respondents, 9.2% respondents had 1 earning member in their family and 90.8% respondents

had 2 earning members in their family.

- **Findings:** It was found that out of total 500 respondents, 89.6% respondents lived in a pucca house and 10.4% respondents lived in a semi pucca house.
- **Findings:** It was found that out of total 500 respondents, 30.6% respondents lived in a parental house, 59.4% respondents lived in a rented house and 10.0% respondents lived in a house given by government.

From the results of above analysis, it can be said that Research Objective is fulfilled.

4.2 Ratio Analysis: Potentiality of loan Repayment Capacity

Ratio Analysis is a form of **Financial Analysis** that is used to obtain a quick indication of a financial performance in several key areas.

This section will address the following research questions-

- How to calculate **household monthly income** of the 500 respondents?
- How to calculate **household monthly expenses** of the 500 respondents?
- How to calculate **disposable monthly income** of the 500 respondents?
- How to calculate **discretionary monthly income** of the 500 respondents?
- How to calculate **average interest rate**?
- How to calculate **average amount of the loan**?
- How to calculate **average tenure of the loan**?
- How to calculate **average EMI**?
- How to measure **potentiality of repayment of the housing loan EMI by the Unorganised Sector Employees**?
- How to perform different **Ratio Analyses for ascertaining the potentiality of repayment of the housing loan EMI**?

4.2.1 Calculation of Disposable Income

Disposable income, also known as disposable personal income (DPI), is the amount of money that households have available for spending and saving after income taxes have been accounted for.

Many economists use disposable income as a starting point to calculate metrics such as **discretionary income**, personal savings rates, marginal propensity to consume (MPC) and marginal propensity to save (MPS).

Disposable income minus all payments for necessities, such as mortgage, health insurance, food and transportation, equals **discretionary income**. This portion of disposable income can be spent on what the income earner chooses or, alternatively, it can be saved.

The present research is about calculating disposable income of the unorganised sector employees who have no proof of their income. They are not tax payers, neither do they get salary through the bank or cheque, nor they have any proof of their employment such as salary slips, appointment letter etc.

This research is an attempt to calculate their disposable income for the purpose of Micro Housing Financial Services or small housing loans. Researcher collected the data of 500 respondents (unorganised sector employees) through schedules. Following information was sought to calculate their disposable income and to check their potentiality of repayment of the housing loan EMI.

- Demographic information
- Monthly Income
- Household Monthly Income
- Saving Pattern
- Applicant's average Monthly Savings
- Household Average Monthly Savings
- Expected size of affordable house
- Amount of loan
- Tenure of the loan
- Ability to repay Loan/EMI on time
- Details of the Assets:
- Household Monthly Expenses
- Other behavioural Dimensions

Step-1

First of all **Household Monthly Income** was calculated. As the respondents are **not tax payers**, so, there is no question of **deducting taxes from the income** and getting **Disposable Income**.

So whatever **household income** is mentioned by them was considered as the **household disposable income** of the respondents.

Secondly, all the expenses were calculated for all the 500 respondents by adding the amount of following **Household Monthly Expenses-**

- Food & Grocery
- Education
- Electricity & Water
- Mobile Conveyance
- Medicine
- Clothing
- Rent
- Cable / Entertainment

Thirdly, **Household Monthly Savings** were deducted from **Household Monthly Expenses**. And finally, **household monthly expenses** were also deducted in order to get **Discretionary Income**.

$\text{Household Income} - \text{Household Savings} - \text{Total Expenses} = \text{Difference (Discretionary Income)}$

Step-2

4.2.2 EMI Calculation

An **Equated Monthly Installment (EMI)** is a fixed **payment** amount made by a borrower to a lender at a specified date each calendar month. Equated monthly installments are used to **pay** off both interest and principal each month so that over a specified number of years, the loan is **paid** off in full.

CONCLUSION

The conclusion of present research study can solve this issue. In order to ascertain the potentiality of the unorganised sector employees researcher applied ratio analysis.

Firstly, **Ratio Analysis-1: EMI (6L) /HMI Ratio (R1)** was calculated for the EMI- Rs.9681/- and the amount of loan was 6 Lacs. **EMI (6 lacs) /Household Monthly Income Ratio** was calculated to ascertain the **potentiality** of repayment of housing loan **EMI** by unorganised sector employees (respondents). It was found that out of total number of 500 respondents, 214 (42.8%) respondents are **Non-potential** and 286 (57.2%) respondents were **Potential**.

Secondly, **Ratio Analysis-2: EMI (6L) / Discretionary Income Ratio (R2)** was calculated for the EMI-Rs.9681/- amount of loan was-6 Lacs. **EMI/ Discretionary Income Ratio (R2)** was calculated to ascertain the **potentiality** of repayment of housing loan **EMI** by unorganised sector employees (respondents). It was found that out of total number of 500 respondents, 445 (89.0%) respondents are **Non-potential** and 55 (11.0%) respondents were **Potential**.

Here, Potential means respondents **will be able to repay** the housing loan EMI; and **Non-Potential** means respondents **will not be able to repay** the housing loan EMI.

The result of the aforementioned ratio analysis show that if potentiality of unorganised sector employees is calculated on the monthly income ratio there are 57.2% potential prospects for the MHFIs; but if the potentiality of unorganised sector employees is calculated on the Discretionary Income Ratio there are very less potential prospects for the MHFIs.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Customers' Attitude Towards Shopping Malls: : Does Gender Matter?

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ABSTRACT

The retailing sector in India is continuously grown in the past decade. The organized retail industry in India is expected to grow at 30 to 35% on annual basis. Today most of the organized retailing shopping is much more than just purchasing it is an experience itself. Shopping malls are one of those formats which have started coming up in large numbers. Shopping malls offered number of advantages against the traditional markets. The customer are attracted in shopping mall because of various reason some are pleasant ambience, safety from extreme weather conditions, convenience because of escalators and lifts, shopping comfort, watching movies at the same place, wide choice of shops, various of food alternative through food courts etc. However, the rush to be there in the mall boom has not gone well with all the malls. As the number of malls in the same place was going up because of this some of the malls started struggling to survive. The development of Indian organized retail market is mainly due to the change in consumer buying behavior. Change in consumer behavior relates various aspects like income, lifestyle, demographic etc. Now the consumer wants to shop at a place where he can get food, entertainment, shopping under the one roof.

Keywords: *Shopping Mall, Window Shopping, Retail Marketing, Shopaholism*

INTRODUCTION

Retailing India is a largest industry accounting for a 10% of GDP and around 70% of employment. Indian retail sector is highly grow as compare to other developed as well as developing country. Basically retail industry distributed into groups organized and unorganized. Shopping generally refers to act of buying but some time it is done as reactional activity like window shopping and drowsing. Retail come from French word "RETAILERS" which refers to Cutting off my hands Clip and Divide" its relates to tailoring. The concept of shopping mall is not new in India. The number of shopping malls in India is growing. It is a truth that the arrival of shopping malls in a city promises to change the shopping and recreation activities of the consumers. Therefore, many corporates are investing a large amount of money to design and develop malls in terms of providing the benefits of shopping and the access of customers' to different global brands. At present, there is a nace to nack competition among the shopping malls has gone beyond bound with time to time. Because of this, the developers and stakeholders of shopping malls as well as the retailers need to understand

the consumer's attitude towards shopping malls. Today, the developers of shopping malls are introducing new strategies in order to develop a new style in a shopping mall. They are adding up restaurants, food court, cinema halls and game zones to attract the different customers having different tastes and choices.

LITERATURE REVIEW

Archana C. N. & Dhiman K. (2017), this study was based on a quantitative analysis. For the purpose of data collection Survey method was implemented. The data collected from three popular shopping malls of Bhavnagar, they were (1) Himalaya Shopping Mall (2) K-Mart and (3) ABM Mall. The sample size of this study was 100 and there is equal representation of gender i.e., 50 male respondents and 50 female respondents. For the purpose of study Purposive random sampling method has been adopted that means purposively three malls are selected in Bhavnagar, and then randomly picked the respondents who visit malls for the survey. As the study is on overall purchasing behavior of shopping mall customers in Bhavnagar, the questions were not addressed targeting any mall and they are not compared

with each other. The study finds that there are no differences between men and women in their shopping experiences. This is a good sign for the role of women. But, there is a slight variation in opinions in case of purpose of visit, where men agreed that they were visit malls often for entertainment, but women agreed that they were visit for entertainment occasionally¹.

D. Elangoyan & R. Sangeetha (2017), the main objective of the study is to find the level of awareness of customers towards the shopping malls in Coimbatore city and to find out the consumer preferences towards various factors of the shopping mall. The type of this research study was Descriptive Research. This study is carried out with two data collection methodology i.e primary data and secondary data. The primary data was collected by using 100 questionnaire. The major source of secondary data was collected from internet, library and the books and journals. They have used non-probabilistic convenience sampling method Analysis for survey with the Secondary data. The study find out that there is no difference between reasons for purchasing in shopping malls and personal profile of the customer and there is no relationship between Perception towards shopping malls and personal profile of the Customers².

Amit M. & Deepika J. (2016), this study will help in developing the mall patronage or attractiveness measures. Data was collected and finally analysis is done using exploratory factor analysis. The attributes were measured on a five point Likert scale. For the purpose of the study they were selected a total of five hundred active shoppers of shopping malls from the major cities of Punjab and Chandigarh (these were two relatively prosperous regions in India with a significant emerging mall culture). They had used a structured questionnaire to administered the respondents through the 'mall-intercept survey technique'. And from them two hundred and forty questionnaires were finally received for further use leading to a success rate of forty eight percent. Research had been conducted to understand Indian Shoppers' mall patronage behavior based on their evaluation of mall attractiveness attributes. To achieve this objective, the sixteen attributes were outlined. They were first classified into two broad clusters of mall attributes each consisting of eight attributes each. These clusters were first Shopping Mall Product Attributes and second Shopping Mall Service Attributes. The findings of this research indicates that the more different markets, geographical contexts may seem, the more similar

customers would behave in the long run.

Afreen C., Muhammad I.A. & Sigma I. (2012), this study may be a descriptive study wherever quantitative knowledge are collected to research the customers' perspective towards shopping mall. So as to form the report additional meaningful and respectable, 2 sources of information and data are used. Each primary and secondary information sources were used to generate the report. Field survey was dealt to gather primary information for conducting the study. The first information had been collected on twelve variables that are known once reviewing the various literatures. The variables are convenience, quality of product, availability of product, store selection, entertainment, parking facility, interior design, place to socialize, price, employee's behavior. The secondary sources are websites and journals. To conduct the analysis, individuals of various occupations of Dhaka town were surveyed. The 3 activity teams are students, housewives and service holders. During this study, seven purpose Likert Scale technique has been used. Here, the structured form has been went to collect knowledge from the respondent. The sector work was personally done. To conduct the research: target population was outlined because the shoppers of Bashundhara town looking Mall; the patrons aged on top of fifteen were qualified as sample unit for the study and one hundred respondents are surveyed. The respondents within the sample were chosen through judgmental sampling technique and knowledge were collected using mall intercept methodology³.

Vipul P. & Mahindra A. (2009), the objective of the study is to find out Consumers' Motivations to shop in Shopping Malls based on Indian customers. For this purpose they used mall intercept survey method. Data were collected in last week of February, 2007 from different shopping malls located in Ahmedabad city of Gujarat, India. The population for the study were consisted of active mall shoppers. The authors used structured questionnaire which was developed to measure the customers' shopping motivations in the shopping malls. The questionnaire consisted of questions concerning shopping motivations, and demographic information of respondents etc. Total forty seven items were developed to measure the shopping motivations⁴. Some of the items were adopted from various previous studies, and some were developed by the researchers. All of these were five point Likert-type scales in which respondents were questioned to indicate their

level of agreement whether they agree or not. Finally, the questionnaire also consisted questions to solicit demographic information of the respondents such as gender, age, education and marital status of the respondents etc. the study find out that the consumers not only went for shopping in a shopping mall, but for fun also they went on shopping mall. This study may help the shopping malls to know their consumer and help them to craft the marketing strategy as per the demand of the customers.

RESEARCH OBJECTIVE:

The objective of this study is to find out role of gender on consumers’ buying behavior in select shopping malls in Ahmedabad.

1. To compare the buying capacity of male and female consumers at selected shopping malls in Ahmedabad.
2. To study gender differences in shopping experience at selected malls in Ahmedabad city, Gujarat.

RESEARCH METHODOLOGY

Population: All persons visiting Ahmedabad One Mall for shopping were the target population for this study.

Sample Size: The study was undertaken on 350 consumers of Ahmedabad One Mall in Ahmedabad, Gujarat.

Data Collection Producer: From Ahmedabad One mall, 350 customers were selected using Simple Random Sampling. Researcher had visited mall personally for the purpose of the Survey. Customers who had given concern to participate in the survey were selected for the study. In selection procedure, there was no restriction of age, income and gender etc. of the customers. The questionnaire was handed over to randomly selected customer and got back filled questionnaire.

Data Collection Tool: The questionnaire consisted of closed-ended questions that included a 5-point Likert scale. Where 5 for highly satisfied and 1 for highly dissatisfaction. To collect data from the customers of shopping malls Pre-Tested questionnaire was developed. We had carried out Cronbach’s Alpha to check internal reliability.

Data Analysis: Once the questionnaires were completed, it was coded, and analysis is done in SPSS. Descriptive statistics were calculated to summarize nominal and categorical data using frequency and percentage whereas continuous data were summarized using mean, SD.

Table No. 1 Respondent Profile

Characteristics	Frequency (N=350)	Percentage
Gender:		
Females	168	48
Males	182	52
Age:		
15 – 25 years	72	20.6
26 – 35 years	101	28.9
36 – 45 years	75	21.4
46 – 55 years	58	16.6
Above 56 years	44	12.5
Educational Qualification		
10th Pass	27	7.9
12th pass	128	36.6
Diploma	94	26.9
Graduate	48	13.6
Post Graduate	53	15
Sector in which employed		
Private sector	158	45.14
Public sector	114	32.6
Self employed	63	18
Other	15	4.28

Table No. 2 Association of frequency of visit with Gender

Particulars	Female(168)	Percentage	Male(167)	Percentage	Total	Percentage
Daily	24	14.28	20	10.98	44	12.57
Once in a week	87	51.78	91	50	178	50.86
Every Two Weeks	25	14.88	26	14.28	51	14.57
Once in a Month	20	11.9	35	19.23	55	15.71
Rarely	12	7.14	10	5.49	22	6.29

This above table presents the findings and discussion of the findings. Continuous data are summarized in form of mean as well as SD throughout this discussion. Table 1 presents the profile of the respondents. It is clear from Table 1, that 48% of the respondents are female. The mean age of the respondents was 37.17 years. The majority of the respondent's (36.6%) had 12th pass and 26.9% a diploma. Of the respondents, 45.14% were employed in the private sector and 32.6% in the public sector. It is clear from Table 2, that 12.57% of the respondents visited the mall daily whereas 50.86% visited it once a week. The proportion of male respondents who were visiting malls daily is low as compared to female respondents. There is no statistically significant association between frequency of visiting mall and gender of respondents (chi-square value = 8.641, p-value = 0.071).

CONCLUSION

This study finds out that the existence of significant gender differences of customer shopping behavior amongst the mall shoppers. Understanding the aspect of the gender differences from the shopping experience of mall shoppers provides mall managers with rich information of approaching different customer segment with appropriate strategies. The findings of this study provide helps in understanding the impact of gender difference in shopping mall experience. The study finds out that there is gender difference (Male / Female) in shopping behavior in Alpha One Mall, Ahmedabad, Gujarat. Average time spent by female is high as compared to male which also affect their average money spent at shopping mall. The study finds out that the average visit of the females in shopping mall is higher in comparison to male visit the mall.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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Computer Vision Syndrome in Visual Display Terminal users (VDT)

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ABSTRACT

Introduction : The digital screen has become a part of the everyday life at present which is a common item now-a-days in offices, colleges, universities and home This has led to an increase in number of patients complaining of ocular symptoms.

Objective: To assess Computer Vision Syndrome in Visual Display Terminal users (VDT)

Material and method: In a cross sectional, questionnaire survey study, data was collected to identify the impact of digital screen on Visual Display Terminal users. Sample was selected by simple random sampling and Data was appropriately analyzed using spss version 21.

Result : A total of 144 subjects with mean age of 27.73 ± 4.88 years old (range 18–35 years). Of all these 94 (65.28%) were having CVS where mean score of CVS was 7.50 ± 5.86 . Out of that 65.95% of male and 34.04% of female were having CVS. 34 subjects were using Visual Display Terminal for 4-6 hours per day, 63 subjects were using Visual Display Terminal for 7-10 hour per day and 47 subjects were using Visual Display Terminals for more than 10 hours per day. According to pearson correlation coefficient there was no significant association between computer vision syndrome with number of hours working on computer per day(+0.048;p=0.567)

Conclusion : The present study revealed 65.28% of the subjects were affected with Visual Display Terminals.

Keywords: *Computer Vision syndrome, Visual Display Terminal, digital screen*

INTRODUCTION

Today in the era of information and technology, computer and mobile phones have become pervasive around the globe. Already nearly half of the working population uses computer or any visual display terminal for their job and recreation¹. In almost all offices, colleges, universities and homes, the video display terminals (VDTs) are becoming a common item of use. Millions of people including children, college students are using computers for prolonged hours. A video display terminal (VDT) is also known as computer screen. According to the American Optometric Association “Computer Vision Syndrome” (CVS), is as a complex of eye and vision problems related to the activities which stress the near vision and which are experienced in relation to or during the use of computers².

Computer Vision Syndrome (CVS) is a condition in which a person experience one or more of eye symptoms and/or headache and back pain as a result of prolonged working on a computer³. Bankers, account section workers, professional computer workers, excessive near work by mobile, laptop or tab users are commonly affected by CVS.

CVS encompasses a group of visual symptoms which crop up from the extended viewing of the Video Display Terminal (VDT), when the demands of the task exceed the abilities of the viewer. Symptoms of CVS includes; dry and irritated eyes, eye strain/fatigue, blurred vision, red eyes, burning eyes, excessive tearing, double vision, headache, light/ glare sensitivity, slowness in changing focus and changes in colour perception⁴. If you spend more than 2 hours daily in front of computer you have 90% chance to develop computer vision syndrome.

Computer Vision Syndrome (CVS) is the number one occupational hazard of the 21st century⁵

It is estimated that nearly 60 million people suffer from CVS globally and that a million new cases occur each year⁶. Prevalence of CVS ranges between 64 and 90% among computers users.⁷. The prevalence of symptoms of CVS (one or more) was found to be 89.9%^{8,9}.

Studies among students have shown prevalence of CVS among engineering students was 81.9% and 78.6% among medical students¹⁰. Prevalence of CVS among university staff in Malaysia was 68.1%¹¹. Prevalence of CVS among keyboard users was 59.5%. Prevalence of Computer Vision Syndrome among Information Technology Professionals Working in Chennai was 69.3% (moderate, 62% and high, 7.3%)^{12,1}. Another study showed that 50% to 90% of computer users experience the symptoms of CVS⁵.

Visual mechanism on VDT screen

The focusing systems of human eyes are not meant for electronically generated characters on the VDT. It responds perfectly to the images that have well defined edges with good background contrast. (eg: solid black letters on white background). VDT letters are made up of small dots or pixels. Each pixel is bright at its center and with decreasing brightness towards its outer edge.

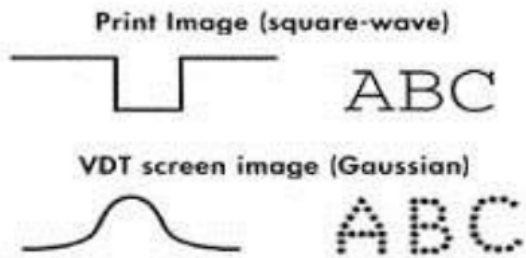


Fig. 1 Print image and VDT screen image

The human eyes find it very difficult to focus on the pixel characters. The eyes focus on the plane of the computer screen but cannot sustain that focus. Then it will relax on to a focus behind the screen. This point is called the resting point of accommodation (RPA) or dark focus. RPA is different from person to person but it is somewhat away than the normal working distance to the computer. Therefore the eyes are constantly relaxing to RPA and straining to refocus on to the screen constantly.

The constant changing of focusing by the ciliary body creates fatigue to the eye and causes accommodative symptoms pertaining to CVS.

Pathogenesis of computer vision syndrome (CVS)
^{13, 14}

Images on computer screens contrast is not sharp, edges of characters are not well-defined and eyes will have difficulty on focusing



Eyes will drift to the resting point of accommodation (RPA)



strain on ciliary muscles of the eye



Leads to Fatigue, tired eyes



Cause Dry eyes due to less blinking (<5, N=15/min)



Change in repeated head posture /wrong posture to maintain the focus



This leads to strain on the neck muscles and cervical spine



And then neck and back pain

VDT has led to an increase in number of patients complaining of ocular symptoms related to computer use. It certainly has improved the quality of the work and efficiency, but altogether has also led to ocular problems^{13, 14}.

METHODOLOGY

The overall research design parameters of the study are

- 1) Study design: Cross-sectional study
- 2) Study population: VDT (Test, T) with CVS

3) Study duration: 6 months. The present study is a cross sectional study conducted for a period of 6 months from January to June' 2018 at IT professional of Punjab.

Patient data collection: Patient Sampling was done considering various inclusion/exclusion criteria.

Inclusion criteria: VDT users with best corrected visual acuity were eligible for the present study and those who use VDT more than 2 hours⁸.

Exclusion criteria: Patients with the following factors and characteristics are ineligible to be included for the present^{15,16}, **1)** Age above 35 years, **2)** Subjects with any ocular disease, **3)** Subjects undergone refractive surgery, **4)** History of contact lens wear, **5)** History of Diabetes Mellitus, **6)** Connective tissue disease, **7)** Hepatitis C infection, **8)** Postmenopausal estrogens therapy, **9)** History of medications like lubricating eye drop, vitamin A therapy, antihistamine, antihypertensive agents, antipsychotic agents, antidepressants, antileprosy agents, sedatives and hypnotics, antimalarial agents, antiviral, anti-rheumatic gents/analgesics use, **10)** Radiation therapy, **11)** Hematopoietic stem cell transplantation.

Prior permission/consent was taken from the organisation and human subjects. Questionnaire was explained to the subjects before giving the questionnaire. Detail ocular and medical history was taken^{15,16}.

Patient Score calculation and classification: Vision and refraction was assessed for VDT

To assess the extent of computer usage and collect data of preliminary symptoms of the population under study, CVS-Questionnaire (CVS-Q) was used for VDT users to calculate the CVS score for comparison and grouping of the population as VDT and non-VDT users.

Sample design and sample size

Simple random sampling will be done on VDT and non VDT users to include 140 subjects

(male and female) in each group. Sample size will be calculated using the following general

Formula:

$ME = z \sqrt{p(1 - p)/n}$ whereas,

n (sample size) = $p(1 - p)z^2/ME^2$

$p = 0.899$ (prevalence of dry eye in VDT users)⁸

$z = z$ score, 1.96 for 95% confidence interval

ME = desired margin of error assuming margin of error (ME) to be 5%, its significance level is 0.05 (for 95% confidence interval.) Therefore, $n = 0.899 (1 - 0.899) 1.96^2 / 0.05^2$

$0.899 \times 0.101 \times 1.96 \times 1.96 / 0.05 \times 0.05 = 140$ patients.

RESULTS

A total of 144 subjects participated in the study; 42 (29.16 %) were female and 102 (70.83 %) were male. The mean age was 27.73 ± 4.88 years old (range 18–35 years) and mean age of male was 28.80 years and female was 25.11 years. The prevalence of computer vision syndrome (CVS) found in this study was 94 (65.28%) where mean CVS score was 7.50 ± 5.86 CVS score in male and female were $8.96 (\pm 4.20)$ and $12.63 (\pm 6.71)$ respectively. There was no significant changes in CVS score in between male and female ($p = 0.07$)

A negative correlation co-efficient value (-0.174) and ($p = 0.0037$) was found in between Computer Vision Syndrome and age of the VDT users.

According to pearson correlation coefficient there was no significant association between computer vision syndrome with number of hours working on computer per day ($+0.048; p = 0.567$)

Table 3 reveals association between CVS number and number of working hours per day where 34 subjects were using computer 4-6hours per day, 63 subjects were using computer for 7-10hour per day and 47 subjects were using computer for more than 10 hours per day.

Table 1: Impact of digital screen on Visual Display Terminal users

	Number	Percentage
Total number of CVS	94	65.28
Male	62	43.05
Female	32	22.23

Table 2: Association between CVS and age in years

Age in years	CVS
15-20	8±6.67
21-25	10.40±7.69
26-30	6.65±4.75
31-35	6±4.17

Table 3: Association between CVS and number of working hours per day

No. Of working hours per day	No. Of CVS	Mean CVS score with sd
4-6 hrs	34	7.88±7.79
7-10hrs	63	7.04±4.76
>10hrs	47	8.85±8.01

DISCUSSION

The prevalence of computer vision syndrome (cvs) found in this study was 65.28%

The findings of the study was supported by Seshadhri Arumugam et al and Rahman, Z.A. and Sanip, S., 2011^{1,11}.

In our study, more than 4 hours continuous use of computer was significantly associated with occurrence of CVS. Muttiand Zandic (1996)¹⁷ reported more pronounced visual symptoms in people spending 6-9 hours daily at a computer, while Stella et al (2007) observed the same in people using computer more than 8 hours daily¹⁸.

In our study there was no significant association between computer vision syndrome with number of hours working on computer per day(+0.048;p=0.567) which is supported by Seshadhri Arumugam et al study there was no significant association between the incidence of Computer Vision Syndrome and total number of hours of working on computer¹.

Spending long time on the computer screen without pause also can lead to problem of shifting focus on screen, documents and keyboard. The constant process of drifting and refocusing on fuzzy pixel of texts on the screen can leave eyes strained and fatigued¹⁹.

Computer work place illumination, screen contrast, duration of work on compute, viewing distances and angles, specific work related task, pressure and interest, screen reflection, image quality, and work place ergonomics were found to have significant role in manifesting symptoms in VDT users¹⁸.The level of the computer screen can be at or above or below the eye level of computer user. A higher proportion of subjects who had their computer screen at or above the eye level reported asthenopia^{20, 21, 22}.

CONCLUSION

Computer Vision Syndrome is a common ocular problem but the symptoms often been ignored and neglected by the computer users. If the problem persisted it may reduce job satisfaction and performance. Looking at far objects in-between work, viewing the monitor below the eye level, massage of eyes, and use of eye drops helped in reducing the symptoms.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Enhanced Improvement in Dynamic Behavior of Hybrid Active Power Filter using PI Controllers and Fuzzy Logic

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ABSTRACT

This paper shows a fuzzy-logic, PI managed shunt active power filter used to compensate to get symphonious writhing in three-phase techniques. The Hybrid Vehicle power filter makes use of a more fundamental procedure for its quote of this benchmark settlement present in gentle of Rapid Fourier change. The exhibited Hybrid Power filter may work-in well-balanced, loading requirements. Exceptional filters may perhaps not need sufficient functionality in speedy varied states. Be as it could, automobile trained active electricity filter presents far better results for symphonious minimization, also THD progress. The suggested auto tempered hybrid power filter retains up the THD very well inside of IEEE-519 standards. The suggested strategy is widely Tri-ED with enhanced unique behavior of hybrid power filter making use of fuzzy-logic, PI controls. The outcome are seen to become somewhat satisfactory to medium Distortions, also enhance high quality. The Nitty-gritty reproductions have been finished on MATLAB surroundings to accept the operation.

Index Terms : Proportional-Integral (PI) control, Hybrid Active Power Filter (HAPF), Fuzzy Logic Controller (FLC), THD, load compensation, power quality (PQ), power factor, voltage-source inverter (VSI).

INTRODUCTION

With the improvement of power electronic devices and these related control advances, increasingly power electronic gear has been introduced in power framework arrange. In any case, numerous power electronic buyers, for example, circular segment heaters and rectifiers, as a result of these unique activity attributes, would cause genuine voltage change, harmonic current contamination, low power factor (PF), less qualitated power and so forth. Hence, a considerable measure of authorities have offered consideration regarding enhancing such power quality issues. Power quality conditioners, for example, static var compensators (SVCs) and active power filters (APFs), which locally relieve the harmonic current, can successfully improve voltage quality and PF and stifle harmonic contamination¹

Albeit passive power filters (PPFs) can smother restricted trademark recurrence harmonic current, this dynamic filtering performance isn't adequate to keep away from that the harmonic current from passive power filter causes series- parallel reverberation between the filter and the framework. As of late, APFs have been

created rapidly in light of this great filtering performance, yet the confinements of limit and voltage level of power electronic devices keep APFs from applying in medium-high-voltage systems. Hybrid APFs (HAPFs) join the benefits of APFs and PPFs and are appropriate to be prepared in medium-high-voltage framework.

The expanded seriousness of power quality issues and different issues related with the passive filters, for example, substantial size and weight, higher cost, settled compensation, and reverberation issues with loads and systems have required an emphasis on a power electronic arrangement, that is, active power filters (APF) as appeared in Fig.1. As of late, numerous distributions have likewise showed up on the harmonics concealment utilizing active power filters. Determination of a control strategy and appropriate topology of harmonic concealment, most appropriate to specific conditions, requires that points of interest, impediments and confinements of these devices, which show an exceptionally wide scope of properties.

The control methodology for a hybrid active power filter produces the reference current, that must be given by the power filter to remunerate reactive power and harmonic streams requested by the load ⁴⁻⁶ This includes an arrangement of ebbs and flows in the phase area, which will be followed creating the changing signs connected to the electronic converter by methods for the fitting shut circle exchanging control strategy, for example, hysteresis or bum control. A few techniques including double prompt genuine and reactive power hypothesis have been proposed for extricating the harmonic content ²⁻⁵.

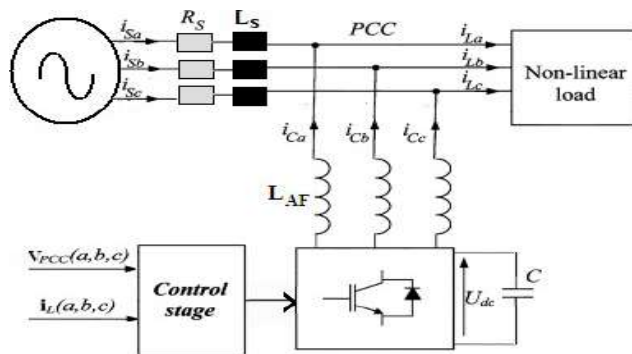


Fig.1. Shunt current compensation in active filter, a basic principle

All these techniques function admirably under enduring state, balanced and Sinusoidal conditions of supply voltage. Among every one of the techniques exhibited in the writing, the double prompt active and reactive power (P-Q) hypothesis is a standout amongst the most widely recognized and likely it is the best method⁴.

As of late, to evade the inborn bothersome attributes of ordinary control approaches, Fuzzy Logic Controller (FLC) is being produced. FLC offers a semantic way to deal with create control calculations for any framework. It maps the information yield relationship in view of human mastery and consequently, does not require a precise scientific model of the framework and can deal with the nonlinearities that are for the most part hard to demonstrate ². This therefore makes the FLC tolerant to parameter variation and more precise and vigorous.

DESIGN OF APF

Principle of APF

An APF, which is schematically depicted in Fig. 2, contains two-level Voltage Source Converter (VSC), a dc vitality stockpiling device, a coupling transformer associated in shunt to the dispersion arrange through

a coupling transformer. The VSC changes over the dc voltage over the capacity device into an arrangement of three-phase air conditioning yield voltages⁷. Appropriate modification of the phase and greatness of the APF yield voltages permits successful control of active and reactive power trades between the APF and the air conditioner framework. Such arrangement enables the device to ingest or create controllable active and reactive power⁸.

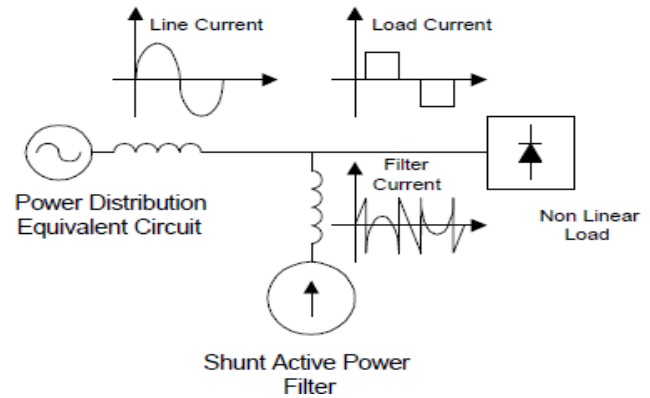


Fig. 2. APF Schematic Diagram

The VSC associated in shunt with the air conditioner framework gives a topology which can be utilized for up to three very unmistakable purposes:

1. Compensation of reactive power and Voltage direction
2. Power factor correction
3. Current harmonics elimination.

Here, such device is utilized to give ceaseless voltage direction utilizing an in a roundabout way controlled converter ⁹. As appeared in Fig. 3 the shunt infused current I_{sh} revises the voltage list by modifying the voltage drop over the framework impedance Z_{th} . The shunt infused current I_{sh} can be composed as,

$$I_{sh} = I_L - I_S = I_L - (V_{th} - V_L) / Z_{th} \quad (1)$$

$$I_{sh} / \eta = I_L / \theta \quad (2)$$

It might be said that the adequacy of the APF in redressing voltage hang relies upon the estimation of Z_{th} or blame level of the load transport. At the point when the shunt infused current I_{sh} is kept in quadrature with V_L , the coveted voltage remedy can be accomplished without infusing any active power into the framework. Then again, when the estimation of I_{sh} is limited, a similar voltage remedy can be accomplished with least evident power infusion into the framework ¹⁰.

Principle of HAPF

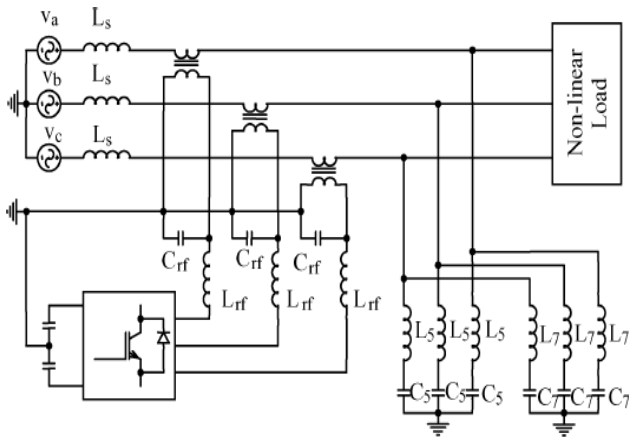


Fig. 3. HAPF Schematic Diagram

At the point when this gear is associated in arrangement to the air conditioner source impedance it is conceivable to improve the compensation qualities of the passive filters in parallel connection¹². This topology is appeared in Fig. 3, where the active filter is spoken to by a controlled source, where is the voltage that the inverter should produce to accomplish the goal of the proposed control calculation.

FUZZY LOGICCONTROLLER

Fuzzy Logic Controller is a procedure to encapsulate human-like reasoning into a control framework. FLC can be intended to copy human deductive reasoning, that is, the procedure individuals use to derive conclusions from what they know. In an engine control framework, the function of FLC is to change over linguistic control rules into control system in light of heuristic data or master learning. FLC has a settled arrangement of control rules, generally got from master’s information. The membership function (MF) of the related info and yield linguistic variables is for the most part predefined on a typical universe of talk. For the fruitful plan of FLC’s appropriate determination of information and yield scaling factors (picks up) or tuning of the other controller parameters are urgent employments, which as a rule are done through experimentation to accomplish the most ideal control performance. The structure of FLC is appeared in Fig.4. The structure indicates four functions, every one emerged by block.

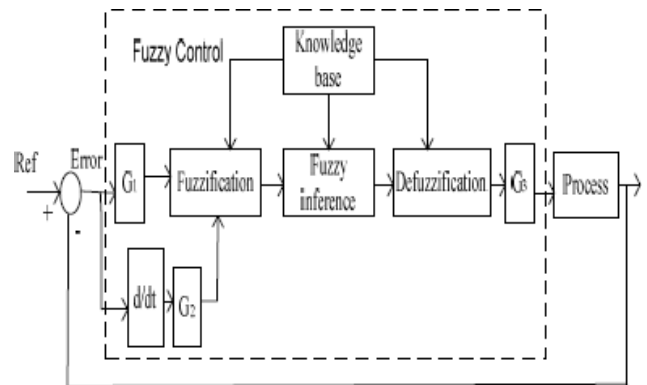


Fig.4. Structure of fuzzy controller

- Membership functions are characterized inside the standardized range (- 1, 1), and related with each name: NB (Negative Big), NM (Negative Medium), NS (Negative Small), ZE (Zero), PS (Positive Small), PM (Positive Medium), and PB (Positive Big). Seven MFs are decided for e(pu) and ce(pu) signs and seven for yield. Every one of the MFs are symmetrical for positive and negative estimations of the variables. Accordingly, most extreme 7x7 = 49 standards can be framed as in Fig.6.
- The membership functions for the sources of info (error and change of error) and yield of fuzzy control for hybrid active power filter are appeared in Fig.5.
- A learning base (an arrangement of If-Then standards), which contains the meaning of the fuzzy subsets, their membership functions, their universe talk and the entire of the tenets of derivation to accomplish great control
- An surmising instrument (likewise called an “induction motor” or “fuzzy derivation” module), which is heart of a fuzzy control, groups the limit of fake the human choices and copies the master’s basic leadership in translating and applying learning about how best to control the plant.
- A de-fuzzification interface, which changes over the finishes of the surmising instrument into genuine contributions for the procedure

A. Fuzzy Logic Membership Functions:

Fuzzy controllers don’t require a correct numerical model. Rather, they are planned in view of general information of the plant. Fuzzy controllers are intended to adjust to varying working focuses. The single yield variable (u) is unflinching state flag of the converter, only error free reaction is straightforwardly sustained to the

framework.

B. Fuzzy Logic Rules

The target of this exposition is to control the yield voltage of the converter. The error and change of error of the yield voltage will be the contributions of fuzzy logic controller. These 2 inputs are isolated into seven groups; NL: Negative Large, NM: Negative Medium, NS: Negative Small, ZO: Zero Area, PS: Positive small, PM: Positive Medium and PL: Positive

Large and its parameter ¹⁰. These fuzzy control rules for error and change of error can be alluded that is appeared as underneath:

$\Delta e \backslash e$	NL	NM	NS	EZ	PS	PM	PL
NL	NL	NL	NL	NL	NM	NS	EZ
NM	NL	NL	NL	NM	NS	EZ	PS
NS	NL	NL	NM	NS	EZ	PS	PM
EZ	NL	NM	NS	EZ	PS	PM	PL
PS	NM	NS	EZ	PS	PM	PL	PL
PM	NS	EZ	PS	PM	PL	PL	PL
PL	NL	NM	NS	EZ	PS	PM	PL

Fig. 5. Membership functions for Input, Change in input, Output.

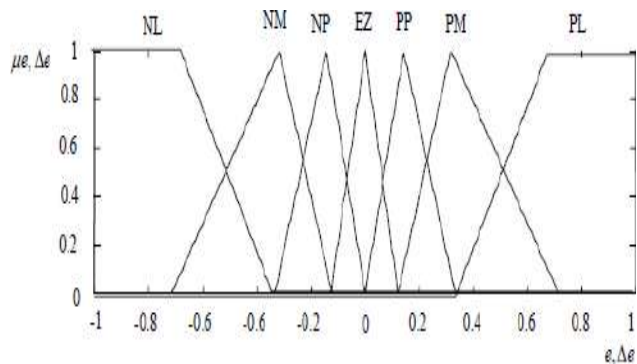


Fig. 6. Rules for fuzzy logic controller

MATLAB/ SIMULINK MODELING AND SIMULATION RESULTS

Effects of Short Circuit Fault Currents on Power System

Short circuit fault current depends on the power circuit voltage and configuration, method of neutral connections (solidly grounded, resistance grounded, reactance grounded and ungrounded), presence of the regulating devices (such as shunt reactor, series reactor, shunt and series capacitors and FACT devices), and the speed of disconnection of the faulted circuit section. Different types of short circuit currents can affect the

power system in different manners. It is known that, the flow of short circuit currents incident to the occurrence of inter phase short circuits near the generating units frequently results in substantial disturbance to normal operation of the power system.

Simulation results are presented in this section using MATLAB/SIMULINK for Fuzzy based Fault Tolerant control of a four leg Active Power Filter. Initially, we studied Fuzzy based Fault Tolerant Active Power Filter in the presence of open circuit fault/short circuit fault and also line to ground fault and computed total harmonic distortion. Subsequently, we studied the comparison of Fuzzy based Fault Tolerant Active Power Filter with traditional Fault Tolerant Active Power Filter in the presence of fault and also in the absence of fault.

The simulation results are obtained for Fuzzy Based Fault Tolerant Active Power Filter in the presence of open circuit/short circuit fault and line to ground fault

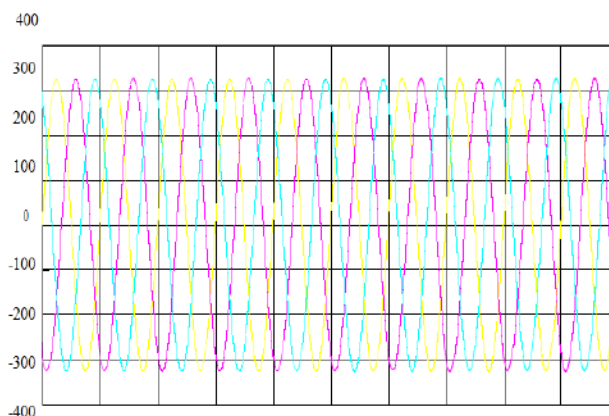


Fig.7. Open circuit analysis for 400V reference

- Sometimes the short circuit takes the form of the arc that may cause considerable damage to the elements of the power system. For example an arc on an overhead transmission lines if not cleared quickly will burn the conductors causing it to break resulting in long time interruption of the supply

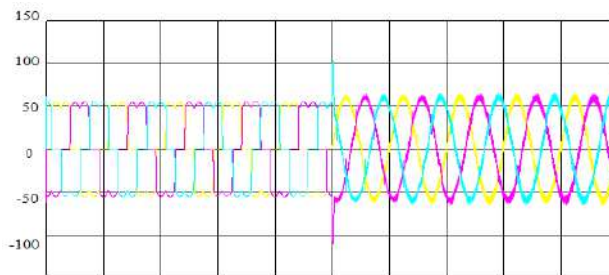


Fig.8 Before compensation and after compensation

- Unsymmetrical short circuit faults (such as line to ground, phase to phase, double phase to ground) introduce unbalance in the symmetrical circuits of the power system
- Stability of the power system may be adversely affected and can even lead to complete shutdown or cascade tripping of the power system
- Damage to other apparatus in the power system due to short circuit currents may be caused due to the over-heating and also due to abnormal mechanical stresses or forces set up by the fault
- A reduction in the voltage in power system due to faults will be sometimes be so large that the relays having pressure coils tends to fail

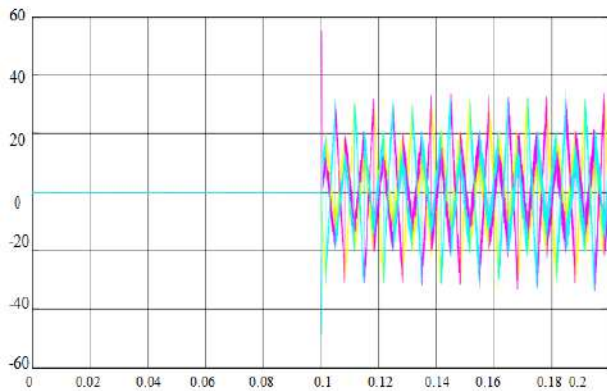


Fig.9 Short circuit analysis

- Due to short circuits in the power system, there may be considerable reduction in the voltage on the healthy feeders connected to the system having fault. This may result in drawing of abnormal high currents by the motors or the operation of no load coils of the motors. In the latter case there will be considerable loss in the industrial output due to the outage of the motors and other drives
- Sometimes in an interconnected systems, when a fault develops it is followed by a fall in voltage and frequency. This may result in loads such as motors which normally take the power from the supply will start to feed or deliver the power to the fault locations. During the faults, induction motors and synchronous motors feed the fault.

CONCLUSION

The target of this paper is to analyze the time determination performance between conventional controller and artificial intelligence controller (FLC)

controlling the dc interface voltage. A VSI topology for HAPF remunerating air conditioning balanced nonlinear loads and a dc load provided by the dc connection of the compensator is introduced. The proposed Fuzzy based Fault Tolerant control scheme offers continuous operation and gives superior Total Harmonic Distortion in contrast with PI based Fault Tolerant shunt Active Power Filters A control calculation for conventional pi controller and fuzzy logic controller constituted by a hybrid active power filter, this topology we built up an arrangement active power filter and a passive filter associated in parallel with the load is examined. At long last Matlab/Simulink based model is created and reproduction comes about are introduced.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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Forensic Accounting as a White-Collar Crime Detection Tool: A Study

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ABSTRACT

The financial frauds are increasing at an alarming rate. The stake holders have lost a huge amount of money through these financial frauds. India is no way different. Even though it has a huge potential to grow the increasing financial frauds and white-collar crimes are a hindrance to it. To put an end to it we require a tool called forensic accounting. Forensic accounting is an integration of accounting, auditing and investigation. They keep on looking at the possibility of exposing frauds. They are meant for identifying the transactions which are not authentic and gathering evidence against the same which can be provided as a proof in the court of law. Forensic accounting is at an infant stage. And through our study we would like through analyse the extent to which forensic accounting act as a detection tool in reducing white collar crimes. And this study would throw light on the stakeholders who are still unaware of this concept and thus their chance of getting cheated become reduced. And there by a reduction in financial frauds and white-collar crimes.

Keywords: *Forensic Accounting, White Collar Crimes, Financial Frauds, External Auditor, Prevention Tool*

INTRODUCTION

India is a developing country which has a huge potential to grow further into a developed one. However, a hindrance to its growth is the increasing crimes which include financial frauds and corruption. According to Global Economic Crime Survey in 2018 about 49% of the organisation has experienced fraud globally. This marks the importance of a tool which helps in bringing an end to these white collar crimes and this is done through forensic accounting. Forensic accounting is an integration of accounting, auditing and investigation. They keep on looking at the possibility of exposing frauds. They are meant for identifying transactions which are not authentic and gathering evidence against the same which can be provided as a proof in the court of law.

LITERATURE REVIEW

Dr. Partap Singh, Mr. Joginder Grewal, Mr. Virender Singh (2015) done a study on **“Forensic Accounting As A Fraud And Corruption Detection Tool: An Empirical Study”** their major findings were the concept of forensic accounting is new and the people needed to be made more aware of the same. The forensic

accounting is not used for investigating the fraud in majority organization. However, forensic accounting is a strong tool for detecting fraud. It helps in having a good control over the internal control system and also on the external audit. A point to be noted is that forensic accounting does not cover the risk factor involved fully¹.

Ifath Shaheen, Pranathi, Asra Sultana, Amathun Noor (2014) done a study on **“Forensic Accounting And Fraud Examination In India”** and their major findings were the forensic accounting is the concept and certain corporate experience should be shared to make all understand about the new concept. However since it is in the stage of developing it has a huge future. It is used for investigation rather than of prevention. If forensic accounting is made compulsory then the financial scams would be reduced. For this, the government should bring in the laws and the RBI also makes the banks that it is compulsory to do forensic accounting. The chartered accountants also should be given a proper training and exposure to do forensic accounting².

Dr. Mahua Biswas, Kiran G. Hiremath, Shalini R (2013) done a study on **“Forensic Accounting In Indian Perspective”** and their major findings were the

forensic accounting is used as a investigation tool not as a preventive tool. It should be changed as it can be used for prevention also. Certain laws must be brought in by the regulatory authorities to make the forensic accounting compulsory. And RBI also should make laws to make compulsory for banks³.

Dr. Manas Chakrabarti (2014) done a study on **“Problems And Prospects Of Forensic Accounting Profession In India”** and his major findings were the financial scams and the failure of corporate communication structure made the corporate world to realize the importance of skilled professionals who can recognize the frauds and malpractices done. Forensic accounting is something which can be easily reliable by the stakeholders. But however in India we lack the forensic accounting skills. The forensic accounting should be made compulsory to reduce the scams.

Dr. Ruchita Verma, Ms. Urvi Singh (2017) done a study on **“Barriers In The Implementation Of Forensic Accounting In India: An Analysis Of Academicians’ Perception”** and their major findings were more than half of the academicians were aware of forensic accounting. The corruption, lack of proper training to the professionals and due to the weak judiciary was some of the reasons which act as a barrier in application of forensic accounting. The awareness can also be increased by certain online classes, programs on various Medias etc.

Prof. Shimoli Dhami (2015) done a study on **“Forensic Accounting: Signaling Practicing Accountants To Improve Skillset And Forming Regulatory Body For Forensic Accountants In India”** and their major findings were forensic accounting is an interesting area and it is beneficial to both society and the investigator. The persons with skill and courage can only succeed in this process. In order to have accuracy and transparency in the transaction check lists can be prepared.

Mr. Harish Jagdish Sharma (2017) done a study on **“Forensic Accounting And Its Application In Selected Industries Of Mumbai: An Analytical Study”** and his major findings were forensic accounting helps in preventing frauds rather than in auditing. The techniques of forensic accounting are as such that it helps in examining fraud. Occupational fraud can be reduced to a large extent and various computer techniques helps

in preventing the frauds.

Dr. Anita Sharma (2014) done a study on **“Frauds In India And Forensic Accounting”** and her major findings were the increasing number of financial frauds and white collar crimes have shaken our economy and caused a huge financial loss to our economy. To prevent this forensic accounting is introduced. It has various tools to meet this objective.

Dr. Sudhir Yadav and Dr. Sushama Yadav (2013) done a study on **“Forensic Accounting A New Dynamic Approach To Investigate Fraud Cases”** and their major findings were our law do not have the expertise to uncover these financial frauds. Since the white collar crimes and financial frauds are increasing the demand for forensic accountants are also increasing. The forensic accountants also need to have imminent knowledge in accounting, finance, law and also investigative and research skills then only they can find these financial frauds.

Dr. CA Kishore S. Peshori (2015) done a study on **“Forensic Accounting A Multidimensional Approach To Investigating Frauds And Scams”** and his major findings were forensic accounting should be used as a prevention tool rather than investigation tool. Forensic auditing must be made compulsory in all financial and corporate sector to reduce the financial scams. However SEBI and RBI have took a few steps to prevent fraud using the forensic accounting.

STATEMENT OF PROBLEM

Increasing white collar crimes are hindrance to the growth of our economy. Auditing cannot reveal the frauds. So in order to reduce the rate of increasing white collar crimes forensic accounting can be used. But however there is a lack of knowledge related to forensic accounting. So through our study conducted among professionals, students of finance we would like to analyse the extent to which the forensic accounting act as a detection tool in recognising frauds and the level of knowledge of this new concept among the professionals.

NEED AND IMPORTANCE OF STUDY

Forensic accounting is at an infant stage. Many of the stakeholders are still unaware about this concept even after the increasing rate of white collar crimes like Harshad Mehta scam, Satyam computers scam, 2G spectrum scam, Nirav modi scam. So by the study

conducted the concept of forensic accounting become familiarised among stake holders. Moreover, the chances of them getting cheated will be less. With the reducing rate of financial frauds and white collar crimes the stock market would not fall apart rather emerge as stronger and this in turn would boost the growth of our economy.

OBJECTIVES OF THE STUDY

- To understand the concept of forensic accounting.
- To evaluate the relevance and effectiveness of forensic accounting as a fraud and crime detection tool in India.
- To understand various Forensic Accounting techniques in fraud and crime detection.
- To analyze the role of forensic accounting in reducing the fraud cases.
- To examine the difference between Forensic Accountants and External Auditors.

HYPOTHESES OF THE STUDY

Ho: There is no significant reduction in Fraud cases in the Public Sector by using Forensic accounting.

Ho: There is no significant difference between Traditional External Auditors and Professional Forensic Accountants.

RESEARCH METHODOLOGY

The data is collected from primary as well as secondary sources. A sample size of 50 respondents have been set for collecting primary data. Data from primary source is collected using questionnaire. The primary data is collected from the professional chartered accountants, professionals, professors in finance and students of finance. The secondary data is collected from books, journals and various websites. The statistical tool which is used for analysis is ANOVA.

ANALYSIS AND INTERPRETATION

TABLE 1 GENDER OF THE RESPONDENTS

	Frequency	Percent
MALE	23	46.0
FEMALE	27	54.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1 showing the gender of respondents it is clear that that out of the 50 respondents (54%) are female and (46%) are male.

TABLE 1.1 AGE OF THE RESPONDENTS

	Frequency	Percent
20-30 Years	38	76.0
30-40 Years	10	20.0
50 & Above	2	4.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.1 showing the age of the respondents it can be seen that out of 50 respondents (76%) are between 20–30 years (20%) are between 30-40 years and (4%) of respondents are 50 and above.

TABLE 1.2 EDUCATIONAL QUALIFICATIONS OF THE RESPONDENTS

	Frequency	Percent
Higher Secondary	4	8.0
Graduate	18	36.0
Post Graduate	15	30.0
Professional	13	26.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.2 showing the educational qualifications of the respondents it is clear that that out of the 50 respondents (36%) are graduate (30%) are post graduate (26%) are professional and (8%) of the respondents are higher secondary.

TABLE 1.3 ANNUAL INCOME OF THE RESPONDENTS

	Frequency	Percent
Below 50000	25	50.0
50000-200000	6	12.0
200000-500000	12	24.0
Above 500000	7	14.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.3 showing the annual income of the respondents it can be seen that out of 50 respondents (50%) are below 50000 (24%) are 200000-500000 (14%) are above 500000 and (12%) of respondents are between 50000-200000.

TABLE 1.4 AWARENESS ABOUT FORENSIC ACCOUNTING

	Frequency	Percent
YES	41	82.0
NO	9	18.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.4 showing the awareness about forensic accounting among respondents it is clear that that out of the 50 respondents (82%) are aware about forensic accounting and (18%) are unaware about forensic accounting.

TABLE 1.5 UNDERSTANDING THE CONCEPT OF FORENSIC ACCOUNTING

	Frequency	Percent
YES	37	74.0
NO	13	26.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.5 showing the understanding of the concept of forensic accounting among respondents

it can be seen that out of the 50 respondents (74%) understand the concept of forensic accounting and (26%) do not understand the concept of forensic accounting.

TABLE 1.6 SERVICES OF FORENSIC ACCOUNTANT REQUIRED IN INDIA

NEUTRAL	8	16.0
AGREE	25	50.0
STRONGLY AGREE	17	34.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.6 showing the services of forensic accountant required in India or not it is clear that out of the 50 respondents (50%) agree to it (34%) strongly agree to it and (16%) are neutral regarding the forensic accountants' service requirement in India.

TABLE 1.7 SERVICES OF FORENSIC ACCOUNTANT NEEDED MORE IN PUBLIC SECTOR

	Frequency	Percent
NEUTRAL	6	12.0
AGREE	20	40.0
STRONGLY AGREE	24	48.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.7 showing the services of forensic accountant required more in public sector or not it is seen that out of the 50 respondents (48%) strongly agree to it (40%) agree to it and (12%) are neutral regarding the services of forensic accountants are needed more in public sector.

TABLE 1.8 FORENSIC ACCOUNTING HELP IN DETECTING AND PREVENTING FRAUD IN PUBLIC SECTOR

	Frequency	Percent
NEUTRAL	7	14.0
AGREE	24	48.0
STRONGLY AGREE	19	38.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.8 showing the forensic accounting help in detecting and preventing fraud in public sector or not it is clear that out of the 50 respondents (48%) agree to it (38%) strongly agree to it and (14%) are neutral regarding the forensic accounting help in detecting and preventing fraud in public sector.

TABLE 1.9 SERVICES OF FORENSIC ACCOUNTANT DIFFERES TO TRADITIONAL EXTERNAL AUDITOR

	Frequency	Percent
NEUTRAL	9	18.0
AGREE	28	56.0
STRONGLY AGREE	13	26.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.9 showing the services of the forensic accountant differs to traditional external auditor or not it is seen that out of the 50 respondents (56%) agree to it (26%) strongly agree to it and (18%) are neutral regarding the services of forensic accountant differs to traditional external auditor.

TABLE 1.10 SERVICES OF A FORENSIC

TABLE 2 ANOVA

FORENSIC ACCOUNTING HELP IN DETECTING AND PREVENTING FRAUD IN PUBLIC SECTOR

	Sum of squares	Df	Mean Square	F	Sig.
Between Groups	9.421	2	4.711	16.162	.000
Within Groups	13.699	47	.291		
Total	23.120	49			

SOURCE: PRIMARY DATA

From the above table 2 it is clear that f value is (16.162) significant at (p < 0.05). So hence we reject the null hypothesis and accept the alternate hypothesis that there is significant reduction in

ACCOUNTANT PREFERABLE OVER THE SERVICES OF A TRADITIONAL EXTERNAL AUDITOR

	Frequency	Percent
STRONGLY DISAGREE	2	4.0
DISAGREE	7	14.0
NEUTRAL	17	34.0
AGREE	15	30.0
STRONGLY AGREE	9	18.0
Total	50	100.0

SOURCE: PRIMARY DATA

From the above table 1.10 showing the services of the forensic accountant preferable over the services of traditional external auditor or not it is clear that out of the 50 respondents (34%) are neutral to it (30%) agree to it (18%) strongly agree to it (14%) disagree to it and (4%) strongly disagree regarding the services of forensic accountant preferable over the services of a traditional external auditor.

TESTING HYPOTHESES

a)Ho: There is no significant reduction in Fraud cases in the Public Sector by using Forensic accounting.

fraud cases in the public sector by using forensic accounting.

b)Ho: There is no significant difference between Traditional External Auditors and Professional Forensic Accountants.

TABLE 2.1 ANOVA

SERVICES OF FORENSIC ACCOUNTANT DIFFERES TO TRADITIONAL EXTERNAL AUDITOR

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	8.299	4	2.075	6.977	.000
Within Groups	13.381	45	.297		
Total	21.680	49			

SOURCE: PRIMARY DATA

From the above table 2.1 it can be seen that the f value is (6.977) significant at (p < 0.05). So hence we reject the null hypothesis and accept the alternate hypothesis that there is significant difference between traditional external auditor and professional forensic accountant

FINDINGS AND SUGGESTIONS

- Majority of the respondents are female.
- Most of the respondents belong to the age group of 20-30 years.
- Majority of the respondents are graduate.
- A huge number of the respondents have their annual income less than 50000.
- Majority of the respondents are aware about forensic accounting.
- Most of the respondents understand the concept of forensic accounting.
- Majority agree to it that the services of forensic accountant are required in India.
- A huge number of respondents strongly agree that services of forensic accountant are needed more in public sector.
- Most of them agree that forensic accounting help in detecting and preventing fraud in public sector.
- More than half of the respondents agree that services of forensic accountant differ to the services of traditional external auditor.
- Majority of the respondents are neutral regarding the services of forensic accountant preferable over

the services of traditional external auditor.

- There is significant reduction in fraud cases in the public sector by using forensic accounting.
- There is significant difference between traditional external auditor and professional forensic accountant.
- Forensic accounting should be made compulsory to prevent frauds.
- SEBI and RBI should incorporate a separate cell for forensic accounting to prevent corporate crimes.
- Seminars and classes should be conducted to polish the skills of existing forensic accountants and making others aware about this and learning this.
- Government should take initiative in providing a specialised education for forensic accounting.

CONCLUSION

Forensic accounting is an integration of accounting, auditing and investigation. Since the white-collar crimes are increasing the forensic accounting needed to be made compulsory. Even though it is at infant stage it can be developed and it has a huge potential ahead. In future it can be even used as a prevention tool rather than a detection tool. And thus, help in the growth of the Indian economy.

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Analysis of the Impact of Perda Implementation Number 2 of 2014 on the Development of Prostitution in Jambi City

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ABSTRACT

Articles from the results of this study describe the impact of the application of Regional Regulation No. 2 of 2014 concerning the eradication of prostitution in the city of Jambi, the implementation of the regulation directly closes the places of prostitution (*Payo Segandung and Langit Biru*) in the city of Jambi. By using a qualitative descriptive research design, this study illustrates the positive impact and negative impact of the enactment of local regulations by closing the place of prostitution in the city of Jambi. The positive impact of the enactment of regional regulations can be seen from the increasingly reduced intensity of prostitution practices in the city of Jambi and the increasingly strong identity of the city of Jambi as a Malay land that closely cultivates eastern cultures and customs. However, the negative impact is also felt by the health service which previously could control the spread of HIV-AIDS contagion before the closure of the localization in the city of Jambi, then the economic impact was also felt by the people who depend on living in the place of localization.

Keywords: Prostitution, Regional Regulation No. 2 of 2014.

INTRODUCTION

Democracy in the era of Regional Autonomy, in the last decade many have been colored by the proliferation of legislative processes that have resulted in sharing the provisions of laws and regulations and public policies. The initial idea of autonomy was to build democracy with the main characteristics for the entire community, including it, to improve the community environment that had been neglected. Regional autonomy is a form of policy that gives authority to regions within certain limits that allow people to be more independent and more developed, so that the community becomes more prosperous.

DISCUSSION

a. Development of the Prostitution World in Jambi City

There is not too much literature available regarding the development of prostitution or commercial sex in Indonesia. In a country that is very broad and very varied in its cultural background, it is difficult to determine when and from which historical study of prostitution in Indonesia began. Nonetheless, there have

been various important and interesting studies that have taken the history of pre-colonialism in Java to the era of colonialism in the same region, especially Java, Bali and Sumatra as references. ⁴The history of prostitution in Indonesia, like many other places, is full of unfair treatment and violence.

b. Analysis of Factors that Underlie the Emergence of Regional Regulation NO. 2 of 2014

Prostitution or prostitution always leads the thoughts and images of people about sexuality that is taboo or humiliated. This is because it is morally considered to be contrary to the values of religion and morality. Departing from the argument, the regional regulation prohibiting prostitution and immoral acts was born in the city of Jambi. Not much different from the Prostitution Prohibition Regulations in several regions and cities that have been promulgated in advance, that one of the main factors for the formation of a Regional Regulation is to make the area a peaceful, religious, respect for human rights as a support for the movement to make an area of morality.

In the analysis carried out by the author specifically there are several factors that cause the birth of

Regional Regulation No. 2 of 2014 in the midst of the community and became the legal basis for prohibiting the practice of prostitution and immoral acts in Jambi City. **First**, the Strengthening of the Criminal Network Organizing the Sex Industry in the City of Jambi. Based on Indonesian norms and culture, the practice of prostitution is considered a disgraceful thing, but in reality there are certain regions that are accustomed to accepting the reality that citizens are sex workers, there are even prostitutes who are supported by their families or husbands to make money this way. strengthening the criminal network that organizes the sex industry in cities in Indonesia, including the City of Jambi. In addition to the blue shoots and sky there are many places in Jambi City that offer sex tours or provide sex services. Such as those who pretend to be beauty salons, massage venues, or karaoke entertainment places, which are directly backed by well-organized groups of thugs.

Second, Increased sex tourism carried out by teenagers in Jambi City. Based on the information the author obtained in the field today many adolescents and educated people who do sex tourism places where prostitution in the city of Jambi, based on the results of the author's interview with Kastpol PP Jambi City he revealed that in the conduct of raids in prostitution places and places of koroke and massage parlors often meet teenagers and students in these places. **Third, Efforts to Reverse the Identity of Jambi City.** Besides the thick Islamic nuances Jambi is known as Malay land which upholds the values of tradition and culture, it was these two important factors that were reflected in the Jambi saying that Syara Babunyi Adat Mengato, between religious and customs provisions must go hand in hand as a guide for life and life for society in the Malay land of Jambi. Of course a very anomalous thing, when on land that upholds the norms of customs thrives on the practices of prostitution which is very clearly contrary to the local identity of the Jambi people who are known as religious communities who uphold all the norms of existing customs.

In order to restore the identity of the city of Jambi, the regulation was implemented, based on the results of interviews with the Legislation Board of the Jambi City DPRD, he said that the most important thing is that this regulation is expected to restore the social identity of Jambi City as a religious community that upholds the norms of customs. which exists.

Fourth, Efforts to Protect Women from Immoral Actions. The commissioner of the National Women's Commission said the country was in an emergency situation of violence against women. The reason is that the rate of violence against women continues to increase from year to year. Komnas Perempuan data in 2014 showed that there were 293,220 cases of violence against women. This number increased compared to 279,688 cases in 2013.

The birth of regional regulation number 2 of 2014 concerning the eradication of prostitution and immoral acts has become a protection effort, over the increasing cases of sexual violence against women, cases of sexual violence against women that occurred in the city of Jambi. This is based on the interview with the author of the Jambi City DPRD Legislative Council, he confirmed that the regional regulation No. 2 of 2014 as an effort to procure women in the city of Jambi against the possibilities of immoral acts experienced by women in Jambi City.

c. Analysis of the impact of enactment of local regulations With closure of localization

The enactment of Perda No 2 of 2014 with the closure of the lokalasai of Payo Segadung and Langit Biru, has had its own impact on the social life of the people in Jambi City. In the analysis and study that the authors carried out in the field based on the results of interviews and observations, there was a positive impact and the negative impact of the implementation of Regional Regulation No. 2 of 2014 with the closure of the two localizations.

1. Positive Impact

Both localization thrived along with the change of generation of people in Jambi City, and during that time the anxiety felt by parents in keeping their children from falling into such immoral places, anxiety is not only felt by parents but also felt by wives who are always wary and frightened if their husbands fall into the lust to enjoy sex in places of prostitution until they forget their obligations as family members for their wife's children at home.

The birth of Regional Regulation No. 2 of 2014 with the noble aim of providing benefits to the community, where prostitution is one of the causes of poverty for the birth of poor public morality, this regulation is more

specifically aimed at safeguarding the morality of future generations and more importantly maintaining the integrity of family life in the middle middle of Jambi City community.

As for the positive impact that has been felt by the community with the birth of the regulation which affected the closure of localization in the city of Jambi, nowadays the public is increasingly convinced that the morality of the next generation and social life is more secure, certainly not bring more concern for parents of their children and anxiety for wives against their husbands.

Then the positive impact can be seen also in terms of social and cultural, in a society can occur as a result of an influence and the process that is happening. Where changes that occur must have a positive and negative impact or bring progress or decline. The Jambi City community in particular and the Jambi Province in general with all its existence in the globalization era at this time still uphold the values of customs that play a role both in life with fellow groups, and even those outside the group.

Positive impact in terms of health, adverse effects on contagion or contracting several genital related diseases very quickly, such as gonorrhoea, syphilis, and also other diseases such as HIV / AIDS.

2. Negative Impact

Localization of shoots and blue sky before being closed can be said to be an open prostitution area, meaning that before the enactment of the regional regulation there is no binding legal sanction for sex tourism lovers in the two neighborhoods. However, when this regulation was effective on January 16 2015, it was almost certain that the practice of prostitution was closed. So that it can be said that one of the negative impacts of the enactment of this regional regulation will be increasingly widespread closed prostitution (via online and closed prostitution networks) whose numbers are difficult to detect.

The next negative impact is that it is very possible to expand new cases of sexually transmitted diseases (STI / HIV AIDS) because this program intervention can no longer be carried out after the enactment of the law.

Based on information from the Jambi City health office that before the local regulation was enacted they

always carried out routine controls and socialization of sexually transmitted diseases (STI/HIV AIDS), in addition to routine control and socialization of the health department also to provide free condoms to CSWs in the two localizations, but after the enactment of the regional regulation the control and socialization of the spread of venereal disease cannot be done anymore given the existence of sex workers who cannot be detected after the closure of the two localizations.

Then the next negative impact is related to the economic problems of the community, especially the people who depend on the two lokalisis. Based on the results of the interviews that the authors conducted with the people who opened businesses (food stalls, grocery stores) in the localization area, most of them hailed since the closure of the localization automatically ate their income and there was even one resident who closed his business because of the imbalance between the intakes as well expenditures due to loneliness. Complaints were also conveyed by motorcycle taxi services that hung out every day in the localization area, due to the closure of the localization, and their motorcycle taxi revenue was also reduced.

Some of the negative impacts must also be considered by the Jambi City government to find solutions and solutions, so that the Perda No. 2 of 2014 concerning Eradication of Prostitution and Asus Actions brings disability to the community and more importantly minimizes the occurrence of resistance in the midst of society.

CONCLUSION

From the description above this article concludes that there is a positive and negative impact on the implementation of local regulation No. 2 of 2014 on the development of prostitution in the City of Jambi. The positive impact of the enactment of regional regulations can be seen from the increasingly reduced intensity of prostitution practices in the city of Jambi and the increasingly strong identity of the city of Jambi as a Malay land that closely cultivates eastern cultures and customs. However, the negative impact is also felt by the health service which previously can control the spread of HIV AIDS infectious diseases cannot control again after the closure of the localization in the city of Jambi, then the economic impact is also felt by the people who depend on the place of localization.

So that in the future it is expected. (1). The City Government must further strengthen the existence of local regulations to achieve the long-term goal of realizing the city of Jambi that is free of prostitution, because it is possible that the practice of closed prostitution via online has begun to penetrate the city of Jambi along with technological developments, so that the author of this regulation must continue to be evaluated to cover crime. closed prostitution crime. (2) with the closure of the localization, the health office is hired to intervene in the prevention of HIV / AIDS, so that in the future NGOs are expected to work together with community organizations to regularly advocate to the local government to provide 'discretion' to AIDS prevention in particular to ensure access to health services for they are both for prevention and treatment. (3) The city government is expected to be able to maximize the ex-localiation that has been closed, in order to be used as productive places that run in the field of community economic development as well as fostering the character and mentality of the community, this also aims to eliminate negative stigma ex localization.

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The Reflection on the Implementation of Pre-Marriage Course in Aceh

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ABSTRACT

The increasing divorce rates in Aceh shows that couples are unprepared to deal with various issues arose in the household. These issues are dominated by the economic and violent issues within the household. It can be prevented, if both bride and bridegroom to be are equipped with special guidance on fostering harmonious relationships before they start the marriage. In Indonesia, based on the Regulation of the Director General of Islamic Community Guidance, the Guidelines for Implementation of Pre-Marriage Courses has been set to improve understanding and knowledge of family life aiming for the sakinnah family and to reduce the number of disputes, divorce and domestic violence. This study employed library and field research and the data was analyzed using sociological juridical approach. The field research conducted in the districts of East Aceh, North Aceh and Aceh Besar. It is aimed to describe the practice of pre marriage course conducted by the Office of Religious Affairs (ORA) and to explore the acceptance and response of the bride and groom to be related to the implementation of the pre-marriage course. The study found that the implementation of the course has been implemented not only refers to the Regulation of the Director General of Islamic Community Guidance but also in accordance with the mandate of Qanun Aceh Number 8 Year 2014. However, the implementation of the pre-marriage course is not in line with the expectations aspired in the rules. There are several technical constraints faced by the ORA including the unavailability of fund allocation, the lack of instructor and the rejection of participants to follow the entire course sessions for various reasons. This study recommends the Government of Aceh to immediately enact the Aceh Qanun on Family Law and to provide special arrangements for strengthening of pre-marriage course in order to create a harmonious Acehnese society.

Keywords: Family Law, Pre-Marriage Course, Sakinnahmawaddahwarahmah Family (harmonious).

INTRODUCTION

The study of the implementation of the course for future bride and groom conducted in Aceh is inspired by previous research that have demonstrated the weak position of women in law, especially in solving various household problem. This is due to the fact that married couples are unprepared for the marriage life as a result of the lack of training and guidance provided by the families of bride and groom or facilitated by the state through pre-marriage course for future bride and groom.

Studies related to women's position and protection have been conducted in various contexts by previous researchers. Some studies are conducted in term of the juridical context of women's protection¹, the aspect of law enforcement officials² as well as non-judicial

aspects such as the effort to improve women's protection perspective by law enforcement officials and the studies of the country policies related to women's perspectives². These studies show that the Indonesian legal system is not capable to provide justice and legal protection for women, both for women as perpetrators of crime and as victims of violence.

Some studies related to women and their rights in families and communities were also found³. In the local context of Aceh, there are various studies addressing women in various aspects such as violence, education, economy and the double burden of women³. In addition, there is a study discussing gender awareness of law enforcement officials in dealing with cases related to both women as perpetrators of crime and as crime victims⁴.

ACEH REFLECTIONS OF THE IMPLEMENTATION OF PRE-MARRIAGE COURSE IN ACEH

Taking into account the polemic of the divorce law and problems in the household resulting in the *sakinah*, *mawaddah* and *warahmah* families being hard to achieve, this study has also reviewed other studies concerning the importance of studying the law, in particular the Regulation of the Director General of Islamic Supervision No. DJ.II / 491 Year 2009 which is updated with the Regulation of the Director General of Islamic Supervisory no. DJ.II / 542 of 2013 on the guidance of pre-marriage courses conducted by researchers in several regions in Indonesia. Some of these studies, among others, are conducted by Mahmudin.²³ His study concluded that: 1) pre-marriage course is the process of behavioral and attitude transformation in the smallest group or social unit in society to the future bride and groom. 2) Preparation for marriage needs to be done so that those who will be married are ready, both in terms of mental and material, especially in running the functions of family. 3) A quality marriage is a condition in which it is able to create happiness, conformity and stability of marriage. While the quality of marriage itself is influenced by various factors such as optimal family composition, family life cycle, socio-economic feasibility and suitability of roles, social and personal factors of the couple and prenuptial conditions. 4) Building the *sakinah mawaddah warahmah* family requires a long process and great sacrifices. 5) The *sakinah* family is a family that all family members feel the love, security, tranquility, protection, happiness, blessing, and honor as well as being appreciated, trusted and blessed by Allah SWT.

The pre-marriage course for the future bride and groom in Aceh has been conducted by KUA in several sub-districts. Upon the completion of the course, KUA will provide a certificate as evidence that the future bride and groom have participated in the course. This is stated by the head of KUA of Muara Dua district mentioning the role of KUA in providing *sakinah* family service started from course for future bride and groom before the wedding and certificate is given after the course. The course takes approximately four hours. The material presented includes the forty-four problems aiming to keep the households as a solid foundation, are gradually presented.

Similarly, the head of KUA Kecamatan Pidie⁵⁵ also reported that the pre-marriage courses has been implemented and the certificate of graduation is given. However, due to the time constraint the materials presented are not sufficient. Furthermore, the Head of KUA stated that the three hours of pre-marriage course in KUA is not enough. Ideally, the course is conducted over a three-day period addressing the problematic discussion of the law as many of the future bride and groom have lack of understanding of marital law problems such as the terms and *rukun*. In addition, medical understanding is also needed, including reproduction, and health, and therefore there are some doctors who handle it. Therefore, the head of KUA collaborates with the Ministry of Religious Affairs and Ministry of Health. KUA also gives provides a useful pocket book discussing religious materials, reproductive health, family planning issues (family planning) for the future bride and groom.

The Chairman of the Consultative Assembly of Clerics (*Majelis Permusyawaratan Ulama*) (MPU) Pidie⁵⁶, also explaining the importance of pre-marriage course, briefing to the future bride and groom to continue their marriage and so forth. The pre-marriage course explains the topic related to the responsibilities of husbands and wives, the rights and duties of husbands and wives, and the shared responsibilities. In addition, there is an explanation of the transfer of rights and obligations after the *ijabqabul* (wedding vows) and the change of status that is previously under the responsibility of the father shifting the responsibility to the husband. Furthermore, there is also an explanation related to the factors causing the destruction in the household, for example livelihoods, egoism and the third parties interference. Therefore, guidance is needed to anticipate all possibilities and to maintain harmonious household.

Based on field research conducted, this study found that pre-marriage courses conducted in Aceh through the Office of Religious Affairs are ineffective as the duration of the course is very short. This course is conducted as merely to fulfill a task of BP4. This is in contrast with Malaysia, pre-marriage course is implemented within 3 (three) months. Today's couples are no longer based on *taaruf* rather based on the lust so that marriage and its attributes are no longer sacred, for example, hugging is common in the courtship, and therefore the hugs after marriage are no longer sacred⁵⁷. In addition, the ineffectivity of the pre-marriage courses is also caused budget issues. Cost allocation for KUA is only sufficient

for daily activities, including electricity, and Wi-Fi. As for the activities related to marriage, wakaf, and socialization they are carried out free of charge.

This condition will increasingly place the pre-marriage course to not being able to provide strength for the future bride and groom to be stronger in facing the married life. Not to mention the view of the neighbors concerning the future bride and groom who marry at a young age. These raise the debate about the importance and effectiveness of the implementation of pre-marriage in Aceh and therefore further study to examine to what extent the pre-marriage courses have been conducted is needed. In addition, to obtain the legal force and a strong position of BP4 as part of the Aceh government's activities so that there is a need to formalize the sharia law conducted by BP4.

The materials for the future bride and groom has already been arranged through the Regulation of Director General of Islamic Community Guidance No. DJ.II / 542 of 2013 concerning Guideline of Preparation of Pre-Marriage Course. In the regulation, the Pre-marriage Course Material is divided into three groups, namely: 1) Basic group; 2) Core Group and 3) Supporting Groups. In addition to the materials that have been regulated through the Director General of Islamic Community Guidance No. DJ.II / 542 of 2013, additional materials taught by the MPU are also required for the future bride and groom. These additional materials will reinforce the future brides and groom to understand the fiqh of munakahat (marriage law). The couple to be married are the bride and groom who have completed the course and are given a certificate as a proof of the completion.^{58, 7}

The implementation of the pre-marriage course in Aceh requires strengthening in term of the legal side and funding. Legal strengthening is required for the implementation of the pre-marriage course to be included in the pre-marriage course qanun (Islamic law) in Aceh³¹. This is in line with Article 16 Paragraph (2) of Law Number 11 Year 2006 regarding the Law of Aceh Government stating the mandatory matters that is the authority of the Aceh Government concerning the implementation of Aceh's privileges including the implementation of religious life as the implementation of shari'ah Islam for its adherents in Aceh while maintaining the harmony of interfaith society. Similarly in Article 2 paragraph (2) Qanun Number 8 of 2014 concerning the Principles of Islamic Sharia, it is stated

that the implementation of Sharia Islamic Law as referred to in paragraph (1), letter b, includes ahwal al-syakhshiyah (family law). This family law needs to regulate pre-marriage course for the prospective bride and groom. The pre-marriage course for prospective bride and groom should be included in qanun of family law and arrangement should be refined through the Aceh Governor Regulation which in turn will be applied throughout Aceh.

CONCLUSION

This study concludes that the reflection on the implementation of pre-marriage courses in Aceh has been implemented as required by the Regulation of the Director General of Islamic Community Guidance No. DJ.II / 542 of 2013, however, it is not optimum due to time constraint, and therefore the materials provided are not fully absorbed. In addition, other materials related to local wisdoms in term of the implementation of Islamic Sharia in Aceh are needed. These local contexts are required as additional contents to discover the philosophical, juridical, and sociological aspects of Acehnese society with the strong Islamic Shari'a. These local materials can be presented by scholars from the MPU Aceh, as well as from the ulemas (tengku) of the Islamic boarding school or *dayah*. Furthermore, it is necessary for the pre-marriage course to be included in the Qanun of Family Law in Aceh and then reinforced by the Governor Regulation as implementation rules.

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57. KUA Banda Baro, Dewantara sub district.
58. Judge of Syar'iyah CourtTakengon.

An Efficiency Analysis in the Zimbabwean Metal Manufacturing Sector

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ABSTRACT

The study analysed the efficiency of the metal manufacturing sector in Zimbabwe. The background to this study is the decimation of the sector given its contribution to vital economic indicators like employment, Gross Domestic Product (GDP) and export. A non-parametric methodology, Data Enveloping Analysis (DEA) was used to measure efficiency in the metal sector and estimating the drivers and barriers to efficiency using STATA econometric software. Data on metal manufacturing inputs; cost of raw material (CM), energy (E), water and sewages (WS) and cost of services (S) were transformed into multiple outputs; sales (SLS), value added (VA) and gross value of production (GVP). Using an input oriented constant returns to scale (CRS) model, in the Metals sub-sector of the manufacturing sector, 38% of the Decision Making Unit (DMUs) are efficient and 62% are inefficient. At least 52% of the DMUs are operating above the average efficiency of 68%, whereas 48% of the DMUs are struggling below the average efficiency level. Under an input oriented variable returns to scale (VRS) model, in the Metals sub-sector of the manufacturing sector, 57% of the DMUs are efficient and 43% are inefficient. At least 62% of the DMUs are operating above the average efficiency of 86%, whereas 38% of the DMUs are struggling below the average efficiency level. The study's literature confirms that small to medium metal manufacturing firms have increased, which are mainly informal and thus pose a threat to government when it comes to instituting efficiency policies.

Keywords: *manufacturing; efficiency; metal; data enveloping analysis*

INTRODUCTION

This study will investigate the efficiency levels in the metals manufacturing sector in Zimbabwe in the post dollarized era. Efficiency analysis is important in Zimbabwe in the vain to rescue the decimation in the manufacturing sector in general and the metals manufacturing sub-sector in particular. The Data Enveloping Analysis (DEA) methodology which will be employed in this study has strong interpretive power on the drivers and barriers of efficiency in the metals manufacturing sub-sector. The study results will provide leverage for government policy as well as strategic planning for other key stakeholders that include mining houses, investors, financiers, suppliers, labour and communities.

BACKGROUND OF THE METALS MANUFACTURING SECTOR

Metal production is energy intensive. However, sophisticated energy management systems ensure the efficient use and recovery of energy throughout the steelmaking process for re-use, wherever possible. The World Steel Association Fact Sheet on Energy Use in the Industry (2016: 1) found that energy is one of the major cost drivers of steel production, comprising 20% to 40% of the total cost in some countries¹. Thus, improvements in energy efficiency result in reduced production costs and thereby, improved efficiency. The energy efficiency of steelmaking facilities vary depending on production route; type of iron ore and coal used; the steel product mix; operation control technology; and material efficiency. Therefore, these are the widely agreed drivers of efficiency in the metal industry.

3. Drivers and barriers in the metals manufacturing sector

The metals manufacturing sector is driven by many input variables and also incentivized by many outputs.

Capacity utilization in the mining sector is a driver of efficiency in the metals manufacturing sector. According to the State of Mining Industry Report (2016: 7), average capacity utilisation for the mining sector increased from 60% in 2015, to 64% in 2016. Platinum sector continues to operate at full capacity, while gold recorded an increase to 79%, from 77% in 2015. Chamber of Mines (2016: 11) survey identified capital constraints, constraints in electricity supply, high cost of electricity, low feedstock and low commodity prices, as the major challenges in initiating value addition in the Zimbabwe’s mining sector. The four major cost drivers in metals manufacturing are wages, stores and supplies, power and royalty. Stores and consumables at 36 % of the total costs constitute the biggest chunk of the total costs, followed by wages (32%), power (15%) and royalty (5%) (State of Mining Industry Report 2015: 21).

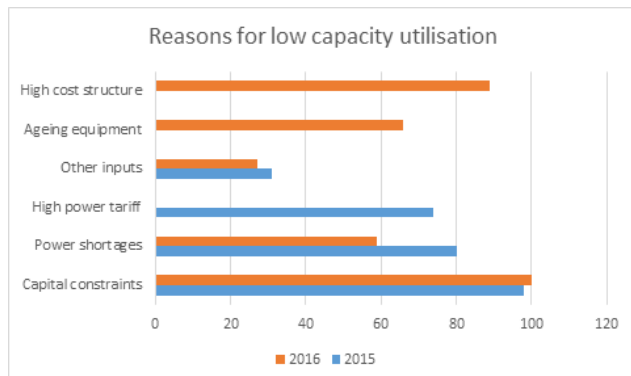


Figure 3.1: Reasons for low capacity utilisation

Source: Adapted from State of Mining Industry Report 2015 and 2016

In 2015 mining survey, respondents mentioned capital constraints, power shortages and high power tariffs as major barriers to efficiency in the mining sector which subsequently constrain metal manufacturing sector in Zimbabwe. All respondents in the survey for State of Mining Industry Report (2016) pointed capital shortages as the major constrain undermining capacity utilisation, coupled with high cost structure and ageing equipment.

LITERATURE REVIEW

The literature guides the study methodology.

Barriers and drivers in metals manufacturing sectors are traced in order to review other country’s efficiency conditions.

Terziovski (2010) study attempted to explain innovation practices in Australia and how they can affect efficiency and subsequently performance. The study aimed at explaining the drivers of efficiency in 600 manufacturing small to medium enterprises (SMEs) in Australia in the fabricated metal products, basic metal products or tooling and machinery industries. The major drivers of efficiency from a simple regression model of this study are presented below:

Table 4.1: Drivers of efficiency

Driver of efficiency	Size of impact
Innovation strategy	37.9%
Formal structure	42.3%
Customer and supplier relationship	-1.1%
Innovation culture	4.8%
Technological capabilities	-1.09%

Source: Adapted from Terziovski (2010)

Table 4.1 shows that an innovation strategy positively drives the efficiency of manufacturing SMEs by 32.9%, followed by the form of the structure with 42.3%. It was found that if these manufacturing SMEs were to formalise their firm structures, efficiency will improve. The above drivers were found to have about 61.6% influence on efficiency, leaving 48.4% of the efficiency being influenced by other drivers not captured in this study. Erkoç (2012: 28) suggested that X-efficiency is largely caused by inadequate motivation, incomplete contracts, asymmetric information, agency problems and attendant monitoring difficulties. A conclusion can be reached that in this study, X-efficiency was measured using a simple OLS regression analysis.

In their study, which was initiated by the Swedish Foundry Association, Rohdin, Thollander and Solding (2007: 673), utilised respondents from Swedish foundries who discussed major driving forces for energy efficiency within the sector. Partly based on the results from the workshop and a previous study of the non-energy-intensive industry, and partly based on the scientific theory on the subject, it can be concluded that this will help firms better solve their efficiency barriers. In order

to enhance efficiency in Swedish metal manufacturing, the following were the drivers of energy efficiencies in their order of influence:

- Long term strategy
- Management ambition
- Environmental company profile
- Environmental management system and
- Third party financing.

The foundry sector in Sweden found that energy was a major driver in this metal manufacturing industry.

Goriwondo, Mhlanga and Mutsambwa (2013) studied Agility for sustainability in Zimbabwe, using manufacturing Companies in Bulawayo as a case. They opined that agility as a driver of efficiency in manufacturing is critical for competitiveness. Audits were carried out on a spectrum that covers textiles, beverages, pharmaceuticals, foundry and rubber manufacturing, including household and industrial chemicals³.

METHODOLOGY

The methodology applied in the research involves the use of an empirical measure of efficiency of DMU in the metal manufacturing entities while using a non-parametric method for the estimation of a production frontier referred to as the DEA or balanced benchmarking. This method is based on the theory of production and makes efforts to depict a production frontier, which can be considered to as the best practice-frontier⁴. Mathematical formulations of the DEA and its orientations, definition of variables and model specification are covered in this study, with special recognition to Zimbabwe.

As a result of massive closure of manufacturing firms in Zimbabwe in recent times, the targeted population therefore contained metals manufacturing firms which have managed to operate for the past decade. This will enable benchmarking efficiency DMUs and analysis on efficiency drivers and barriers. The sample data from ZIMSTAT was representative of the metal sector considered and therefore large enough to provide valid results according to how the DEA methodology operates.

RESULTS PRESENTATION

The results presented under this section are a synthesis of DEA methodology from STATA software. DEA is a mathematical methodology which analyses efficiency by coming up with a composite efficiency score. The efficiency score is determined by the rate at which the existing metal manufacturing DMU's technology transforms inputs to outputs. In this study, the input variables are cost of raw materials (CM); energy (E); water and sewage (WS); and cost of services (S) and the output variables are sales (SLS); value-added (VA); and gross value of production (GVP).

Charnes, Cooper and Rhodes' (CCR) (1978) derives a CRS curve from a DMU which is considered to optimize the ratio of output to input (maximum average productivity). Two sets of econometric results for the metals manufacturing sector will be presented and interpreted in line with the three areas of efficiency: 1) orientation, 2) returns to scale and 3) stages of efficiency. The separate sets are for CRS and VRS in all the ten sub-sectors under Stage 1. In terms of efficiency orientation, the results are for input minimisation efficiency since the same results apply to the output maximisation from the Duality Theory. The slack analysis was done to show the drivers and barriers to efficiency in each manufacturing sub-sector, as well as the level of improvement necessary for the sector to become efficient.

6.1. CCR Metals Input-Orientation, Returns to Scale and Stage 1

The following results are based on the assumption that the DMUs exhibit constant returns to scale and attempt to minimise inputs to attain efficiency in Stage 1 and the objective is to: Measure efficiency in Zimbabwe's metal manufacturing sector using production plans of the efficient scores.

6.1.1 CCR Metals efficiency score analysis

This will analyse the efficiency levels of DMUs in the metals manufacturing sector in Zimbabwe.

Table 6.1: CRS Metals Efficiency scores

DMU	Rank	Efficient Score	Decision	Above average
dmu:1	1	1	Efficient	Yes
dmu:2	14	0.495293	Inefficient	No

Cont... Table 6.1: CRS Metals Efficiency scores

dmu:3	1	1	Efficient	Yes
dmu:4	1	1	Efficient	Yes
dmu:5	1	1	Efficient	Yes
dmu:6	1	1	Efficient	Yes
dmu:7	16	0.46008	Inefficient	No
dmu:8	18	0.325005	Inefficient	No
dmu:9	19	0.251807	Inefficient	No
dmu:10	15	0.471122	Inefficient	No
dmu:11	13	0.597081	Inefficient	No
dmu:12	12	0.639747	Inefficient	No
dmu:13	11	0.732013	Inefficient	Yes
dmu:14	10	0.776189	Inefficient	Yes
dmu:15	20	0.199249	Inefficient	No
dmu:16	17	0.404965	Inefficient	No
dmu:17	1	1	Efficient	Yes
dmu:18	9	0.951313	Inefficient	Yes
dmu:19	1	1	Efficient	Yes
dmu:20	21	0.03337	Inefficient	No
dmu:21	1	1	Efficient	Yes
Average		0.682725		

Source: Adapted from STATA output

The DMUs with an efficiency scores of 1 are the efficient firms in the Metals manufacturing sub-sector. The results above are for a sample of 21 DMUs in the Metals manufacturing sub-sector. Average efficiency in the Metals manufacturing sub-sector is 0.68 = 68%.

Table 6.2: CRS Metals Efficiency Score Analysis

	Number	Percentage
Efficient DMUs	8	38
Inefficient DMUs	13	62
Above average efficient DMUs	11	52
Below average efficient DMUs	10	48

Source: Adapted from STATA output

In the Metals sub-sector of the manufacturing sector, 38% of the DMUs are efficient and 62% are inefficient. At least 52% of the DMUs are operating above the average efficiency of 68% whereas 48%, of the DMUs are struggling below the average efficiency level.

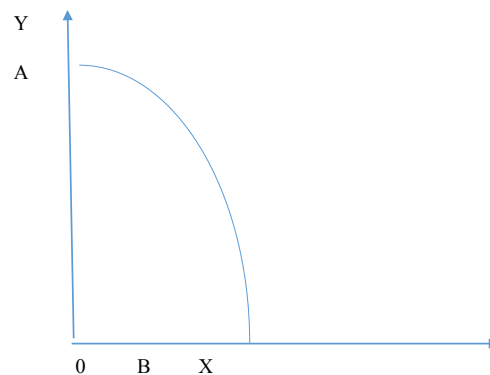


Figure 6.1: CRS Metals Frontier Analysis

The efficient DMUs (1, 3, 4, 5, 6, 17, 19 and 21) are found on frontier AB, whereas all the other DMUs (2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18 and 20) operates below the frontier AB.

Table 6.3: CRS Metals Benchmarking Analysis

DMU	Benchmarks
1	0
2	3 (0.46) 19 (1.34)
3	13
4	2
5	1
6	5
7	3 (0.00) 6 (0.00)
8	3 (0.00) 5 (0.00)
9	3 (0.00) 17 (0.00) 19 (0.00)
10	3 (0.00) 4 (0.00) 21 (0.16)
11	3 (0.00) 19 (0.01) 21 (1.31)
12	3 (0.00) 19 (0.01) 21 (0.01)
13	3 (0.02) 6 (0.01)
14	3 (0.00) 17 (0.09) 19 (0.02)
15	3 (0.00) 6 (0.00)
16	3 (0.00) 4 (0.00)
17	3
18	3 (0.00) 6 (0.02) 17 (0.73)
19	5
20	3 (0.00) 6 (0.00)
21	3

Source: Adapted from STATA output

Table 6.4: CRS Metals Slack Analysis

	Inputs				Outputs		
DMU	{S} E{I}	{S} CM{I}	{S} WS{I}	{S} S{I}	{S} SLS{O}	{S} GVP{O}	{S} VA{O}
dmu:1							
dmu:2	1.96	0	0	15.67	0	5.23	24.58
dmu:3							
dmu:4							
dmu:5							
dmu:6							
dmu:7	0	0	0.03	0	0	0.01	0.02
dmu:8	0.01	0	0	0.01	0.01	0	0.02
dmu:9	0.02	0	0	0	0	0.01	0.03
dmu:10	0	0	1.16	0	0	0.09	0.15
dmu:11	0	0	0	0.48	0	0.09	0.2
dmu:12	0	0	0	0.02	0	0.01	0.02
dmu:13	3.45	0	0.57	0	0	0.49	0.83
dmu:14	0	0	0	0	0	0.06	0.11
dmu:15	0.03	0	0.01	0	0	0.03	0.05
dmu:16	0	0	0.01	0.01	0	0.05	0.07
dmu:17							
dmu:18	0.83	0	0	0	0	0.16	0.33
dmu:19							
dmu:20	0.01	0	0.03	0	0	0	0.01
dmu:21							
Total	6.31	0	1.81	16.19	0.01	6.23	26.42

Source: Adapted from STATA output

CONCLUSIONS AND IMPLICATIONS

Under CRS, in the Metals sub-sector of the manufacturing sector, 38% of the DMUs are efficient and 62% are inefficient. At least 52% of the DMUs are operating above the average efficiency of 68%, whereas 48% of the DMUs are struggling below the average efficiency level. Overall analysis shows that **input variable CM** is the major driver of efficiency in the **Metals** manufacturing sub-sector. Output variable **VA** is the major barrier to efficiency in the **Metals** manufacturing sub-sector.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Low Cost Child Abduction Prevention with RFID Technology

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ABSTRACT

An ever-green problem over thousand years is the Child abduction around the world. The kidnapping of child in the society happens for the new-born babies to 15 years child. There are many methods, technologies;equipment etc. developed over the years. But, everything is having its own pitfalls. In this paper, we are addressing the prevention technique for infant abduction of new-born babies in the Hospital scenario. Here, an active anti-allergic RFID (Radio Frequency Identification) tag is attached with the new-born baby and mother. Among them one is acting as a master tag and other is slave tag. The mother tag and the baby tag's status are continuously sensed by an active RFID reader. The coverage range of the designated Active RFID system is around 100m. So, when the infant is moving far away from the mother or if it is separated for a long time then the reader fails to get the status of the baby tag and the corresponding control signals alert the hospital management and the mother. The Mother and Baby tag have the same Tag ID which helps during mother baby matching. So, this two added features effectively prevents and informs the child abduction well in advance at very cheaper cost in a very safer manner. Thus, RFID based method could be adopted in all the hospitals to prevent the Child abduction at low cost.

Keywords: *Child abduction, RFID tag, Transceiver.*

INTRODUCTION

In India the Child abduction from 1965 to till now is around 350 as per NCMEC (National Center for Missing and Exploited Children) ¹. The statistics says that, more than 40% of the child missing happens in the hospitals and healthcare centers ². There are various reasons behind this act of child kidnapping. The most common reasons are,

A female who is incapable of becoming pregnant (burning desire for motherhood) ¹

Illegal adoption (Woman usually 17-33 and unable to have a child)

The new-born child has been sold for money (\$2,500 to \$850,000) ²

There were many methodologies suggested in the literatures to prevent and identify the kidnapping before or after the event has been occurred. The existing methods discusses about, Footprints of infant at birth, HD closure picture of baby, a unique band number for baby/mother, physical identification of child ². Moreover, certain types of electronic products are being incorporated in the

normal life style. They are, parking lot controller, child controller in elevators, alarm sounds, etc... ³. But, they are still inefficient in terms of, the environment, cost, lacking in real-time prevention. It is expected to prevent the abduction in the initial step itself.

In order to avoid missing, swapping or kidnapping, a biometric recognition based methodology is suggested. Here, the foot prints of the newborn are taken in to account to prevent the above said occurrences. It needs preprocessing and other computational devices in the field itself ⁴. An automatic system of newborn babies' identification system using palm print of child is developed and it is tested in hospitals ⁵. Another automatic child identification methodology using ear images of the newborn is developed with ICA and PCA ⁶. Recently, the image processing based face recognition system has been proposed using domain specific learning with the base work of ⁷⁻⁸.

A cost-efficient kidnapping prevention system using RFID tags being proposed; and the radiation effect of RFID tag when it is immersed in the water are studied in ⁹. Infant living condition monitoring system able to measure sleep posture, breathing rate, and CO₂ level and

send the information to the remote server is developed to avoid sudden death at hospitals ¹⁰.

Apart from the above researches, there are patents are being filed regarding Safety Sleeping Pod for the infant¹¹, wearable alarm in ornament to prevent child kidnapping [12] and an IOT based smart wrist band ¹².

On summary, there are three categories of Child abduction prevention systems. They are,

A stand-alone image processing and wireless based information and identification system

RFID tag based identification system

Patents proposing smart devices

Drawbacks or limitations of the previous methods

The image processing based identification system would not be suitable to prevent the child kidnapping and also it is relying on the computer, algorithms and analysis programs. It makes this methodology costlier and in-effective for implementation. In RFID based systems, there is a possibility of prevention of kidnapping and making alert at the same instant. It means the method could be deployed in hospitals, homes and malls wherever we have closure contact of the baby and mother is needed.

PROPOSED METHOD

In the proposed method, the RFID tag is placed on the mother’s wrist and baby’s ankle with the same Tag identification number. The active RFID reader placed on the maternity ward keeps on receiving the status from both the Tags. If any deviation occurs, it immediately alerts the mother and the hospital Staffs for the next action to be taken. This methodology, gives alertness at almost zero time and very cheaper.

Functional Representation of the proposed method

There are two RFID tags namely Mother and Baby tag. The Mother RFID tag is connected to wrist of the Mother and the Baby tag is connected to the ankle of the new-born as shown in Fig.1. The RFID used in this work is having the attribute of far field coupling (FFC); means it could able to make communication up to 100 meters (more than 300 feet). This distance is sufficient to have proper communication between the mother and

baby within the hospital environment.

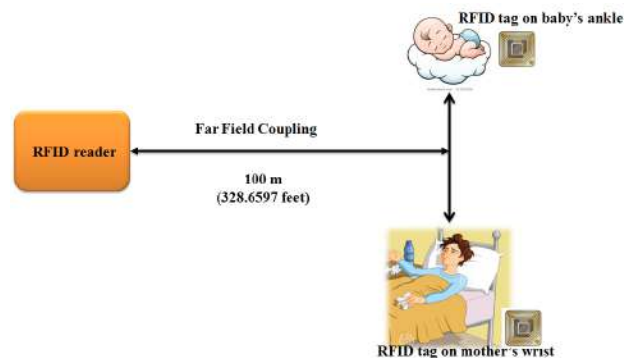


Fig.1: Representation of RFID Tag in Baby and Mother Functional components of the proposed method

The RFID used here are active type, which has internal power source for its operation. The internal architecture of the tag used is shown in Fig.2. It has transmitter module, receiver module (transceiver as combined), control logic (actions to be taken for the received data) and memory. It has an in-built antenna for data transmission and reception.

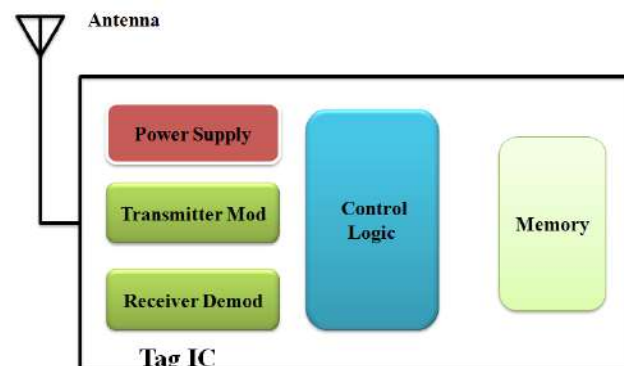


Fig. 2: Internal architecture of RFID Tag

Each tag is having its own unique identification number; which is shown in Fig. 3. In that, the header defines the EPC format to be used, the EPC manager field specifies the product manufacturer, object class defines the types of product and the serial number is a unique identification number of the RFID tag. The totally it has 96 bits in its data format.

Header	EPC Manager	Object Class	Serial Number
01	12345ABC	00012E	000123ABC
(8 bit)	(28 bit)	(24 bit)	(36 bit)

Fig. 3: EPC Code of RFID Tag

One more special feature of the tag is that, it has an embedded portion of an IR (Infra-Red) detector. So, when the tag is removed from the infant by the kidnapper, it makes or sends alarm signal to the reader. The internal tag is shown in Fig.4.

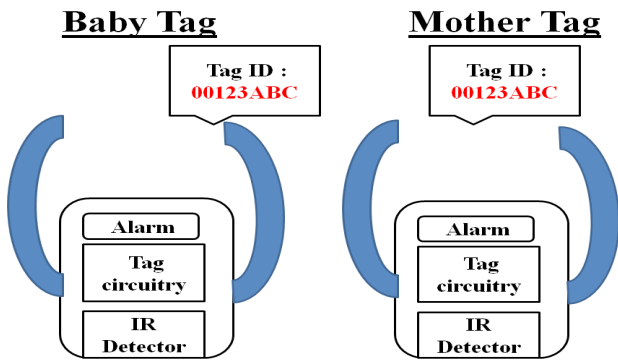


Fig.4. Structure of RFID tag

The reader which accesses the information from the tags is placed on the hospital environment. Each reader consists of a transceiver, microprocessor, communication interface and memory. The microprocessor does the processing of received baby's tag, mother's tag information and decides the actions to be performed on the information. The internal architecture of the RFID reader is shown in Fig.5.

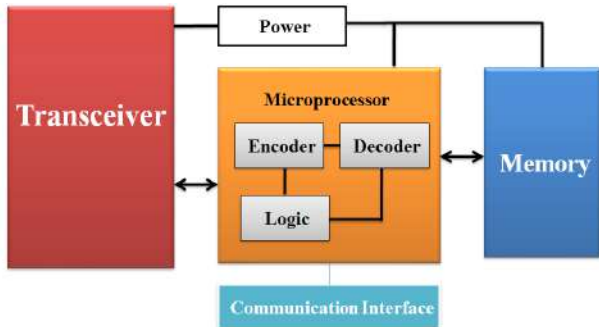


Fig.5. Internal architecture of the RFID reader

Working methodology

The functional setup unit of this work consists of majorly 3 components, two active RFID tags, one RFID reader and Communication protocols. There are three ways of communication possible in the new-born baby safety setup. They are,

Mother Tag and Child Tag communication (Direct)

Mother Tag and Child Tag communication through RFID reader (Indirect)

Mother / Child Tag communication to reader alone

In the direct communication, whenever the child is present very close to the mother (in bed, in mother lap etc...); the proximity is very good, so the tag to tag communication is effective and low power consumption. In mother's tag, simple subtractor control logic does the

matching of mother and new-born as shown in Fig.6. If there is a mismatch or no information corresponding control signals are sent to the server unit via reader.

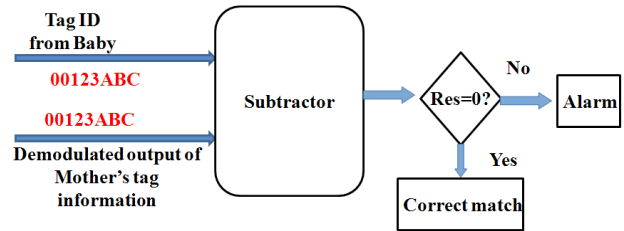


Fig.6. Control Logic

The indirect communication is needed when the child is taken to the clean room by the hospital staff, general medical checkup etc... During these scenarios, the mother tag sends request to the reader for its unique baby tag details. The processor searches for the concerned baby tag details in the last updated information from server or it directly looks for the nearness of the baby tag. Once the reader gets the updated recent information it updates the mother tag with the same. Hence, the real time update of the tag details of consistently available to both the ends.

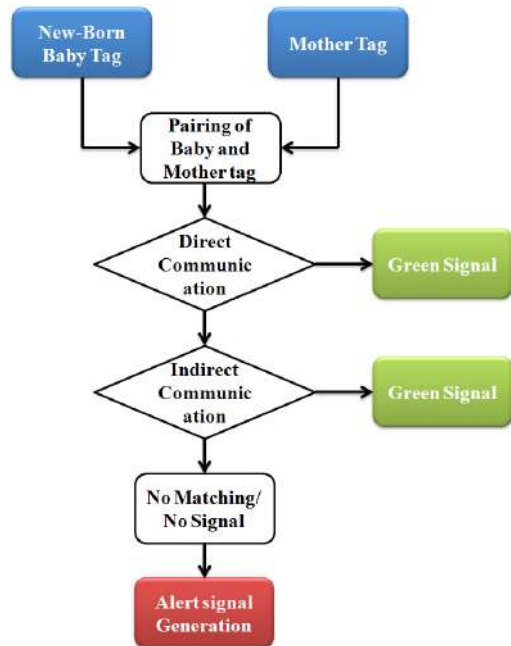


Fig.7. Flow Diagram of Child kidnapping prevention

The third scenario comes into the effect, when the negative scenario occurs in the hospital. When first communication fails, then the mother's tag informs same to the reader via control signals. Then the reader tries for the indirect communication method; if that also fails, then the reader informs the same to the centralized server as shown in Fig.8 for emergency actions to be taken by the hospital management. The entire communication

pattern and flow of the work is shown in Fig. 7.

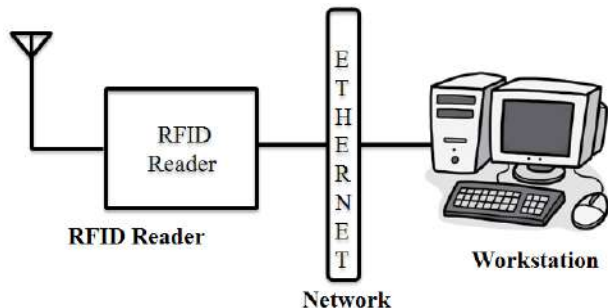


Fig.8. RFID architecture on the data management

Since the response time of the above discussed process of RFID tags are in terms of milli/micro seconds; the theft detection and prevention is practically possible with less time in cheap.

RESULTS AND DISCUSSION

The functional unit completely relies on the working of RFID tag. There are many child kidnapping happens around the hospital scenario. The existing methods²⁻⁸ is

depending on the higher end technology for the child kidnapping detection. They are not capable of preventing the kidnapping before it happens. Moreover the hospital management has to spent more money. In the proposed system the child prevention is possible in real time and the cost of implementation also very much affordable.

There are some wearable devices supporting to provide the child details globally and provides child safety too⁹⁻¹². But, they¹¹⁻¹² are applicable to the home environment, not for the hospital scenario. The proposed system could be employed in home as well as in hospital environment. The functional, methodology, application and cost comparison of the existing and proposed methodology is shown in Table 1. From the table, it is evident that, the proposed method is better in terms of cost, real-time support in prevention and simple in operation. Thus it could be applied to the hospital environment for the new-born baby management.

Table 1: Comparison of Existing with the Proposed Method

S.No.	Existing method	Technology	Prevention / Detection	Real-time support	Home / Hospital	Cost
1.	[2]	Foot Print + Image Processing	Detection	No	Hospital	Very High
2.	[3]	E-Gadget	Prevention	Yes	Anywhere	High
3.	[4]	Foot Print + Image Processing	Detection	No	Hospital	Very High
4.	[5]	Palm Print + Image processing	Detection	No	Hospital	Very High
5.	[6]	Ear images	Detection	No	Hospital	Very High
6.	[7, 8]	Face image	Detection	No	Hospital	Very High
7.	[9,10]	RFID	Prevention	Yes	Home	High
8.	[11-12]	RFID	Prevention	Yes	Home	Low
9.	Proposed	RFID	Prevention	Yes	Home / Hospital	Low

Precautions to be taken by hospital management, Staff / Parents

Parents:

Asking ID cards to the hospital staffs

Be suspicious of the visitors

Learn the hospital protocols

Hospital Management:

Installing CCTV, Check points, login in hospital environment

Equipping with necessary technological

developments

Alarm systems wherever possible

Staff:

Educating the mother and visitors

Provide the tags to the mother and baby

Periodically checking the functioning of all the security systems

CONCLUSION

Child abduction is an ever-green problem in the hospitals, apartment regions and public places. Here, we have addressed the new-born baby abduction and prevention methodology using RFID tags. The tag chosen for this work is supporting up to 100m communication. There are three ways of communications between mother tag, baby tag and reader. This increases the effectiveness of the proposed system. Also, the tags are having direct communication which makes the system works faster. The special feature of the proposed system is; it is a prevention method rather than detection, provides real time support. The comparison of the existing methods and the proposed method shows the evidence that, it is a preventive method, cost effective, faster response, to be adapted in the hospital scenario for the new-born babies. Also, guidelines for the hospital management, faculty and parents are provided.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISSE Journal Reviewer Committee

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The Nursing Image of College Students

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ABSTRACT

This study is a descriptive research conducted to investigate the degree of influence of several influencing factors on the image of the nurse among college students.

This study is a descriptive research to investigate the degree of influence of influencing factors on the image of the nurse among college students.

The subjects of this study were a total of 551 college students living in metropolitan areas, and they were selected by convenience sampling. The collected data were analyzed using the SPSS/PC program. The significance level α of the statistical test was set at .05 and a two-sided test was performed.

The mean score for the image of the nurse of subjects was 3.70 points on a 5-point scale. The score for the image of the nurse according to the general characteristics of subjects was higher in college students with religion, in first-year students than second-year or third-year students, in third-year students than second-year students, and in nursing students than those majoring in other fields. As a result of the stepwise regression analysis to identify the factors influencing the image of the nurse of subjects, the school year, school system, and media affecting the image were identified as the variables which have a statistically significant effect on the image of the nurse perceived by the subjects.

This study is a descriptive research to investigate the degree of influence on the image of nursing among college students. The mean score for the nurse image of the subjects was slightly lower than that of nursing students. In order for nursing to be properly recognized as a profession, an active and systematic nursing strategy is needed to build a positive image of the nurse among the subjects.

Keywords: *nursing Image, The Image of the Nurse, Self-Esteem, Factors Affecting the Image, General Characteristics*

INTRODUCTION

The role and work of nurses has also expanded and specialized in the recent rapidly changing health care sector, as the demand for targeted medical care has increased. Also, the image of nurses and nursing is changing positively due to the ease of employment and job security.

An image is defined as the sum of beliefs, attitudes, and impressions an individual or group has about a particular object¹. Therefore, different images can be formed about the same entity according to the individuals' past, experience, information, attitude, belief, etc.² and the effects are very large.

The image of a nurse has long been a dependent, unfriendly, difficult profession for doctors, and has been recognized as a peripheral in hospitals, so the professional functions and social roles of nurses are not properly recognized. These negative images of nurses can easily promote conflict among the general public as well as health care policy decision making by communicating incorrect knowledge in the setting of nurses and role understanding, thus hampering the activities of many nurses³.

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The image of the nurse has been changing with the times. The public image of the nurse was classified into an angel of compassion from 1854 to 1919, a secretary from 1920 to 1929, a heroine from 1940 to 1945, a mother from 1946 to 1965, a sexual object from 1966 to 1982, and an expert from 1983 onwards. According to the recent analyses of the image of the nurse on the Internet in 2001 and 2004, nurses were portrayed as intellectual and highly educated people in about 70% of websites, and were depicted as respectable, responsible, competent, and trusted professionals in 60% of websites⁴.

In a survey of 22 occupations conducted by a polling agency in the United States in 2017, 82% of Americans surveyed said the most honest and ethical job was the nurse. The nurse has been ranked first with the exception of one year since the survey of Americans' most trusted jobs was begun in 1999⁵. Recently, the public's perceptions of the image of nurses have become positive, but the image of the nurse may be different according to individuals or survey participants.

Nurses are professional workers who play a pivotal role in promoting the health of patients based on their professional expertise, and they occupy an important position in the organization of medical institutions. However, despite nurses' efforts, the general public does not fully understand the role and status of nursing, and the public perception of nurses is also negatively distorted to a great extent⁶.

Given the fact that the image of a profession has a major influence on the development of the profession⁶, research on images is inevitably required for the development of the nursing profession. The purpose of this study was to investigate and understand the influence on the image of the nurse perceived by college students who express their values without hesitation or inhibition in order to provide basic data to establish measures for enhancing the desirable image of the nurse in the future.

METHOD

Study Design: This study is a descriptive research to investigate the degree of influence of influencing factors on the image of the nurse among college students.

Study Subjects and Procedure: The subjects of this study were a total of 551 college students living in metropolitan areas, and they were selected by

convenience sampling. The sample size was determined to be 110 people or more as a result of calculating it by applying the significance level of .05, the effect size of .3, and the statistical power of .95 using the G Power 3.1 program. In this study, a total of 560 questionnaires were completed, but a total of 551 copies were used in the analysis excluding those with missing data.

The data collection of this study was conducted from October to December, 2016, and we explained the purpose and contents of the research to the subjects and informed them that they could withdraw from participation at any time during the data collection process. Data were collected from the participants who voluntarily agreed to participate in the study and signed the informed consent.

Research Instruments: To measure the nurse image, the assessment tool for the image of nurse developed by Lee et al.⁷ and modified and supplemented by Jang⁸ was used. The tool consists of a total of 29 questions about qualifications, roles, social participation, interpersonal relationships, etc. The nurse image was measured on a Likert 5-point scale, and a higher score indicates a more positive nurse image. Cronbach's α was .95 in the study by Jang, and was .94 in this study.

Statistical Analysis: The collected data were analyzed using the SPSS/PC program (SPSS, Inc., Chicago, IL). The significance level α of the statistical test was set at .05 and a two-sided test was performed. The specific statistical analysis method is as follows.

- For the general characteristics of subjects and the level of the nurse image, the real numbers, percentage, mean, standard deviation, and minimum and maximum values were calculated.
- The nurse image according to general characteristics of subjects was analyzed by the t-test and ANOVA, and for the variables which had statistically significant effects, the post-hoc Scheffe test was performed.
- The image of the nurse and general characteristics were analyzed by stepwise multiple regression to identify the factors influencing the image of the nurse perceived by subjects. For the regression analysis, the multi-collinearity test between independent variables and residual analysis were performed, and it was confirmed that the assumptions of the regression model were satisfied.

Experimental Analysis: The results obtained from this study were as follows ;

1. The Image of the Nurse and Level of Self-Esteem: The mean score for the image of the nurse among subjects was 3.70 points on a 5-point scale (Table 1).

2. The Image of the Nurse according to General Characteristics of Subjects: The scores for the image of the nurse according to the general characteristics of subjects were higher in college students with religion ($t=2.18, p=.03$), in first-year students than second-year or third-year students, in second-year students than third-year students ($t=2.89, p=.02$), and in nursing students than

students majoring in other disciplines ($t=5.86, p<.001$).

3. Factors Affecting the Image of the Nurse: Table 3 shows the results of the stepwise regression analysis to identify the factors affecting the nurse image of the subjects. As a result, the F value for the goodness of fit of the regression model was 2.829, which was statistically significant ($p<.001$). The R^2 value was .156, indicating that the explanatory power of the nurse image was 15.6%. The variables which had statistically significant effects on the nurse image were found to be the school-year ($\beta=-.279, p<.001$), the school system ($\beta=.185, p<0.5$), and the media affecting the image ($\beta=-.143, p<0.5$).

Table 1: Mean Scores and Range for Nursing Image

N = 551

Variables	M (SD)	Minimum	Maximum	Possible range
Nursing image	3.70 (0.55)	1.38	4.97	1–5

Table 2: Differences of Nursing Image by General characteristics of subjects

N = 551

Characteristics	Categories	N (%)	Nursing image	t or F	Scheffe
			M ± SD	(p)	
Gender	Male	62(11.3)	3.66 ± 0.54	.60(.54)	
	Female	489(88.7)	3.70 ± 0.55		
Religion	Have	336(61.0)	3.74 ± 0.51	2.18(.03)	
	None	215(39.0)	3.63 ± 0.59		
School system	university	275(49.9)	3.67 ± 0.63	1.01(.36)	
	junior college	376(50.1)	3.73 ± 0.37		
School year	First-year ¹	242(43.9)	3.76 ± 0.43	2.89(.02)	1>2 1>3 3>2
	Second-year ²	150(27.2)	3.58 ± 0.77		
	Third-year ³	105(19.1)	3.73 ± 0.48		
	Fourth-year ⁴	54(9.8)	3.63 ± 0.36		
Major	Nursing ¹	327(59.3)	3.78 ± 0.60	5.86(.00)	1>2 1>3
	Health ²	37(6.7)	3.41 ± 0.43		
	Humanities/Social science ³	99(18.0)	3.59 ± 0.45		
	Natural science ⁴	69(12.5)	3.61 ± 0.42		
	Art ⁵	19(3.4)	3.74 ± 0.42		
Hospital experience	Present	221(4.01)	3.88 ± 0.55	-.49(.62)	
	Absent	330(59.9)	3.71 ± 0.55		
Nurse among family	Present	119(21.6)	3.65 ± 0.55	-1.06(.28)	
	Absent	432(78.4)	3.71 ± 0.55		

Conted...

Influence	Novels(book)	23(4.2)	3.68 ± 0.68	1.28(.28)
	Newspaper/Magazine	15(2.7)	3.90 ± 0.62	
	Movie/Drama	283(51.4)	3.66 ± 0.51	
	Experience of nursing	155(28.1)	3.76 ± 0.55	
	Others	75(13.6)	3.67 ± 0.55	

Table 3: The Predictors of Nursing Image

N = 551

Variables	B	β	t	P
school year	-.377	-.279	-4.642	.000
school system	.223	.185	3.072	.002
Influence	.558	.143	2.248	.025

R = .395, R² = .156 Adjusted R² = .101, F = 2.829, p<.001

Independent variables:

CONCLUSION

The purpose of this study was to investigate the degree of influence of influencing factors on the image of the nurse among college students.

The mean score for the image of the nurse among subjects was 3.70 points on a 5-point scale. The score of the nurse image according to the general characteristics of subjects was higher in college students with religion than those without it, in first-year students compared to second-year and third year students, in third-year students than second-year students, and in nursing students than students majoring in other disciplines.

In the study of nursing students by Seong, Yeom, & Do⁹, the score for the nurse image was 3.85 points, which is consistent with the result of this study that the score for the image of the nurse was higher in nursing students than in general college students. These results show that nursing students who have entered college to become nurses have a more positive image of nurses. This finding is also consistent with the study results of Seo¹⁰, which reported that nursing students had more positive images about nurses than other college students.

As a result of the stepwise regression analysis to identify the factors influencing the nurse image of subjects, the school year, school system, and media influencing the image were found to be the variables which had a statistically significant effect on the level of the nurse image among subjects.

In a study of the general public¹¹, the 30-39 age group and the group of higher educated people were found to have the most negative image of the nurse. In Kang et al.¹², the occupation group of teachers showed a more positive perception of nurses than any other occupation group. Waters¹³ reported that those showing the highest level of support for nurses were patients receiving the care of nurses or their guardians.

In addition, mass media may have a decisive impact on the formation of the image of the nurse. So far, the nurse has been frequently portrayed and viewed as a good and kind person, a self-sacrificing hero, or a sexual object rather than as a person who has professional expertise and voluntarily performs nursing care^{14, 15, 16}. In the United States, as the nurse has been perceived as an occupation socially recognized as a profession¹⁷ and ¹⁸, in recent years, the nurse has begun to be represented as a socially recognized profession through the media¹⁹. As social media and the Internet are now very important media in modern society, it is necessary to investigate how the image of the nurse is changing in mass media and make efforts to improve the image of the nurse through these media.

When the image of a nurse who is late for work is positive, the nurse becomes more involved in the organization and can be satisfied with her job. These results not only increase the efficiency of nursing, but also contribute to the competitiveness of hospitals^{20, 21, 22}.

As the role of nursing care is expanding these days, it is becoming more important to establish a desirable

image of the nurse because it not only helps to reduce nurses' own conflicts while performing nursing care but also enables them to provide better nursing care to patients. In particular, because college students in their twenties are an age group who expresses their thoughts assertively and is particularly sensitive to the mass media, and thus are important for the formation of the nurse image, it is necessary to continuously investigate and understand how they feel and communicate about the nurse image.

A positive image of a nurse's nurse will be an important factor in successfully overcoming the practical problems that are given to them. Given the fact that an image of a profession has an important impact on the development of that profession, research on the image is essentially a requirement for the development of a nursing profession.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Data Analysis on the Application of Advanced Information System to Relieve Knee Osteoarthritis in Korean Adults

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ABSTRACT

Background/Objectives: Osteoarthritis is an inflammation of the joints caused by various bacteria. There search is to verify the mediation of advanced information system to relieve knee osteoarthritis.

Method/Statistical analysis: The data was carried out through preparation and face to face survey from February 5th to April 27th, 2018. The Basic information from respondents was analyzed the comparison between experimental and control group by using the Chi-square test. Factors related to physical symptoms and treatment procedure were analyzed by t-test. Pre and post-system conditions in osteoarthritis patients were analyzed by t-test.

Findings: There are three main points from these findings. 1) 30.8% of the experimental group was lower than 35.4% of control group for the age of 60 to 69. 2) 44.6% of the experimental group was significantly higher than 32.3% of the control group in the family history of osteoarthritis. 3) For leg pain, it has decreased significantly since the arbitration of the information system ($t=2.41$, $p=.035$). 4) Physical acupuncture increased significantly post-arbitration than pre-arbitration ($t=-5.27$, $p=.001$). 5) The adaptability of the system was higher pre-arbitration than post-arbitration ($t=-4.31$, $p=.016$). 6) The accessibility of the system has been significantly higher after application ($t=-7.54$, $p=.000$). 7) The experimental group has steadily increased than the control group since the 10 days. 8) The system worked better for osteoarthritis patients after the arbitration than pre-system arbitration. But after 25 days, the effects tend to decrease.

Improvements/Applications: This system has been confirmed to be effective in relieving pain of osteoarthritis. It is expected to help for the treatment of osteoarthritis in the future

Keywords: Osteoarthritis, Acupuncture, Adaptability, Accessibility, Treatment

INTRODUCTION

Osteoarthritis is an inflammation of the joints caused by various bacteria such as tuberculosis and bacteria. The joint is the part of the body that connects the bone to the bone, which enables the muscles to exercise. Osteoarthritis can only be called arthritis if it comes with pain, swelling or a feeling of heat^[1,2]. Osteoarthritis patients are severely uncomfortable with osteoarthritis. It's hard to climb, get off, and walk any staircase. It's hard to get up after sitting down. The pain is severe at night as well as during the day. It is necessary to control the pain of osteoarthritis patients^[3,4],

The most common and early complaints are localized pain in the joint area where osteoarthritis occurs. Pain can worsen in the initial movement of the joint, but continues to develop as the disease progresses. As the elderly population increases, osteoarthritis patients are

rapidly increasing. Osteoarthritis is the number one cause of disability in the United States. Osteoarthritis is the most common chronic condition in adults over 45 and more than 20 percent suffer from osteoarthritis [Figure 1]. Knee osteoarthritis is a disease that affects more than 271 million people. As blood circulation fails, joint pain and inflammation can occur even with minor shocks. Women have thinner cartilage than men, which can cause degenerative osteoarthritis [Figure 2]. Women have wider pelvis than men, but when walking, the gap between the two feet is narrow, and the weight on the knees is concentrated. In Korea, the proportion of serious patients in need of treatment is three to four times higher than that of women^[5,6].

The x-ray reportedly showed that half of women aged 70 were suffering from osteoarthritis. It was assumed that the reason was due to hormonal changes after menopause and prolonged squatting, but the

exact cause was not found. Women’s knees were 30 percent heavier than men’s, with arthritis rate 3.2 times higher six years later. Osteoarthritis has degenerative osteoarthritis caused by worn joints. On the other hand, there is rheumatism arthritis caused by white blood cells attacking normal joints. Having anti-contact antibodies means that the immune system tends to irritate the patient’s own body. Although they are found in various areas of the body, they usually occur on the knees. Knee joints are the largest joints in the body and are prone to injury. Also, knee joints are the first things you bump into during an exercise or an automobile accident^[7,8].

Walking carries two to eight times the weight of the knee joint. The deterioration of cartilage in the middle age causes degenerative changes. A repeated weight shock is applied to the cartilage in the joints without major trauma^[9]. In winter, when the weather gets cold and cold, the symptoms of osteoarthritis get worse and we suffer from pain [Figure 3]. Organisms such as joints, muscles, ligaments, and blood vessels in our bodies have features that are sensitive to the weather and temperature. When the temperature drops in winter, the muscles, blood vessels, ligaments, and joints of the body become constricted and stiff. Therefore, the research analyzes data on the mediation of the latest system to relieve Osteoarthritis¹³.

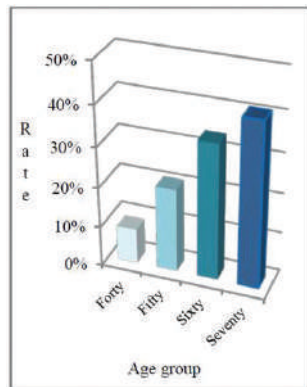


Figure 1: Distribution of osteoarthritis by age

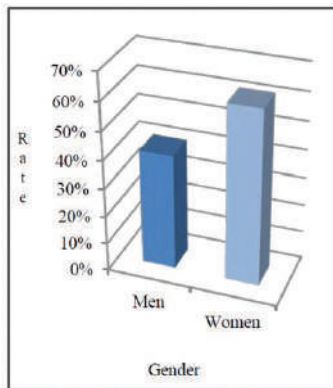


Figure 2: Distribution of osteoarthritis by gender

SURVEY RESEARCH

Framework of a system: This paper indicates the outline of the framework of the latest system for the reduction of osteoarthritis [Figure 4]. Firstly, system design steps to reduce osteoarthritis. Secondly, strategy for the Protection of Arthritis. Thirdly, intervention in the system for mitigation of osteoarthritis. Fourthly, measuring the effectiveness of osteoarthritis pain relief. Fifthly, data analysis on osteoarthritis pain. Sixthly, setting priorities for osteoarthritis pain relief. Seventhly, feedback for reducing osteoarthritis pain. Eighthly, a Proposal of the effects of the contents to reduce osteoarthritis pain. Ninthly, an analysis of the latest systems for reducing osteoarthritis pain [Figure 5].

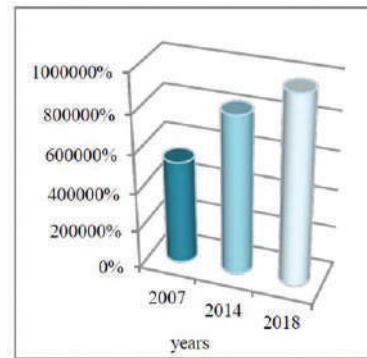


Figure 3: Distribution by year of osteoarthritis incidence

MATERIALS AND METHOD

The data was carried out through face to face and preparation survey from February 5th to April 27th, 2018. This research was drawn from two parts. The experimental group categorized 65 people for arbitration and 65 for control group for which arbitration was not applied. The Basic information from respondents was analyzed the comparison between experimental and control group by using the Chi-square test. Symptoms and treatment procedure before and after system application were analyzed by t-test. Pre and post-system conditions in osteoarthritis patients were analyzed by t-test.

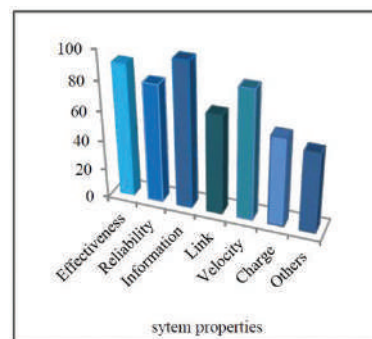


Figure 4: Percentage of information system efficiency to reduce osteoarthritis

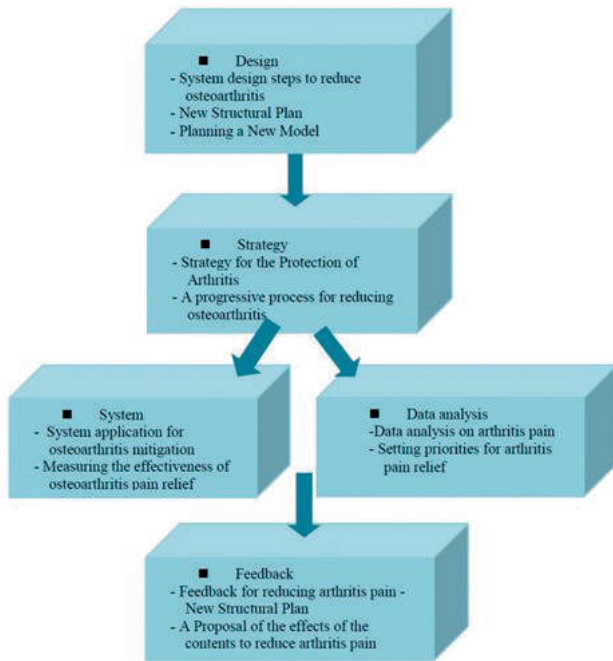


Figure 5: A new methodology to relieve knee osteoarthritis

RESULTS AND DISCUSSION

Basic information from respondents: The basic information from respondents indicates in Table 1. For marital status, 24.6% of the experimental group was lower than 29.2% of the control group in the unmarried state. On the other hand, 75.4% of the experimental group was higher than 70.8% of the control group in the married state. 30.8% of the experimental group was lower than 35.4% of control group for the age of 60 to 69. For educational level, 41.5% of the experimental group who graduated from high school was found to be higher than 35.4% of the control group. For family history of osteoarthritis, 44.6% of the experimental group with family history of osteoarthritis was significantly higher than 32.3% of the control group with it ($X^2=2.59, p<.05$).

Table 1: Basic information from respondents

Variables	Exp. g.	Cont. g.	χ^2
Marital status			
Unmarried	16(24.6)	19(29.2)	3.74
Married	49(75.4)	46(70.8)	

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Age			
≤49	6(9.2)	12(18.5)	11.95
50-59	14(21.5)	16(24.6)	
60-69	20(30.8)	23(35.4)	
≥70	25(38.5)	14(21.5)	
Educational level			
Below middle school	14(21.5)	18(27.7)	8.14
High school	27(41.5)	23(35.4)	
Total	65(100.0)	65(100.0)	
College degree or higher	19(29.2)	16(24.6)	
Others	5(7.7)	8(12.3)	
Family history of osteoarthritis			
Yes	29(44.6)	21(32.3)	2.59*
No	36(55.4)	44(67.7)	
Average income			
≤100	11(16.9)	15(23.1)	13.81
101-199	14(21.5)	10(15.4)	
200-299	22(33.8)	24(36.9)	
≥300	18(27.7)	16(24.6)	
Total	65(100.0)	65(100.0)	

* p<.05

Symptoms and treatment procedure: Pre and post-arbitration of symptoms and treatment procedure reveal in Table 2. From the results obtained, for leg pain, it has decreased significantly since the arbitration of the information system ($t=2.41, p=.035$). The finding was similar with the previous studies on the chronic diseases^[9,10]. Based on the results obtained by the study, it found that this analyzed a new data for reducing the leg pain in osteoarthritis patients. On the other hand, physical acupressure increased significantly post-arbitration than pre-arbitration ($t=-5.27, p=.001$). Cholesterol level was significantly lower an average score of 25.62 point safter system application than an average score of 30.70 points before system application ($t=4.57, p=.028$).

Table 2: Symptoms and treatment procedure before and after system application

Variable	Before	After	t	P
	Mean ± S.D	Mean ± S.D		
Leg pain	34.95 ± 1.84	28.74 ± 3.72	2.41	.035
Edema	33.47 ± 0.93	21.19 ± 0.76	1.46	.017
Fever	29.13 ± 2.51	23.63 ± 1.94	3.82	.394
Blood pressure	32.53 ± 1.47	30.74 ± 0.53	0.71	.514
Cholesterol	30.70 ± 0.63	25.62 ± 2.18	4.57	.028
Wt. control	27.25 ± 1.95	24.19 ± 3.51	6.91	.395
DM	23.82 ± 0.72	22.73 ± 0.46	1.36	.592
Stretching	19.42 ± 3.26	33.57 ± 1.72	-3.19	.000
Physical acupressure	15.38 ± 1.54	20.19 ± 0.47	-5.27	.001
Walking	21.44 ± 0.72	25.18 ± 1.53	-3.68	.294
Eating garlic	18.36 ± 3.17	26.37 ± 3.60	0.37	.000

Pre and Post-System Conditions: Pre and post-system conditions in osteoarthritis population reveal in Table 3. The adaptability of the system was higher pre-arbitration than post-arbitration($t=-4.31, p=.016$). The accessibility of the system was significantly higher post-arbitration than pre-arbitration($t=-7.54, p=.000$).

Table 3: Pre and post-system conditions

Items	Pre	Post	t	p
	Mean ± S.D	Mean ± S.D		
Information	27.82 ± 3.15	38.42 ± 3.17	-2.95	.072
Application	18.44 ± 0.49	36.15 ± 0.82	-5.28	.000
Adaptability,	19.52 ± 2.72	31.81 ± 2.56	-4.31	.016
Accessibility	14.75 ± 0.52	35.63 ± 0.43	-7.54	.000
Efficiency	22.08 ± 1.74	35.29 ± 1.83	-3.61	.000
Simplicity	25.19 ± 3.20	37.43 ± 1.75	-1.88	.207
Expandability	23.83 ± 1.63	34.08 ± 1.62	2.49	.000
Cost	38.51 ± 4.16	30.53 ± 3.17	-5.14	.168

Treatment Effects of Osteoarthritis: The treatment effects of osteoarthritis indicate in Figure 6. The experimental group has steadily increased than the control group since the 10 days. The stage of the system arbitration in osteoarthritis patients reveals in Figure 7. The system worked better for osteoarthritis patients after arbitration than before the system arbitration. But after 25 days, the effects tend to decrease.

The mediation studies established in order to verify effectiveness of this study. The findings showed that the condition of osteoarthritis in the system was increased from 13.7% to 25.4% by the arbitration, which is similar to data reported in the previous studies^[11,12]. But the effects of osteoarthritis patients did not last that long.

Periodic training is required to maintain the system's effectiveness to osteoarthritis patients

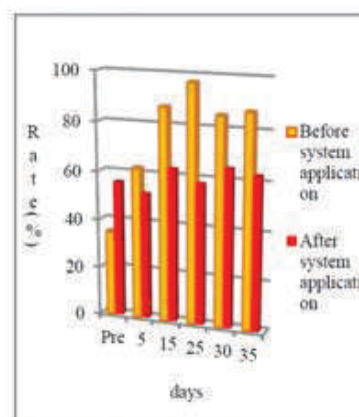


Fig. 6: Treatment effects of osteoarthritis

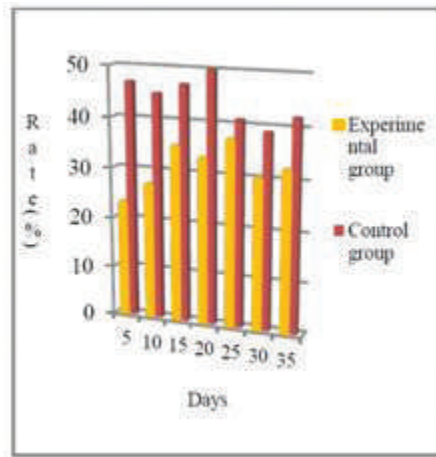


Fig. 7: System mediation steps for osteoarthritis patients

CONCLUSION

The research analyzed data on the arbitration of the advanced system to relieve knee osteoarthritis. Based on the results obtained by the study, leg pain had decreased significantly after the arbitration of the system ($t=2.41, p=.035$). Also, the introduction of a state-of-the-art system had proven effective for osteoarthritis population. Moreover, the accessibility of the system was significantly higher after arbitration ($t=-7.54, p=.000$). Therefore, the latest system has been confirmed to be effective in relieving pain of osteoarthritis. The findings are thought to be helpful for the treatment of osteoarthritis in the future

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Effects of Isometric Pull-Down Exercises on Acromio-Humeral Distance According to Various Angle

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ABSTRACT

Background/Objectives: The aim of this study was to investigate the effects of isometric pull-down exercises on acromio-humeral distance(AHD) in 30°, 60°, 90° and 120° shoulder flexion angles, to establish the force required to achieve a clinically important in the AHD.

Method/Statistical analysis: A total of thirty-six healthy volunteers(18 males and 18females) with a mean age of 19 years participated in this study. Ultrasonography was used to measure AHD in asymptomatic participants during resting position and while performing isometric pull-down exercises at 30°, 60°, 90° and 120° shoulder flexion. The load used during the isometric pull-down exercises was equivalent to 70% of 1RM.

Findings: The change of AHD depending on the shoulder flexion angle was showed significant difference. According to the post-hoc test results, AHD was the longest at 90° shoulder flexion and there was a significant difference.($p < .05$) However, there was no significant difference between gender and dominant/non-dominant arm when compared.

Improvements/Applications: According to the results, there was an increase in AHD which shows the effectiveness of isometric pull-down exercise at 90° shoulder flexion. This study can be used as a base to prove the clinical importance of AHD and as well as a means to develop exercises which may benefit patients with shoulder pathology.

Keywords: *Isometric pull-down exercise, Acromio-humeral distance, 90° shoulder flexion, Shoulder pathology, Ultrasonography*

INTRODUCTION

Pull-down exercises are one of the most popular complex mid back exercises. It is known that pull-up is one of the exercises which uses back muscles. When doing pull-ups, each part of back muscles tend not to get its muscle load appropriately only to follow the course of hands. In order to overcome the shortcomings, pull-down machine was developed. Although there are few comparative studies between pull-down exercises and other popular exercises such as squat and bench

press, we have enough amount of data which shows that pull-down exercises use a lot of muscles in arms and back^[1]. The target muscles to pull-down exercises are latissimus dorsi(LD), teres major, posterior deltoid, trapezius, rhomboid, levator scapulae, biceps brachii, brachialis and brachioradialis. Thanks to those muscles, triceps brachii and rotator cuff are stabilized. It is said that weakened lower trapezius(LT) and middle trapezius increase instability in shoulder joints, causes disease such as impingement syndrome and leads to functional impairment^[2]. It is a source which aggravates pathological findings in shoulder joints^[3].

The prevalence of shoulder pain is 6.9~26% and is one of the most common musculoskeletal disease in primary care. Its coming from musculoskeletal diseases is much higher in working populations and it increases as people age. Pain can have actual impact on an individual's capacity to perform functional or sport-related activities. The most

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common shoulder pain is detected in the rotator cuff. Impingement syndrome, including rotator cuff tears (RCT) is the most common diagnosis in shoulder diseases^[4]. Decrease in the subacromial space increases pressure on the soft tissue between acromion and the humeral head, which is an important cause of impingement syndrome^[5]. Isometric exercises for shoulder joint rehabilitation are a safer way to facilitate muscle activation without load increase in the glenohumeral joint, especially for those whose shoulder joint mobility is limited^[6]. The average distance between acromion and humerus head is 11mm, and is reduced to 5.7mm when abduction 90°. acromio-humeral distance (AHD) of less than 6mm is related to RCT. Interventions such as surgery or rehabilitation are performed clinically in general for the sake of increasing AHD^[7].

AHD is the shortest lineal distance between the lowest part of the acromion and adjacent humerus head. AHD depends on the posture of shoulder longest in neutral position (10~15mm) and shortest when abduction 30°~90° at scapular plane and flexion 90° at sagittal plane^[8]. Subacromial pathology is related with the decrease in AHD. Patients with RCT and rotator cuff dysfunction have AHD of 1.9mm, 2.1mm shorter than that of healthy subjects. An average of 2mm difference is clinically significant. Real-time ultrasound (RTUS) is suggested as a reliable measure for AHD. RTUS is a measurement tool for AHD of the shoulder joint in neutral position and active&passive abduction 60°, which has high inter-rater reliability. Ultrasound measurement, when conducting dynamic screening, can make it possible for AHD to be measured easily and quickly without exposure to radiation and also compare the other side shoulder. AHD measurement through ultrasound measurement has been reported^[9].

Critchley et al.(2014) has examined whether isometric pull-down exercises of a variety of forces by those who has subacromial impingement syndrome (SIS) and those who do not have the disease has an impact on AHD. Isometric pull-down exercises showed an increase in AHD for those who have no symptoms of SIS whereas it is clinically important to conduct repetitive tests when it comes to the subject with SIS. It is proposed that the result of subjects with SIS has low consistency and lacks research, thereby tolerating the Isometric pull-down exercises at the same time^[10]. Sealey et al.(2017) measured AHD in those asymptomatic subjects at neutral position at rest and 90° shoulder flexion at rest using

RTUS, and examined isometric pull-down exercises at 100%, 50%, 30%, and 10%. It was suggested that Isometric pull-down exercises can be an appropriate exercise for patients of shoulder pathology because it increases AHD of asymptomatic male. Furthermore, it was proposed that ultrasound measurement of AHD at shoulder flexion 90° is practical and reliable^[11]. Kuncewicz et al.(2015) examined the effect of isometric pull-down exercises to AHD for those who symptomatic and asymptomatic of unilateral Subacromial pain syndrome (SAPS). Compared with 90° active shoulder flexion, AHD has increased during isometric pull-down exercises in asymptomatic shoulders in 100% Maximum voluntary isometric contraction (MVIC). There was no significant difference in AHD between 90° active shoulder flexion or 50% MVIC with or without symptoms. Compared with 90° active shoulder flexion, it was proposed that AHD has increased only during 100% MVIC isometric pull-down exercises of those whose asymptomatic shoulders^[12]. However, other authors reported that it is stimulated the muscle group in LD and serratus anterior (SA) using neuromuscular electrical stimulation (NMES) and examined the effect of muscular contraction. It was also suggested that the biggest increase in AHD appeared in NMES of combined LD and SA muscle.

The preceding researchers examined the change of AHD in pull-down exercises using ultrasound measurement and comparative gender, load, dominant and non-dominant arm. However, there is a lack of study in the change of AHD by the angle and the research of pull-down exercises using 1RM. Therefore, this study is intended to examine the change of AHD by the angle of 30°, 60°, 90° and 120° in Isometric pull-down exercises for those who have no damage in shoulder joints using ultrasound analysis.

MATERIALS AND METHOD

Subject: The subjects of the research are undergraduate students in S University, located in Asan, Chungnam Province. There were instructed enough about the purpose and method of the research prior to the experiment. All the subjects are those who showed voluntary agreement on the participation of the research and they participated in the research after filling out the consent form. The selected participants are healthy 20s, who show no positive reaction to the special test on the instability of shoulders, have no surgical or neurological

lesions or abnormalities, and have no pain or abnormal range of motion during voluntary or passive shoulder flexion-extension. Furthermore, those who have the history of surgery, have an abnormality or neurological problems in the shoulders, and cannot move shoulders because of severe pain were excluded. The total sample size of 36 was selected using G*Power 3.1. A total of 41 (20 males and 21 females) people was selected in order to apply the standard of inclusion and exclusion. The general characteristics of research participants are as follows[Table 1]. This research was performed under the approval of Institutional Review Board (IRB) in Sunmoon University(SM 2017O5-021-2).

Table 1: General characteristics (n = 36)

Gender (male/female)	Male (n=18)	Female (n=18)
Age(years)	19.39 ± 2.23 ^a	19.11 ± 0.68
Height(cm)	175.08 ± 4.83	159.67 ± 4.56
Weight(kg)	72.41 ± 13.06	56.22 ± 10.25

^aValues indicate mean ± standard deviation

Procedure: The research, conducts the anterior drawer test, jerk test and feagin test in order to examine the instability of shoulder joints.

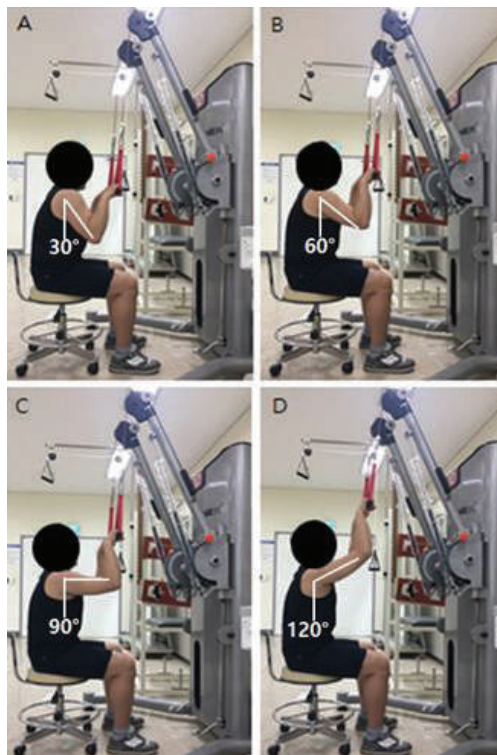
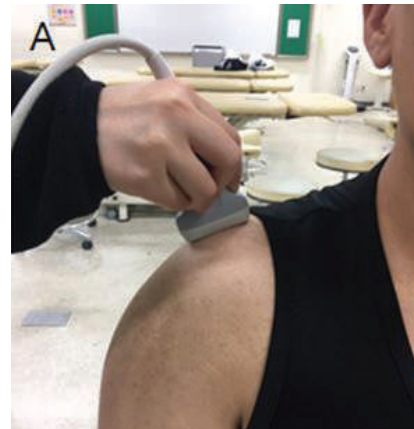
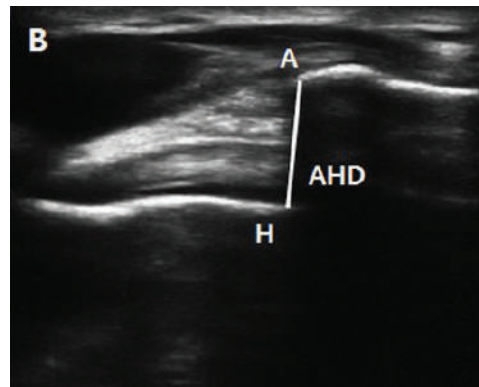


Figure 1: Four postures of shoulder flexion. A: 30° B: 60° C: 90° D: 120°

Prior to the experiment of the research, the research subject’s height and weight were measured using automatic BMI measuring stadiometer (automatic BMI measuring stadiometer, BSM 370, Korea, 2011). In order to determine the appropriate exercise intensity of the research subjects, 70% of 1RM was set as an intensity following the standard of ACSM(American College of Sports Medicine). 1RM was measured as the maximum antebrachial circumference *7.239-62.831 for male and maximum brachial circumference *3.916-34.185 for female. When it comes to maximum antebrachial circumference, the maximum circumference of the forearm was measured when the muscle is fully relaxed. When it comes to maximum brachial circumference, the maximum circumference of the middle of the upper arm was measured when the muscle is fully contracted. The research the subjects were suggested to wear a sleeveless shirt with which the shoulders and arms can be fully exposed for the sake of accurate ultrasound measurement. The subjects performed shoulder flexion four times for each angle with the intensity of 70% of 1RM.



A: The place of ultrasound probe in subacromial space



B: The acromio-humeral distance and surrounding structure acromiohumeral distance(AHD), acromion(A), humeral head(H)

Figure 2: Measurement region

The angle of shoulder flexion was set to 30°, 60°, 90°, 120°[Figure 1] and AHD was measured at rest position before the exercise. During the measurement, the subjects were required to sit on a chair and stare at the front with their back straightened. After the measurement, pull-down exercises by angles were conducted using 3D X- trainer. When measuring the subjects, the AHD of dominant and non-dominant arm was measured using ultrasound measurement while maintaining stable position. At this time, the research subjects were examined randomly depending on the angles. After measuring the AHD to each angle, they took a rest for 30 seconds in a sitting position and continued the rest of the experiment with the same method.

Research measurement equipment and measurement region:

The research measured the angle of shoulder flexion using electronic goniometer(digital absolute+axis™ goniometer, USA, 2008) and used ultrasound measurement (ultrasonography, eZono 3000, Germany, 2011) in order to examine the change of AHD. In this came, the B-mode image was used with the frequency set into 7.5MHz and the image depth of 3cm. During the image acquisition, ample amount of gel was applied between the skin and probe in order to minimize the pressure of skin. The probe remained right angle to the skin in order to raise the accuracy of measurement with the forearm fixed in order to prevent the swaying.

During the measurement, the position of the probe was placed in anterior acromion lateral aspect in greater tubercle level and arranged in scapular plane which is perpendicular to the skin. At this time, the shortest distance between acromion and humerus head in the ultrasound image was measured as AHD[Figure 2].

DATA ANALYSIS

In this research, descriptive statistics were used in order to analyze the mean and standard deviation (SD) of each variable. Statistical analysis of every measured value was calculated using SPSS/PC ver.18.0 for windows program(SPSS INC. Chicago. IL). One-way repeated ANOVA was used in order to figure out whether the change of angle in shoulder flexion is significantly to the increase of AHD. In addition, Bonfferoni method was used in post-hoc test in order to figure out the difference between each variable. The significance level was set to (p<.05) for statistical analysis.

RESULTS

Comparison of AHD between right and left according to shoulder flexion:

The change of AHD depending on the shoulder flexion angles(30°, 60°, 90°, 120°) is presented in [Figure 3]. The AHD depending on angle showed significant difference in right(p<.05). The AHD depending on angles was measured as 11.50mm in resting position, 9.91mm in 30°, 9.14mm in 60°, 10.95mm in 90° and 8.98mm in 120°. The result of post-hoc test showed significant difference between resting and 30°, resting and 60°, and resting and 120°(p<.05). It also showed significant differences between 60° and 90°, and 90° and 120°(p<.05). Similar to right, the AHD depending on angles in left also showed significant differences(p<.05). The AHD depending on angles was measured as 11.59 in resting position, 9.97mm in 30°, 8.95mm in 60° and 11.02mm in 90°, and 9.14mm in 120°. The result of post-hoc testing showed significant difference between resting and 30°, resting and 60°, resting and 90°(p<.05). It also showed significant differences between 30° and 60°, 30° and 90°, 60° and 90°, and 90° and 120°(p<.05).

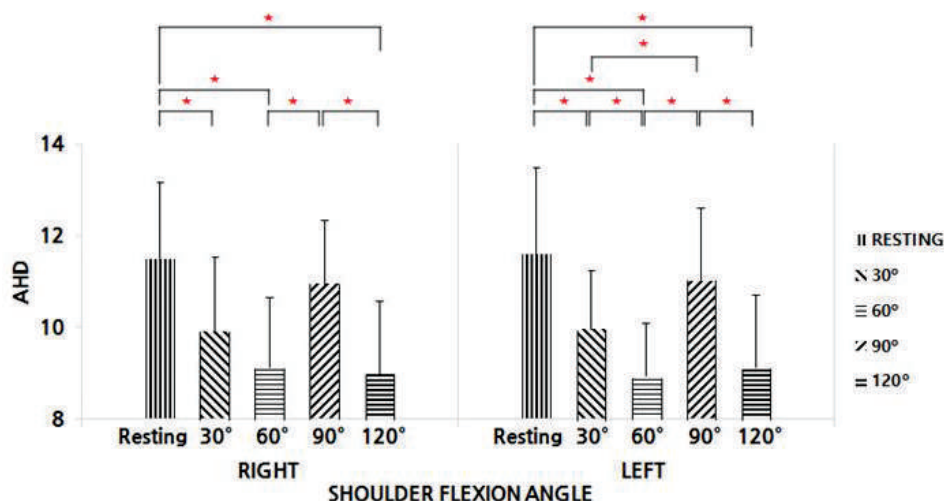


Figure 3: Comparison of AHD between dominant arm and non-dominant arm according to shoulder flexion.

Comparison of AHD between male and female according to shoulder flexion: It was examined whether there is a difference between genders in the change of AHD depending on the shoulder flexion angles (30°, 60°, 90°, 120°). It only showed that AHD in left 120° of females was 0.02mm longer than that of males. There was no significant difference between genders after comparing the difference of AHD between genders depending on the shoulder flexion angle in right and left each ($p > .05$).

Comparison of AHD between dominant arm and non-dominant arm according to shoulder flexion: It was compared whether there is a change in AHD between dominant arm and non-dominant arm depending on shoulder flexion angles. As presented in and [Figure 3], there was no significant difference both in dominant arm and non-dominant arm depending on angles ($p > .05$).

DISCUSSION

The research examined the impact of the angle on the change of AHD by measuring the change of AHD depending on shoulder flexion angles (30°, 60°, 90°, 120°) using ultrasonography and now discuss the result of the research. The result of the research showed that there is a significant difference of the change of AHD depending on shoulder flexion angles in right and left each ($p < .05$), but there was no significant difference in the change of AHD between genders and in the change of AHD between dominant arm and non-dominant arm ($p > .05$).

Rotator cuff disorders are known to be a major source of shoulder pain in both athletic and nonathletic. Among endogenous and exogenous sources of rotator cuff pathologies, SIS seems to play an important role. In effect, when subacromial space, the space between humerus head and acromion, decrease, rotator cuff tendons and bursa contact with acromion in an unstable manner, thereby possibly activating the rotator cuff pathologies and pain^[15]. In this context, it is important to make an effort to plan surgical intervention and rehabilitation program in order to increase the subacromial space.

According to the study by Robert et al. (2002), acromiohumeral interval (AHI) was 6.40 inside, 7.70 in 90°/IR, 10.90 in 120°, 14.20 in 160°, the shortest among which was inside, and showed no significant difference

in average AHI from 90° to 160°. It also turned out that rotator cuff does not contact directly with anterior acromion^[13]. It contradicts with this thesis. It seems that it is because it focused only on the posture of the angle without muscle contraction of shoulder muscle, which is different from the method of this research, and also internal rotation was combined in 90° flexion.

Critchley et al. (2014) observed an increase in AHD while conducting active pull-downs exercises with 10%, 30%, 50%, 100% maximum voluntary contraction (MVC) to those asymptomatic subjects and there was no significant difference between the proportion of MVC. In addition, there was no significant increase in AHD while conducting active pull-down exercises with 10%, 30%, 50%, 100% MVC to those subjects who have SIS [10]. Furthermore, Kuncewicz et al. (2015) measured AHD under three conditions of unload, 50%, and 100% MVIC at 90° forward flexion posture. The AHD in asymptomatic shoulders has increased more when conducting isometric pull-down exercise with 100% MVIC compared with active shoulder flexion 90°. In addition, there was no significance in other changes of AHD in asymptomatic shoulder during 50% MVIC and symptomatic shoulder at 100% MVIC and 50% MVIC, and showed the tendency to decrease while isometric pull-down exercises^[12]. Despite the fact that there has some difference in the intervention between preceding researches and this research, the fact that the result of AHD in shoulder 90° flexion has similar value supports the basis of this research.

Herbert et al. (2003) compared the AHD of both shoulders of those subjects who has a unilateral SIS in shoulder flexion and abduction position and compared shoulder AHD of both shoulders between those subjects who has SIS and those who are healthy. As a result, the average AHD of SIS subjects in flexion (rest to 130°) varied from 8.3mm to 2.8mm compared with the average AHD of asymptomatic contralateral shoulders of 8.7mm~4.1mm. In addition, it was said that AHD was the shortest in 110°^[14]. However, it is difficult to conclude that the value of the preceding research is accurate because it is difficult for MR image to distinguish articular cartilage of the humeral head from surrounding structures.

Sealey and Critchley (2017) wanted to examine AHD at shoulder 90° flexion with and without load with isometric extension. Load was set at 10%, 30%,

50%, and 100% of MVIC, and men showed significant changes in AHD when compared to women. There was no difference more than 1mm as a result of the AHD value of the dominant arm was compared with the AHD value of the non-dominant arm^[11]. Existing research focused only on load and little research has been done on flexion angles, so this study focused on this point. The study focused on the load showed differences in male and female AHD because of the physiological characteristics that showed less muscle hypertrophy in the strength improvement of women compared to men. However, this study shows that there is no difference in AHD between men and women. The AHD of the dominant arm and the non-dominant arm of this study were not the same as those of the previous studies. Therefore, it can be said that there is little or no effect of hand use on AHD under normal circumstances.

This study compared changes in AHD with shoulder flexion angles during isometric pull-down exercises. In conclusion, the highest AHD value at 90° shoulder flexion was shown. This is because infraspinatus, deltoid anterior & middle parts, supraspinatus, LT contribute to activity at 90° shoulder flexion. In addition, AHD measurements showed that the values of AHD between dominant arm and non-dominant arm and between male and female were similar between various shoulder flexion angles.

Many limitations should be considered in this study. First, the number of subjects is relatively small, and this study explored only the posture of the movement, not the long-term effect of the exercise. Therefore, we can not yet know whether these results have long-term clinical implications. Additional research over time is needed to clarify this aspect. Second, it can not be immediately applied to people with a history of shoulder dislocation because it is a result of a population with no history of shoulder joints. Also, it is difficult to generalize because the population participating in the study is younger than the typical age of those with a history. Third, because the load is fixed to 70% of 1RM and AHD is measured during shoulder flexion, different loads can affect the result. Finally, muscle fatigue in subjects due to isometric pull-down repetition during the experiment may affect the result value. So, it is considered to need study that complements these limitations.

CONCLUSION

This study investigated the changes of AHD according to shoulder flexion angle during isometric pull-down exercises. In conclusion, we confirmed that the isometric pull-down exercises had the largest AHD at 90° flexion of the shoulder, but there was no correlation between changes in AHD between dominant and non-dominant arms and between males and females. Therefore, the change of AHD according to angle of shoulder flexion should be used to diagnose patients with shoulder disease compared with normal shoulder in clinical practice, and to focus on the angle of shoulder flexion to establish safer treatment plan.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Development of Running-bra Pattern for Mid-aged Women

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ABSTRACT

Background/Objectives: This study aims to develop a running bra pattern, reducing pressure along with the function of the brassiere.

Method/Statistical analysis: Brassiere used in this study are based on 85B full-cup design that is suitable for the standard size in mid-aged women. The wearing test based on wearing the research brassiere covers 12 items in total. As for the statistical analysis, F-test and Duncan's test were conducted in accordance with SPSS 18.

Findings: This study is valuable in that it is a basic pattern of low-pressure running-type brassiere. Therefore, the aim is to carry out a research with regards to the outer clothing of brassiere and underwear with less pressure based on research running-type brassiere.

Improvements/Applications: This result is probably because the research running-type brassiere pattern had less pressure and was comfortable in terms of wear-ability so it had been developed to suit the purpose of the research.

Keywords: *full-cup design, wearing test, running-type brassiere pattern, wear-ability, underwear, basic pattern*

INTRODUCTION

Women wish to express their bodies in a beautiful and voluptuous silhouette. Prior research papers^[1-12] do contain contents regarding various underwear, but patterns of running bras could not be found. In the various precedent studies, the results imply that underwear has a negative impact on health due to excessive pressure on certain areas of the body and others. This study aims to develop a running bra pattern, reducing pressure along with the function of the brassiere. The characteristics of the research brassiere design is that it reduces the pressure

of the shoulder and under-bust band by measuring the neck point to breast point of naturally sagging breasts of mid-aged women then widening the shoulder strap.

RESEARCH METHOD AND PROCEDURES

Subjects: As for the research running-type brassiere, a brassiere pattern combining Product C and Product D was developed in the precedent study(Comparative analysis of running-type brassieres on the market)^[13]. As for the bra-cup, mold brassiere 85B suitable for the breast size of the selected test subject was chosen. As for the shoulder line and back neck line, it was designed by Body considering the ptosis B.P (4.5cm below from inferior breast) of middle age and the elasticity of material based on secondary revision(Made in Japan B85 Body).

Wearing test: The wearing test based on wearing the research brassiere covers 11 items(as shown in Table 1) in total. As for the statistical analysis, F-test and Duncan's test were conducted in accordance with SPSS 18.

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Table 1: Items of Wearing Test

Parts	Item	Contents
Bra-cup	Q1	Does the bra-cup adequately hold the breast shape?
	Q2	Does the nipple-right and left and bra-cup come in contact, making it appropriate without creating space in the B·P location?
	Q3	Is there pressure or elation in the center front line, making it suitable?
	Q4	Is the pressure at the lower area of the bra-cup appropriate?
	Q5	Is there elation at the side of the bra-cup, making it suitable?
Torso	Q6	Is the pressure around the shoulders appropriate?
	Q7	Is the flesh around the armpit pushed out and is the pressure appropriate?
	Q8	Is the torso comfortable in general without unnecessary wrinkles?
	Q9	Is the flesh around the back neckline pushed out and is it appropriate?
	Q10	Is the length of the torso appropriate?
	Q11	Is the pressure at the hem appropriate?
	Q12	Is the overall wear-ability appropriate?

RESULTS AND DISCUSSION

Research running-type brassiere pattern’s design:
 The research running-type brassiere pattern design technique is as Figure 1. below.

- **Front pattern:** The dimension of neck point to breast point was measured by considering the sagging status of breast at nude state.
- **Back pattern:** The breast part was based on the ‘Under-bust circumference/4×reduction ratio’ formula and the reduction ratio was set as 92%.
- **Armhole:** As for the shoulder angle, the pattern was designed with 30° for the front shoulder and 25° for the back shoulder. The shoulder strap was 5cm armhole circumference and as a result of the first wearing test, there was a margin of 1.5cm in the front armhole circumference so in the second pattern, the margin of 1.5cm was removed.
- **Reduction ratio:** Despite the fact that the material of the sample has high elastic recovery rate (wale 87%, course 53%), the entire circumference of the under-bust, waist and hip was set as 92% respectively.

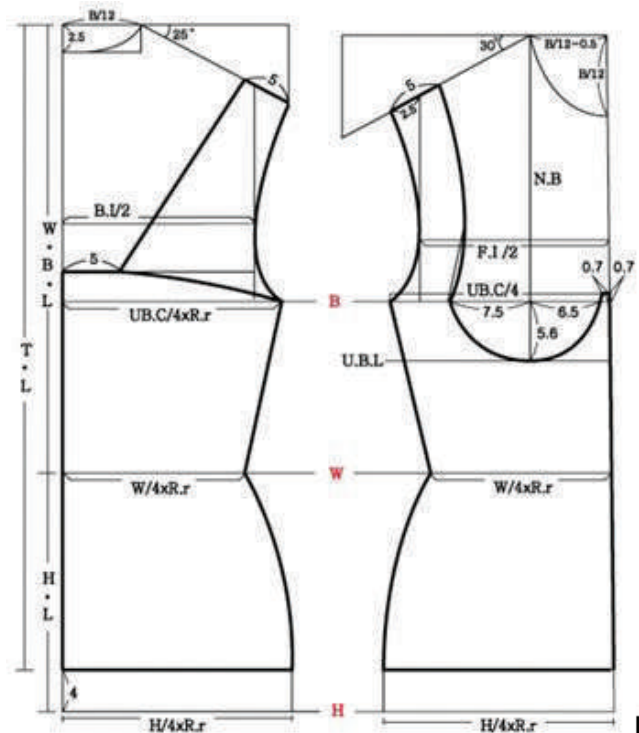


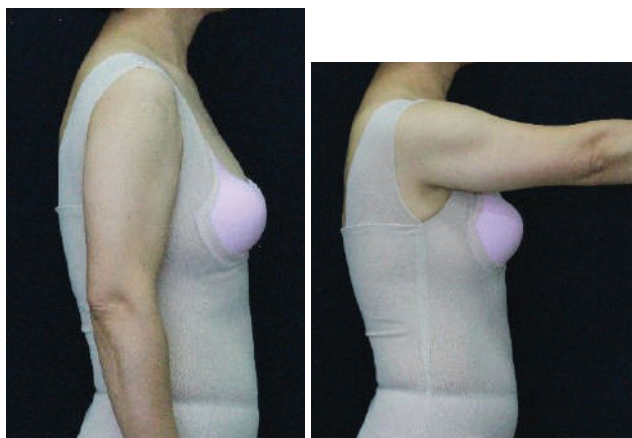
Figure 1: Construction of Research Running-type Brassiere Pattern

B: Bust; W: Waist; H: Hip
 T.L: Total Length;
 W.B.L: Waist Back Length
 H. L: Hip Length;
 U.B.L: Under Bust Line
 N.B: Neck point to Breast point;
 B.I: Back Interscye Fold Length
 F.I: Front Interscye Fold Length;
 R.r: Reduction ratio

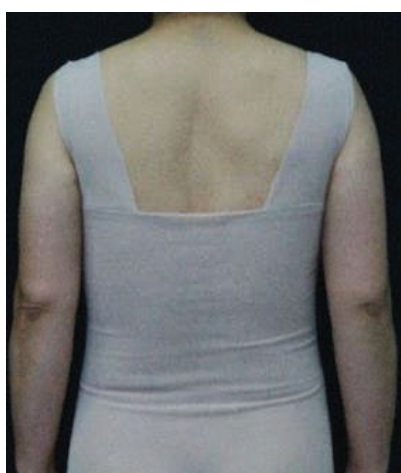
Wearing test for research running-type brassiere pattern: The research running-type brassiere was produced for the purpose of minimizing the pressure with regards to the body and the wearing test image is as Figure 2.



Front



Side



Back

Figure 2: Wearing test Image for research running-type brassiere

Bra-cup: As a result of a wearing test, all 5 items related to the bra-cup indicated significant difference in the level of 0.001 and is as Table 2.

Table 2: Comparative analysis of research running-type brassiere and 2 types of market products (bra-cup)

No.	Res.	C	D	F-value
Q1	4.30 a 3.80 b		2.03 c	115.37***
Q2	2.95 b	3.78 a	1.20 c	160.21***
Q3	1.85 b	3.70 a	3.85 a	67.34***
Q4	4.38 a	2.75 b	1.87 c	55.21***
Q5	4.12 a	1.95 c	3.44 b	45.75***

***p < .001, Duncan test (a>b>c)

Q1 indicated that the size of research bra-cup adequately held the breast in the order of the Research type>Product C>Product D.

As for Q2, it indicated that in Product C, the Nipple-right and left and the bra-cup came in contact, not creating space in the B·P location, making it suitable. As for the research type, it was normal with 2.95.

As for Q3, the research type had a low evaluation score compared to Product C and D in the order of D (3.85) ≥ C (3.70) > Research type (1.85).

As for Q4, it was in the order of Research type (4.38) > Product C (2.75) > Product D (1.87).

As for Q5, the research type obtained the highest value in the order of Research type (4.07) > D > C (1.93).

Looking at the result of 5 items of the bra-cup, as for the pressure, research type was outstanding and in items that require adjustment, intermediate results were shown.

Torso: The comparative analysis per item with regards to the torso part is as Table 3.

As a result of wearing test with regards to 7 items related to the torso part, there was significant difference except for Q8.

As for Q6, the research type obtained the highest value out of the questions with 4.96 and there was no difference between Product C and D with 3.87 and 3.80.

In Q7, the research type was much more outstanding than the market products in the order of Research type (4.42)>D>C.

As for Q9, the research type obtained the highest value with 4.78 in the order of Research type>D>C. The flesh at the back neck line area was not pushed out and was appropriate.

As for Q10, the research type obtained the highest value with 3.75, indicating that the torso length of the research type was appropriate. As for Product D(1.84) and Product C(1.78), the length of the torso was not appropriate.

As for Q11, Product D(3.81) indicated that the pressure at the hem was appropriate in the order of D>Research type>C.

As for Q12, the research type obtained 4.87 score in the order of Research type>D>C, with the response indicating that the wear-ability in general was appropriate. Out of 7 items related to the torso, the research type was appropriate in 5 items when compared to the market products.

Table 3: Comparative analysis of research running-type brassiere and 2 types of market products (torso)

No.	Res.	C	D	F-value
Q6	4.96 a	3.87 b	3.80 b	45.47***
Q7	4.42 a	1.31 c	3.78 b	124.31***
Q8	3.81	3.92	3.86	0.42
Q9	4.78 a	3.65 c	4.05 b	17.01***
Q10	3.75 a	1.78 b	1.84 b	97.86***
Q11	3.81 a	2.89 b	3.94 a	21.64***
Q12	4.87 a	3.80 c	4.32 b	15.26***

***p < .001, Duncan test (a>b>c)

The average value with regards to the bra-cup (5 items) and torso (7 items) per product is indicated in Table 3. Looking at Table 3., the average value of bra-cup and torso with regards to the entire 12 items of wearing test was in the order of Research type>Product D>Product C with the research type being outstanding. Figure 3. is Average value in Table 1 & Table 2.

This result is probably because the research running-type brassiere pattern had less pressure and was comfortable in terms of wear-ability so it had been developed to suit the purpose of the research.

This study is valuable in that it is a basic pattern of low-pressure running-type brassiere. Therefore, the aim is to carry out a research with regards to the outer clothing of brassiere and underwear with less pressure based on research running-type brassiere.

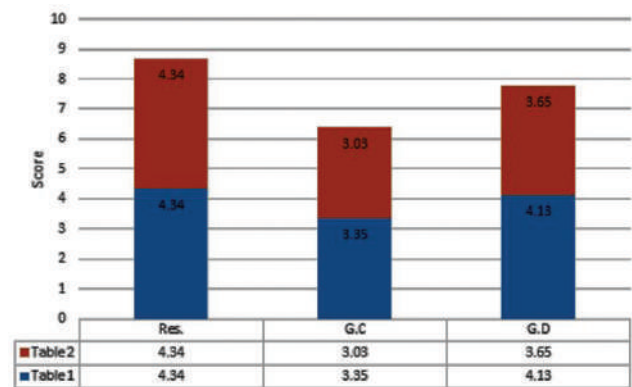


Figure 3: Average value in Table 1 & Table 2

CONCLUSION

A running-type brassiere pattern minimizing the pressure on body experienced when wearing the existing brassiere while complementing the sagging breasts of middle age was developed. As a result of a wearing test, the research type’s overall average value was 4.34 while it was 3.16 for Product C and 3.85 for Product D so the brassiere for research was outstanding compared to the 2 types of existing products.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Evaluation of Visual Image with Change in Collar Design and Width

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ABSTRACT

This study is to analyze the most commonly used collar types in women's tops which are stand, round flat, and soutien collars as well as observe the differences in visual image according to the width of each design. The three designs that were selected were the most standard stand, round flat, and soutien collar, a type of convertible collar. The experiment outfit was made in No.8 size 55. Evaluates visual images of 9 stimulus created through the combination of 3 collar designs and 3 stages of width. As for the statistical analysis, ANOVA and Scheffe test were conducted in accordance with SPSS 24.0. This research is valuable a Study on the Visual Image Evaluation of the collar pattern. Four factors applied the visual image as collar design and Collar width changed : attraction, cuteness, elegance and activity. In the order of soutien collar > round flat collar > stand collar, collar width of 7.5 cm was rated highly in the elegance factor for its comfortable and neat image. This research deals only with 3 types of collar designs but further research of different types of designs is needed.

Keywords: Collar Design, Visual Image, Width Variation, Stand, Round Flat, Soutien

INTRODUCTION

In modern society, collars are a way to express various characteristics and have the merit of being able to match its design with a modern, cute, and intellectual image.

There are various studies on the subject of collars¹⁻¹⁴, but research on its component factors and visual image is not enough.

The purpose of this study is to analyze the most commonly used collar types in women's tops which are stand, round flat, and soutien collars as well as observe the differences in visual image according to the width of each design.










RESEARCH METHOD

Select and create stimulus: The three designs that were selected were the most standard stand, round flat, and soutien collar, a type of convertible collar. The widths of the collars were set to be in 3 steps, 5.5 cm, 7.5 cm, and 9.5 cm based on the rear center line, and in reference to the collar drafting method, we have made Table 1 as the stimuli with 100% Muslin¹⁵.

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Table 1: Collar Design & Collar Width

Collar Width	Collar Design		
	Stand Collar	Round Flat Collar	Soutien Collar
5.5cm			
7.5cm			
9.5cm			

EVALUATION METHOD

Evaluator: A total of 48 evaluators, composed of 38 college students in fashion design and 10 Masters and doctorates on clothing, were selected in order to increase objectivity and trust of this research.

Experiment environment: The experiment outfit was made in No.8 (Made in JapanBody)size 55, which is, according to the human body size research, close to the average body size of Korean women at the age of 18~39. Size of each part is as presented in Table 2.

Table 2: Body Size

Body Part	Neck Circumference	Chest Circumference	WaistCircumference	Waist Back Length
Size	31.5cm	84.5cm	65.5cm	38.5cm

Data analysis: In the reliability test of the visual image measurement, with the exemption of 3 items, 19 pairs with Crombach’s alpha value of 0.5 or more, were ultimately selected.

Data analysis was conducted with the SPSS Ver. 24.0 program, and the ANOVA, Scheffetest were used for further post hoc tests.

visual image in accordance with changes in collar design and width.

We have derived Crombach’s alpha for reliability verification and through main component Varimax orthogonal rotation analysis, 4 factors (attraction, cuteness, elegance, activity) were derived that had eigenvalue of one or more.

RESULTS AND DISCUSSION

Component factors of the visual image evaluation test: We have initiated factor analysis to identify the

These 4 factors constituted for 68.917% of the whole variant, and the attraction factor accounted for 23.989%, making it the most important factor of all, and the result of this analysis is as presented in Table 3.

Table 3: Component factors of the visual image evaluation

Factor	Visual Image	Factor loading	Eigen value	Cronbach's α	% of total variance
1 Attraction	Classy/Undignified	0.906	4.558	0.889	23.989
	Trendy/Not trendy	0.848			
	Unusual/Normal	0.793			
	Modern/Classic	0.731			
	Cool/Not cool	0.715			
	Chic/Tacky	0.650			
	Pretty/Chapter Ugly	0.622			
2 Cuteness	Casual/Formal	0.801	3.756	0.812	19.766
	Cute/Old	0.735			
	Lively/Gentle	0.706			
	Younger/Adult	0.703			
	Dynamic/Static	0.584			
	Soft/Hard	0.570			
3 Dignity	Tidy/Not tidy	0.826	2.760	0.788	14.526
	Proper/Burdensome	0.796			
	Comfortable/Uncomfortable	0.718			
	Neat/Not neat	0.693			
4 Activity	Fresh/Tight	0.769	2.021	0.558	10.636
	Open/Conservative	0.700			
Cumulative % of variance		68.917%			

Visual image in accordance with collar design: Visual image in accordance with collar design is as presented in Table 4. In the attraction factor, its results were rated highly in the order of stand>soutien>round collar, and for the cuteness factor, its results were rated highly in the order of round flat>soutien>stand collar. The elegance factor was shown to have no meaningful differences, thus implying that the elegance factor is not greatly affected by changes in types of collar design. Round flat and the soutien collar were rated highly in the activity factor, while stand collar was evaluated as visually tight and conservative.

Table 4: Visual image in accordance with collar design

Factor	Design	Mean			F-value
		Stand Collar	Round Flat Collar	Soutien Collar	
Attraction		4.9024 c	3.5261 a	4.5749 b	61.256***
Cuteness		3.7940 a	5.6938 c	4.7385 b	197.838***
Dignity		5.1443 a	5.1504 a	5.1179 a	0.036
Activity		3.3374 a	4.1707 b	4.0772 b	20.501***

***p<.001, a<b<c

Visual image in accordance with changes in width of a collar: The results of analysis regarding visual image in accordance with changes in collar width, as presented in Table 5 had meaningful differences in all 4 factors at the level of 0.001. Collar width of 9.5cm was rated highly in the attraction factor and evaluated as unique, chic, modern and cool while the collar width of 5.5cm was rated highly in the cuteness factor, implying that the narrower the collar, the cuter and younger the visual image becomes. Collar width of 7.5cm was rated highly in the elegance factor, and evaluated as the most neat and comfortable image. The activity factor was rated highly in the order of 9.5cm>7.5cm>5.5cm, showing that wider collars were evaluated as more open and less tight.

Table 5: visual image in accordance with changes in width of a collar

Factor \ Collar width	Mean			F-value
	5.5cm	7.5cm	9.5cm	
Attraction	4.0290 a	4.3496 ab	4.6249 b	8.251***
Cuteness	5.0921 b	4.4309 a	4.7033 a	12.427***
Dignity	4.8902 a	5.6626 b	4.8598 a	29.164***
Activity	3.3699 a	3.8699 b	4.3455 c	23.789***

***p<.001, a<b<c

Visual image in accordance with collar design and width: The result of the visual image analysis in accordance with collar design and width is as presented in Table 6. The round flat collar was ranked lowest among all width in the attraction factor, while the stand and soutien collar of 9.5cm width were rated the highest, implying that wider collars are viewed as a more classy image. The round flat collar with 9.5cm width was rated the highest in the cuteness factor. The round flat collar with 5.5cm, 7.5cm width and the soutien collar of 5.5cm width, all shared a similar image according to the Scheffe verification result, which implied that a circular design is evaluated as a cuter and more youthful image. Collars of 7.5cm width were rated highly in the order of soutien>round flat>stand in the elegance factor. The soutien collar of 9.5cm width was rated highest in the activity factor, implying that wider collars give a fresher and less conservative image.

Table 6: visual image analysis in accordance with collar design and width

Factor	Collar	Collar width			F-value
		Mean			
		5.5cm	7.5cm	9.5cm	
Attraction	Stand	4.5226 cde	4.8118 de	5.3728 e	20.791***
	Round Collar	3.2927 a	3.7979 abc	3.4878 ab	
	Soutien	4.2718 bcd	4.4390 cd	5.0139 de	
Cuteness	Stand	4.2317 bc	3.2154 a	3.9350 b	73.616***
	Round Collar	5.7764 d	5.4919 d	5.8130 d	
	Soutien	5.2683 d	4.5854 c	4.3618 bc	
Dignity	Stand	5.0671 abc	5.4451 bcd	4.9207 abc	9.808***
	Round Collar	5.0976 abc	5.5854 cd	4.7683 ab	
	Soutien	4.5061 a	5.9573 d	4.8902 abc	
Activity	Stand	3.2195 ab	2.9878 a	3.8049 abc	19.387***
	Round Collar	3.7439 abc	4.5732 cd	4.1951 cd	
	Soutien	3.1463 a	4.0488 bc	5.0366 d	

***p<.001, a<b<c

CONCLUSION

This research evaluates visual images of 9 stimulus created through the combination of 3 collar designs and 3 stages of width. The results show that wider collars are more attractive while narrower collars give a cuter and more youthful image. The stand collar is deemed visually attractive but rated as tight and conservative.

For active design, the round flat and soutien collar will give a positive visual image. This research deals only with 3 types of collar designs but further research of different types of designs is needed.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Investigating Major Related Determinants of Short or Long Sleep Time among Older Koreans in the Community

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ABSTRACT

Background: Sleep time problems are increasing especially for the elderly population globally. This study was conducted to investigate the determinant major factors of sleep time problems.

Method: Over 65 aged respondents were participated and used the data of 1180 subjects through multiple-level logistic regressions with complex sampling methods by the national representative data for a cross-sectional study.

Findings: As results, the prevalence of abnormal sleep, lack or excessive status, was 62.5% of the Korean elderly. The determinant factors of sleep time were gender (female), middle income (economic level) group and age (70-79) significantly.

Improvements: Therefore, specialized public health interventions by gender, age, and economic level should be urgently prepared to control the sleep problem especially for the remarkably aging population in the community.

Keywords: Short or long sleep, Gender, Income, Economic level, Age, Older people, Korea

INTRODUCTION

Short or long sleep problems, which are associated with general health as well as quality of life among the elderly, are rapidly increasing worldwide ¹⁻³. Also either short or long sleep were negatively related with health of genders ¹ and reported to be caused of metabolic syndrome in females ² and related with mental health ⁴ and that mental health such as depression was seriously direct correlation with general health especially among older people ⁵. And insomnia was reported to be influenced by gender, age, education, physical and mental health ⁶. In addition to that, healthy lifestyle behaviors including sleep duration were reported to be very beneficial for preventing of cardiovascular mortality regardless of education level ⁷. According to another study of

sleep and cognitive functions, they reported that sleep deprivation may impair recognition of emotions ⁸. And sleep was reported to be related to mental health among middle aged adults including both genders among general population ⁹. By the English longitudinal study, a decrease of sleep duration was reported to be causing of greater adiposity ¹⁰. By previous study, long sleep was positively associated related with current smoking, alcohol use, living rural area and lack of physical actives¹¹. Also long sleep was reported to be related with Sarcopenia ¹² and later sleep time was reported to being related with higher insulin resistance by cohort study ¹³ and shorter sleep group was reported to be associated with higher risks of hypertension while long sleep one had no association of hypertension incidence ¹⁴. Long sleep and smoking were also reported to be associated with being worse function of memory ¹⁵. And shorter or longer sleep was reported that they had poorer status of health ¹⁶ and significantly related with falls, major dangerous factor of the older people ¹⁷. Longer sleep time was reported that it was related with higher prevalence of stroke especially in women ¹⁸ and the association of sleep health and cardiometabolic risk(CRS) was reported the one that sleep may be the predictor of CRS ¹⁹. Also, by recent

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another study, they reported that insufficient sleep was related to having lower social capital especially in men²⁰. And it was reported that the people who complained about insomnia, they had poorer health conditions²¹.

Despite of its growing importance, there are rare studies on the association of lack or excessive sleep time and the determinants of especially growing elderly. Through this study, we performed to investigate on the determinant major factors of abnormal sleep time such as too short or long sleep.

MATERIALS AND METHOD

By the 6th KNHANES(Korea National Health and Nutrition Examination Survey data), we examined 1,180 participants to investigate the major related factors of short or long sleep time of older subjects using the complex sampling method through multi-logistic regression by SPSS (ver. 21.0).

RESULTS AND DISCUSSION

Table 1 displays the characteristics of socio-demographic factors like sleep time, factors of life style. The proportions of lack or excessive sleepers were accounted for 62.5%. Over half of them were female (58.3%) and aged 70-79 subjects (52.4%). Two thirds of them were educated level of elementary school (67.3%).

Table 1: The general characteristics of older people

		N	%
Gender	Male	497	41.7
	Female	683	58.3
Age	65- 69	395	33.2
	70-79	624	52.4
	Over 80	161	14.4
Education	Elementary	778	67.3
	Middle	154	13.3
	High	177	14.0
	Collage	71	5.4
Marital status	Yes-spouse	747	61.1
	No-spouse	433	38.9
Family member	1	273	21.7
	2	566	46.0
	Over 3	341	32.4

Conted...

Smoking	No	1047	89.0
	Yes	133	11.0
Drinking	No	795	66.8
	Yes	385	33.2
Income	Low	297	25.2
	Middle-low	295	24.2
	Middle-high	291	24.6
	High	297	26.1
Economic Activity	No	835	70.8
	Yes	345	29.2
Sleeping	Lack(<7hrs/day) or excessive(8hrs/day<)	742	62.5
	Normal(7-8 hours/day)	438	37.5
	Total	1180	100.0

Table 2 presents the related factors of sleep time. The directly related factors of lack or excessive sleep time were showed by education level, gender (female), marital status(no-spouse), lower income level, living alone, ageing(70-79), and drinking.

Table 2: The related factors by sleep time among the elderly

	OR(96% CI)	p
Gender		
Female	1.992(1.519-2.612)	.000
Male	Reference	
Age		
70-79	1.494(1.099-2.032)	.001
Over 80	2.042(1.337-3.118)	.121
65- 69	Reference	
Education level		
Middle	2.111(1.250-3.566)	.005
High	1.318(0.726-2.390)	.362
College	1.695(0.926-3.105)	.087
Elementary	Reference	
Marital status		
No-spouse	1.771(1.342-2.337)	.000
Yes-spouse	Reference	
Smoking		
No	1.338(0.855-2.092)	.201
Yes	Reference	

Conted...

Drinking		
No	1.360(1.032-1.792)	.029
Yes	Reference	
Economic level		
Low	1.231(0.795-1.905)	.349
Middle-low	1.734(1.166-2.579)	.007
Middle-high	1.608(1.072-2.413)	.022
High	Reference	
Family member		
1	1.550(1.083-2.218)	.017
2	.928(0.670-1.285)	.651
Over 3	Reference	
Economic Activity		
No	1.237(0.895-1.709)	.196
Yes	Reference	

Table 3 shows the independent major related factors of lack of excessive sleep time. Multi-logistic regression revealed that gender (female), income level (middle low, middle high) and aged 70-79 group were positively associated with lack or excessive sleep time. While education level, no-spouse, drinking and family member¹ had been showed of having no relations with short or long sleep time.

Table 3: The determinant factors of sleep duration among the elderly

	OR(96% CI)	p
Gender		
Female	1.813(1.293-2.542)	.001
Male	Reference	
Age		
70-79	1.432(1.041-1.971)	.042
over 80	1.712(1.021-2.872)	.423
65-69	Reference	
Education level		
Elementary	1.382(0.811-2.354)	.232
Middle	1.097(0.608-1.979)	.758
High	1.511(0.816-2.798)	.187
College	Reference	
Marital status		
No-Spouse	1.110(0.720-1.712)	.635
Yes-spouse	Reference	

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Smoking		
No	.995(0.619-1.598)	.982
Yes	Reference	
Drinking		
No	.949(0.696-1.293)	.737
Yes	Reference	
Economic level		
Low	1.094(0.680-1.759)	.710
Middle-low	1.605(1.062-2.426)	.025
Middle-high	1.558(1.029-2.359)	.036
High	Reference	
Family member		
1	1.016(0.639-1.616)	.947
2	0.898(0.640-1.260)	.531
over 3	Reference	
Economic activity		
No	1.078(0.755-1.540)	.678
Yes	Reference	

Our study showed that the determinants of sleep were the factors of gender (female), middle income, ageing. The prevalence of short or long sleep among the elderly was 62.5% and that was similar to those of Canada's recent study though it had some differences of the subjects, they reported that 65 to 79 ages people had some troubles of sleep duration and quality²². Female, gender specific factor, one of the determinants of sleep durations as one of our results, it was partially proved through previous study of Sweden even if their results are having some differences in gender, they suggested that sleep duration and correlated factors need to be considered on sex-specific of some associations²³. By recent Germany's study, elderly women who especially using more time on housework activities caused of short or long sleep time, had been reported of having poor health²⁴ and these results had in consensus with those of our results in view of female, gender, as the affecting factor of sleep. By Korea's recent study, they reported the association of longer sleep duration and higher prevalence of stroke and the trend was severe in women¹⁸ and these results was supporting the importance of gender specific policies for the future. And with the previous study, female gender, older age were reported to be significantly associated with insomnia²⁵, these results are supporting our results in some points of view though education level, unmarried status, smoking, and drinking variables were not associated factors in our study.

Through our study, middle income factor compared to lower or higher income one, showed more being affected one by sleep, and these results are not in consensus with another study, they reported that sleep health was associated with being lower cardio-metabolic risks among lower and middle wage workers and these differences should be considered of seeming the cause of the different race and subjects ¹⁹.

Older age, the major determinant factor through our study, was supported by the prior study, they revealed of the association of older age and short sleep even though some difference in view of smoking and alcohol use ¹¹. It was reported that some associations of sleep time and metabolic measure might be age dependent¹³ and these ageing variables should be considered as the important major factor.

Smoking and drinking problems which had no relations in our study, have inconsistency with the results of the China's study¹¹ partially due to differences of sample subject characteristics. In the study of relationship between drinking alcohol and sleep durations of US, they reported that environmental, biological and social factors may contribute on their findings ²⁶.

CONCLUSION

According to our results, health professionals should focus on gender, income and aging factors to promote sleep health status in older population as well as proper sleep recommendation policy implications in the community. And further studies to explore those associations of sleep duration and general health factors as well as investigating the certain life style factors through reflecting circadian rhythms should be continued on these older populations in Korea.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Usefulness assessment of Stereotactic Body Radiation Therapy with Breathing Observation (RPM system) in Lung Cancer Patients

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ABSTRACT

Background/Objectives: The aim of this study is to evaluate the usefulness of the RPM system by comparative analysis in the reproducibility of tumor motion with respiration changes in patients undergoing SBRT.

Method/Statistical analysis: Twenty patients with respiratory gated radiation therapy and 20 patients without RGRT were divided into groups 1 and 2, and shoot 4-Dimensional Computed Tomography, Cone-Beam CT and Fluoroscopy In order to verify the stability of respiration during treatment. We set the reference interval of the respiration signal using Real-time Position Management(RPM) System(version 1.7.5, Varian, USA) for Group 2, and then, we counted the number of off-center values.

Findings: The differences between the average motions are measured by 4-D CT and CBCT the results are 1.0 mm, 1.1 mm, and 1.9 mm in the anteroposterior direction, the axial direction, and the lateral direction in Group 1. The mean axial difference between the 4-D CT and Fluoroscopy in the axial direction's result is 0.6 mm in group 1 and 2.3 mm in group 2. The difference in axial direction between CBCT and Fluoroscopy's result is 1.7 mm in group 1 and 1.4mm in group 2.

In group 2, the number of treatments (20patients, single treatment, 15Gy) without not match with reference respiratory interval is 32 out of 80 times. The mean tumor movement value in all patients is less than 5 mm on average. In this study, the accuracy of the planned dose delivery during treatment can be improved by confirming the movement of the tumor with RPM system even in patients without RGRT.

Improvements/Applications: For improvement of this research we should consider another method for the patient who has very erratic breath.

Keywords: SBRT, RGRT, RPM system, Respiratory interval, 4-Dimensional Computed Tomography

INTRODUCTION

Sophisticated treatment techniques such as IMRT and VMAT, which optimize the dose of tumor tissue and normal organs, have been widely used clinically since the development of radiotherapy technology¹⁻³, and related research activities are actively underway. Besides, The application range of image-guided radiation therapy(IGRT), which can confirm the posture

of the patient and the position of the tumor using the images obtained before the treatment, and corrects the differences between obtained images and planning images, is being gradually expanded.⁴⁻⁵ Although the development of this radiotherapy technique has been enabled SBRT that are difficult to perform surgically⁶, SBRT in thoraco-abdominal site, The movement and position of the tumor may change according to patient's breathing.⁷ So, In the process of establishing the treatment plan, acquisition and analysis of information about respiration and tumor movement are needed in advance.⁸⁻⁹ In our hospital, we measure the tumor movement in 4-Dimensional Computed Tomography(4-D CT) and then decide whether or not to apply Respiratory Gated Radiation Therapy(RGRT) which irradiate only the

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particular interval based on the patient’s respiratory cycle with reference value(10mm), after that we set the Internal Target Volume (ITV) and Planning Target Volume(PTV).^{10,11}

The patient’s respiration and tumor movement are analyzed using the 4-D CT images acquired within a short time of 10 minutes only. Thus, the movement of the tumor and the patient’s breath could change the treatment dose and be delivered differently than planned during the therapy.

Therefore, we use images obtained from the treatment planning stage through the whole process to evaluate the reproducibility of the tumor motion. In case of patients without RGRT, Observation with RPM system is carried out during the treatment.

After that, patient’s respiration changes are checked and the usefulness of patient respiration observation using RPM system is evaluated.

MATERIALS AND METHOD

From January 2015 to January 2017, among the patients who underwent SBRT, 20patients who underwent RGRT and 20 patients who did not undergo RGRT were selected as Group 1 and 2. Then, during the treatment, the respiration reproducibility and the stability of the patient’s breathing were compared and evaluated.In order to establish the treatment plan, 4-D CT was taken using a 3-D simulator(Lightspeed RT16 CT simulator, General Electric Co. Waukesha, WI, USA) and CT images of each respiratory phase were obtained from 0 to 90%. The computerized treatment planning system(Eclipse treatment planning system, Version 10.0, Varian, USA) was used to measure the movement of the tumor in the anteroposterior (AP), axial (SI), and lateral (RL) directions. [Fig. 1]

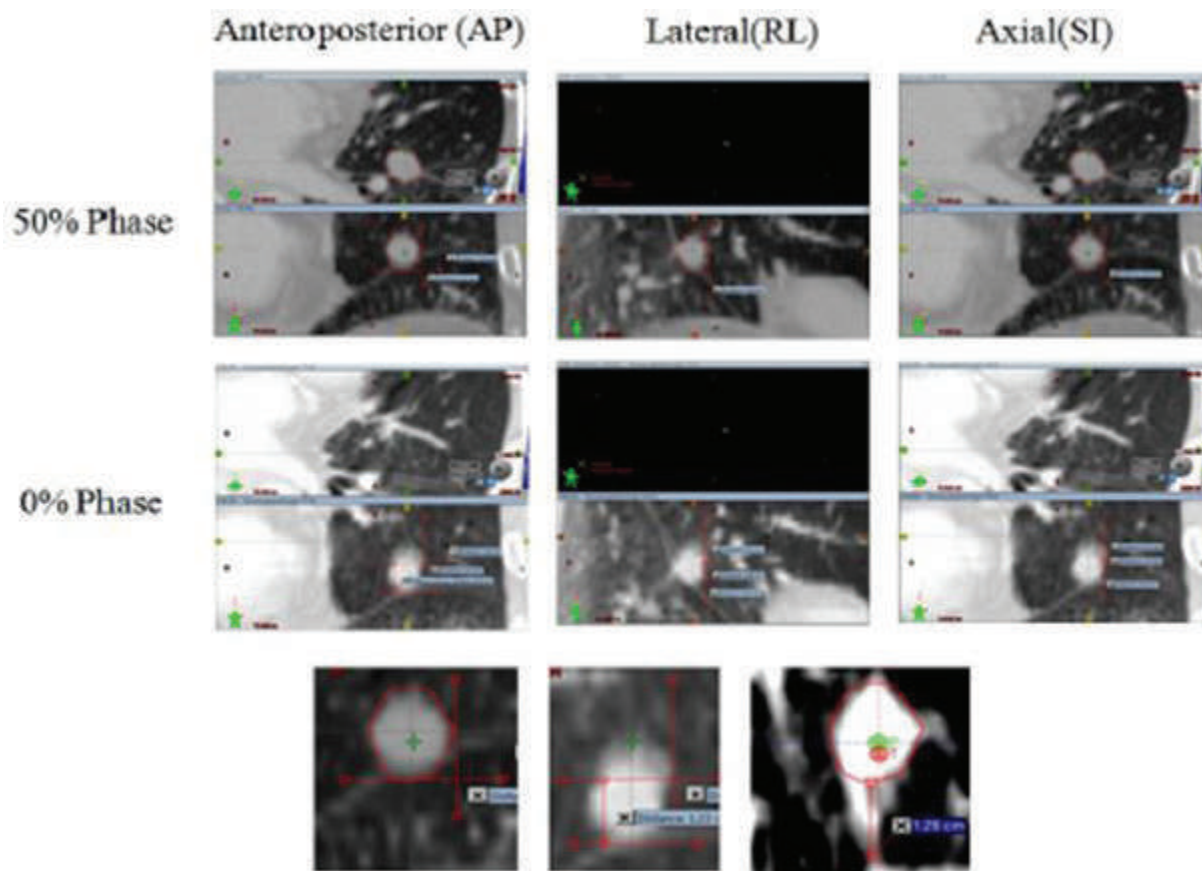


Figure 1: Measurement of tumor motion in 4-DCT images

The RGRT was applied to patients whose tumor motion measurements exceeded 10 mm in a specific direction based on 4-D CT images.

For treatment, we used TrueBeamSTx™(Varian Medical Systems, PaloAlto, USA). Kilo-Voltage(kV) X-ray images and Cone-Beam CT (CBCT) images obtained with the On-Board Imaging(OBI) system for IGRT were used to confirm the posture and location of the tumor before treatment.

In order to confirm the accuracy of IGRT once again and to confirm the movement of the tumor according to the patient’s breathing, we performed the procedure after confirming with fluoroscopic images, and the stored images were used to measure the change of the tumor movement.

Forty patients were treated with the same method and the tumor movement was measured using Offline Review Registration Software(ARIA 10, Varian, USA).[Fig.1, 2, 3]

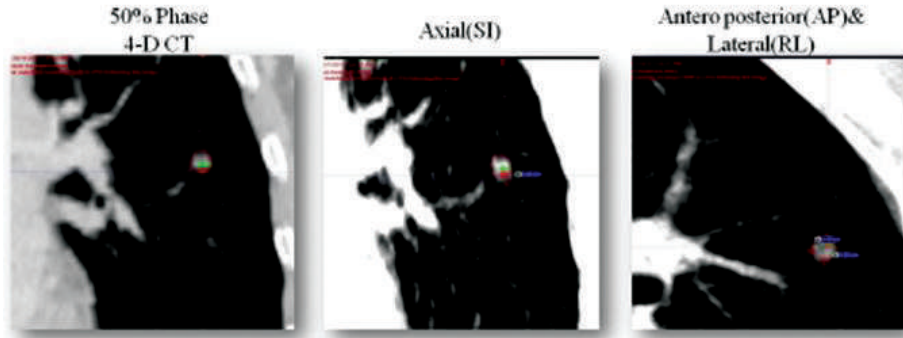


Figure 2: Measurement of tumor motion in CBCT images

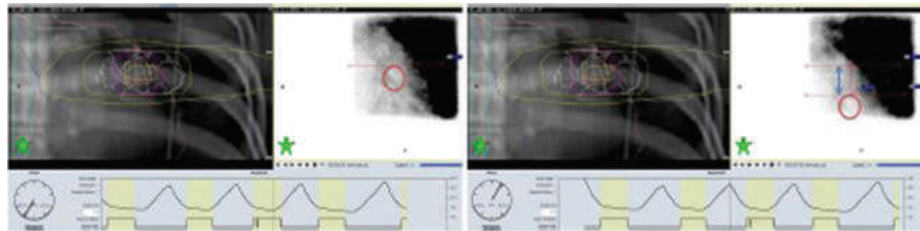


Figure 3: Measurement of tumor motion in Fluoroscopy

Data were collected and analyzed for each patient during a total of 80 times of SBRT performed four times of 15Gy.

To confirming the change of tumor location, before the treatment, we performed guidance image based on the vertebral column adjacent to the PTV during the IGRT process. After that, performed guidance image based on the shift value of the couch and the gross tumor volume, and then, Shift value was compared and analyzed in the anteroposterior (AP), axial (SI), and lateral (RL) directions.

In group 2 patients who were treated without RGRT, the RPM system was used to confirm the stability of the patient’s breathing. The patient’s respiration signal entirely acquired when observing the movement of the tumor with Fluoroscopic image before treatment. The upper and lower margins of movement were set up and counted the number of off-center values during the treatment. [Fig. 4]

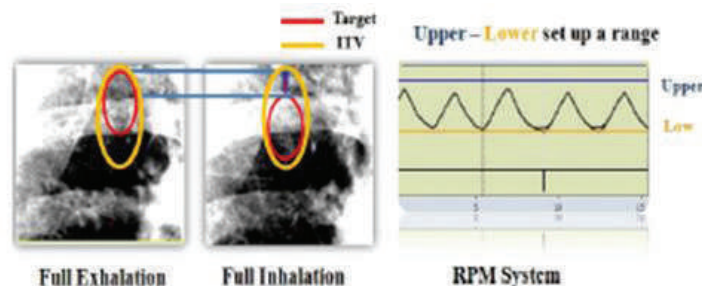


Figure 4: Set up the respiration Upper-Lower range on fluoroscopy images

RESULTS AND DISCUSSION

On the 4-D CT images, the tumor movements in the anteroposterior, axial, and lateral directions were measured. The mean values measured in group 1 with RGRT were 3mm, 15.2mm, and 2mm, and The mean values of Group 2 without RGRT were 1.4mm, 4.2mm, and 1.2mm.

In the same way, on the CBCT images, the mean values of group 1 were 1.5mm, 13mm, 1.3mm, and Group 2 were 0.9mm, 5.0mm, 0.7mm. On the fluoroscopic images, the mean value of axial direction in group 1 was 14.9mm, and group 2 was 6.24mm. [Table 1]

Table 1: Mean value of tumor motion in 4-D CT, CBCT, Fluoroscopy images (unit: mm)

	4-DCT			CBCT			Fluoroscopy
	(AP)	(SI)	(RL)	(AP)	(SI)	(RL)	(SI)
Group1	0.3	15.2	0.2	1.3	13	1.5	14.9
Group2	1.4	4.2	1.2	0.9	5.0	0.7	6.4

In order to compare the motion of the tumor with the CBCT and the fluoroscopic images, the mean value of the axial direction of the same patient was 2.3 mm in Group 1 and 1.6 mm in Group 2. The maximum value of each group was found to be 12.1 mm in group 1 and 6.6 mm in group 2, and the minimum value was 0 mm in group 1 and 2.

In order to confirm the change of tumor movement during the 4 times of SBRT in the same way, the movement of the tumor was measured with fluoroscopic images and compared the measured values for the remaining 3 days based on the measured value of the first day, 13 patients in group 1 and 4 patients in group 2 showed a difference of more than 5 mm.

The mean difference of the tumor movements measured in the axial direction of 4-D CT and fluoroscopic images was 4 mm in group 1 and 2.4 mm in group 2.

The greatest difference of the tumor movement showed in the 25th patient, in Group 1 with a difference of 13.5 mm between the first day and last days, and in Group 2, the fifth patient showed a difference of 6.5 mm between the first and second days. [Fig. 6]

Group 1 and Group 2 had a difference of more than 5 mm in each group, 17 and 16 times, respectively. [Fig. 5]

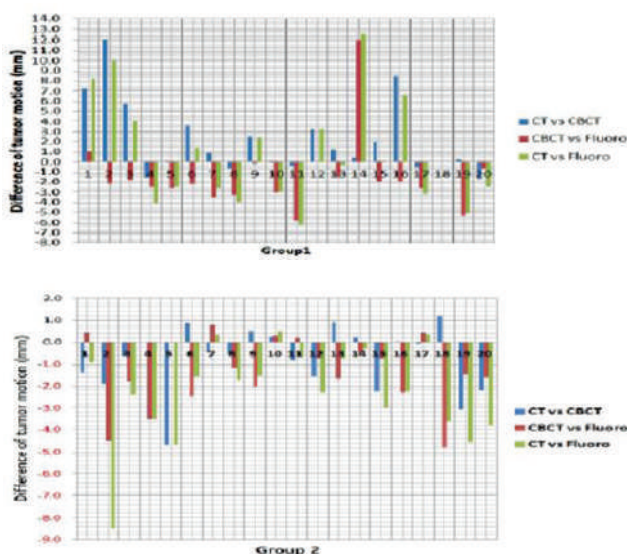


Figure 5: Difference of tumor motion at the Superoinferior (SI) direction in 4-DCT, CBCT and Fluoroscopy images. (unit: mm)

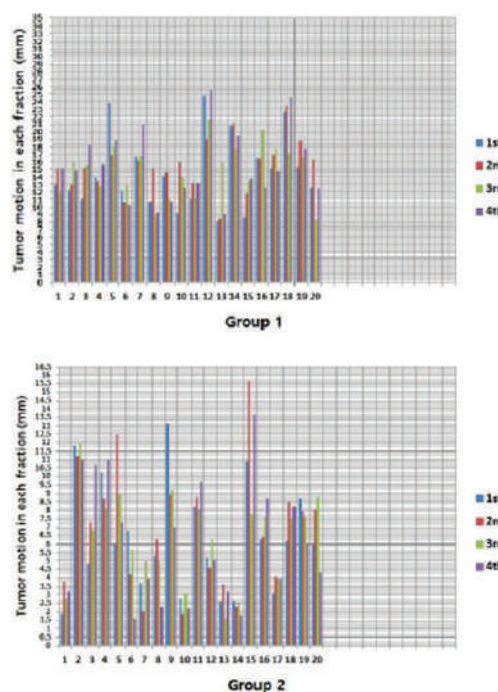


Figure 6: Inter-fractional variation of Tumor motion (unit: mm)

In the IGRT procedure, we performed image guidance based on the vertebral column adjacent to the PTV, followed by image guidance based on the tumor one more time, and after that, the difference of the shift value of the couch was compared in the anteroposterior, axial and the lateral direction.

Group 1 had an average difference of 4.1 mm, 4 mm, and 0.27 mm. Group 2 had 3.3 mm, 3.7 mm, and 2.4 mm difference, but there was a patient with difference of 10mm or more in both groups.

The largest difference between groups was 13 mm in group 1 and 16 mm in group 2. [Table 2]

Table 2: The difference of Couch shift value between bone-based matching and target-volume-based matching in CBCT images (unit: mm)

Shift value	Anteroposterior	Axial	Lateral	Maximum value
Group1	4.1	4	2.7	13
Group2	3.3	3.7	2.4	16

As a result, in group 2, patient respiration was observed using RPM system during treatment, the number of treatment cases with stable respiration without exceeding the pre-treatment respiratory criteria, was 32 out of 120 times in 30 patients, in patients with the most unstable respiration, it was found that treatment dose delivery was interrupted by the 108times of off-center during the one time treatment.

CONCLUSION

In the treatment planning of 40 patients who underwent SBRT, the change in tumor motion or position at the time of treatment did not deviate from the standard considered in the treatment plan, with an average difference of less than 5 mm in actual treatment. However, in some patients showed the difference of more than 10mm.

SBRT without RGRT is performed with patients who sustain stable respiratory status with less than 10mm tumor movement during 4-D CT in treatment. However, in this study, the patient’s respiratory change during treatment with RPM system in Group 2 was observed, and 73% of the patients were found to be out of the setting criteria range more than once during the treatment.

Therefore, even if the tumor movement and position are accurately measured on 4-D CT images, tumor movement and position deviation should be observed consistently. SBRT of 10Gy dose or more per a treatment without RGRT will be better to patients if apply RPM system which not only could reduce errors due to unexpected changes in respiration during treatment but also be able to accurately delivery the planned treatment dose.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effects of Support Surface Change and Upper Arm Resistance Exercise on Abdominal Muscle Thickness

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ABSTRACT

Background/Objectives: This study investigated the effects of various upper arm resistance exercise on abdominal muscle thickness during bridging posture on stable and unstable surfaces.

Method/Statistical analysis: This study was performed on 30 normal adults (6 men and 24 women). During the performance of the bridge exercise accompanied with BOSU ball to give variations of surface. Resistance exercises focusing on the upper extremities using medicine balls, pilates circle and weight bar were practiced to measure the thickness of muscles by using ultrasound. Independent t-test and one-way ANOVA were used to compare the thickness of the abdominal muscles with the stable and unstable support surface according to the type of upper arm resistance exercise.

Findings: There was a significant difference in abdominal muscle thickness between the stable and unstable support surface groups without upper arm resistance exercise ($p < .05$). However, there was no significant difference in abdominal muscle thickness between the stable and unstable support surface groups with upper arm resistance exercise ($p > .05$). The result of this study showed that all of rectus abdominis(RA), internal oblique(RO), external oblique(EO) and transverse abdominis(TrA) were more thickened at the stable supporting surface than that of the unstable supporting surface. The resistance exercise using pilates circle at the stable supporting surface resulted in thicker muscle in rectus abdominis and external oblique. The resistance exercise using a weight bar resulted in significant change in both internal oblique and transverse abdominis.

Improvements/Applications: The resistance exercise of the arm using various tools and the change of the supporting surface affect the increase of abdominal muscle thickness. In addition, Upper arm resistance exercise may be an effective alternative method for those who cannot apply an unstable support surface to increase the thickness of abdominal muscles.

Keywords: Abdominal muscle, Bridging posture, Muscle thickness, Resistance exercise, Support surface

INTRODUCTION

Spinal stability, which is an important factor in preventing back pain, occurs during simultaneous activation of the trunk muscles^[1]. This simultaneous activation acts like a corset on the bones of the waist and provides stability between spinal segments during functional activity^[2]. Lumbar segmental instability in the absence of bony architecture defects of the lumbar spine is a significant cause of chronic low back pain^[3]. Recent research has focused on the importance of muscle activation for motor control and stability of the lumbopelvic region^[4]. Some evidence exists that transversely oriented abdominal muscles play a specific and crucial role stabilizing the lumbopelvic region^[5].

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Trunk bridging exercises are often used to improve lumbopelvic stabilization. These exercises re-train the tuning pattern of the muscles to assume that an optimal ratio between localized partial stabilization and overall torque-generating muscle activity is essential^[6]. Recently, many training methods have used equipment to improve lumbar stabilization by providing an unstable support surface, which enhances proprioceptive sensation^[7]. The purpose of this study is to compare changes in abdominal wall thickness according to the type of upper arm resistance on a stable and unstable support surface.

MATERIALS AND METHOD

Study Method: The subjects selected 30 males and females attending K university in Busan city who fully understood the purpose and method of this study and agreed to participate in the experiment. The thickness of the abdominal muscles was measured using ultrasound in the state of maintaining the bridging posture at the stable and unstable support surface using a BOSU ball.

Measuring equipment: To measure abdominal muscle thickness, we used a diagnostic ultrasound instrument (MyLab One World, Esaote, Italy) with a linear probe to measure muscle and surface layer. We used a BOSU ball (BOSU PRO, FitnessQuest, USA) as the unstable support surface and 3.17 kg weight bars (Patterson Medical, Canada) and 5kg medicine ball (Gymnic, Italy) and pilates circle (Core Body, Taiwan) for upper arm resistance exercises.

Data Analysis: We used IBM SPSS Statistics for Windows (version 23.0) to perform statistical analysis. An independent *t*-test and one-way ANOVA was used to compare abdominal muscle thickness with and without upper arm resistance exercise and with stable and unstable support surfaces. The significance level of .05 was applied for verifying statistical significance.

RESULTS

General characteristic of subjects: The participants included 6 men and 24 women in their twenties. Mean height was 172.50 ± 3.22 cm for men and 161.36 ± 3.78 cm for women. Mean weight was 66.16 ± 10.53 kg for men and 61.87 ± 10.43 kg for women See Table 1 for all participant characteristics.

Table 1: General characteristic of subjects

N = 30

Characteristic	Man	Woman
Age (yr)	21.50 ± 1.22	21.25 ± 1.51
Height (cm)	173.90 ± 4.22	162.16 ± 4.98
Body Weight (kg)	67.13 ± 11.70	62.98 ± 11.57

Comparison of abdominal muscle thickness according to the presence or absence of upper arm resistance exercise and support surface

To compare abdominal muscle thickness according to upper arm resistance exercise and support surface, an independent *t*-test was used. The results are shown in Table 2.

There was a significant difference in the thickness of the rectus abdominis, internal oblique, external oblique, and transversus abdominis muscles between the stable and unstable support surface groups without upper arm resistance exercise (*p* < .05). There was no significant difference in the thickness of the rectus abdominis, internal oblique, external oblique, and transversus abdominis muscles between the stable and unstable support surface groups with upper arm resistance exercise (*p* > .05). These results are shown in Table 2.

Table 2: Comparison of abdominal muscle thickness according to supporting surface and upper arm resistance exercise

	Muscle	Stable Supporting Surface	Unstable Supporting Surface	t	p
Non-weight	RA	9.78 ± 2.18	10.76 ± 2.38	2.61	.010*
	EO	5.01 ± 1.04	5.42 ± 1.07	2.30	.023*
	IO	8.94 ± 2.43	10.18 ± 2.70	2.92	.004*
	TrA	4.47 ± 1.13	5.25 ± 1.07	4.25	.000*
Medicine Ball	RA	10.44 ± 2.05	10.84 ± 2.15	.73	.470
	EO	5.41 ± 0.98	5.81 ± 0.91	1.66	.102
	IO	9.88 ± 2.41	10.53 ± 2.45	1.03	.305
	TrA	5.02 ± 1.06	5.31 ± 1.01	1.08	.284
Weight Bar	RA	10.84 ± 2.15	11.13 ± 3.00	.44	.663
	EO	5.59 ± 0.93	5.97 ± 0.90	1.60	.116
	IO	10.54 ± 2.62	11.11 ± 2.66	.83	.408
	TrA	5.23 ± 1.05	5.57 ± 1.06	1.25	.217

Conted...

Pilates Circle	RA	10.97 ± 2.29	11.43 ± 2.52	.74	.463
	EO	5.78 ± 0.98	6.05 ± 0.97	1.07	.290
	IO	9.98 ± 2.61	10.50 ± 2.57	.77	.443
	TrA	5.09 ± 1.02	5.35 ± 1.06	.96	.342

**p*<.05

RA: rectus abdominis, EO:external oblique, IO:internal oblique, TrA:transversus abdominis

Comparison of abdominal muscle thickness according to supporting surface change and upper arm resistance exercise type

In order to compare the changes of the abdominal muscle thickness according to the type of resistance exercise of the arm on the stable support surface, the result of analysis by one-way ANOVA was as shown in Table 3.

Rectus abdomin is showed the highest mean value in resistance exercise using a pilates circle, with a statistically significant difference (*p*<.05).External oblique showed the highest mean value in resistance

exercise using a pilates circle, with a statistically significant difference (*p*<.05).Internal oblique showed the highest mean value in resistance exercise using a weight bar, with a statistically significant difference(*p*<.05). Transversus abdomin is showed the highest mean value in resistance exercise using a weight bar, with a statistically significant difference (*p*<.05).

In order to compare the changes of the abdominal muscle thickness according to the type of resistance exercise of the arm on the unstable support surface, the result of analysis by one-way ANOVA was as shown in Table 4.

Rectus abdomin is showed the highest mean value in resistance exercise using a pilates circle, no statistically significant difference(*p*> .05).External oblique showed the highest mean value in resistance exercise using a pilates circle, with a statistically significant difference(*p*<.05).Internal oblique showed the highest mean value in resistance exercise using a weight bar, no statistically significant difference (*p*>.05).Transversus abdomin isshowed the highest mean value in resistance exercise using a weight bar, no statistically significant difference (*p*>.05).

Table 3: Comparison of the thickness of abdominal muscles according to the upper arm resistance exercise on the stable support surface

Muscle	Non-exercise	Medicine Ball	Weight Bar	Pilates Circle	F	p
RA	9.78 ± 2.18	10.44 ± 2.05	10.84 ± 2.15	10.97 ± 2.29	3.30	.022*
EO	5.02 ± 1.04	5.41 ± 0.98	5.59 ± 0.93	5.78 ± 0.98	5.63	.001*
IO	8.94 ± 2.43	9.88 ± 2.41	10.54 ± 2.62	9.98 ± 2.61	3.86	.011*
TrA	4.67 ± 1.13	5.02 ± 1.06	5.23 ± 1.05	5.09 ± 1.02	5.45	.001*

**p*<.05

Table 4: Comparison of the thickness of abdominal muscles according to the upper arm resistance exercise on the unstable support surface

Muscle	Non-exercise	Medicine Ball	Weight Bar	Pilates Circle	F	p
RA	10.76 ± 2.38	10.84 ± 2.15	11.13 ± 3.00	11.43 ± 2.52	.55	.652
EO	5.42 ± 1.07	5.81 ± 0.91	5.97 ± 0.90	6.05 ± 0.97	3.65	.014*
IO	10.18 ± 2.70	10.53 ± 2.45	11.11 ± 2.66	10.50 ± 2.57	.84	.474
TrA	5.25 ± 1.07	5.31 ± 1.01	5.57 ± 1.06	5.35 ± 1.06	.63	.599

* *p*<.05

DISCUSSION

This study aimed to investigate changes in abdominal muscle thickness during upper arm resistance exercise with the use of stable and unstable support surfaces in the bridging posture.

Clinical bridging exercises are commonly used in clinical practice to stabilize the body and improve muscle strength. Bridging exercises is global muscles (e.g., the rectus abdominis muscles and erector spinae muscles) and several local muscles (e.g., transversus abdominis muscles and internal oblique muscles), have been modified in various ways to enhance coordination stability^[8].

In the previous study, when the pylon movement was performed together with external resistance, the activity of the muscles of the hippocampus was changed to maintain the neutral position of the body, thereby controlling the imbalance of the body^[9]. In addition, changes in the activity of the back muscles were found to play an important role in stabilizing the torso in various postures and directions^[10].

Shumway-Cook and Woollacott reported that to maintain balance on unstable support surfaces, joint contraction of muscles passing through the body segment are induced^[11]. In this study, a bridging exercise on a BOSU ball (providing an unstable support surface) without upper arm resistance exercise increased the thickness of the rectus abdominis, internal oblique, external oblique, and transversus abdominis muscles more than on a stable support surface. These results are consistent with a previous study^[12]. However, there was no statistically significant difference in abdominal muscle thickness between the stable and unstable support surface groups during upper arm resistance exercise. This suggests that upper arm resistance exercise increases abdominal muscle thickness similar to using an unstable supporting surface.

Hodges and Richardson reported that the transversus abdominis muscle activity was most significantly altered to maintain the posture of the trunk when bridging exercise with external resistance^[13]. In this study, the abdominal muscle thickness according to the type of arm resistance on the stable support surface was significantly different in rectus abdominis, external oblique, internal oblique, and the transversus abdominis muscle. The rectus abdominis and external oblique of the

surface muscle were the highest in the arm resistance exercise using the pilates circle and the internal oblique and transversus abdominis muscles of the deep muscle were the highest in the arm resistance exercise using the weight bar. In unstable support surface, the rectus abdominis and external oblique of the surface muscle increased the highest in the arm resistance exercise using the pilates circle and the deep oblique and transversus abdominis muscles increased the highest in the arm resistance exercise using the weight bar. However, statistically significant differences were found only in external oblique.

Therefore, the resistance movements of the arms using various tools and the change of the supporting surface affect the increase in the thickness of the abdominal muscles.

CONCLUSION

This study investigated the effects of various arm resistance exercises on abdominal muscle thickness in bridging postures with stable and unstable support surfaces. First, abdominal muscle thickness increased during maintenance of the bridging posture with an unstable support surface without upper arm resistance exercise. Second, although abdominal muscle thickness increased during maintenance of the bridging posture with an unstable support surface with upper arm resistance exercise, this difference was not significant. Third, there was a statistically significant difference in the abdominal muscle thickness between the absence of resistance exercise on the stable support surface and resistance exercise using the medicine ball, weight bar, and pilates circle. We propose that upper arm resistance exercise is an effective alternative method to increase abdominal muscle thickness for those who cannot apply an unstable support surface.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Study on Efficiency of Joint Research on National R&D Projects by Research Entity and Technology Life Cycle

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ABSTRACT

Background/Objectives: With the recent growth of industry, there has been a rising demand for evaluation of efficiency of collaborative R&D projects among industries, universities, and research institutes against R&D investments.

Method/Statistical analysis: In this paper, we analyzed the efficiency of the joint national R&D projects performed on the display technology fields, which is considered as an out-performed area as South Korea possesses number of world-leading technologies in the area. To evaluate the efficiency of the joint R&D projects, we mainly used the research outputs of the national R&D projects such as research papers, domestic and overseas patents, technology transfer, and commercialization.

Findings: At first, we compared the productivity of the research outcome for the display technology area with the research outcome of the entire research area. The results of the analysis show that the research efficiency of the display technology area is higher than the efficiency of the other area of research in overall except the technology transfer. In addition, we also analyzed the efficiency of the research based on the technology life cycle and research entities of the joint R&D projects for the display technology area. The results show that the efficiency of the early stages of the joint R&D projects is higher than other life stages in terms of the productivity of the research papers and patents, and the efficiency of the growth and maturity stages is superior on the productivity of the technology transfer and commercialization. Furthermore, the productivity of the research papers of the university is higher than the other research entities while the industry has higher productivity on the technology transfer and commercialization.

Improvements/Applications: With results of analysis shown in this paper, we can apply it for formation and management process of the joint R&D projects to maximize the efficiency of the R&D projects.

Keywords: *Efficiency of Research, Joint Research, Technology Life Cycle, Research Entity, National R&D Projects, R&D Outcome*

INTRODUCTION

South Korea has been one of the largest countries in the world in terms of national R&D expenses^[1, 2]. This study analyzed the research outcomes in terms of the technology life cycle^[3-5] and research entities in order to

evaluate the efficiency of the joint national R&D projects. The research outcomes including research papers, domestic and overseas patents, technology transfer, and commercialization are often considered as the verified research outcome for evaluating the efficiency of researches^[6-9]. In this paper, we analyzed the efficiency of the joint R&D projects specifically related to the display technology field, in which South Korea is regarded as one of the technology-leading countries. To analyze the efficiency of the joint researches, we collected the most of data about the joint R&D projects for the entire research area including the display technology area for the past five years (2012-2016).

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The data about the joint R&D projects are collected from the national R&D databased maintained by National Science & Technology Information Service (NTIS) [1]. NTIS collects and manages the data about the national R&D projects nationwide in Korea to share and disseminate the national R&D outcomes such as research papers, research reports, and patents. The data about the joint R&D projects include project-performing duration, budget, related area, research participants with affiliation, research outcomes, etc. With such data, we analyzed the efficiency of the joint R&D projects by classifying and aggregating the data based on the research area of the R&D projects, the types of the research outcomes, the years produced the research outcomes, technology life cycle, the research entities performed the R&D projects, etc.

The rest of this paper is organized as follows. We first present the collected data of the joint R&D projects with the basic statistical analysis on the data to show the status of the joint researches performed in South Korea. Then, we present the methods of the analysis on the various aspects such as yearly statistics, technology life cycle, and research entities, and it also presents the results of the analysis. Lastly, the conclusion is given in the last section.

Status of the Joint National R&D Projects

In this study, the most of the entire joint national R&D projects among industries, universities, and research institutes for the past five years (2012-2016) are collected and analyzed to evaluate the efficiency of the national R&D investments especially for the display technology field. To evaluate the efficiency of the researches, we compared the joint national R&D projects in the display technology area with the entire joint national R&D projects. The joint national R&D

projects regarding TFT, LCD, PDP, FED, OLED, parts/materials, E-Paper, 3D, manufacturing equipment, and measuring system were classified as the R&D projects related to the display technology [10-12].

At first, we analyzed the total R&D expenses for the joint national R&D projects related to the display technology by comparing the R&D expenses on the overall joint national R&D projects. Table 1 shows the amount of the R&D expenses and ratios of the expenses between the entire R&D projects and the display-related R&D projects. The results shows that the entire R&D projects for display technology has high investment budget compared to the overall joint R&D projects because the number of joint R&D projects for display technology takes possession of 1.16% for the entire joint R&D projects while its budget takes possession of 1.27% for the entire budget in the joint R&D projects. The ratios firstly shows the percentage of the joint R&D projects related to the display technology area based on the overall joint R&D projects, and they also shows comparison of the averages of the expenses for a single R&D projects for the display technology and the overall research area. The average of expenses for the joint R&D projects related to the display technology area is appeared a bit higher than the average of the expenses for the entire research area, but it is a small difference that can be neglected on the analysis of the efficiency. With this data of the joint national R&D projects, we analyzed the efficiency of the researches on the display technology field mainly in terms of the number of research outcomes. In addition, the number and amount of the joint R&D projects and the number of their outcomes are aggregated on the technology life cycle and the research entities to analyze the efficiency of the researches. The details of the analysis and its results are shown in next section.

Table1: Status of the Joint Researches on the National R&D Projects

	2012	2013	2014	2015	2016	Total
Number of joint R&D projects for entire field (A)	7,511	8,312	8,056	10,693	11,711	46,283
Number of joint R&D projects for display field (B)	96	94	91	117	137	535
Ratios (B/A)	1.28%	1.13%	1.13%	1.09%	1.17%	1.16%
Expenses of joint R&D projects for entire field (C)	71,301M	72,077M	65,081M	71,700M	102,711M	382,870M
Expenses of joint R&D projects for entire field (D)	5,135,526M	5,918,452M	5,615,541M	6,370,639M	7,029,584M	30,9069,742M
Ratios (D/C)	1.39%	1.22%	1.16%	1.13%	1.46%	1.27%

ANALYSIS OF JOINT RESEARCH EFFICIENCY

In this paper, we used research outcomes in order to evaluate the efficiency of the joint national R&D projects for the display technology area. The research outcomes include research paper, domestic and international patents, and the cases of technology transfer and commercialization. To evaluate the efficiency of the joint R&D projects in the display technology field, we compare the average number of the research outcomes produced as the results of the joint R&D projects both for the display technology area and the entire research area. In addition, the analysis has been performed mainly based on 1) annual statistics of research outcomes, 2) technology life cycle of the R&D projects, and 3) research entities performing the R&D projects. Following subsections show the results of the analysis performed by the criteria.

Annual Joint Research Efficiency: In this section, we show the results of the annual analysis. Table 2 shows the

number of the joint R&D projects related to the display technology field along with their research outcomes for the past five years (2012-2016), and their average number of the joint R&D projects along with their average number of research outcomes. It also shows the average number of the joint R&D projects along with their average number of research outcomes for entire research area.

Figure 1 shows the analysis for the yearly research outcomes. The chart in figure 1 is generated with the average number of the research outcomes for each joint R&D project based on the numbers on table 2. It shows that the most of the research outcomes of the joint R&D projects related to the display technology field have been produced more than the research outcomes in general except the technology transfer. It also shows that the yearly outcomes of both domestic and overseas patents and commercialization have been produced more than the overall average of the research outcomes in general. In addition, the research papers have been produced more than the overall average except 2012.

Table 2: Yearly Outcomes by Joint Researches

Year (Display)	No. of Projects	Research Paper	Patent (KR)	Patent (Overseas)	Technology Transfer	Commercialization
2012	96	64	281	37	63	68
2013	94	102	282	59	15	38
2014	91	137	268	29	35	48
2015	117	154	212	33	10	14
2016	137	187	155	0	2	41
Average (Display)	107.0	128.8	239.6	31.6	25.0	41.8
Average (Total)	9,256.6	10,358.4	4,074.4	336.8	5,054.8	897.8

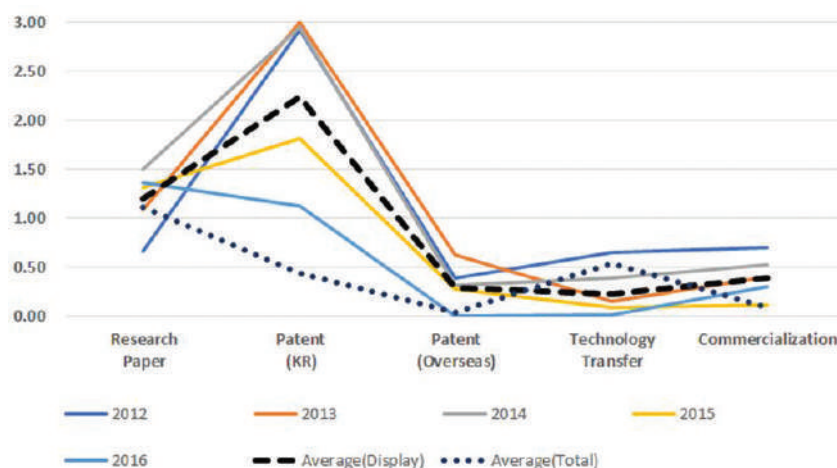


Figure 1: Yearly Efficiency by Joint Research

Joint Research Efficiency by Technology Life Cycle:

In this section, we show the results of the research-outcome analysis based on the technology life cycle of the joint R&D projects. Table 3 shows the number of the joint R&D projects related to the display technology field along with their research outcomes by classifying the life stages of the joint R&D projects for the past five years (2012-2016). The technology life cycle is classified as four main stages including the introduction, growth, maturity, and decline. The unclassified represents the number of the joint R&D projects that have not been classified as any of the life stages. The attribute of the percentage of expenses represents the percentage of the expenses spent at each stage.

Figure 2 shows the analysis of the research outcomes produced during the technology life cycle of the joint R&D projects. The chart in figure 2 is generated with

the normalized number of the research outcomes for each type based on the percentages of the expenses of projects at each stage. At first, we calculated the average numbers of the research outcomes based on the ratios of the expenses, so that the average numbers represent the efficiency of the research by assuming the equal expenses spent on each life stage. Then, the normalization is performed on the average numbers for each type of the research outcomes. Thus, the normalized numbers on the chart represent that the normalized efficiency of each life stage for each type of the research outcomes. It shows that the efficiency of producing the research papers at the introduction and growth stages is higher than other life stages. For the patents, the efficiency of the growth and maturity stages are higher than the other stages. Lastly, the efficiency of the growth stage is higher than the other stages for the technology transfer and commercialization.

Table 3: Number of Research Outcomes by Technology Life Cycle

Life Stages	Percentage of Expenses	Research Paper	Patent (KR)	Patent (Overseas)	Technology Transfer	Commercialization
Introduction	9.34%	75	68	11	7	12
Growth	21.14%	65	125	13	34	109
Maturity	1.35%	1	21	1	1	4
Decline	0.10%	0	0	0	0	0
Unclassified	68.07%	503	984	133	83	84
Average	7.98%	35.25	53.5	6.25	10.5	31.25

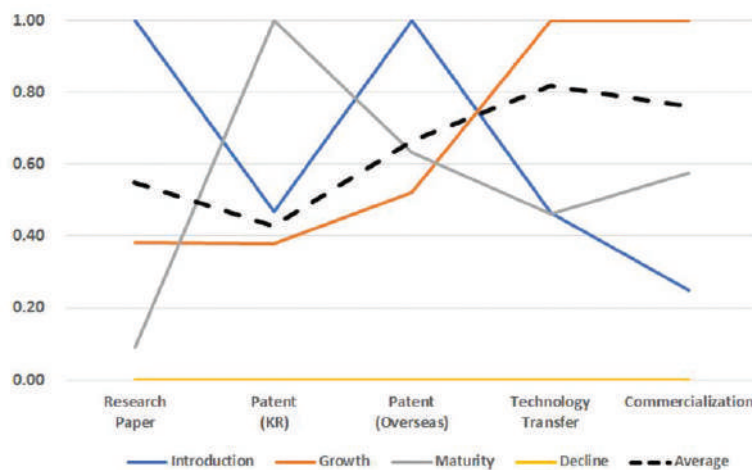


Figure 2: Analysis of Research Outcomes by Technology Life Cycle

Joint Research Outcome by Research Entities: This section shows the results of the research-outcome analysis based on research entities. Table 4 shows the number of the joint R&D projects related to the display technology field along with their research outcomes by classifying the research entities performed the joint R&D

projects during the past five years (2012-2016). The joint R&D projects have been performed by more than one research entities such as industries, universities, and research institutes, so that the percentage of expenses for each research entity might be duplicated.

Figure 3 shows the analysis of the research outcomes of the joint R&D projects performed by the research entities. As in figure 2, the chart in figure 3 is generated with the normalized number of the research outcomes for each type based on the percentages of the expenses on the joint R&D projects performed by each type of research entity. For the normalization, the average numbers of the research outcomes based on the ratios of the expenses are calculated first, so that the average numbers represent the efficiency of the research based on the assumption of the equal expenses on each research entity. Then, the normalization is performed

on the average numbers for each type of the research outcomes. Thus, the normalized numbers on the chart represent that the normalized efficiency of research entity in terms of each type of the research outcomes. The results of analysis show that the efficiency of researches performed by university is higher than other research entities in terms of the production of the research papers and patents. Also, it shows that the efficiency of researches by industry is higher than the other research entities in terms of the technology transfer and commercialization.

Table 4: Number of Research Outcomes by Research Entities

Entities	Percentage of Expenses	Research Paper	Patent (KR)	Patent (Overseas)	Technology Transfer	Commercialization
Industry	36.10%	547	969	132	87	92
University	30.38%	556	927	119	69	63
Institute	15.95%	258	476	56	27	28
Etc.	17.56%	203	378	48	22	53
Average	27.48%	453.67	790.67	102.33	61.00	61.00

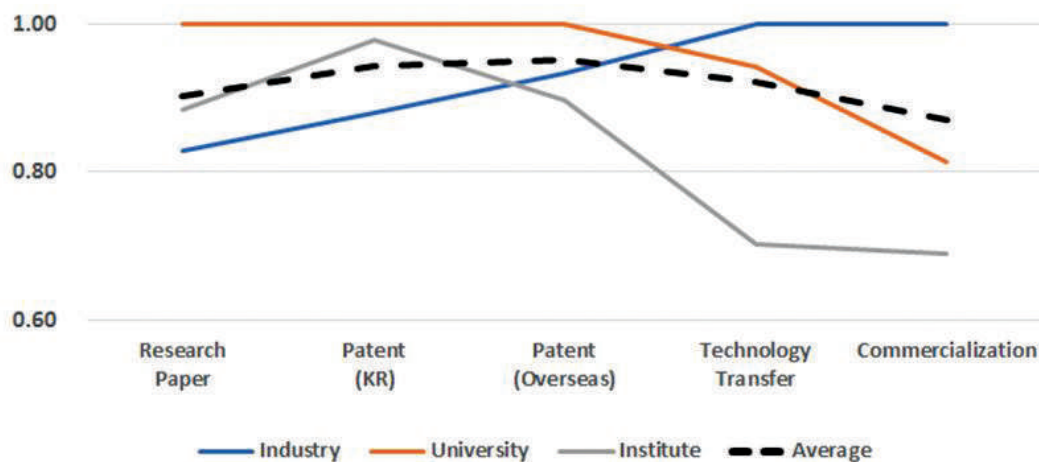


Figure 3: Analysis of Research Outcomes by Research Entities

CONCLUSION

This study analyzed the efficiency of research of the joint national R&D projects mainly for the display technology field, which is the one of the nation's world-leading area. The analysis of the efficiency has been performed based on the research outcome produced as the results of the joint R&D projects for the past five years (2012-2016). In addition, the analysis has been performed with the three criteria of the joint R&D projects that are annual statistics, technology life cycle,

and research entities. For the annual analysis of the joint R&D projects, we compared the productivity of the joint R&D projects related to the display technology field to the entire joint R&D projects, and it turned out to be more productive than the other area of research in overall except the technology transfer. This might be said that the most of the results of the joint researches on the display technology fields have been commercialized instead of the technology transfer. For the analysis based on the technology life cycle of the joint R&D projects, the results of the analysis show that the research papers

and patents are more produced at the early stages of the joint R&D projects, and the technology transfer and commercialization are achieved at the growth and maturity stages. Lastly, the university has more efficiency of the research in terms of the productivity of the research papers, and the industry has more efficiency of the research in terms of the technology transfer and commercialization.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Evaluation of Benefit of Prophylactic Scaling Service According to National Health Insurance Policies

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ABSTRACT

Background/Objectives: This study was carried out with the purpose of confirming the effectiveness of the scaling benefit policy in terms of social and economic aspects.

Method/Statistical analysis: In this study, the claim data of National Health Insurance Corporation was used. Data was collected from the national health insurance corporation by using the quo of the scaling benefit data from 2007 to 2016. The number of general dental treatments and scaling cases from 2007 to 2016, where scaling was covered by National Health Insurance benefit, and the total dental costs and dental treatment costs for periodontal treatment were calculated based on the subjects who received the descaling service for each year.

Findings: The number of patients with scaling tended to increase continuously after the scaling insurance policy. The number of dental visits per patient per patient decreased from 2.15 times in 2007 to 1.63 times in 2016, and the number of visits for periodontal treatment also decreased. It is significant that the dental plaque removal policy has increased preventive dental visits. Also, in the long run, it is expected that medical expenses will be reduced through the increase of such visits

Improvements/Applications: Preventive scaling service have been found to be affecting the growth in demand for dental care. Since this service will prevent periodontal disease, dental expenditure is expected to decline over the medium to long term.

Keywords: Coverage, Prophylactic Scaling, National Health Insurance, Periodontal Disease, Prevention Measures.

INTRODUCTION

The life expectancy has increased globally and chronic diseases have increased beyond the prevalence of epidemic diseases, there has been a growing interest in oral health as well as general health^[1]. Periodontal

disease and dental caries are one of the most common chronic disease^[2]. In the past 5 years, the number of patients in gynecologic diseases and periodontal diseases has increased to 46.7% and total medical expenses to 87.1%^[1]. Periodontal diseases are highly prevalent and periodontal disease includes gingivitis and periodontitis, and the worldwide prevalence of gingivitis is reported to reach 90%^[3]. Periodontal disease is a poor results of oral hygiene management, resulting in the formation of a soft tissue pocket between the gingiva and the root. It is a disease that can lead to tooth loss, eventually accompanied by discomfort, pain, and impaired mastication as well as inappropriate treatment^[2,3]. In

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particular, periodontal diseases are one of the major causes of tooth loss in elderly^[3]. The cost of treating periodontal disease has been increasing as individuals and social burdens continue to increase^[1].

Prevention of periodontal disease should be based on risk factors, commonly accepted risk factors include the formation of biofilm on periodontal tissue due to lack of proper oral hygiene control^[2]. These precautions should be included at the same time as personal care and management through oral healthcare professionals. To prevention of periodontal disease through oral healthcare professionals includes early oral examination and the purpose of removal of calculus by oral healthcare providers^[2]. In Korea, however, visits to the dental clinic for the prophylactic scaling are rarely reported^[4]. Discussions on the development of measures to prevent periodontal disease continue, and since July 2013, dental health insurance benefits with the highest priority among dental preventive care items have been expanded^[4]. In the past, only the items for which follow-up treatment, such as periodontal disease treatment, was applied, were included for the age of 20 years or more, and only once a year, the elimination of preventive purposes was included as a benefit^[3,5,6]. It is also noteworthy that it is a new policy intervention for the prevention of periodontal disease in adults^[3,5,7].

Prior to the expansion of benefits, the removal of calculus for prevention was a preventive measure for non-payment, so the burden on the cost to pay was relatively large. However, after the benefit application, the burden of copayment decreased sharply to around 13,000 won^[5]. It is likely that this policy will have an impact on improving access to dental access and mitigating unmet dental need^[3,8]. It is estimated that periodontal disease will be prevented and the cost of treating periodontal diseases will be reduced, and the oral health of the people will be improved. However, the effectiveness of this policy has not been measured. The purpose of this study is to evaluate the utility of the scaling insurance benefit policy by confirming the changes and trends of medical use after the scaling insurance benefit, using the insurance benefit data from the National Health Insurance Corporation customized data.

This can be used as a basis for analyzing the change of medical use according to the policy of expanding the

cost of dental calculus and enhancing the accessibility of preventive dental use in Korea.

MATERIALS AND METHOD

In this study, the claim data of National Health Insurance Corporation was used. Due to the development of computer technology since the introduction of the National Health Insurance in 1989, the demand for computerized claims for health insurance increased to 90% in 2001, and since 2005, more than 99% of the accumulated data has accumulated in about 10 years. It was reported to reach 600 billion^[9]. The claim data is representative of the health service contents of the whole nation and is characterized by representative and inclusiveness^[10]. Data were collected from the national health insurance corporation by using the status quo of the quartz removal benefit data. From 2007 to 2016, the subjects who were benefited from the calculus removal service were identified by using the Korean Standard Disease Sign Classification (KCD7) according to the disease name (K05) and the specification specific identification code (U2232, U2233).

The number of visits to the dentist and the total amount of the dental expenses were calculated based on the subjects who received the scaling service for each year. At this time, the precautionary calculus removal was calculated based on the assumption that it would be effective not only in the removal of the calculus but also in the prevention of the oral disease by improving accessibility of the oral healthcare institution.

RESULTS AND DISCUSSION

Table 1 shows the characteristics of the subjects who were removal of calculus from the coverage of the insurance benefits from 2007 to 2016. First, according to gender, 55.98% of women were higher than 44.02% of men. According to the type of health insurance subscription, 51.20% of health insurance subscribers were higher than 48.80% of the medical benefit recipients. The lowest income group had the highest income with 52.79%, followed by the middle group with 33.70% %, and 13.51%, respectively. Finally, depending on the types of calculus removal, 53.22% of calculus removal required subsequent treatment, and 46.78% of calculus removal was performed on the entire oral cavity.

Table 1: General characteristics of subjects

Classification		N	%
Sex	Male	102,637	44.02
	Female	130,542	55.98
Type of health insurance	Health insurance	119,381	51.20
	Medical benefit	113,798	48.80
Income level	Lower	61,839	52.79
	Middle	39,465	33.70
	Higher	15,838	13.51
Type of remove calculus	U2232	124,107	53.22
	U2233	109,072	46.78
Total		233,179	100.00

From 2007 to 2016, the number of patients who visited the dentist for removal of calculus appeared as shown in Fig 1. After the application of the tartar removal benefit policy, it tended to increase continuously. In particular, the number of patients in 2013 is 32,097, which is about 460% higher than in 2012.

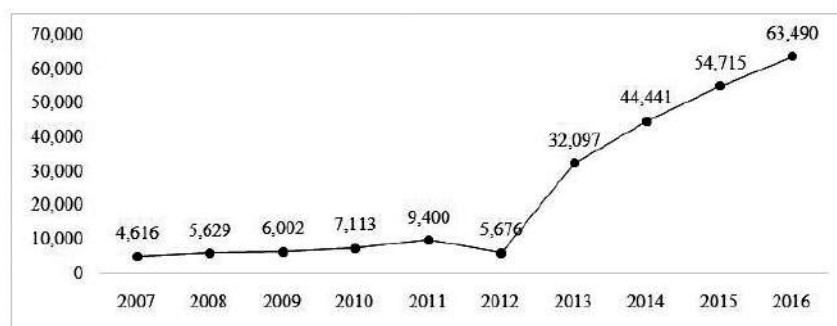
**Figure 1: Number of dental visits for scaling**

Table 2 shows the actual use of dental care per patient per year. The average number of dental visits per patient was 1.84 for 9 years, and the number of visits for periodontal treatment was 1.47. The average dental treatment cost per person was about 71 thousand won, and the cost of periodontal treatment was about 55 thousand won. The number of dental visits per patient per year decreased from 2.15 times in 2007 to 1.63 times in 2016, and the number of visits for periodontal related treatment also decreased (Fig 2).

Table 2: Use of dental treatment for periodontal disease

Year	Visit of general treatment	Visit of periodontal treatment	Fee of general treatment	Fee of periodontal treatment
2007	2.15(0.01)	1.72(0.01)	50,372(242)	41,067(191)
2008	2.34(0.01)	1.77(0.01)	57,433(244)	44,681(182)
2009	2.28(0.01)	1.76(0.01)	59,841(244)	47,403(187)
2010	2.20(0.01)	1.72(0.00)	61,995(236)	49,561(179)
2011	2.19(0.01)	1.72(0.00)	63,973(234)	50,781(174)
2012	2.07(0.01)	1.67(0.00)	66,167(287)	53,655(206)
2013	1.76(0.00)	1.41(0.00)	68,046(202)	54,731(101)
2014	1.70(0.00)	1.36(0.00)	71,891(208)	56,467(89)
2015	1.69(0.00)	1.35(0.00)	78,291(254)	58,351(91)
2016	1.63(0.00)	1.33(0.00)	82,638(284)	59,104(89)
Total	1.84(0.00)	1.47(0.00)	71,428(93)	54,737(40)

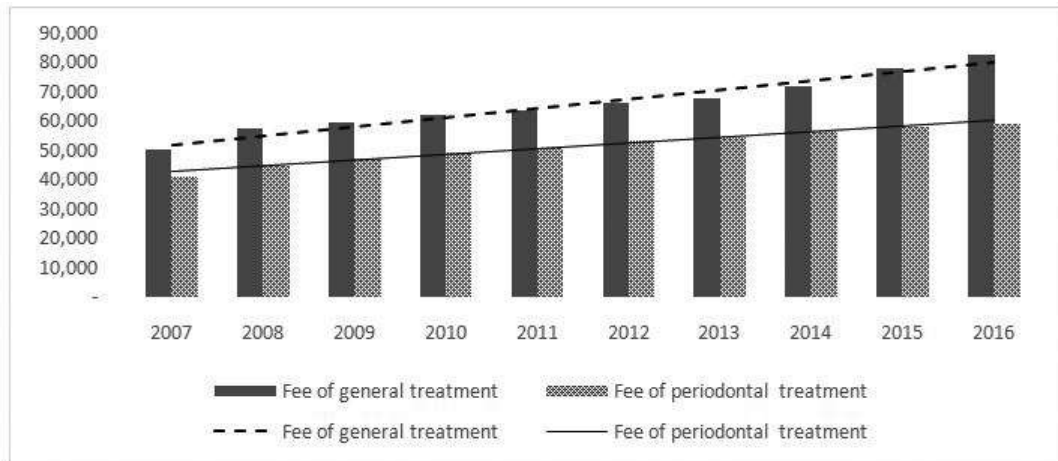


Figure 2: Trend of dental treatment cost

To treat periodontal disease, huge human and economic resources are inevitable. This is because not only the cost of treatment for periodontal disease but also the cost of treatment increases because dental prosthesis treatment leads to dental prosthesis removal due to severe periodontal disease^[11,12]. Therefore, in the long term, it is considered that a policy to prevent periodontal disease is needed instead of treatment of periodontal diseases and restoration and reconstruction of teeth.^[3,7,13]. The purpose of this study was to investigate the effect of dental stone removal benefit policy by examining the number of patients with dental calculus removed and the change of usage pattern before and after treatment.

This Study has shown that the number of patients visiting the dentist for quartz removal increased by a factor of four after scaling insurance benefits. Since periodontal disease is an inflammatory disease that can be caused by calculus and stasis, the increase in the number of beneficiaries of the periodontal disease removal service is an important factor in societal prevention^[7,11,14]. In other words, it is a positive effect that the economic burden is alleviated due to the benefit of the tartar removal insurance, leading to patients' voluntary dental visits. As a result of checking the number of dental visits and the cost of treatment for a period of one year, the cost of dental treatment increased due to the implementation of various protection policy, but the number of dental visits decreased. These results are positive in that the policy to expand the benefits of tartar removal is clear in the short term and maintains the sustainability of the policy effects. The increase in the cost of dental treatment can be seen as a result of the broadening of the scope of benefits for dental services in cross-sectional areas as a whole. In-depth discussion, it is not the target group directly benefiting from the removal

of plaque removal for prevention purposes, but it can be regarded as a result of the person who visited the dentist for prevention after the policy implementation increased the medical expenses of the periodontitis patient group after diagnosis of periodontitis. In other words, the effect of the policy effect seems to be evident because it was thought that the policy to increase the benefits of preventive plaque removal was influential on the increase of demand for dental care for potential periodontal disease patients^[11,12].

To date, there have been few official research data on the policy effects of strengthening dental protection, and research institutes and academic circles have recently done little to evaluate the dental health insurance. Although periodontal disease reduces the inflammation of the disease, it is highly likely that inflammation will recur, so it is essential to maintain, treat, and prevent periodontal health through continuous professional oral care rather than one-off management^[1,15]. In order to reduce the prevalence of periodontal disease, which is the ultimate goal of the policy, it is not necessary to limit the number of annual benefits and to apply the single preventive benefit item. It will be necessary to continuously expand the policy to apply dental preventive treatment benefits at a level that includes preventive measures such as management education and periodontal disease management fee (plaque control)^[11]. And in order to expand the effect of the policy for periodontal disease patients, which is the mainstay of the application of the calculus removal benefit, it is necessary to expand the salary by reflecting the characteristics of the patient's illness rather than the uniform pay increase. Furthermore, System should be established and follow-up observation on patient management should be conducted.

CONCLUSION

In conclusion, it was confirmed that the policy of prophylactic scaling service was influential on the increase of demand for dental care for potential periodontal disease patients. The increase in the number of patients with scaling and the average cost for periodontal treatment per capita can be interpreted as an increase in the national medical expenses in the short term. However, considering the mid- and long-term effects of preventive services such as scaling will lead to a reduction in periodontal disease, and oral health promotion will be possible in the future.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nill

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Meta-analysis of Effects of Cosmetological Manual (Su-gi) Therapy on Psychological Factors -Focused on Journal Articles Published in Korea-

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ABSTRACT

Background/Objectives: The purpose of this paper is to systematically analyze the effect of manual therapy on psychological aspects by considering previous articles on manual therapy published in cosmetology over the past decade.

Method/Statistical analysis: The data was gathered from journal articles on manual therapy published in Korea from January 2008 to December 2017. CMA (Comprehensive Meat-Analysis) version 3 was used for the meat-analysis.

Findings: The meta-analysis of 37 individual studies on the effect size of cosmetological manual therapy relative to psychological factors highlighted the following. First, manual therapy had a statistically significant large effect size in relation to psychological factors overall. Second, by treatment type, Swedish, meridian and myofascial massage had large effect sizes, in comparison to a medium effect size of Lymph massage. Third, by age group, large effect sizes were found in 20-39, 40-64 and 20+ groups, compared to a medium effect size in 65+ group. Fourth, in dependent variables, large effect sizes were found in both protection and risk factor groups.

Improvements/Applications: This meta-analysis of the effects of cosmetological therapy on positive and negative psychological factors by age and treatment type provides scholarly reference data for cosmetology, as well as a systematic theoretical background for developing manual therapy programs applicable in practice.

Keywords: *Manual therapy, Meta-analysis, Psychological factors, Effect size, Complementary and alternative therapy*

INTRODUCTION

Healthcare in modern days has shifted from treatments toward disease prevention and health improvement and from pathologic t to psycho-social healing ^[1]. According to data published in 2017 by the Ministry of Health and Welfare, 13.2% of Koreans experienced depression, which outpaced the prevalence in major advanced countries such as Germany and the U.S., with Korea ranked 28th in

the Gross National Happiness Index 38 OECD member states Depression and fatigue are two of the aspects that define modern society ^[2]. Therefore, psychological and emotional health is drawing increasing attention and central to well-being, which is high on the agenda for contemporary people against the backdrop of growing average life expectancy ^[1].

Likewise, as an approach to improving mental and physical health, complementary and alternative medicine (CAM) is in increasing demand. According to the WHO, more than 41%, 90% and 69% of the entire population use the CAM in the U.S., China and Australia, respectively (WHO, 2012). In Korea, the percentage of CAM users was estimated to increase to 86% in 2008 from 69% in 2001. The high percentage of CAM users is

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attributable to its viability for overcoming the limitations of Western medicine, increasing the potential for healing and providing psychological stability leading to a higher quality of life [3].

The complementary and alternative medicine includes plant therapy, mind-body interventions, homeopathy and folk remedies, to name a few. The mind-body interventions include the massage (or Su-gi in Korean) therapy. As a collective term for rubdown, acupressure and other therapies using hands, the massage refers to a method of improving health and treating illness by dynamically stimulating the skin with hands in certain ways and eliciting biologic responses [4]. Characterized by movement and touch, the massage therapy comprises specific techniques of stimulating the sensory paths to the cerebrum by activating the pressure, vibration and tactile sensations and unique sensory receptors and is generally considered to reduce anxiety and stress hormone secretion and influence the biologic responses of the body involving the nervous system, circulatory system, immune system and endocrine system as well as the muscle relaxation [5].

Research on the massage therapy has accumulated since 2000. Particularly, quite a few studies on the effects of massage therapy have been published in cosmetology [6]. Korea is ranked 6th in the world in terms of the number of institutions offering cosmetology courses. To secure competitive advantage, the field of cosmetology should increase the support for academic research and professional knowledgeability across the board [7].

Specifically, as for the effects of the massage therapy in view of subjects' psychology and mental health explored in the field of cosmetology in Korea, Jeong (2016) applied the deep tissue massage (DTM) to middle-aged women and reported the massage therapy was effective for relieving subjects' psychological symptoms and depression whilst boosting their self-esteem. Lee (2008) investigated the relationship between the foot massage and depression in senior citizens and reported the remedy decreased symptoms of depression. Applying the back massage to middle-aged women, Kim (2012) concluded the back massage was effective for relieving their mental stress.

To draw systematic conclusions on the effects of the massage therapy on psychological factors by treatment type and age and to present some scholarly reference data for the benefit of cosmetology, this paper meta-analyzes previous studies on the massage therapy used in cosmetology. Meta-analysis is a statistical method of comparatively analyzing the effect sizes across different studies [8].

To that end, this paper focuses on the following: first, it reviews journal articles published in Korea to examine overall effects of the massage therapy on psychological factors; second, it determines the effect size by therapy and age group reported in journal articles published in Korea; and third, it examines the effect sizes of psychological factors relative to the massage therapy.

MATERIALS AND METHOD

This meta-analysis uses CMA 3.0 (Comprehensive Meta-Analysis 3.0 version). The journal articles were collected as follows.

Data collection: First, from January 18th to 25th, 2018, the author searched Korean journal articles published since 2008 involving such keywords as 'Sugi therapy' and 'massage' on <http://www.riss.kr> run by Korea Education & Research Information Service, which returned a total of 702 articles. Out of the 702 articles, the author sorted out 73 articles published in the field of cosmetology based on their titles and abstracts. Second, 7 articles irrelevant to pure Su-gi or massage therapy, another 7 involving discrete characteristics of subjects and 2 using statistics inapplicable to analysis were excluded. Third, excluding 37 articles using irrelevant dependent variables, a total of 20 articles were meta-analyzed.

Article selection criteria: It is critical to articulate the inclusion and exclusion criteria in meta-analysis so as to elicit significant results. The reason for clarifying the reference points for the article selection is to prevent researchers from the selection bias that may arise in the process of literature review [9]. In this paper, the author referred to Lee (2017) for the reference points for the article selection as outlined in Table 1.

Table 1: Reference points for article selection

Area	Reference points
Types of study	Empirical and quantitative studies based on experimental findings
Inclusion criteria	Journal articles published in Korea Excluding articles unpublished at the request of authors

Conted...

Subjects	Adults aged 20 and over Excluding studies on patients or children
Measures	Selecting studies only if clear measures are used
Variables	Selecting studies utilizing the massage (Su-gi) therapy as independent variable and effectiveness of psychological factors as dependent variable
Data processing	Selecting articles only if they quantify the effect sizes

Article selection results: Table 2 shows the articles conforming to the reference points for selection and used for the meta-analysis.

Table 2: Characteristics of theses to be analyzed

Target	Journal name	Age	Variable	Effect
Chae-jeong, Han(2011)	Journal of The Korean Society of cosmetology	40-60 years old	Meridian message	Mental symptoms
Bo-ra, Park(2010)	Journal of Investigative Cosmetology	20 years old	Meridian message	Stress
Na-Rae Jung(2011)	Korean journal of aesthetics and cosmetics society	20-50 years old	Meridian message	Anti-Stress Emotion quotient
Si-kung Lee(2009)	Korean journal of aesthetics And cosmetics society	30 years old	Meridian message	Psychological well-being
Sang-Eun Lee(2012)	Journal of the Korea Soc. Beauty and Art	20-30 years old	Fascia message	Psychological well-being
Suk-ja choi(2009)	Journal of The Korean Society of cosmetology	30-40 yrs old	Swedish message	Caution index Anti-stress Psychological stress
Seok-naYoun(2014)	Journal of the Korea Soc. Beauty and Art	20-40 years old	Swedish message	Stress Mood state
Na-rae Jung(2012)	Journal of investigative Cosmetology	20-50 years old	Meridian message	Activity, Expression, Stress, Anti-stress
Su-young Kim(2012)	Journal of The Korean Society of cosmetology	40-50 years old	Swedish message	Mental stress Psychological stress
Jung-Hwan Kim(2010)	Korean journal of Sports Science	40-50 years old	Swedish message	Stress
Mi-HyangJeong(2016)	Journal of Investigative Cosmetology	40-50 years old	Fascia message	Psychological symptoms, Depression, Positive self, Negative self
Suk-Hee Lee(2008)	Korean Journal of Clinical Social Work	65 years or older	Meridian Massage	Depression
Min-suGwak(2013)	The Korean Journal of Complementary And alternative medicine	20-25 years old	Meridian message	Stress
Joo-heeHeo(2009)	Journal of The Korean Society of cosmetology	70 years or older	Meridian message	Depression
Seong-ah Ahn(2008)	Journal of The Korean Society of cosmetology	40-50 years old	Meridian message	Depression
Ji-on Park(2017)	Asian journal of Beauty and cosmetology	40-50 years old	Lymph message	Depression

Criteria for categorizing the variables for analysis: To determine the effect sizes of sub-items in the selected articles and to analyze their effectiveness, the author set up the criteria for sub-categories. Here, the items and contents were categorized by the type of Su-gi (manual) therapy, subjects' age and dependent variable.

Following the age criteria suggested by Ahn(2010) and Park(2009), the age groups were sub-categorized as per the life cycle into early adulthood (19-39 years old), mid-life and mature adulthood (40-64 years old), and late adulthood(65+). Table 3 shows the sub-categories of the articles analyzed.

Table 3: Categorization of moderating variables

Item	Details
Types of manual (massage) therapy	Swedish massage, shiatsu massage, myofascial massage, limp massage, more than two types applied
Subjects' age group	20-39 years old, 40-64 years old, 65+, all ages(≥ 20)

To review previous studies to determine the dependent variables relevant to psychological effects, meta-analyzing stress management programs for workers, Wang (2016) sub-classified the factors into improvement factors showing positive changes and reduction factors manifesting some effects by reducing stress. Choi (2017) meta-analyzed the psychological effects of programs for the elderly and sub-categorized the variables into facilitation variables which facilitated psychological stability and inhibition variables which inhibited psychological instability. Also, reporting on the effects of aroma therapy on stress, Park and Park

(2017) defined such subcategories as psychological stress, physical stress and state anxiety.

Hence, depending on the effects of gaining psychological satisfaction or the effects of relieving psychological anxiety, this meta-analysis of the effectiveness of the Su-gi(massage) therapy subcategorized the dependent variables into the psychological protection factor group involving the emotion quotient, positive self and anti-stress that facilitate positive psychology, and the psychological risk factor group involving depression, stress and negative self that constitute unstable psychology. Table 4 shows the categorized dependent variables.

Table 4: Categorization of dependent variables

Categories	Dependent variables in articles analyzed
Protection factor group	Mental symptoms, anti-stress, emotion quotient, psychological well-being, mood state, activity, expression, psychological symptoms, positive self, compassion and sympathy
Risk factor group	Stress, psychological stress, mental stress, depression, negative self

Data processing: To verify the effect size reported in each study, the author examined the homogeneity of samples across the studies. As the samples and treatment methods varied across the studies, a random effect model was used for analysis [10]. The effect size was determined as per Cohen (1998), i.e. small ($d \leq .20$), medium ($.20 < d < .80$) and large ($d \geq .80$).

RESULTS AND DISCUSSION

This meta-analysis of the effects of cosmetological manual therapy on psychological factors shed light on the following results. As shown in Table 5, since the homogeneity test determined the previous studies were highly heterogeneous, a random effects model was used to measure the effect size.

Table 5: Homogeneity test result

Q-value	df(Q)	P-value	I ²	T ²
287.751	36	.000	87.489	1.120

Overall effect size in psychological domain

Table 6: Overall effect size on psychological factors

Number of studies: 37					
Point estimate	Standard error	Lower limit	Upper limit	Z-value	P-value
1.600	0.197	1.213	1.987	8.106	.000

As shown in table 6, The overall effect size of manual therapy on psychological factors was 1.600, which was very large and statistically significant.

Effect size by treatment type: Table 7 shows the effect size of manual therapy by treatment type. The analysis of 12 studies on Swedish massage indicated the largest effect size of 1.799, followed by meridian massage (1.661) and myofascial massage (1.270). The lymph massage had a medium effect size of 0.665, which was based on no more than one article and requires caution. Comparative analysis of the effects of different types of massage is hardly documented. The present meta-analysis findings are comparable to Shin (2014) that compared the effects of Swedish massage with that of Thai massage and reported both relieved stress, although the latter employed different age groups and treatment types [11].

Table 7: Effect size by therapeutic manual treatment type

Type	Number Studies	Point estimate	Standard error	Lower limit	Upper limit	Z-value	P-value
Swedish	12	1.799	0.365	1.084	2.514	4.932	.000
Meridian	18	1.661	0.323	1.027	2.295	5.136	.000
Fascia	6	1.270	0.266	0.750	1.791	4.784	.000
Lymph	1	0.655	0.337	-0.005	1.316	1.945	.052

Effect size by age: Table 8 shows the effect size of manual therapy by age. The effect size was largest in the 20-39 group (2.064), followed by a large effect size of 1.465 in the 40-64 group and a medium effect size of 0.726 in the 65-plus group. Notably, the meta-analysis of the 65+ group was based on no more than two articles. Meanwhile, the meta-analysis of 12 articles involving the 20+ age group indicated a very large effect size of 1.714, which seemed attributable to the high percentage of subjects in their early adulthood and mid-life and mature adulthood. Given physical conditions vary across age groups, it is contestable whether the analyzed effect size involving all subjects aged 20 and over is valid, which warrants attention in further studies on manual therapy [12].

Table 8: Effect size of manual therapy by age

Age group	Number Studies	Point estimate	Standard error	Lower limit	Upper limit	Z-value	P-value
20-39	7	1.726	0.262	1.212	2.239	6.590	.000
40-64	16	1.249	0.099	1.055	1.444	12.598	.000
65 +	2	0.744	0.252	0.251	1.238	2.958	.003
20 +	12	1.229	0.010	1.036	1.422	12.481	.000

Effect size on dependent variables: Table 9 shows the effect size on dependent variables. The effect size of the protection factor group facilitating positive psychology was 0.859, whereas the risk factor group triggering unstable psychology had a very large effect size of 2.344. These findings suggest manual therapy is significantly effective for increasing positive psychology and decreasing such unstable elements as depression and stress, which is consistent with Jeong (2016) that found myofascial massage raised positive self while reducing negative self in middle-aged women [13].

Table 9: Effect size on dependent variables

Dependent variable	Number Studies	Point estimate	Standard error	Lower limit	Upper limit	Z-value	P-value
Protection factor group	15	0.895	0.135	0.594	1.123	6.360	.000
Risk factor group	22	2.344	0.329	1.699	2.988	7.129	.000

CONCLUSION

This meta-analysis of journal articles on cosmetological manual therapy published over the past decade in Korea was intended to give a scientific and systematic insight into the effectiveness of manual therapy on psychological factors by treatment type and age and to provide some scholarly reference data for cosmetology. Meta-analysis is a method of research to derive quantitative results from previous articles on a topic.

This meta-analysis shed light on the following findings.

First, manual therapy had a very large effect size of 1.600 overall relative to psychological factors, which indicates manual therapy was effective for psychological factors overall.

Second, as for the effect size by treatment type, Swedish, meridian and myofascial massages scored 1.799, 1.661 and 1.270, respectively, which were large in comparison to the medium effect size of lymph massage (0.665). These findings substantiate the positive effects of manual massage on psychological factors irrespective of treatment types. Yet, the analyzed effect size of lymph massage was limited to no more than one article, which warrants the need for further research on the effects of lymph massage on psychological factors.

Third, as for the effect size by age group, very large effect sizes of 2.064 and 1.465 were found in the 20-39 and 40-65 groups, respectively, in comparison to a medium effect size of 0.726 in the 65+ group. Given the analysis of the 65+ group was based on no more than two articles, the effect size of manual therapy in this group is less generalizable, which underscores the need for further research on the effects of manual therapy on psychological factors in the elderly. A large effect size of 1.229 was found in the general adult group aged 20 and over. Still, measuring the effect size in a 20+ cohort requires extra caution, in that physical condition varies across ages, which need be considered in future research on manual therapy.

As for the effect size on dependent variables across the entire articles on manual therapy, very large effect sizes of 2.344 and 0.895 were found in the risk and protection factor groups, respectively. This finding corroborates the effects of manual therapy on decreasing the unstable factors while increasing the protection factors in clients. Such effects as associated with psychological healing underpin the value of manual therapy as a mind-body intervention in the field of complementary and alternative therapy.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Changes in Serum Lipids according to the Amount of Exercise Activity in Middle-Aged Women

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ABSTRACT

The purpose of this study was to identify the effects on basal metabolic rate and serum lipid according to the amount of exercise activity of middle - aged women. We divided 30 middle - aged women into dynamic exercise group and static exercise group in Seongnam Senior Experience Complex on 8 weeks. The before and after tests examined the body weight and height, basal metabolic rate, serum lipids that LDL-cholesterol, HDL-cholesterol, total cholesterol and triglyceride level. Data were analyzed using descriptive statistics. As a result of comparing the changes in before and after results of dynamic exercise group and static exercise group, significant differences were shown in basal metabolic rate($P<0.05$), total cholesterol($P<0.05$). And there was a significant difference in total cholesterol($P<0.05$),LDL-cholesterol($P<0.05$) between the two groups before and after the experiment. The basal metabolic rate and LDL values were changed with or without exercise. And total cholesterol and LDL values showed different changes according to the amount of exercise. Therefore, dynamic exercise with a high amount of exercise is effective in lowering serum lipid.

Keywords: Amount exercise, Static exercise, Dynamic exercise, Basal metabolic rate, Cholesterol rate, Middle-age women

INTRODUCTION

Today, due to rapid economic growth and the development of medical technology, the proportion of elderly people over 65 is increasing. Along with the increase in the elderly population, the average life expectancy in Korea has also increased to 80.8 years (National Statistical Office, 2011). On the other hand, the lifespan of health is 71 years¹, which is lower than the other countries in developed countries such as Japan, Switzerland and England (Ministry of Health and Welfare, 2010).

Elderly people are more likely to become ill due to lowering of their physical function as they get older. As a result, the ability to operate daily life is weakened, and the need for other people's assistance increases, so social and medical problems are emerging.

According to the analysis of medical care trends of the elderly patients in Korea, the number of geriatric patients increased from 899,000 to 1,027,000 in 8 years (2002 ~ 2009). Also total medical expenses increased by 419.5% from 580 billion won to 2,440 billion won (Ministry of Health and Welfare, 2011). Therefore, it is important to treat geriatric diseases, but it is necessary to prevent diseases from the middle and old years in order to maintain and promote the current health status under the social interest to reduce the burden of the national medical expenses and prolong the health life span. Basal Metabolic Rate (BMR) and serum lipids are important factors in the health care of the elderly. Basal

metabolic rate refers to the amount of energy consumed to maintain a life phenomenon. As the physical activity increases, energy required for maintaining the body's homeostasis, autonomic nervous system activity, heartbeat, respiration, and body temperature is increased. Therefore, basic metabolism is an important item for life maintenance².

As the age increases, the basal metabolic rate decreases, which leads to an increase in body fat and a

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change in blood lipids³. Increased body fat changes blood lipid levels in the elderly and causes vascular diseases such as arteriosclerosis, cardiovascular disease, and cerebrovascular diseases⁴. Cardiovascular diseases such as coronary artery disease, stroke, and hypertension are closely related to low-density lipoprotein-cholesterol (LDL-C) and high-density lipoprotein-cholesterol (HDL-C). Increased levels of LDL-C, the major carrier of blood cholesterol from aging, are a risk factor for aneurysmal diseases such as atherosclerosis, and increased levels of HDL-C may reduce the risk of cardiovascular disease in the elderly⁵. 95% of cardiovascular diseases result from atherosclerosis associated with LDL-C and HDL-C stated that a major cause of over 50% of atherosclerosis is lack of physical activity⁶. Therefore, regular exercise training is essential and has shown that lowering the levels of total cholesterol (TC), triglycerides (TG), and LDL-C and increasing the levels of HDL-C to prevent sclerosis of the arteries and hypertension⁷.

In addition, several studies have shown that older people can prevent or reverse many of the physical dysfunctions by regular physical activity. And the declining muscle strength of elderly people also reported that regular physical activity can maintain or enhance the functional capacity of fat and muscle⁸.

These studies suggest that proper physical activity and regular exercise in middle - aged and elderly people may delay aging and prevent geriatric diseases. Therefore, it is very important to select important factors of physical activity and carry out planned exercise continuously. In particular, in middle-aged women, continuous physical activity is necessary to overcome the physical changes that come from menopause and emotional disorders caused by social and psychological factors.

Motivation is the most important factor in sustaining exercise. In order to induce motivation, the exercise is most interesting and the group exercise programs with colleagues are good. Therefore, in this study, a dynamic and static group exercise program was developed and applied to increase exercise participation and exercise performance. Dynamic exercise can have a positive effect on performance improvement due to body temperature rise, muscle blood flow increase, and nerve conduction velocity improvement. Static exercise has less energy consumption, less pain due to tissue damage, and less muscle aches to be⁹.

The purpose of this study was to investigate the change of serum lipids before and after the exercise program through the development and operation of 8 week dynamic and static group exercise program for female middle-aged women. . This study was conducted to provide health information for the elderly and middle-aged people.

MATERIALS AND METHOD

Research Design: The purpose of this study is to compare the pre-and post-test results of dynamic group exercise and static group exercise for 8 weeks for 30 middle-aged women on table 1. In this study, we use the convenience sampling method which is a non-probability sampling method. Because it is not easy to use the probability sampling method, also the difficulty in recruiting sufficient candidates for the probability sampling.

Table 1: Basic data of subjects

Total (person)		average age	average height (cm)	average weight (kg)
30		53.45	156.84	53.13
Dynamic person	Static person			
15	15			

We measured body weight, height, and basal metabolic rate using a body composition analyzer (Inbody 720, Biospace, USA, 2005). Also the serum levels of LDL-C, HDL-C, TG, and TC were measured by a serum lipid assay. Pre - test was performed from March 12, 2018 to March 16, 2018, and each experimental group then performed the corresponding dynamic group exercise and static group exercise for 8 weeks. The post-test was conducted from May 14, 2018 to May 16, 2018.

Experimental Method

Dynamic exercise program: Dynamic exercise program is a large-scale energy metabolism movement that requires a lot of activities. The program consisted of a total of 3 exercises including free exercise, senior dance which is low-intensity aerobic exercises to be performed according to 4/4 beat songs, weight bearing exercise on table 2¹⁰. Each exercise took 50 minutes including preparatory exercise and twice a week for 8 weeks in total 16 times.

Table 2: Dynamic exercise program

Type of exercise	Method
Free exercise	1.5 minutes stretching 2. 30 minutes : Lightly run, Waist rotation, Shake upper body, Shoulder rotation 3. 5 minute finishing exercise
Senior dance	1.5 minutes stretching 2. 30 minutes fast 4/4 beat dance 3. 5 minute finishing exercise
Weight exercise	1.5 minutes stretching 2. 30 minutes : Lifting dumbbells(with sit to stand up), Sit-up 3. 5 minute finishing exercise

Static exercise program: Static exercise program is a small-scale energy metabolism movement that requires less activity. Yoga and core exercises are one of the measures to stabilize the waist, It is an exercise method that uses anti-gravity effects to provide balance and stability of the trunk¹¹. In addition, the Gymball movement is suitable for the spinal stabilization exercise on table 3. The exercise frequency was 16 times for 8 weeks for 2 times per week.

Table 3: Static exercise program

Type of exercise	Method
Yoga	1.5 minutes stretching 2. 30 minutes : Lying, sitting, standing, one leg standing position, *Breathing exercise in all position 3. 5 minute finishing exercise
Core exercise	1.5 minutes stretching 2. 30 minutes : Squat exercise, Lift legs in a lying, Keep four foot position 3. 5 minute finishing exercise
Gym ball exercise	1.5 minutes stretching 2. 30 minutes : keep lying on the ball, sit on the ball, standing on the ball with one foot * Keeping time is about 30 seconds 3. 5 minute finishing exercise

Analysis method: The normal distribution test was performed to find out the normal distribution of each test group. Paired sample T-test was performed for the

comparison between the dynamic and static exercise groups. In addition, an independent two-sample T-test was conducted to determine the difference in serum lipids according to each exercise group. Statistical analysis was performed using SPSS version 22.0 and the significance level (α) was 0.05.

RESULTS AND DISCUSSION

Dynamic exercise program: The basal metabolic rate was increased but there was no significant difference and TC decreased significantly difference ($P=0.01$). There was no significant difference in TG, HDL-C, and LDL-C on table 4.

Table 4: Comparison before and after application of dynamic exercise program

	pre	post	P
BMR (kcal)	1206.933 ±98.238 ^a	1211.400 ±101.827	0.394
TC (mg/dL)	196.000 ±31.605	183.067 ±28.831	0.010*
TG (mg/dL)	116.333 ±79.729	110.133 ±57.301	0.687
HDL-C (mg/dL)	62.200 ±10.380	61.533 ±12.340	0.659
LDL-C (mg/dL)	118.133 ±24.219	112.133 ±26.180	0.129

BMR: Basal metabolic rate, * ($P<0.05$)

^aaverage± standard deviation

Static exercise program: There was a significant difference in basal metabolic rate ($P=0.01$). TC and TG decreased but there was no significant difference. There was no significant difference between HDL-C and LDL-C on table 5.

Table 5: Comparison before and after application of static exercise program

	pre	post	P
BMR (kcal)	1170.000 ±60.582 ^a	1180.400 ±57.360	0.014*
TC (mg/dL)	200.600 ±32.704	199.867 ±32.654	0.823
TG (mg/dL)	131.133 ±56.955	121.133 ±46.915	0.478
HDL-C (mg/dL)	58.800 ±10.094	57.667 ±10.533	0.446
LDL-C (mg/dL)	124.267 ±34.868	131.933 ±35.874	0.072

BMR: Basal metabolic rate, * ($P<0.05$)

^aaverage± standard deviation

Comparison of pre-post change of between groups:

There was no significant difference in basal metabolic rate, TG, and HDL-C when comparing the pre- and post-change amounts of the dynamic exercise program and the static exercise program. However, there were significant differences in TC(P=0.03) and LDL-C(P = 0.02) on table 6

Table 6: Comparison of pre-post change of between groups

	Dynamic	Static	P
BMR (kcal)	4.467 ±19.657 ^a	10.400 ±14.282	0.352
TC (mg/dL)	-12.933 ±16.829	-0.733 ±12.487	0.032*
TC (mg/dL)	-6.200 ±58.354	-10.000 ±53.073	0.853
HDL-C (mg/dL)	-0.667 ±5.728	-1.133 ±5.592	0.823
LDL-C (mg/dL)	-6.000 ±14.422	7.667 ±15.253	0.018*

BMR: Basal metabolic rate,* (P<0.05)

^aaverage± standard deviation

As life expectancy increases, regular exercise to prepare for geriatric diseases has become an essential element in the lives of the elderly. Therefore, studies on suitable exercise for the elderly have been going on steadily, and many older people are studying ways to participate with interest in exercise. In this study, we tried to examine the effects of the program on the participation of the elderly people in the exercise with the social issues. The purpose of this study was to investigate the changes of basal metabolic rate and serum lipid after exercise in the dynamic and static exercise group for middle - aged women.

The results of previous studies, such as Choi¹², which investigated the correlation between exercise effects and serum lipid changes, showed that pre-post-test was not statistically significant because the subjects' pre-blood test values did not deviate from normal range.

The results of the dynamic exercise group are similar to those of the previous studies, but there is a slight difference in the basic metabolism item. This is considered to be a difference in exercise intensity, and it will be a good study if research on the change of body composition such as basal metabolism according to the future strength is carried out.

In the static exercise group, only the basal metabolic rate showed a statistically significant difference, which is slightly different from the previous studies. These results suggest that basal metabolic rate is more influenced by living environment than exercise.

Comparisons between dynamic and static exercise groups showed statistically significant reductions in TC and LDL-C compared to the static exercise group. These results suggest that continuous dynamic exercise is more effective than static exercise in reducing and preventing the incidence of vascular diseases such as arteriosclerosis, cardiovascular disease, and cerebrovascular disease.

CONCLUSION

This study was undertaken to examine the effect of dynamic and static exercise programs on the serum lipids of middle-aged women twice a week for 8 weeks. First, there was a significant difference in the basal metabolic rate between the static exercise group and the TC in the dynamic exercise group. Second, the result of the difference between groups, there was a significant difference TC and LDL-C showed a significant difference in the comparison between the dynamic exercise group and the static exercise group. These results suggest that dynamic exercise is more effective in promoting health by positively changing serum lipid changes in middle - aged women.

Basal metabolic rate and LDL values were changed with or without exercise. And total cholesterol and LDL values showed different changes according to the amount of exercise. Therefore, dynamic exercise with a high amount of exercise is effective in lowering serum lipid.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Effects of Job Characteristics and Organizational Communication on Job Satisfaction among Dental Hygienists

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ABSTRACT

Background/Objectives: This study aims to identify the effects of job characteristics and organizational communication on job satisfaction among dental hygienists.

Method/Statistical analysis: The participants were 241 dental hygienists in Seoul and South Chungcheong province. The data were collected using a self-report questionnaire and analyzed using independent t-test, one-way ANOVA, Pearson's correlation coefficient, and multiple regression. We used a level of significance of $p < 0.05$.

Findings: Dental hygienists' job satisfaction was positively correlated with job characteristics and organizational communication ($p < 0.01$). Dental hygienists' job characteristics and organizational communication affected job satisfaction ($R^2 = .535$, $F = 20.113$, $p < 0.001$). Task identity was the only subfactor of job characteristics that significantly affected job satisfaction. Horizontal communication, quality of media, and personal feedback significantly affected organizational communication.

Improvements/Applications: To improve job satisfaction, strategies to enhance job characteristics and organizational communication satisfaction should be devised.

Keywords: Job characteristics, Job satisfaction, Organizational communication.

INTRODUCTION

With the increased mean lifespan, interest in improving quality of life is greater than ever. As shown by the rising medical consumerism and the number of people visiting healthcare facilities for health promotion, needs for quality medical service are on the rise, and healthcare facilities are engaging in substantial efforts to improve the quality of their medical service and efficiently manage human resources^[1].

Within an organization, the job is an important medium that connects individuals to the organization, so it is important to understand the job characteristics

of dental hygienists. In dental hospitals and clinics, dental hygienists' jobs usually require skills, proficiency, attention, and judgment. Job characteristics theory states that workers' satisfaction and performance may differ depending on the objective characteristics and traits of a job^[2]. A previous study on clinical nurses reported that job characteristics are positively correlated with job satisfaction^[3,4]. Furthermore, some studies reported that turnover intention decreased with increasing job characteristics^[5] while others found that job characteristics are not associated with turnover intention^[6].

In today's healthcare industry, communication is perceived as an essential clinical skill, and the need for proper communication between medical professionals and service recipients tailored to their needs in a rapidly evolving society is increasingly emphasized. Communication in dental hospitals and clinics plays a crucial role in promoting a shared understanding among dental professionals and successfully providing satisfactory dental care to patients^[7]. Regarding

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communication-related studies in the field of dental hygiene, one study reported that trust in and satisfaction with dental hygienists increase with their medical communication competence^[8], and another reported that higher scores of dental hygienists on informative and affiliative communication as perceived by the patients were associated with higher patient satisfaction and intention to revisit^[9]. Smooth communication among dental professionals influenced patient satisfaction, and smooth communication among coworkers contributed to a lower remanufacturing rate for dental prosthetics^[10]. It has been reported that dental hygienists maintain better communication among themselves than do dentists^[11]. Further, higher satisfaction with organizational communication among dental hygienists was associated with high job satisfaction and organizational commitment with low turnover intention^[12].

However, only a handful of studies have investigated the relations among job characteristics, organizational communication, and job satisfaction or examined the effects of job characteristics and communication on job satisfaction among dental hygienists.

Therefore, this study aims to identify the associations among job characteristics, organizational communication, and job satisfaction as well as the effects of job characteristics and organizational communication on job satisfaction based on a new perspective to provide foundational data to improve the efficiency of dental hygienists working in dental hospitals and clinics.

MATERIALS AND METHOD

Dental hygienists working in one of the randomly chosen dental hospitals and clinics located in Seoul and South Chungcheong province were surveyed from

September 26, 2016, to December 15, 2016. From a total of 244 questionnaires retrieved, three were excluded for being inappropriate for data processing, resulting in a total of 241 questionnaires in the final analysis. A 15-item questionnaire measuring skill variety, task identity, task significance, autonomy, and feedback (three items each) was used to measure job characteristics^[1], and organizational communication was measured using a 24-item questionnaire measuring eight factors of organizational communication, including organization prospect, personal feedback, communication with superior, media quality, horizontal communication, and organizational climate. Job satisfaction was measured with nine items. A five-point Likert scale was used with a higher score indicating higher levels of job characteristics, organizational communication, and job satisfaction. The reliability (Cronbach's α) of the scales was 0.827 for 15 job characteristics items, 0.888 for 24 organizational communication items, and 0.873 for 9 job satisfaction items. The collected data were analyzed using the SPSS/WIN 18.0. Job characteristics, organizational communication, and job satisfaction by general characteristics were analyzed with t-test and one-way ANOVA. The relations among job characteristics, organizational communication, and job satisfaction were analyzed with Pearson's correlation coefficient, and the effects of job characteristics and organizational communication on job satisfaction were analyzed with multiple regression.

Job characteristics, organizational communication, and job satisfaction by participants' general characteristics: Job characteristics and organizational communication significantly differed according to age, total length of career, length of current career, and position. Job satisfaction significantly differed according to age, total length of career, and position [Table 1].

Table 1: Differences among job characteristics, organizational communication, and job satisfaction by general characteristics

Variables		N	% M \pm SD	Job characteristics		organizational communication		Job satisfaction	
				t or F	M \pm SD	t or F	M \pm SD	t or F	
Gender	male	2	0.8	3.87 \pm 1.04	1.703	3.40 \pm 1.10	0.470	3.22 \pm 1.10	-0.152
	female	239	99.2	3.31 \pm 0.45		3.23 \pm 0.48		3.29 \pm 0.62	
Age	≤ 25	85	35.3	3.21 \pm 0.46 ^a	5.794**	3.21 \pm 0.42 ^{ab}	3.683*	3.21 \pm 0.55 ^a	7.920***
	26-30	101	41.9	3.33 \pm 0.45 ^{ab}		3.17 \pm 0.49 ^a		3.20 \pm 0.66 ^a	
	≥ 31	55	22.8	3.47 \pm 0.43 ^b		3.40 \pm 0.54 ^b		3.57 \pm 0.56 ^{bc}	
Total length of career (year)	< 4	134	55.6	3.20 \pm 0.45 ^a	10.757***	3.18 \pm 0.44 ^a	5.124**	3.19 \pm 0.57 ^a	6.093**
	4-8	67	27.8	3.43 \pm 0.46 ^b		3.23 \pm 0.49 ^{ab}		3.32 \pm 0.68 ^{ab}	
	≥ 8	40	16.6	3.52 \pm 0.39 ^c		3.45 \pm 0.54 ^b		3.57 \pm 0.56 ^b	

Conted...

Length of current career (year)	<1	79	32.8	3.22 ± 0.46 ^a	5.614 ^{**}	3.20 ± 0.46	3.420 [*]	3.25 ± 0.67	1.599
	1-3	87	36.1	3.28 ± 0.47 ^{ab}		3.17 ± 0.47		3.24 ± 0.59	
	≥3	75	31.1	3.46 ± 0.42 ^b		3.35 ± 0.52		3.39 ± 0.59	
Position	Staff DH	171	71.0	3.21 ± 0.45 ^a	20.612 ^{***}	3.12 ± 0.45 ^a	19.869 ^{***}	3.15 ± 0.56 ^a	16.125 ^{***}
	Charge DH	40	16.6	3.51 ± 0.38 ^b		3.43 ± 0.46 ^b		3.55 ± 0.68 ^b	
	Head DH	30	12.4	3.68 ± 0.34 ^b		3.62 ± 0.43 ^b		3.70 ± 0.55 ^b	

*p<0.05, ** p<0.01, ***p<0.001

Degree of job characteristics, organizational communication, and job satisfaction: The mean job characteristics score was 3.32 ± 0.46 out of 5. Task identity had the highest score at 3.55 ± 0.74. The mean organizational communication score was 3.24 ± 0.48 with the highest score for horizontal communication (3.60 ± 0.70) followed by communication with superior (3.37 ± 0.49) and communication with subordinate (3.33 ± 0.70). The mean job satisfaction score was 3.29 ± 0.62 [Table 2].

Table 2: Degree of job characteristics, organizational communication, and job satisfaction

variables	M ± SD
Job characteristics	3.32 ± 0.46
skill variety	2.99 ± 0.54
task identity	3.36 ± 0.54
task significance	3.55 ± 0.74
autonomy	3.16 ± 0.77
feedback	3.52 ± 0.66
Organizational communication	3.24 ± 0.48
horizontal communication	3.60 ± 0.70
communication with superior	3.37 ± 0.49
media quality	3.12 ± 0.73
organization climate	3.47 ± 0.61
organization conflict	2.99 ± 0.82
personal feedback	3.02 ± 0.74
organization prospect	2.99 ± 0.83
communication with subordinate	3.33 ± 0.70
Job satisfaction	3.29 ± 0.62

Correlations among job characteristics, organizational communication, and job satisfaction: Job characteristics were significantly positively correlated with organizational

communication (r = .511, p<0.01) and job satisfaction (r = .432, p<0.01) while organizational communication was significantly positively correlated with job satisfaction (r = .611, p<0.01) [Table 3].

Table 3: Correlations among variables

	job characteristics	organizational communication	job satisfaction
job characteristics	1		
organizational communication	0.511 ^{**}	1	
job satisfaction	0.432 ^{**}	0.611 ^{**}	1
^{**} p<0.01			

Effects of job characteristics and organizational communication on job satisfaction: The F value of the regression model was 20.113, which was statistically significant (p <0.001). The R² of the regression equation for job characteristics and organizational communication was .535, showing a relatively high explanatory power. Task significance was the only subfactor of job characteristics that had a significant effect on job satisfaction. Among subfactors of organizational communication, horizontal communication, media quality, and personal feedback had significant effects on job satisfaction [Table 4].

Table 4: Variables influencing job satisfaction

Variables		B	β	t
job characteristics	skill variety	-.021	-.018	-.375
	task identity	-.098	-.086	-.375
	task significance	.131	.157	2.586 [*]
	autonomy	.053	.066	1.047
	feedback	.086	.092	1.520

Conted...

organizational communication	horizontal communication	.105	.119	2.125*
	communication with superior	-.099	-.079	-1.537
	media quality	.165	.193	2.990**
	organization climate	.028	.027	.469
	organization conflict	-.050	-.066	-1.025
	personal feedback	.386	.464	7.169***
	organization prospect	-.011	-.015	-.266
communication with subordinate	.026	.029	.442	

 $R^2 = .535$ Adj $R^2 = .509$; $F = 20.113$ $P = .000$

CONCLUSION

In this study, dental hygienists' job satisfaction was positively correlated with job characteristics and organizational communication. Further, dental hygienists' job characteristics and organizational communication affected their job satisfaction. Particularly, task identity was the only subfactor of job characteristics that significantly affected job satisfaction while horizontal communication, media quality, and personal feedback were the subfactors of organization communication that significantly affected job satisfaction. Based on these findings, institutional support to help dental hygienists perceive their job as significant and have expanded autonomy is needed to improve their job satisfaction. Moreover, various communication programs involving all members of the organization should be implemented to facilitate organizational communication.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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A study on the s Diffusion of Infectious Disease Issues and Paradox of Public Health

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ABSTRACT

Background/Objectives: The purpose of this study is to define the political and social debate on the operational problems of public hospitals in Korea as a paradox situation and to find out the elements of paradox in this debate and how to manage it.

Method/Statistical analysis: We analyzed policy issues, IAD analysis, coverage and media frame analysis. We also analyzed policy cases to test the impact of public issue dissemination on the form of media coverage.

Findings: As a result of analyzing the paradox phenomenon of public health policy in Korea, the government's coercive and one-sided management method has not been an efficient solution to aggravate today's public health conflicts. Korea has suggested the need for a democratic conflict management system in the era of localization and democratization. In this controversy, paradoxical factors were found and the public health policy was sought for how to manage it.

Improvements/Applications: In addition to the spread of public issues due to the disaster of infectious diseases after the closure of the Jinju Medical Center, the concentration of profitability in public hospitals has brought attention to the public role of public hospitals and changes the public health policy. Therefore, according to the form of media reports, the policy impact on the spread of medical public issues can be confirmed.

Keywords: *Infectious Disease, Paradox of Public Health, Diffusion of Issues, Public Health, Institutional Approach*

INTRODUCTION

On the one hand, public hospitals in Korea are forced to commercialize healthcare (profitability) due to the problem of deficit management, and on the other hand they face the problem of lack of public health system (loss of publicity). That is, public hospitals have developed policy paradox phenomena that result in 'policy failure' due to problem definition and problem solving that deviated from the original goal of 'improvement of the entire public

health'. After the closure of Jinju Medical Center in 2013, the company tried to increase its medical profitability by claiming to improve its chronic management deficit by surviving. However, after 2015, due to the infectious diseases such as Middle East respiratory syndrome (MERS) since the loss of credibility of the system, there has been a paradox in which public interest in public hospitals has increased.

In short, the most serious problem of public health in Korea is that there is no solution to support public loss when social public health problems such as infectious diseases arise. The importance of the role and existence of public hospitals every time the epidemic that has been prevalent since 2000 (SARS in 2003, H1N1 flu in 2009, Ebola virus in 2014, MERS in 2015, ZIKA virus in 2016) The public and the public have been attracting attention, but when the situation is over, interest in public health

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has disappeared. So far, medical publicity in Korea has been highlighted with social interest and policy issue when incidents such as infectious diseases spread.

Such policy issues, which have a high level of social interest, cause political and social changes in the society, and the media plays a decisive role in policy issues. If the general public's interest in an issue rises, the media will continue to report it, and the media reports will lead to political and social changes in one society by keeping the public interested in the issue [1,2,3].

Public health issues related to public health are likewise emphasized by the media as the public's awareness and the issues are expanded to develop social issues [4,5,6]. Therefore, there has been a directional change in the overall policy systems depending on the media reports on medical issues and publicity issues, and whether the policy direction has a significant effect on public health development and social contribution of the nation as a whole it will be important to confirm.

This study starts from the fact that this policy is essentially simultaneous and coexistent in public hospitals, which is the core of public health policy. In other words, the need for public hospitals, as well as other public institutions, should be understood as a paradoxical situation including conflicting values and elements of profitability and publicity. In public hospitals, various different factors coexist such as improvement of equity through healthcare accessibility of vulnerable areas of the target, strengthening the medical safety net of medical blind spot, guaranteeing the health rights of the people, and eliminating social exclusion. In this regard, public hospitals are recognized as a rational choice to maximize their benefits in consideration of the behavioral characteristics of recipients, whether to pursue the policy or to understand the paradoxical situation and to recognize that a new management strategy is required. And to find ways to find out the appropriate policy effect.

MATERIALS AND METHOD

How to analyze policy paradox case in public health field: Generally, in welfare policy, paradox is classified into three types. First, as a built-in paradox, based on the assumption that welfare policy is maintained based on steady economic growth, economic accumulation is difficult, or the cost burden is different from the

benefit burden group. It is a paradox. Second, it is a political paradox, a paradox due to systematic design mistakes. For example, when the recipient is selected while the National Basic Livelihood Security System is implemented, the remaining classes, especially those in the next level (potential poverty strata), turn into poverty. In addition, selected recipients will not seek to escape the current economic situation or seek other means to avoid being excluded from the supply and demand of the various benefits. This corresponds to a political paradox [7,8]. Third, it is a paradox due to problems in the execution of welfare policy determined as operational paradox. This is mainly due to the overlapping, leakage, and inefficiency caused by the inability of the central government, central and provincial, and local and private networks to operate [9,10].

Institutional Analysis and Development (IAD)

systematic analysis of public health policy: The IAD analysis framework is the simplest form of social institutionalization. However, in actual individual decision-making situations, exogenous variables of bio-physical conditions, rules, and community characteristics can affect complex incentive structures in individuals in the action arena. The purpose of this study is to apply the IAD analysis tool to the case of closure conflict of Jinju Medical Center under the theoretical basis of rational new institutionalism. Especially, we want to analyze the situation of the behavior system by setting it as a game situation.

How to quantify the amount of press releases

on 'diffusion of public issues': The discussion of 'spreading public issues' about the case appears as the press coverage of the press. Therefore, it conducts quantification work on the amount of press coverage of the press. The volume of media coverage of an incident can be quantified by the extent to which the media deals with the issue. In this study, TV or radio use the amount of newspaper coverage rather than the weight of the issue to investigate the media coverage of the incident.

Regardless of the type of paper or the difference in the size of the newspaper, it can be quantified as the number of articles on the issue, the total number of articles, and the total number of articles. Among the three methods, the number of articles (although the number of articles on one side and the articles on the other side are different for each tendency of newspapers) treats all related articles as the same weight in the measurement, . Second, because the area of coverage

includes photographs (perceived as heavy events), it can be more accurate than the number of articles or the total number of articles. However, this method suffers from the difficulty of measuring by measuring the area of newspaper articles on issues.

Third, the way to quantify the number of characters is to quantify the press coverage of the issue as the total number of characters. The weight of the photographs related to the articles may not be taken into consideration, but there is no problem in any quantification method. Therefore, this study quantifies the media coverage as the total number of newspaper articles on issues.

In this study, we search the articles of ChosunIlbo and JoongangIlbo in Korea and analyze the articles. Therefore, we include as many terms related to issues as possible in our search terms.

RESULTS AND DISCUSSION

Analysis of policy paradox case in public health sector: The purpose of privatizing an organization that was operated as a public institution is because it expects to be able to improve the productivity of the organization and ultimately respond to the demand of the public administration more efficiently by securing autonomous responsible management system from the interference of the government. In many countries, however, it points out that institutional responsibility and productivity deteriorate after privatization. This is called ‘paradox of privatization’ in a comprehensive sense. The case of Korea is the case of the closure of Jinju Medical Center and the occurrence of new infectious diseases.

The cause of the disease has not yet been elucidated globally, and many infectious diseases that have not developed vaccine have been developed worldwide, resulting in public anxiety. Ignoring the convergence of the public opinion of the Governor of Gyeongnam Province with regard to the closure of Jinju Medical Center, As a reason, the unilateral declaration of closure was made and enforced. The paradigm conflict surrounding the operation of public medical institutions has surfaced. Paradigm is centered on profitability, government-led restructuring is taking place, and Korea is the world’s second largest casualty sufferer due to the respiratory syndrome in the Middle East in 2015, resulting in astronomical economic losses, restructuring the paradigm of public health policy Necessity is being reconsidered.

Institutional Analysis and Development (IAD) systematic analysis of public health policy: Among the elements of IAD analysis, physical attributes, rules, and attributes of the community are as follows. Changes in the concept of public health as a result of amendments to the Act on Public Health Care On February 2, 2013, the concept of public health changed as a result of the amendment of the Act on Public Health Care. The revised law also means that private medical institutions can provide public healthcare services and do not need the exclusive existence of public medical institutions. The operation of public medical hospitals is efficiency. Most public health centers had problems with chronic deficits and inefficiencies. In other words, public hospitals were seriously in debt, continued deficits, and lack of will to improve management.

According to the situation of the act and the participants, the opposition struggle of the health and medical labor union, the Jinju medical union, the civil society, and the people opposed to the closure started in accordance with the unilateral decision of closure of Gyeongnam Province regarding Jinju Medical Center.

The evaluation shows that the closure case of Jinju Medical Center is a typical example of failure of conflict management when local governments with power decide and pursue public policy and neglect the opponents.

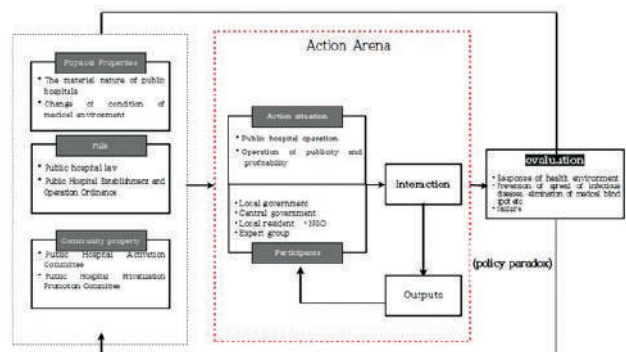


Figure 1: IAD analysis result

Results of quantitative analysis of press release volume: According to the purpose of the study, this study analyzed the media coverage of ‘Infection Disease and Public Health Policy’. According to the analysis results, it can be seen that there is a single network of 315 key word nodes with ‘infectious disease and public health’ as hubs. The connection centrality index of each keyword is 0.26, 0.18, 0.16, 0.14, 0.13, 0.10, 0.08, 0.07, 0.06, 0.03, and so on.

In addition, the infectious disease associated with the keyword with the highest occurrence frequency in the keyword frequency analysis is the role of 'local public hospital', and the result of the network analysis is 0.26, which has the highest mediation center of connectivity. This is due to the fact that there are many media reports expressing the phenomena related to infectious diseases and public health as 'disease management', and in the context of the media reports, this phenomenon is considered as prevention and management in the central government for the purpose of establishing countermeasures against the new pandemic. And the tendency to understand it as interest is strong. In other words, it is necessary to prevent such conflicts and wastes by clarifying local affairs and delegation affairs.

Table 1: Connection centrality and mediation of key words (2000 ~ 2018)

Ranking	Keyword	Connection centrality	Mediation centrality
1	Regional base public hospitals	0.26	0.21
2	Disease control center	0.18	0.19
3	Epidemic management	0.16	0.17
4	Mers	0.14	0.14
5	Public interest in public hospitals	0.13	0.09
6	Public hospital deficit	0.10	0.08
7	National Hospital	0.08	0.07
8	Disease management	0.07	0.05
9	Restructuring of medical institutions	0.06	0.03
10	Jinju Medical Center closes	0.03	0.02

CONCLUSION

This study was analyzed with two purposes. First, it examines the paradoxical phenomenon of public health policy. Second, it examines the influence of media reports on public issues. To achieve the purpose of research, IAD analysis, which is an institutional approach, and how the process of policy decision making changes. Based on

this research, we have solved the research problems and found out the problems of the paradox of public health such as the case of Jinju Medical Center and suggested policy suggestions and implications. In this study, the government's coercive and one-sided management method has led to the suggestion that democratic conflict management methods are required for the localization and democratization era. In the process of resolving the paradox of the policy, there should be no government illegal activities.

This study concludes that the government should recognize and protect the legitimate rights of residents, even if they are in conflict with each other. This study can be used as a policy strategy that can be a model for the decision process of public health policy related to the success of public health in the future by identifying the paradoxical phenomenon of policy on public health policy. It is expected. In other words, this study will be able to improve the overall system by understanding the paradox of public health and diffusion of infectious disease issues from a systematic point of view.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effects of Fall Prevention Static and Dynamic Trunk Stabilization Exercises on the Balance of Elderly Females

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ABSTRACT

Objectives: The purpose of this study is to investigate the effects of static/dynamic trunk stabilization exercises on the balance abilities of female patients above the age of 65 years.

Method/Statistical analysis: This study included 30 females above the age of 65 years, who were randomly divided into the static trunk exercise stabilization group (n=15) and the dynamic trunk exercise stabilization group (n=15). The stabilization exercises were performed three times a week for four weeks. Static and dynamic balance abilities were measured before and after the exercise to determine its effects. Frailty and cooperative studies of intervention techniques-4 (FICSIT-4) and one leg standing test (OLST) were measured to evaluate static balance, while time up & go test (TUG) and functional reach test (FRT) were measured to evaluate dynamic balance.

Findings: Our results showed that static trunk stabilization exercises significantly improved static balance ability (OLST) and dynamic balance ability (TUG) ($p<0.05$). Dynamic trunk stabilization exercises significantly improved static balance abilities (FICSIT-4, OLST) and dynamic balance abilities (FRT, TUG) ($p<0.05$). OLST, which reflects static balance ability, significantly differed between the two groups ($p<0.05$).

Improvements/Applications: The static/dynamic trunk stabilization exercise group showed improvements in balance abilities, and in both groups, static and dynamic balances improved. In terms of effectiveness, no significant differences were observed between the outcomes of static and dynamic trunk stabilization exercises.

Keywords: Trunk stabilization exercise, Elderly Women, static balance, dynamic balance, Fall, elderly

INTRODUCTION

With advancements in medical technology and the improved economy, the average life expectancy has increased, and the geriatric population above the age of 80 years is rapidly increasing¹. As of December 2017, the Korean society is considered an aged society, with 14.02% of the population above the age of 65 years². In 2026, Korea is expected to become a super-aged society³.

Balance is a complex process that maintains the body's posture by adapting to changes in the environment

through voluntary adjustments⁴]. Increased age causes degenerative changes throughout the body, which leads to decreased proprioception², reflexes, and cognition and increased reaction and body-weight shifting times⁵. Decreases in balance abilities occur around the age of 60 years, which, along with decreased muscle strength and flexibility, causes falls⁶.

Exercise programs can effectively prevent falls in the elderly population⁷. Studies on fall prevention for the elderly are actively being conducted and have reported that exercise programs effectively improve joint range of motion, muscle strength, and balance abilities, which contribute to fall prevention⁸. Fall-prevention exercises include complex exercise programs that include tension bands, tai-chi, Swiss-ball, and dance-sports, which have been reported to effectively improve physical fall-prevention variables such as flexibility, muscle strength, and balance regulation abilities⁹.

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Trunk stabilization exercises strengthen deep muscles, such as the spinal stability muscles, abdominal muscles, hip muscles, and pelvic muscles¹⁰. Trunk stabilization exercises stabilize the waist area and provide balance and stability against gravity, which allows the body to maintain an upright posture. Cooperation between the flexor and extensor muscles of the trunk and increased abdominal cavity pressure, which are secondary to increased abdominal spring force, further stabilizes the trunk¹¹. Trunk stabilization exercises simultaneously train the back muscles and multifidus muscles to effectively improve balance and correct unstable postures¹².

Trunk stabilization exercises that use a static mat improve trunk stability by coordinating contraction of the trunk muscles while the limbs are in motion¹³. Static trunk stabilization exercises and static segmental trunk exercises increase the cross-section area of the multifidus muscles¹⁴, while dynamic trunk stabilization exercises improve dynamic body balance. These exercises improve trunk stability and prevent falls. Furthermore, trunk stabilization exercises that are performed in a dynamic environment stimulate proprioception and increase activity of the motor cortex in the cerebrum, which consequentially improves balance and balance maintenance¹⁵. Dynamic trunk stabilization exercises progress from weightless to weight bearing exercises, stable to unstable surfaces, simple to complex exercises, and slow to fast movements^{16, 17}.

This study investigated the type of exercise that is more effective in improving balance of elderly females of 65 years of age or above. Our results will provide a basis for the development of effective future trunk exercise programs.

METHOD

Participants and duration: This study was conducted from June 10, 2018 to July 11, 2018 and included 30 female residents of D city who were 65 years of age or above. The participants were randomly divided into static and dynamic trunk stabilization exercise groups. The selection criteria included 1) participants with no visual impairments, 2) participants with no circulation disorders such as hypertension, 3) participants with no pain-induced exercise restrictions, 4) participants with no neurological impairments that affect balance or gait, and 5) participants who understood the procedure and purpose and volunteered for the study.

Evaluation tools: FICSIT-4 and OLST were used to evaluate static balance, while TUG and FRT were used to evaluate dynamic balance. Measurements were taken three times at each session, from which the average value was calculated. Evaluations were performed before and after exercise training.

Static balance

Frailty and Injuries Cooperative Studies of Intervention Techniques-4(FICSIT-4): FICSIT-4 is a tool that evaluates static balance and is divided into seven categories. Measurements are taken in four different postures: while the participant is standing with feet together (parallel), while the participant is standing with one foot's heel next to the other foot's great toe (semi-tandem), while the participant is standing with feet aligned (tandem), and while the participant is standing on one foot (one-leg standing). The evaluation tool is made up of a total of 28 points, and the score of each category ranges from 0 to 4. With the exception of the one-leg standing positions, the postures are further divided into open and closed-eyed, for 10 seconds. To prevent falls, therapists were in close contact with the patient during measurement. The examination/reexamination reliability of FICSIT-4 was $r=.66$ ¹⁸.

One leg standing test (OLST): The static balance ability can be measured faster than the other methods, and the fall-risk is predictable. The reliability between measurers is $ICC=.9$, sensitivity is 95%, and specificity is 58%¹⁹. While the participant is standing with her eyes open, the participant is asked to spread both arms parallel to the ground surface and lift one leg, upon the measurer's instruction. The lifted leg was to be maintained at a knee angle of 90 degrees. The measurements were taken while the participants had their eyes open, and the maximum time between initiation and tremor of the upper/lower limbs was recorded²⁰. The measurements were performed three times, and the average value was recorded.

Dynamic balance

Functional Reach Test(FRT): The participants were asked to stand next to a wall, extend their arms frontally, parallel to the ground surface, and bend over their trunks while reaching forwards, as far as possible. The distance that the finger tips travelled until one foot detached from the ground was measured in cm. To prevent falls, the examiner stood next to the participant throughout the process. The reexamination reliability of FRT and inter-examiner reliability were high, at 0.92 and 0.98, respectively²¹.

Time Up & Go Test (TUG): TUG is a reliable and effective tool for measuring mobility in the weak elderly. The participants are asked to sit on a chair with the armrest at 46 cm above the ground. A turning point was placed 3 m from the chair, and the participant is asked to get up from the chair, go around the turning point, and sit back down. The reliability of TUG and inter-examiner reliability were high, at $r=0.99$ and $r=0.98$, respectively²².

METHOD

The participants were randomly distributed in each group 15 in the static trunk stabilization exercise group and 15 in the dynamic trunk stabilization exercise group. For both groups, one exercise session was composed a five-minute warm-up, 20 minutes of trunk stabilization exercise, and a five-minute cool-down. A one-minute break was provided when the participant complained of pain or discomfort. Each participant underwent the 30-minute exercise session three times a week for four weeks. Three physical therapists with three or more years of experience and six assistants aided the exercise sessions.

Static trunk stabilization group: The static trunk stabilization exercise was composed of flexibility and isometric exercises. The exercise was performed while the participant is laying on the mat in a static position, without being worried about gravity. The exercise was designed to improve stability and was performed in the pelvic lift position, the pelvic lift with one leg lifted position, and the quadruped with one leg and one arm raised position²³.

Dynamic trunk stabilization group: The dynamic trunk stabilization exercise was composed of a pelvic lift, an alternating diagonal movement of contralateral limbs while the participant was laying down, and a contralateral limb rise in the quadruped position. The exercise program was composed of dynamic exercises that simultaneously strengthen stability and mobility²⁴.

Analysis method: The SPSS 20.0 program was used for data analysis. To investigate the normal distribution

of categories between the groups, the Shapiro-Wilk test was performed. To evaluate changes before and after the exercise programs in both groups, a paired 2-sample test was used. Lastly, to evaluate differences between the two groups, an independent 2-sample test was performed. The significance level of the study (α) was .05.

RESULTS

Characteristics of the participants: The mean age of the participants in the static trunk stabilization exercise group was 70.07 ± 3.09 years, the mean height was 152.53 ± 6.49 cm, and the mean weight was 51.60 ± 7.33 kg. The mean age of the participants in the dynamic trunk stabilization exercise group was 71.20 ± 2.96 years, the mean height was 151.47 ± 7.02 cm, and the mean weight was 50.73 ± 5.65 kg. The characteristics of the participants are shown in Table 1.

Table 1: General characteristics of the subjects

N = 30

	SSE group ¹⁾ (n = 15)	DSE ²⁾ (n = 15)	P
Age(yr)	$70.07 \pm 3.09^*$	71.20 ± 2.96	.305
Height(cm)	152.53 ± 6.49	151.47 ± 7.02	.669
Weight(kg)	51.60 ± 7.33	50.73 ± 5.65	.719

* mean \pm standard deviation

¹⁾ Static Trunk Stabilization Exercise

²⁾ Dynamic Trunk Stabilization Exercise

Changes in static balance based on study methods

Changes in one leg standing balance: The static trunk stabilization exercise group showed a significant increase in one leg standing balance, from 11.48 ± 0.74 sec before exercise to 11.73 ± 1.03 sec after the exercise ($p < .05$). The dynamic trunk stabilization exercise group also showed a significant increase in one leg standing balance, from 12.00 ± 1.31 sec before exercise to 13.33 ± 1.44 sec after the exercise ($p < .05$). A significant difference was observed in OLSTs between the two groups (Table 2).

Table 2: Change in static balance

N = 30

	SSE group ¹⁾ (n = 15)	DSE group ²⁾ (n=15)	t	p
OLST (sec)				
pre	11.48 ± 0.74	12.00 ± 1.31	-1.372	.181
post	11.73 ± 1.03	13.33 ± 1.44	-3.485	.002

Conted...

<i>t</i>	-2.256	-4.000		
<i>P</i>	.041	.001		
FICSIT-4 (score)				
pre	21.47 ± 2.13	21.26 ± 2.37	.243	.810
post	22.13 ± 2.32	22.47 ± 2.92	-.073	.942
<i>t</i>	-2.000	-2.168		
<i>P</i>	.065	.048		

* mean ± standard deviation

¹⁾ Static Trunk Stabilization Exercise

²⁾ Dynamic Trunk Stabilization Exercise

FICSIT-4: Frailty and Injuries Cooperative Studies of Intervention Technique

OLST: One Leg Standing Test

Changes in FICSIT-4: The static trunk stabilization exercise group showed an increase in FICSIT-4, from 21.47±2.13 points before exercise to 22.13±2.32 points after exercise. However, the increase was not statistically significant. The dynamic trunk stabilization exercise group showed a significant increase, from 21.26±2.37 points before exercise to 22.47±2.92 points after exercise (*p*<.05). No significant difference was observed in FICSITs between the two groups (Table 2).

Changes in dynamic balance based on study method

Changes in Functional Reach Test: The static trunk stabilization exercise group showed a significant increase in FRT scores, from 13.73±1.29 cm before exercise to 15.93±2.15 cm after exercise (*p*<.05). The

dynamic trunk stabilization exercise group also showed a significant increase, from 12.60±1.92 cm before exercise to 15.13±2.36 cm after exercise (*p*<.05). No significant difference was observed in FRTs between the two groups (Table 2).

Changes in Time Up and Go: The static trunk stabilization exercise group showed a significant decrease in TUGs, from 11.93±1.10 sec before exercise to 11.13±1.06 sec after exercise (*p*<.05). The dynamic trunk stabilization exercise group also showed significant a decrease, from 12.07±0.70 sec before exercise to 10.87±0.63 sec after exercise (*p*<.05). No significant difference was observed in TUGs between the two groups (Table 3).

Table 3. Change in dynamic balance

N = 30

	SSE group ¹⁾ (n = 15)	DSE group ²⁾ (n = 15)	t	p
FRT (cm)				
pre	13.73 ± 1.29	12.60 ± 1.92	1.902	.067
post	15.93 ± 2.15	15.13 ± 2.36	.971	.340
<i>t</i>	-4.404	-4.219		
<i>P</i>	.001	.001		
TUG (sec)				
pre	11.93 ± 1.10	12.07 ± 0.70	.427	.672
post	11.13 ± 1.06	10.87 ± 0.63	.824	.417
<i>t</i>	4.000	8.290		
<i>P</i>	.001	.000		

* mean ± standard deviation; ¹⁾ Static Trunk y Stabilization Exercise; ²⁾ Dynamic Trunk Stabilization Exercise; FRT-4: Functional Reach Test; TUG: Time Up and Go Test

DISCUSSION AND CONCLUSION

Balance abilities in the elderly are related to personal stamina as age increases. Weakened muscle strength affects quality of daily life activities. Muscle strength and stamina are closely related to balance and gait²⁵. Among the physical properties of the elderly, decreased balance abilities and physical reaction times decrease the quality of life and interferes with independent living. The most prominent problem that arises from decreased physical properties is falling²⁶. At least 33% of the elderly who are above the age of 65 years experience falls yearly, among whom more than 50% experience recurring fall injuries²⁷. A previous fall increases the risk of recurrence by 2–3 times, and falls are responsible for major injuries in the elderly population²⁸.

Trunk stabilization exercise increases the stability of the spinal cord and improves instability of complex segmental movement²⁹. Improved balance abilities allow the correct posture to be maintained during voluntary motion and are important for daily life activities³⁰. Therefore, improvements in balance abilities through trunk stabilization exercises correct abnormal gait and decreases fall risk.

Jang et al.³¹ studied 20 female adults who were above the age of 65 years to investigate the effects of core exercise programs. A study that investigated female adult body composition, stamina, balance abilities, and cognition compared TETRAX (a balance ability evaluation) before and after an exercise program. The results showed a significant decrease in balance ability score, from 35.90 ± 7.29 to 28.70 ± 6.42 , in the core exercise program group, while no significant changes were observed in the control group. A study by Park³² investigated the effects of a core program on the balance abilities of the elderly. In this study, 40 elderly participants were studied for eight weeks, before and after trunk stabilization exercises. The results showed that FRT distance significantly increased, and significant changes were also observed in TUG time. Foss et al.³³ investigated the relationship between trunk muscle strength fortification and balance and found significant changes in TUG and FRT scores. A study by Kim³⁴, in which female elderly participants performed isometric core exercises for eight weeks, found significant changes when TUG was performed after strengthening of the lower limbs. Lastly, Hwang and Lee³⁵ investigated the effects of ball exercises on the balance and functional

motion of elderly females and found a significant change in TUGs, which could be due to the similarity of ball and trunk stabilization exercises. In both exercises, trunk muscle strengthening is secondary to the goal of maintaining a center of gravity³⁶.

In this study, significant changes in OLST, which evaluates static balance abilities before and after trunk stabilization exercise, were observed in both the static and dynamic exercise groups ($p < .05$). Furthermore, significant differences between the two groups were observed. The change in FICSTI-4 was only significant in the dynamic exercise group. However, no significant differences between the two groups was observed. Changes in TUG, which evaluates dynamic balance, were significant in both the static and the dynamic groups ($p < .05$), but no significant difference was observed between the two groups. Changes in FRT were significant in both the static and the dynamic exercise groups ($p < .05$), but no significant difference was observed between the two groups. These results show that trunk stabilization exercises effectively improve static balance. Since there are no significant differences between the groups, it is difficult to distinguish which exercise program is more effective in improving static balance.

Changes in balance abilities after the trunk stabilization exercise program coincide with the results of previous studies. For the elderly population to safely carry out daily activities, balance abilities must appropriately maintain the body in different environments. However, an inactive lifestyle causes decreased muscle strength and flexibility, which ultimately leads to decreased balance and an increased risk of fall.

Static and dynamic trunk stabilizations exercises were compared to determine which type more effectively improves balance. Although dynamic trunk stabilization exercise has a relatively more positive effect on static and dynamic balance, the differences compared to static trunk stabilization exercise is insignificant. However, since the changes in FRT and TUG are relatively less in the static trunk stabilization group, it can be inferred that dynamic trunk stabilization exercise is preferable to static exercises.

When elderly individuals are unable to perform dynamic trunk stabilization exercises, static trunk stabilization exercises could be an alternative to improve balance. In further studies, the duration of the exercise training and the number of participants should be more diverse, to produce meaningful results.

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The Causal Effects of Job Characteristics and Organizational Culture on Knowledge Sharing among Health Care Professions

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ABSTRACT

Background/Objectives: The purpose of the study was to identify factors influencing knowledge sharing among health care professionals.

Method/Statistical analysis: A total of 234 nurses participated in this study. Eight variables related to knowledge sharing, including job characteristics (job fitness, job challenge, job autonomy) and organizational culture (relation orientation, innovation orientation, task orientation, hierarchy orientation) were measured using reliable instruments. The data were analyzed using descriptive statistics, Pearson's correlation analysis, and a path analysis.

Findings: The path analysis showed that job fitness and job challenge had a direct effect on knowledge sharing and job autonomy mediated the effect of relation orientation culture on knowledge sharing. The fit indices of the model satisfied the model fit criteria.

Improvements/Applications: The findings of the study reveal the important role of organizational culture, especially relation orientation, in knowledge sharing in health care professions.

Keywords: Knowledge Sharing, Job Characteristics, Organizational Culture, Health Care Professions, Relation orientation

INTRODUCTION

As the 4th industrial revolution leads to enhanced awareness of creative development of professionals and knowledge management, a need for a knowledge-based organization management has been increasing. Knowledge sharing, a key component of knowledge management, is the act of organization members integrating knowledge by finding and acquiring the knowledge required for task completion^[1]. It is a process of creating new knowledge by sharing, cooperating, and learning new ideas^[2]. It has been reported that knowledge sharing enhances task solving methods and innovative actions of organization members^[3], positively influences

work satisfaction and organization commitment and increases the organization's task performance^[4], work efficiency^[5], and organizational efficacy^[6]. The factors that influence knowledge sharing include characteristics of knowledge, organizational culture, organizational basis, information technology basis, and evaluation and reward system^[7]. Among those, organizational culture is considered a key factor that determines the performance of knowledge sharing and knowledge application^[8]. Organizational culture has an important influence on an organization's attitude and behavior. It symbolizes the homes, values, beliefs, norms, rules, rituals, and symbols that the members of the organization share. An organization that has a knowledge-friendly culture, leadership, concentration of management, and high levels of trust, interest, and openness is typically successful in knowledge sharing^[9].

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With growing public interest in health and medical service and increased efforts to make patients feel safer and enhance the quality of treatment^[10], attention to organizational culture in public health is also expanding.

Accordingly, hospital organizations need to solve problems and grow bigger through knowledge sharing to strengthen the competitiveness of public health organization, which can be classified as a knowledge industry.

The public health is a comprehensive field with various types of organizations, such as hospitals, schools, clinics, and private and public organizations. As such, it also has a wide array of people working in it. Nurses take up more than 30% of all hospital personnel. They work in non-hospital sittings as well, which makes them the most influential contributors to the productivity of health and medical organizations. Nurses are in charge of public health management in hospitals, public health, medical groups, schools, and private and public organizations. Based on the basic factors of health and medicine or nursing tasks, they work either alone or together with other nurses, considering the characteristics of the places they are working in. The work scope of health and medical professionals is stipulated by the guidelines offered by the medical law, regional health law, and industrial safety health law, and its details may vary according to the types and forms of the organizations. A job is a combined concept of tasks assigned to individuals regularly, the responsibilities of which differ according to each position and work field^[11]. According to job characteristics, workers recognize sense of fulfillment, sense of responsibility, and performances. Such psychological state has been found to influence work performances, absence, or job transfer^[12]. Especially more diverse and independent jobs tend to positively affect job satisfaction levels^[13]. Such job characteristics are known to significantly influence knowledge sharing along with organizational culture, but research on the correlation between job characteristics and knowledge sharing is lacking.

Since health and medical professionals deal with health and life issues, they are required to carry out tasks strictly according to the guidelines. This leads to a traditionally strict and authoritarian organization management^[14]. Since their performances are often a matter of life and death, the organizational culture is highly tense and does not tolerate even the smallest mistake. However, such rigidity may hinder knowledge sharing and organizational development. To flexibly prepare for the changes and gain competitiveness in the knowledge society, the organization must make efforts to create an environment that enables active knowledge sharing. To this end, there is a need to study the influence

of the job characteristics and organizational culture on knowledge sharing in the health and medical industry.

Advanced research on knowledge sharing mostly belongs to the fields of public servants, private enterprises, and cyber education. The few researches on the health and medical field studied the influences of nurse organizations on nurses' knowledge sharing^[15], the influences of nurses' knowledge sharing on innovative behavior and organizational commitment^[3]^[16], and the influences of nurses' knowledge sharing on organizational commitment^[17]. Therefore, there is a need for a more systematically designed research to figure out the influences of the job characteristics and organizational culture of health and medical professionals on knowledge sharing.

To achieve this objective, this research has been conducted to study the relations between the job characteristics, organizational culture, and knowledge sharing among health and medical professionals who must adhere to regulatory job standards and complicated job trends. Additionally, it aimed to analyze the indirect effects of organizational culture recognition on the relationship between job characteristic and knowledge sharing. Lastly, it intended to provide rudimentary data to guide program and policy development that could contribute to knowledge sharing. Detailed research objectives are as follows.

1. Analyze the extent of subjects' job characteristic, organizational culture, and knowledge sharing.
2. Analyze the paths among the subjects' job characteristic, organizational development, and knowledge sharing.

MATERIALS AND METHOD

This cross-sectional research aimed to analyze the paths between job characteristic, organizational culture, and knowledge sharing among nurses in the health and medical professional field.

Theoretical framework: Literature review has shown that job characteristics and organizational culture influence knowledge sharing. To study the causal relations among the subcategories of job characteristics, subcategories of organizational culture, and knowledge sharing and to further explore the effect of major factors that affect knowledge sharing and organizational culture, we designed a framework depicted below in Figure 1.



Figure 1: Theoretical Framework

Research Subject and Data Collection: Typically, the number of subjects required for a path analysis is 15~20 times that of measured variables. Therefore, this research considered roughly 25~30% of elimination ratio due to omission and duplication of surveys and came up with the finalized questionnaire of 234 subjects.

The research subjects were nurses working in businesses, hospitals, or health medical organizations who had more than 6 months of experience in their current workplace. They participated either in job training of related committees or in remote-controlled classes of K University. After the authorization of research ethics (authorization certification number- ABN01-201704-21-06), the data was collected from April to July 2017 using a structured questionnaire. The participants were provided with explanation and handed agreement forms. They signed the agreements prior to participating in the surveys. They were notified that the survey results were going to be used only for the purposes of this research. The demographic characteristics of the participants indicated that 86.8% were women, and the average age was 35.5. Additionally, 100 worked in the health department of businesses (42.7%), 121 in medical facilities (15.7%), and 13 in public organizations, including clinics and schools (5.6%). A majority worked for private organizations, with work experiences varying from a minimum of 6 months to a maximum of 34 months. Their average working experience was 4.76 (\pm 6.31) years.

Research Instruments: Knowledge sharing, job characteristic, and organizational culture were measured on 5-point Likert scales, providing the average and variation, with higher scores indicate higher positivity.

Knowledge sharing tool: Knowledge sharing measure comprises a 6-question index, the validity of which was measured by [18] within domestic companies, among [19] model, including the extent of available knowledge within an organization, awareness on the source of knowledge and the rate of acceptance. The tool's reliability measured by Cronbach's α was 0.880 in [18] and 0.810 in this research.

Job characteristic tool: Job characteristics tool was modified from [20]. The tool comprised 16 questions assessing job fitness, job challenge, and job autonomy. A factor analysis that was used to test the tool's validity indicated that 4 questions assessing job fitness, 4 questions assessing job challenge, and 5 questions assessing job autonomy loaded well on their corresponding factors while 3 questions had to be dropped. (2,4,11) The tool's reliability was acceptable according to Cronbach's $\alpha = .849$ in [20] and .866 in this research. The reliability values for job fitness, job challenge, and job autonomy subcategories were .902, .798, .915, respectively.

Organizational culture tool: Organizational culture tool was based on a survey used by [21], which [5] modified to fit domestic situations. A factor analysis revealed that 5 relation orientation questions, 7 innovation orientation questions, 4 task orientation questions, and 5 hierarchy orientation questions loaded well on their factors. Accumulation accuracy was 68.8%. The tool's reliability was acceptable according to Cronbach's $\alpha = .756$ in [5] and .934 in this research. The reliability values for relation orientation, innovation orientation, task orientation, and hierarchy orientation subcategories were .840, .935, .812, .873, respectively.

DATA ANALYSIS

SPSS and AMOS programs were used to analyze the research data. All variables including the participants sociological characteristics were analyzed using descriptive statistics (average, standard deviation, frequency, percentage), and the multicollinearity among variables were analyzed using the Pearson correlation coefficients. Specifically, a factor analysis of job characteristics and awareness on organizational culture was conducted to select the final variables. For path analysis, maximum likelihood method was used, and for the analyses of indirect and total effects, bootstrapping method was used. The model fit was evaluated based on the absolute fit index Chi-square (χ^2), goodness of fit index (GFI), adjusted goodness of fit index (AGIF), comparative fit index (CFI), normed fit index (NFI), and the root mean squared error of approximation (RMSEA). The model's path significance was verified with standardized coefficient (γ , β), C.R. (Critical Ratio), and p value. The significance of endogenous variables was verified using the squared multiple correlation (SMC.)

RESULTS AND DISCUSSION

RESULTS

Prior to the path analysis, the results of multicollinearity among variables are shown in Table 1. The scores for job characteristics subcategories were 3.96 ± 0.70 for job challenge, 3.85 ± 0.82 for job fitness, and 3.29 ± 0.79 for job autonomy. For organizational culture, score for hierarchy orientation was the highest at 3.43 ± 0.83 , followed by task orientation (3.29 ± 0.72), relation orientation (3.27 ± 0.67), and innovation orientation (2.91 ± 0.79). The mean score for knowledge sharing was 3.97 ± 0.51 .

Table 1: Correlational Relationships between the Variables

Variables	Job fitness <i>r</i>	Job challenge <i>r</i>	Job autonomy <i>r</i>	Relation orientation <i>r</i>	Innovation orientation <i>r</i>	Task orientation <i>r</i>	Hierarchy orientation <i>r</i>	Knowledge sharing <i>r</i>	M ± SD
Job fitness	1								3.85 ± 0.82
Job challenge	.560***	1							3.96 ± 0.70
Job autonomy	.230***	.209**	1						3.29 ± 0.79
Relation orientation	.242***	.222**	.417***	1					3.27 ± 0.67
Innovation orientation	.216**	.274***	.296***	.621***	1				2.91 ± 0.79
Task orientation	.077	.213**	.212***	.297***	.558***	1			3.29 ± 0.72
Hierarchy orientation	.313***	.222**	.337***	.415***	.458***	.314***	1		3.43 ± 0.83
Knowledge sharing	.450***	.476***	.205**	.310***	.168*	.186**	.230***	1	3.97 ± 0.51

*: $p < .05$, **: $p < .01$, ***: $p < .001$

The Pearson correlation coefficients ranged from .077 (job fitness and task orientation) to .621 (relation orientation and innovation orientation.)

The results of the path analysis are shown in Table 2. For job fitness, direct effect ($\beta = .241, p = .002$) and total effect ($\beta = .265, p = .003$) were significant. Indirect effect with organizational culture as the parameter ($\beta = .024, p = .391$) was not significant. For job challenge, direct effect ($\beta = .308, p = .002$) and total effect ($\beta = .265, p = .003$) were significant while indirect effect ($\beta = -.010, p = .608$) was not. For job autonomy with organizational culture as the parameter, the indirect and total effects for knowledge sharing ($\beta = .084, p = .004$) were significant. Relation orientation, innovation orientation, and task orientation were all significant for direct and total effects on knowledge sharing. Hierarchy orientation was not significant for either direct or total effect ($\beta = .036, p = .504$).

Table 2: Direct, Indirect and Total effect in Reduced Model

Variables		Knowledge sharing			
		Direct effect	Indirect effect	Total effect	SMC
		β (<i>p</i>)	β (<i>p</i>)	β (<i>p</i>)	%
Job characteristics	Job fitness	.241(.002)	.024(.391)	.265(.003)	32.6
	Job challenge	.308(.002)	-.010(.608)	.298(.002)	
	Job autonomy		.084(.003)	.084(.004)	
Organizational culture	Relation orientation	.271(.002)		.271(.002)	
	Innovation orientation	-.230(.008)		-.230(.008)	
	Task orientation	.140(.037)		.140(.037)	
	Hierarchy orientation	.036(.504)		.036(.504)	

For job autonomy, the path with relation orientation as the parameter among indirect effects with organizational culture as the parameter was significant ($\beta= .390, p=.038$) in Table 3.

Table 3: Indirect effect

Paths				Coefficient	SE*	Standadized coefficient	p-value*	
Job autonomy	->	Relation orientation	->	Knowledge sharing	0.040	0.019	0.390	0.0379
Job autonomy	->	Innovation orientation	->	Knowledge sharing	0.003	0.014	0.261	0.8273
Job autonomy	->	Task orientation	->	Knowledge sharing	0.005	0.009	0.195	0.5710
Job autonomy	->	Hierarchy orientation	->	Knowledge sharing	0.004	0.012	0.287	0.7209

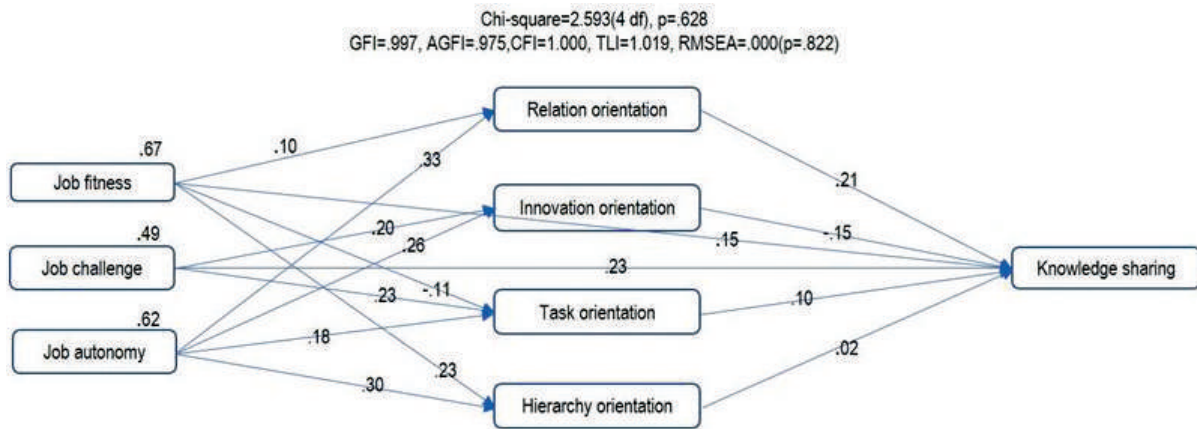


Figure 2: A path diagram of the study

The final path diagram of the study is shown in figure 2. Explanatory power for knowledge sharing for the above path analysis was 32.6%, and no additional paths emerged based on adjusted variables. The goodness of fit indices were all satisfactory, with $\chi^2 = 2.593(p=.628)$, GFI = .98, AGFI = .997, CFI = 1.000, TLI = 1.019, and RMSEA = .000, indicating that the model fit the data well ($\chi^2 \leq 3$; $p > 0.05$; GFI, AGFI, TLI > .09; RMSEA < .005).

DISCUSSION

This research showed that among job characteristic categories, job challenge score was highest at 3.96, followed by job fitness (3.85) and job autonomy (3.29). Job challenge refers to the extent to which one needed to exert new efforts to develop his/her own capabilities outside of repetitive and mundane daily tasks. Job fitness refers to the harmony between internal and external rewards provided by tasks or the harmony between one’s abilities and the job requirements. Job autonomy

refers to the extent to which the person has ability to decide the work schedule, process, and methods involve in task execution [22]. Although nurses execute nursing tasks according to the law and the guidelines, they face new patients every day and find themselves in new health and medical situations. They are required to make specific judgements and take actions in response to unique situations using their knowledge and available technology, which explains the high score on job challenge. Their job autonomy is relatively low because inexperienced nurses need to act according to their bosses’ orders and under their supervision, and some of their actions are guided strictly by the doctors’ orders.

Similar results on such job characteristics have also been reported in other studies. A research on nurses with 1+ year of experience working in secondary and tertiary medical facilities[20] reported scores of 3.72 for job challenge, 3.67 for job fitness, and 3.01 for job autonomy. In another research, [17] found that nurses in medical facilities scored on average 3.7 on job fitness, 3.9

on job challenge, and 3.4 on job autonomy while nurses in businesses scored 4.0 on job fitness, 4.0 on job challenge, and 3.1 on job autonomy, similar to this research. In a different research ^[23], the nurses scored 3.78 on job fitness, 3.71 on job challenge, and 3.11 on job autonomy. These scores are slightly different from those found this research, but in both cases, job autonomy ranked the lowest. In a research conducted with research professionals ^[24], the scores were 3.57 for job challenge, 3.56 for job fitness, and 2.93 for job autonomy. The figures were overall lower compared to those found in this research, probably because nurses tend to view their professions more optimistically compared to other job holders.

Among organizational culture, hierarchy orientation (3.43 ± 0.83) was the highest, followed by task orientation (3.29 ± 0.72), relationship orientation (3.27 ± 0.67), and innovation orientation (2.91 ± 0.79). Advanced research on organizational cultures of nursing industry has reported various findings. In a research on public nurses^[25], hierarchy orientation was the highest at 22.45, followed by innovation at 18.10, similar to this research's findings. The same results have been found in a research by ^[26]among nurses working in tertiary medical facilities. However, in a different research by ^[27], the relationship orientation culture score was the highest, which was followed by hierarchy.

A research on different types of organizational cultures of clinical facilities ^[28]showed that humanitarian culture was recognized most widely, followed by progressive, hierarchical, and task-based cultures. In a different research on organization culture of nursing departments in clinical facilities^[29], relation-oriented culture had the highest score, followed by innovation orientation, task orientation, and hierarchy orientation. Such findings support the existence of various types of organizational cultures, as they are autonomically created by the organization members, rather than having fixed characteristic according to the organization type. In other words, this shows that organizational culture could be improved through efforts of organization members.

Knowledge sharing of research subjects was 3.97 ± 0.51 in this research. In a research on nurses working for general hospitals ^[15], knowledge sharing score was 3.33, consistent with 3.34 reported by ^[3]. In ^[18], the average score for 200 company workers was 3.6. Knowledge sharing score was particularly high in this research. Although accurate comparison is difficult

because the job fields and time of research differed across studies, the findings generally support the growth of knowledge sharing in the health and medical field where professional knowledge is important.

In the path analysis of job characteristic, organizational culture, and knowledge sharing, job fitness and job challenge had significant direct and total effects but not significant direct effects. Job autonomy, with organizational culture as the parameter, had significant indirect and total effects on knowledge sharing. Through indirect effect with organizational culture as the parameter, only the path with relation orientation as the parameter was significant. The fields of health and medical services including hospitals are highly labor-intensive and require the approach of multiple teams. Additionally, nurses in medical facilities work shifts, so they need to take over the tasks accurately. This characteristic shows that the knowledge sharing of health and medical professionals is high, with job fitness and job challenge playing a significant role in knowledge sharing. On the other hand, high job autonomy means that one can carry out a task independently. This could instead work as a detriment to knowledge sharing, implying that organizational culture could lead to wider knowledge sharing and that organization-oriented culture plays a crucial role in doing so.

According to advanced studies on the factors of knowledge sharing, knowledge sharing requires organizational members' trust, interest, openness, and networking abilities. Furthermore, organizational culture that creates, passes, and utilizes knowledge supports the use of computers, intranet, and active communication ^[30,31]. From a cultural-organizational perspective, reliability, openness in communication, participation in decision-making, and innovation are important variables^[32] noted that innovation oriented organizational culture influences knowledge sharing, which in turn enhances the efficacy of organizational tasks. In a research on nurses, the most important predictor variable was openness in communication, explaining 37.8% of variance in knowledge sharing ^[15]. Other studies^[33] ^[34]reported similar findings, supporting the conclusion that relation-oriented culture is a crucial factor in knowledge sharing.

On the other hand, hierarchical culture could deter knowledge sharing. This research showed that the paths between relation orientation, innovation orientation, task orientation, and knowledge sharing were significant, while hierarchy orientation did not have significant direct

and total effects. The health and medical field, which deals with people's lives, traditionally emphasizes rules, regulations, and precision in task execution. Since it follows strict rules^[14], hierarchical cultures are common, and they are helpful in emergency situations with critical patients who require the care of knowledgeable and experienced workers. However, many research results imply that hierarchical and strict cultures negatively influence job satisfaction and organizational performance and thus lead to higher turnover rate^[25,27,35]. Additionally, in the health and medical field that deals with human lives, reports on incidents and errors could be another form of knowledge sharing. Task oriented culture had a positive correlation with the intent to report medication error. However, when the organization had a hierarchical communication system, or its powers were centered on top, the intent to report medication error dropped^[36]. As such, hierarchical culture deters the knowledge sharing activities and hinders people from acting flexibly in case of crisis, so it is likely to lead to more errors^[37]. This negatively affects not only the development of the field, but also the patients' lives. Hence, the hierarchy in nursing industry needs to improve.

The research findings suggest that job characteristics and organizational cultures are important variables that affect knowledge sharing among health and medical professionals, including nurses. Among those, relation-oriented organizational culture was a particularly important parameter in knowledge sharing. Therefore, organizations should refrain from fostering hierarchical and top-down cultures and strive to create communicative and cooperative cultures instead.

This research contributes to the existing studies in that it managed to precisely analyze the indirect effects of organizational culture awareness on the relationship between job characteristic and knowledge sharing of health and medical professionals, specifically nurses. Although nurses must abide by strict working standards as medical professionals and official licenses, relation orientation, rather than hierarchy orientation, was found to be more important in knowledge sharing. However, it should be noted that the health and medical field is very broad and encompasses a wide number of jobs, so the findings cannot be easily generalized. Furthermore, since the concept of knowledge sharing is not yet well-known in the field, further research should focus on different jobs and participants.

CONCLUSION

This cross-sectional study was designed to investigate the indirect effects of organizational culture on the relationship between job characteristics and knowledge sharing and study the relations between job characteristics, organizational culture, and knowledge sharing among nurses who are a part of health and medical professional community working in medical facilities, businesses, and public organizations.

Job characteristics that directly influence knowledge sharing of nurses working in health and medical facilities were job fitness and job challenge. Job autonomy did not have a direct effect on knowledge sharing. Job autonomy influenced knowledge sharing through organizational culture. Only relation orientated organizational culture turned out to be a significant direct predictor of knowledge sharing. Hierarchical organizational culture did not contribute to knowledge sharing.

In conclusion, there is a need to develop a strategy that would increase job fitness, which directly influences knowledge sharing of nurses, encourages job challenge, and enhances job autonomy that influences organizational culture indirectly through awareness. Furthermore, programs aimed at relation orientation should be established to increase the awareness of organizational culture and thus to expand knowledge sharing among medical professionals.

Ethical Clearance: Not required

Source of Funding: Self

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The Effect of Team-based Learning (TBL) on Leadership, Empowerment, and Followership of Nursing Students

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ABSTRACT

Background/Objectives: The purpose of this study was to examine the effects of leadership class on senior nursing students using team-based learning (TBL).

Method/Statistical analysis: This study, a single group pre-post treatment design, measured five types of leadership awareness level, empowerment level, and followership style of the study participants. The students were 60 students of B university nursing school seniors. As a leadership training program, the study was run in total of 12 hours through 6 weeks with 2 hours in a week. The descriptive statistic factors such as mean and standard deviation were used for continuous variables. Paired- t-test was used to compare the level of leadership code before and after TBL.

Findings: By examining the results of each item, the strategists scored an average of 6.84 points before the TBL and an average of 8.15 points after the TBL, the pre-mean of 6.86 and the post-mean of 8.08 for practitioners, the pre-mean of 6.85 and the post-mean of 7.96 for talent manager, the pre-mean of 5.86 and post-mean of 7.55 for human resource developer, the pre-mean of 7.05 and the post-mean of 8.12 for self-development, and the pre-mean of 6.71 and the post-mean of 7.98 for the total leadership level. Statistically significant changes were noted in all five items ($p < .001$). The average level of empowerment of the students was higher than the normal with average of $3.61 \pm .42$ (maximum 5). Most of them were pragmatist followers (87%).

Improvements/Applications: By setting the control group or randomizing samples to generalize the result of study, the future study, verifying the effect of TBL class considering complex variables such as critical thinking, study satisfaction, self-fulfillment, creativity other than leadership variables, is proposed.

Keywords: TBL, Leadership, Empowerment, Followership, Nursing Students

INTRODUCTION

A.I. (artificial intelligence), Big Data, and the fourth industrial revolution are the most issued topics recently. The development of science has brought enormous effects on every area in our society. And, education is not an exception. In order to not reach a situation where humans are unable to control, the paradigm of education has to be changed¹. To develop nurses with capability of working actively and taking responsibilities in the fast-changing medical field, nursing school professors are applying various teaching-learning method as a component of education transformation to make students to be owner of learning and to participate actively in classes, rather than typical cramming education or standardized evaluation process. Team-based learning (TBL), a type of learning that learners accomplish study achievement by participating in learning with efficient

communication skills, helps nurses, who have to work with health care professionals as a team in medical fields, to develop skills such as interaction with co-workers, communication, team work, and decision making².

In a team-based activity, leadership is considered as a key point of great team performance³. Recently, a group leadership that is executed by all team members is attracting more attention than a leadership that is executed out by a single leader. Since leadership is an important factor that affects not only an individual talent but team productivity development, an education for developing leadership is essential⁴. Because a view that leadership is an essential talent for all nurses in clinical fields has been approved, a leadership research about nurses and nursing students are processing recently rather than the leadership research that was centered on nursing manager in the past⁵⁻⁸.

According to “Leadership Code”⁹ that has a motto that ‘we are all leaders,’ one has to start executing from oneself to become a great leader. And, each one can be a great leader if he or she knows the principle of leadership and executes it. In addition, the book describes that leadership is a concept that changes through time because it can be developed from the individual leadership to the organizational leadership if other members, not just oneself, know and execute the principle of leadership. Through the analysis of leadership data, the book suggests 5 leadership codes, a common factor that decides leadership. It says that one with a great leadership has to control oneself and has an ability to set an example to other members, and it calls this a personal competence. The five leadership codes are the followings. Code 1: shape the future (strategist). Code 2: make things happen (practitioner). Code 3: engage today’s talent (talent manager). Code 4: build the next generation (human resource developer). Code 5: improve in yourself (self-development).

A nurse needs to have a sympathetic mind and an ability to understand creatures who need nursing. And, she also needs to apply her own nursing knowledge well. If the power of sensitivity, culture, and creation are projected to be more valuable in the future society, nurse will be one of the jobs that cannot be replaced by robots. Especially for the nursing school seniors who will become the leading role of nursing field in future, investing oneself and maintaining feedbacks by

compensation and punishment according to the result of their own set goals are essential leadership skills as a self-control system.

Motivating students through active participation and enabling students to study voluntarily by arousing learning motivation through provision of various presentation opportunities, TBL is considered as an effective instructional method¹⁰. Even though other studies about TBL focused on variables such as learning commitment⁷, learning motivation, and learning attitude⁸.¹¹, this study is structured to see how the leadership class using TBL affects the leadership ability of students.

METHOD

Samples and TBL procedure: This study, a single group pre-post treatment design, measured five types of leadership awareness level of the study participants before the TBL leadership session and measured them again after the session. The students were 60 students of B university nursing school seniors. And, the study was conducted from September 1st to October 15th in 2016. Through an individual learning and interaction between team members, an education procedure that was structured to maximize outcomes of team and individual was conducted. As a leadership training program, the study was run in total of 12 hours through 6 weeks with 2 hours in a week. The summary of each week’s session is explained in the table 1.

Table 1: Each week’s session contents

	Contents
1 st Session	Composition of team by 5 members (Total 12 teams) The understanding of leadership Finding leaders in the past (using books and videos) Finding leaders around oneself Pre-measurement of level of leadership code
2 nd Session	Improvement of communication (self-introduction between team members) Brainstorming: -“How to be loved by team members” -“How to compliment nicely” -“How to reconcile effectively when there is a discord with a team member”
3 rd Session	The understanding of power Power improvement (“plan my life”) The understanding of empowerment Measurement of empowerment The strategy of empowerment enhancement (using books and videos)

Conted...

4 th Session	The understanding of the followership Finding followers in the past (using books and videos) Measurement of the Kelly followership type The requirement of a beginning nurse
5 th Session	The understanding of conflict management Selection of a recent topic about conflict Personal solution about conflict and the opinion sharing about the result Sharing of friends' advice
6 th Session	Team presentation of recent journals about leadership (including followership and empowerment) Questions and answers on each team's presentation by other teams Evaluation on each team's presentation by other teams Post-measurement of level of leadership code

Instruments: The level of leadership code is measured with Likert-type 10-points scale and in the five areas of the total 26 items suggested by Dave Ulrich, Norm Smallwood & Kate Sweetman⁹: 4 items in strategist, 5 in practitioner, 5 in talent manager, 5 in human resource developer, 7 in self-development. Higher score means more talent a student has. In this study, the value of Chronbach's alpha is .945 in pre-measurement and .955 in post-measurement.

The instrument that Choi Jiwon¹² practiced was used for the measurement of level of empowerment. It was measured with Likert-type 5-points scale and the total of 29 items: 16 items in personal competence, 5 in group orientation, 8 in self-determination. The value of Chronbach's alpha was .84 in the study of Choi Jiwon and it was .887 in this study.

The Kelly's instrument¹³ was used for the measurement of followership type. It was Likert-type 6-points scale. With 10 items of independent, critical thinking and dependent, uncritical thinking and 10 items of active participation and passive participation, it was evaluated to find out which type each student corresponds to out of 5 types.

DATA ANALYSIS

The collected data were analyzed using SPSS statistics 18.0¹⁴ and the significance level was set at .05. The descriptive statistic factors such as mean and standard deviation were used for continuous variables. Paired- t-test was used to compare the level of leadership code before and after TBL.

Ethical Consideration: For ethical consideration, the purpose of the study, anonymity of data, and confidentiality were explained, and students were asked to participate the survey voluntarily. Moreover, the

explanation that any student could withdraw from the study at his own will anytime and the collected data would be only used for the study was explained.

RESULTS AND DISCUSSION

The analytical result of leadership code difference between before and after the study is explained in the table 2. Looking at the result of each item in detail, the average of strategists is 6.84 before TBL and the average is 8.15 after TBL. For practitioners, it is 6.86 before TBL and 8.08 after TBL. For talent manger, it is 6.85 before and 7.96 after. For human resource developer, it is 5.86 before and 7.55 after. For self-development, it is 7.05 before and 8.12 after. The average of total leadership is 6.71 before TBL and 7.98 after TBL.

Table 2: The comparison of leadership code of Nursing Students

(N = 60)

		M	SD	t	p
Strategists	Before	6.84	1.18	8.148	.000**
	After	8.15	1.10		
Practitioners	Before	6.86	1.15	7.937	.000**
	After	8.08	1.01		
Talent manager	Before	6.85	1.13	8.177	.000**
	After	7.96	0.99		
Human resource developer	Before	5.86	1.61	9.106	.000**
	After	7.55	1.15		
Self-development	Before	7.05	1.24	6.575	.000**
	After	8.12	1.08		
Leadership	Before	6.71	1.09	10.448	.000**
	After	7.98	0.93		

**<.001

Looking at the result of each week's session contents, in the first week session, students had become aware of the importance of leadership and the required talents for a leader through understanding of leadership concept and consideration of finding leaders around them. In the second week, students shared solutions through brainstorming about -"How to be loved by team members," "How to compliment nicely," "How to reconcile effectively when there is a discord with a team member." To prevent the confidentiality, which is a weakness of brainstorming, they practiced brainwriting, a writing down method instead of speaking each other. In the third week, since one has to be conscious of the goal of her life to improve her power, students wrote down "plan my life" in 1 year later, 2 years later, 5 years later, 10 years later, 20 years later, 50 years later, and 100 years later. And, they had a time to think about what they need to prepare for succeeding the goal of life. The result showed that most of them want to pass the national exam and work as approved nurses in the hospital where they want to work for long years. And, they responded that they want to have a vacation trip after the exam. The average level of empowerment of the students was higher than the normal with average of $3.61 \pm .42$ (maximum 5). Compared to the average empowerment score of 3.40 (maximum 5) that was resulted from the study of relationship between types of leadership and empowerment¹⁵ that was conducted to 386 nursing students, it is considered that the empowerment level of the contemporary nursing students is highly improved. In the fourth week, throughout the program of the understanding of unfamiliar followership concept, students found out his own followership type and the required talents for becoming an exemplary follower. Most of them were pragmatist followers (87%). In the fifth week session of the conflict management, the students were asked to recall any conflict occurred in school life and practices in the past few weeks and to share with colleagues about their own solution and opinions on the results. Students had conflicts mostly with friends, boyfriends, and families and figured out psychological comfort and better solutions voluntarily through the sharing process with team members. In the sixth week, throughout the team presentation about leadership, followership, and empowerment, students understood the importance of leadership that is treated in the area of nursing management study. Also, team evaluation on each team members' presentation skill, contents of paper, preparation skill, attitude, and

teamwork skill was implemented and they shared opinions on TBL each other. Finally, they checked the change in their awareness of leadership through the pre and the post measurement of leadership code.

Examining the change in leadership awareness of nursing students through TBL, it was approved that most areas were statistically and similarly improved. TBL induces a positive learning effect to students and a motivation to study independently about knowledge regarding assignments¹⁶. The development of individual leadership skill is realized through development in various areas. Especially, leadership is an extremely important skill for graduating nursing students who will play a role as professional nurses in upcoming years. TBL is considered to be helpful for not only change in positive learning method but understanding oneself and his advantage because it can find solution and bring synergy effect to each other through group discussion and collaboration.

Considering both short-term and long-term perspectives at a same time, good leaders think and act voluntarily⁹. The Code 1 "Plan the Future (strategist)" presented in the Leadership Code, means understanding the way that must be made for the success of an organization as a future professional. Since students showed the highest score on this area (Post-M=8.15/ Maximum 10), it is considered that they will show how to develop themselves and the organization in the future with a strong vision. The Code 2 "Make things Happen (practitioner)" means accomplishing tasks given to them to make strategy to actually happen in real life. Nursing is a practice learning. To provide nursing with quality, a nurse has to lead a change, take a responsibility, understand works that needs to be delegated, and practice procedure that brings harmony and collaboration with other teams. In the Kelly's result of the followership type examination¹³, students were mostly pragmatist type (87%). The pragmatist type is a type of response that usually occurs in an unstable situation. The result explains the current situation well where students are mostly worried about graduation and national exams. It was found that personal goal setting and support of an organization were necessary to make students become exemplary types in organizations in the future. The Code 3 "Engage Today's Talent (talent manager)" means creating a positive working environment through communicating with members, organizing goals of a company and members, and providing resources to achieve the goals.

In other words, working with enjoyment is important. After an interview with students who had TBL classes that was centered on learners, Lee et al.¹⁷ found out that the participation of TBL students were higher than that of the ordinary learning method. The Code 4 “Build the Next Generation (human resource developer)” means planning the future talent development, finding the future workers, and helping students finding talents and building experiences. The result that this item received the lowest average score (Pre-M=5.86) in the study demonstrates that students focus only on themselves and they lack on future-oriented perspective about the next generation. However, many progress has been made in the TBL, and the students had been able to confirm the necessity and importance of future-oriented perspective education as well as the reality-oriented education. The Code 5 “Improve in Yourself” (self-development) means that everything can be a learning material if one has a passion to learn from everything around herself because a leader is a learner. The leadership level of nursing students was also high (Post-M=7.98) and it was found that it was improved through leadership training. If one does not hesitate a new challenge and participates with interests and determination, one can not only complement weakness but grow strengths.

CONCLUSION

The purpose of this study was to examine the effects of leadership of graduating nursing students through TBL. The result shows that TBL was effective in improving the leadership level of the students. Through applying the five codes of Leadership Code on nursing students that was not applied in the nursing field before, it is found out that the most significant meaning of this study are identifying leadership awareness of the students and finding out the possibility that the nursing students will grow as great leaders in nursing organizations.

Developing leadership is a very important skill for senior nursing students because they have to play roles as professional nurses in the future. Nursing is a practicing study. In order to provide high quality nursing to patients, nurses need to lead changes, take responsibilities of serious decisions, and cooperate with other teams. The TBL leadership class was meaningful in a way that it helped students finding the change in their positive learning attitude, discovering their strengths, and understanding themselves.

However, the study has a limitation in which it did not control the intervention of the third variable because it was designed as a single group pre-post. By setting the control group or randomizing samples to generalize the result of study, the future study, verifying the effect of TBL class considering complex variables such as critical thinking, study satisfaction, self-fulfillment, creativity other than leadership variables, is proposed.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Relationship between Sleep and Oral Health among Korean Adults

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ABSTRACT

Background: Modifiable short or long sleep duration is related with general health. Therefore, they may influence on oral health.

Method: To identify the relations between sleep and oral health, we examined. 5,285 adults, aged 19 and over, were selected and comprised by the cross-sectional study. Oral health behaviors like chewing and tooth brushing were measured. After adjusting, short or long durations were significantly related with poor oral health.

Findings: Normal sleep duration (7-8 hours/day) was associated with good oral health while short or long sleep duration may be harmful behavioral factors for getting worse of oral health among Korean adults.

Improvements: Public health professionals for primary health care should consider the sleep recommending policies and strategies for the oral health as well as general health.

Keywords: Sleep duration, Obesity, Physical Activity, Chewing difficulty, Short or long sleep

INTRODUCTION

Unhealthy lifestyle factors are reporting as the major issue, world-wide. Also, unhealthy life style behaviors are related with mortality¹. Sleep duration, short or longer, have been associated with several health outcomes in adults²⁻⁵ as well as associated with increasing the Alzheimer's Disease (AD)⁶. In addition, a functional oral factor as masticatory performance is very beneficial in older adults⁷. Also, oral health was known as the critical factor for the adults to maintain their independent lifestyle⁸ as well as related with self-rated health among adults⁴. Oral functions like chewing was reported to be related to mental health^{6,9} which was known for managing oral health, lifestyle and overall health care of the elderly¹⁰. And that undesirable health habits were reported to be caused of possible determinants of impaired intellectual activities¹¹. Recently it was reported that the association of lower sleep quality and lower oral

health¹². Moreover, the factors of education, gender, obesity and self-rated health were strongly related to health inequalities¹³. Through previous study, it was revealed that education and income were potential risk factors for oral health behaviors¹⁴. Also, it was reported that tooth brushing and tooth-paste users showed more status of tooth retention¹⁵ and physical activities from walking to vigorous sports are safe for healthy aging¹⁶. Additionally poor oral health reported to be related with obesity¹⁷. But little is known about the relations between sleep, other influencing factors and general major oral health behaviors. Therefore, we examined the relationship between sleep durations and oral health through major lifestyle factors.

MATERIALS AND METHOD

The 5,285 participants, South Korean, were the self-reported survey subjects from the 6th KNHANES by Korea Centers for Disease Control and Prevention (KCDCP). We used of collected available questionnaires about sleep and oral health status like chewing and tooth brushing as well as demographic data and analyzed using multiple logistic regressing by SPSS (ver. 21.0). General characteristic data were calculated by weighted or not weighted frequency. A

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chi-square was used for those values differences. And for the influencing degree of the healthy or unhealthy behavior variables such as sleep, walking, obesity and economical-activity, multi-logistic regression was performed. The significance level was $p < .05$.

RESULTS AND DISCUSSION

Descriptive data(Table1.)revealed that 35-64 age group(56.2%), female (50.6%), married (77.8%)and majority of participants were good education level (High school and College) except lowest education level (17.5%). In terms of sleep, half of them were excessive or short sleep duration group. As to oral health, some participants (21.1%) had chewing difficulty problem complaints, and almost all of the participants had good habits of tooth brushing. About onethirds of them (38.3%) did not participate in economic activities and over half of them (62.6%) did not engage in walking activities. As to alcohol and smoking, over half those (58.5%) had drinking habits and some of them had smoking habits (23.4%), under or excessive body weight (37.0%).

Table 1: Demographic characteristics of Korean adults

	N	%
Age		
19~34	1106	29.0%
35~64	2993	56.2%
Over 65	1186	14.8%
Gender		
Male	2243	49.4%
Female	3042	50.6%
Marital status		
Married	4457	77.8%
Single	828	22.2%
Education level		
Elementary	1241	17.5%
Middle	543	9.2%
High	1859	39.0%
Collage	1642	34.3%
Drinking		
No	2477	41.5%
Yes	2808	58.5%
Smoking		
No	4256	76.6%
Yes	1029	23.4%

Conted...

Obesity		
Under, Excessive	1945	37.0%
Normal	3340	63.0%
Sleep duration		
Short or long($\leq 6, \geq 9$)	2769	51.0%
Normal(7-8)	2516	49.0%
Economical-activity		
No	2214	38.3%
Yes	3071	61.7%
Walking		
No	3359	62.6%
Yes	1926	37.4%
Chewing difficulty		
No	3994	78.9%
Yes	1291	21.1%
Tooth brushing/day		
No	88	1.4%
Yes	5197	98.6%
Total	5285	100.0%

To observe the influencing factors on oral health (Table 2.), logistic regression was conducted. The results revealed short or excessive sleep duration, economical activity,walking activity and under or excessive body weight significantly influenced on oral health status.

Table 2: Relationship between oral health and affecting factors of Korean adults

	OR(96% CI)	p
Walking		
No	1.301(1.121-1.510)	.001
Yes	Reference	
Sleep duration		
Short or long($\leq 6, \geq 9$)	1.472(1.264-1.714)	.000
Normal(7-8)	Reference	
Obesity		
Under, Excessive	1.160(1.010-1.332)	.036
Normal	Reference	
Economical-activity		
No	1.471(1.268-1.706)	.000
Yes	Reference	
OR : odds ratio, CI : Confidence Interval		

Table 3 shows healthy behaviors like walking, economical-activity or unhealthy factors such as short or long sleep and obesity were all the affecting factors on the general oral health significantly. But after adjusting the confounding variables, short or long sleep duration variable (OR 1.21; 95% CI; 1.03-1.43; $p < .05$) compared to normal sleep one was the most influencing factor on the general major oral health state such as chewing, a kind of mastication, which was reported to be positively associated with obesity even if they were most of cross sectional studies¹⁸. Supporting to keep normal sleep duration was the crucial major factor for good oral health through our study and has shown them in previous findings^{4,5}. In recent study of the relationship between sleep quality and lower oral health¹², they proved on their association, but we had some difference in view the point of sleep duration and oral health.

Some reported the small association of weight change and sleep duration¹⁹, according to recent US study, they reported on the close connection between sleep quantity and body mass index²⁰ of College students but those findings were not proved in our results seeming cause of some difference in the subjects etc. Healthy life style factors were reported to have some differences by socio-demographic characteristics such as age, gender, race and region¹.

We used healthy or unhealthy life style factors to identify the influencing factors on the major factor of oral health closely connected with the general health of Korean adults. We show how short or long sleep duration, the unhealthy life style factors, are meaningfully associated with the major oral functional health factor. It might be urgently considered that public health professionals should focus on healthy lifestyle factors such as sleep quantity, encouraging physical activities and economical activities, and managing obesity of Korean adults not only to reduce dramatically increasing medical expenses, but also to create good models of the community for the future.

Table 3: Major related factors of poor oral health after adjustment

	OR(96% CI)	p
Walking		
No	1.147(0.979-1.343)	.088
Yes	Reference	

Conted...

Sleep duration		
Short or long($\leq 6, \geq 9$)	1.210(1.027-1.426)	.023
Normal(7-8)	Reference	
Obesity		
Under, Excessive	1.142(0.977-1.334)	.096
normal	Reference	
Economical-activity		
No	.971(0.826-1.140)	.717
Yes	Reference	
OR : odds ratio, CI : Confidence Interval		

CONCLUSION

Through our study, we suggest that focusing on normal sleep duration (7-8 hours/day) policy, the healthy life style factor, should be considered as the major prevention strategy for keeping and improving oral health status influencing on the general health among South Korean adults. Focusing on the healthy behaviors like sleep, walking, under or excessive body weight management and encouraging economical-activities, shaping healthy behaviors would be strongly renewed as the point of view of public health in social contexts against communicable, chronic disease and dramatically increasing medical costs. More researches on these healthy or unhealthy life style factors are needed for preparing and managing the public health interventions to promote oral health as well as general health in Korea.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Relationship between Facial Satisfaction and Dental Aesthetic Treatment Awareness among High School Students

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ABSTRACT

Background/Objectives: The purpose of this study was to investigate how high school students in adolescence are satisfied with their external appearance and to find out the relationship between facial satisfaction and dental aesthetic treatment.

Method/Statistical analysis: A total of 600 copies were distributed using the self-filling questionnaire from September 30th to October 6th, 2017, and 558 copies of the questionnaires were collected and analyzed. Statistical analysis of the collected data was performed using SPSS WIN ver. 24.0. Appearance satisfaction means a subjective assessment related to the level of self-satisfaction or dissatisfaction with the external appearance of a person and measured by the 5-step Likert scale. General characteristics were analyzed by using frequency analysis, X²-test, t-test, one-way ANOVA, Pearson correlation analysis.

Findings: 188 (33.7%) of the male and 125 (22.4%) of the female respondents answered that the most important part for appearance was the face. In addition, same result came along with academic, vocational, boy's only, girl's only, coed high school, being in relationship, and popularity. There was statistically significant difference in the perception of dental aesthetic treatment, 54 (9.7%) males and 11 (2.0%) females showed that males had more negative thoughts than females. Although there is a statistically significant difference in facial satisfaction with maxillofacial satisfaction, dental aesthetic treatment has a negative correlation with it as well as statistically significant differences was not found respectively.

Improvements/Applications: Therefore, many publicity and efforts are needed to increase the interest in oral and maxillofacial adolescents, and it is necessary for young people to develop socio-cultural phenomena and adolescents so that they can grow into health, physically and psychologically, people in various social and cultural environments as well as parent, teachers, mass media, and others seems to be responsible for delivering a healthy appearance culture.

Keywords: facial, satisfaction, dental aesthetic treatment, high school, students

INTRODUCTION

Adolescence is a time when people react sensitively to physical changes and characteristics and become more interested in their appearance. In addition, adolescence is a process of developing values, attitudes, and functions

necessary for social participation as a social emergency period, recognizes the importance of social ideation and appearance of physical appearance through four socialization factors such as mass media, parents, and further internalize their values^[1].

Because of the influence of pop culture, people tend to uniformly judge their own appearance by comparing themselves with popular models or actors in movies, beautiful models in magazines, and people in TV commercials which were given their appearance satisfaction^[2].

These social phenomena are more likely to be affected by external stimuli and influences than those

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of adults, when adolescents undergoing many changes in the process of physical and mental growth without proper definition of values and dignity^[3]. In this way, for the adolescents, appearance is an important measure to express themselves and can be a factor to help school adaptation. Therefore, proper appearance management and correct perception can enhance the self-esteem of adolescents and thus positively affect school life.

The reason why adolescents are interested in body and appearance is that adolescents' physical attractiveness or physical image has a significant relation with positive self-evaluation, popularity, and relationship with friends^[4] and also with self-esteem^[5]. In addition, evaluation of adolescent body has an important influence on self-concept and social development after adolescence^[6].

The purpose of this study was to investigate how high school students in adolescence are satisfied with their external appearance and to find out the relationship between facial satisfaction and dental aesthetic treatment.

MATERIALS AND METHOD

Subjects: A total of 600 copies were distributed using the self-filling questionnaire to U high school in Yangsan areas, J, Y, and M high school in Busan area from September 30th to October 6th, 2017, and 558 copies of the questionnaires were collected and analyzed.

Research method: Statistical analysis of the collected data was performed using SPSS WIN ver. 24.0. Appearance satisfaction means a subjective assessment related to the level of self-satisfaction or dissatisfaction with the external appearance of a person and measured by the 5-Likert scale. General characteristics were analyzed by using frequency analysis, chi-square test, independent samples t-test, one-way ANOVA(Analysis of variance), Pearson correlation analysis.

RESULTS AND DISCUSSION

General characteristics of subjects: The subjects were 38 students (6.8%) in the first year, 142 students (25.5%) in the second year, and 378 students (67.7%) in the third year of the high school. 412 students (73.8%) attend in academic high school whereas 125 students (26.2%) attend in vocational high school. 291 students are in coed high school, 225 students (40.3%) are in boy's high school and 42 students (52.2%) are in girl's high school which was the least percentage of all subjects. There were 413 students who answered that they are not in relationship whereas 145 students have answered that they are in a relationship with opposite sex. Among these students, self-judgment on popularity between low, medium, and high were distributed as 8.2% (low), 69.4% (medium), and 22.4%(high).

Table 1: General characteristics of subjects

Variable	Group	Boy		Girl		Total	
		N	%	N	%	N	%
Grade	1 st	33	(5.9)	5	(0.9)	38	(6.8)
	2 nd	116	(20.8)	26	(4.7)	142	(25.5)
	3 rd	208	(37.3)	170	(30.5)	378	(67.7)
School system	Academic	232	(41.6)	180	(32.3)	412	(73.8)
	Vocational	125	(22.4)	21	(3.8)	146	(26.2)
School structure	Boy's	225	(40.1)	0	(0.0)	225	(40.3)
	Girl's	0	(0.0)	42	(7.5)	42	(7.5)
	Coed	133	(23.8)	158	(28.3)	291	(52.2)
relationship	Not in	276	(49.5)	137	(24.6)	413	(74.0)
	In	81	(14.5)	64	(11.5)	145	(26.0)
Popularity	Low	35	(6.3)	11	(2.0)	46	(8.2)
	Medium	232	(41.6)	155	(27.8)	387	(69.4)
	High	90	(16.1)	35	(6.3)	125	(22.4)
Total		357	(64.0)	201	(36.0)	558	(100.0)

Adolescent face image recognition according to general characteristics: 188 male students (33.7%) and female students (22.4%) answered that the most important part of the outlook (external appearance) was the face. Male students answered in the order of body shape, height, lower body, other parts (etc.), upper body where female students answered in the order of body shape, height, lower body, upper body, and other parts (etc.) after majority selection of face. The face was found to be an important part of appearance in all the high school composition which are academic/vocational high school, boy's/girl's high school, and coed high school regardless of being in relationship or not as well as the popularity. The statistically significant differences were found depending on the school structure and the presence of being in relationship.

Table 2: The most important part in appearance based on general characteristics

Variable		Face		Upper Body		Lower Body		Height		Body Shape		ETC.		p*
		N	%	N	%	N	%	N	%	N	%	N	%	
Gender	Male	188	(33.7)	5	(0.9)	17	(3.0)	57	(10.2)	82	(14.7)	8	(1.4)	.094
	Female	125	(22.4)	5	(0.9)	12	(2.2)	19	(3.4)	38	(6.8)	2	(0.4)	
Grade	1 st	18	(3.2)	0	(0.0)	5	(0.9)	5	(0.9)	8	(1.4)	2	(0.4)	.257
	2 nd	82	(14.7)	4	(0.7)	9	(1.6)	15	(2.7)	30	(5.4)	2	(0.4)	
	3 rd	213	(38.2)	6	(1.1)	15	(2.7)	56	(10.0)	82	(14.7)	6	(1.1)	
School system	Academic	238	(42.7)	7	(1.3)	16	(2.9)	51	(9.1)	94	(16.8)	6	(1.1)	.072
	Vocational	75	(13.4)	3	(0.5)	13	(2.3)	25	(4.5)	26	(4.7)	4	(0.7)	
School structure	Boy's	131	(23.5)	2	(0.4)	5	(0.9)	32	(5.7)	49	(8.8)	6	(1.1)	.001
	Girls	35	(6.3)	1	(0.2)	0	(0.0)	1	(0.2)	5	(0.9)	0	(0.0)	
	Coed	147	(26.3)	7	(1.3)	24	(4.3)	43	(7.7)	66	(11.8)	4	(0.7)	
relationship	Not in	238	(42.7)	6	(1.1)	14	(2.5)	58	(10.4)	91	(16.3)	6	(1.1)	.022
	In	75	(13.4)	4	(0.7)	15	(2.7)	18	(3.2)	29	(5.2)	4	(0.7)	
Popularity	Low	24	(4.3)	0	(0.0)	3	(0.5)	9	(1.6)	9	(1.2)	1	(0.2)	.534
	Medium	222	(39.8)	10	(1.8)	19	(3.4)	45	(8.1)	84	(15.1)	7	(1.3)	
	High	67	(12.0)	0	(0.0)	7	(1.3)	22	(3.9)	27	(4.8)	2	(0.4)	
Sub Total		313		10		29		76		120		10		

*By chi-square test

Difference in the Average of Youth Facial Satisfaction according to general characteristics: The satisfaction rate of the first impression was 3.25 ± 0.83 for males and 2.97 ± 0.77 for female students. Mean rating for the first year of the high school students was 3.45 ± 0.89 which was the highest followed by 2nd and 3rd grades. In the school system, the number of vocational students was 3.32 ± 0.73 which was 0.24 points higher than the academic high school. In the school structure, boy's high school was the highest at 3.39 ± 0.81 followed by coed high school and female high school. Students being in relationship 3.24 ± 0.81 had an average score of 0.17 points higher than students who were not in relationship. The most popular students with the highest score of 3.57 ± 0.85 showed statistically significant results in terms of gender, grade, school system, school structure, relationship and popularity.

The face satisfaction rate was 3.14 ± 0.67 for male which is higher than the female students and 3.43 ± 0.76 for the 1st grade, 3.14 ± 0.59 for vocational high school students, 3.19 ± 0.67 for boy's high school students, 3.18 ± 0.66 for students who are in relationship, and 3.42 ± 0.68 for high popularity respectively. There was statistically significant difference in sex, grade, school structure and popularity, but it did not appear to be a factor affecting total face satisfaction because there was no significant difference in school system and being in a relationship.

There were statistically significant results in grade, school system, school structure, and popularity in maxillofacial satisfaction where there was significant difference in sex, grade, school structure, being in relationship, and popularity in maxillofacial interest.

Table 3: First impressions, facial satisfaction, maxillofacial satisfaction/interest according to general characteristics

Variable		First impression satisfaction	p*	Face satisfaction	p*	Maxillofacial satisfaction	p*	Maxillofacial interest	p*
Gender	Male	3.25	.000	3.14	.018*	3.14	.069	3.18	.001
	Female	2.97		3.00		3.03		3.03	
Grade	1 st	3.45	.011	3.43	.001**	3.49	.002**	3.47	.001
	2 nd	3.23		3.14		3.13		3.04	
	3 rd	3.08		3.04		3.05		3.34	
School system	Academic	3.08	.002	3.07	.245	3.06	.036*	3.28	.557
	Vocational	3.32		3.14		3.21		3.23	
School structure	Boy's	3.39	.001	3.19	.003**	3.21	.009**	3.16	.027
	Girls	2.36		2.88		2.90		3.19	
	Coed	3.07		3.04		3.05		3.37	
Relationship	Not in	3.10	.032	3.06	.063	3.08	.233	3.19	.001
	In	3.27		3.18		3.16		3.51	
Popularity	Low	2.91	.001	2.90	.000**	2.98	.000**	3.35	.033
	Medium	3.04		3.01		3.02		3.21	
	High	3.57		3.42		3.39		3.44	

*By independent samples t-test and one-way ANOVA

Recognition of dental aesthetic treatment according to general characteristics: In the perception of dental aesthetic treatment, 54 (9.7%) were male and 11 (2.0%) were female which shows the male students were more negative than female students. 29 (5.2%) in coed high school, 34 (6.0%) for boy's high school, 3 (0.6%) in girl's high school had negative recognition on dental aesthetic treatment. 58 (10.4%) without relationship with opposite sex had more negative recognition than 7 (1.3%) of those who are in relationship. There was a statistically significant difference in the perception of dental aesthetic treatment when the gender, school structure, and being in relationship were dissatisfied with the part of the maxillofacial.

Table 4: Recognition of dental aesthetic treatment according to general characteristics

Variable		Very Negative		Somewhat Negative		Neither		Somewhat Positive		Very Positive		ETC.		p*
		N	%	N	%	N	%	N	%	N	%	N	%	
Gender	Male	15	(2.7)	39	(7.0)	160	(28.7)	107	(19.2)	33	(5.9)	3	(0.5)	.001
	Female	1	(0.2)	10	(1.8)	54	(9.7)	96	(17.2)	39	(7.0)	1	(0.2)	
Grade	1 st	2	(0.4)	4	(0.7)	16	(2.9)	10	(1.8)	6	(1.1)	0	(0.0)	.481
	2 nd	3	(0.5)	15	(2.7)	63	(11.3)	47	(8.4)	14	(2.5)	0	(0.0)	
	3 rd	11	(2.0)	30	(5.4)	135	(24.2)	146	(26.2)	52	(9.3)	4	(0.7)	
School system	Academic	6	(1.1)	14	(2.5)	57	(10.2)	49	(8.8)	20	(3.6)	0	(0.0)	.672
	Vocational	10	(1.8)	35	(6.3)	157	(28.1)	154	(27.6)	52	(9.3)	4	(0.7)	
School structure	Boy's	7	(1.3)	26	(4.7)	101	(18.1)	73	(13.1)	18	(3.2)	0	(0.0)	.022
	Girls	1	(0.2)	2	(0.4)	14	(2.5)	19	(3.4)	6	(1.1)	0	(0.0)	
	Coed	8	(1.4)	21	(3.8)	99	(17.7)	111	(19.9)	48	(8.6)	4	(0.7)	

Conted...

Relationship	Not in	16	(2.9)	42	(7.5)	159	(28.5)	146	(26.2)	47	(8.4)	3	(0.5)	.029
	In	0	(0.0)	7	(1.3)	55	(9.9)	57	(10.2)	25	(4.5)	1	(0.2)	
Popularity	Low	3	(0.5)	4	(0.7)	21	(3.8)	8	(1.4)	10	(1.8)	0	(0.0)	.179
	Medium	9	(1.6)	34	(6.1)	148	(26.5)	148	(26.5)	44	(7.9)	4	(0.7)	
	High	4	(0.7)	11	(2.0)	45	(8.1)	47	(8.4)	18	(3.2)	0	(0.0)	
Sub Total		213		141		87		26		55		36		

*By chi-square test

Correlation between face satisfaction and dental aesthetic treatment awareness: Maxillofacial satisfaction according to facial satisfaction showed a high positive correlation and statistically significant difference. The higher the face satisfaction, the more negative correlation was found on the dental aesthetic treatment, but note statistically significant.

Table 5: Correlation between face satisfaction and dental aesthetic treatment awareness

Variable	Face satisfaction	Dental aesthetic awareness	Maxillofacial satisfaction
Face satisfaction	1		
Dental aesthetic awareness	-.009	1	
Maxillofacial satisfaction	.891	-.017	1

*by Pearson correlation analysis

Modern society is called “Lookism” and the value of the appearance has been increased so that it is not unmistakable. As a result, interest in the appearance of young people is also increasing. In Addition, although many articles on appearance have been published, there is little research on the effect of oral and maxillofacial region on appearance, aesthetics treatment, and there is limited research to discuss the weight and appearance issues of Asian adolescents [7].

In this study, we surveyed high school students about their appearance satisfaction, oral maxillofacial and dental aesthetic treatments. As a result, in the present study, 33.7% of the male and 22.4% of the female students were answered that the facial appearance was the most important part of the external appearance followed by body shape, height, lower body, etc., upper body for males and body shape, height, lower body, upper body, and etc. for females. This is a contrast to the study in Mahoney and Finch (1976) which showed that the most important factor in determining the physical attractiveness of women was weight and face, whereas in men, face was the first and weight was third [8].

In modern society, appearance is the first criterion for judging who the other person is. People have the property

of unconsciously evaluating their impressions through their appearance [9]. With the emphasis on the importance of appearance, various media such as the Internet and TV have seen the benefits of beautiful appearance, and regardless of whether they are male or female.

The face satisfaction rate was 3.14 for male which is higher than the female students and 3.43 for the 1st grade, 3.14 for vocational high school students, 3.19 for boy's high school students, 3.18 for students who are in relationship, and 3.42 for high popularity respectively. This is interpreted as Joiner et al. that female students tend to be more susceptible to physical changes due to higher physical inclinations and to secondary physical changes, resulting in lower physical satisfaction compared to male students [10].

According to Frost & Mckelvie's study of elementary school students, high school students, and college students, on the relationship between appearance satisfaction and self-esteem was found to be lower on girls than boys, and high school students was the lowest. For those adolescents who have confidence in their appearance tend to form a positive identity, by expressing their own personality through their appearance and recognizing them as an indicator of the uniqueness

which will lead to have positive impact for developing the self-identity during adolescence.

In the perception of dental aesthetic treatment, 9.7% were male and 2.0% were female which showed that the male students have more negative perception than female students. In addition, it was generally accepted that dental aesthetic treatments are used to solve when they are unsatisfied with oral teeth, jaws (chin), mouth, which leads not to be confident in their appearance. As a result, it was found that many publicity and efforts were needed to increase interest in oral and maxillofacial on adolescents.

Adolescents' attention to the appearance is increasing daily. Students who undergo cosmetic surgery continue to increase, and they are overly immersed in their appearance due to the socio-cultural influence that is sensitive to external stimuli, which could possibly increase the risk of side effects and mental sequelae. In order to enable young people to grow into a healthy, physically and psychologically, society in a variety of socio-cultural environments, people such as parents, teachers, and mass media people who can affect its phenomena are responsible for shaping a healthy appearance culture.

CONCLUSION

As the social phenomenon of cosmopolitanism spreads, in the adolescent period when the values and self-concept are not properly established, more attention is paid to the appearance than the adult, and it is stimulated and influenced from the appearance itself which can be led to the core factor of the self-concept as well as the body image of the person can be obsessed. The purpose of this study is to investigate through survey and analyze the perception of facial satisfaction and dental aesthetic treatment among Busan and Yangsan areas' high school students and the results is as follows:

1. 33.7% of the male and 22.4% of the female respondents answered that the most important part for appearance was the face. In addition, same result came along with academic, vocational, boy's only, girl's only, coed high school, being in relationship, and popularity.
2. The satisfaction rate of the first impression was 3.25 for males and 2.97 for female students and there was statistically significant results were

found in gender, grade, school system, school structure, being in relationship, and popularity.

3. The face satisfaction rate was 3.14 for male which is higher than the female students and there was a statistically significant difference in gender, grade, school structure, and popularity but no significant difference was found in being in relationship.
4. There was statistically significant result in the grade, school system, school structure and popularity in maxillofacial satisfaction where gender, grade, school structure, being in relationship, and popularity in maxillofacial interested showed significant results.
5. In the perception of dental aesthetic treatment, 9.7% were male and 2.0% were female which shows the male students were more negative than female students. Also, there was statistically significant result in gender, school structure and being in relationship in dental aesthetic treatment.
6. Although there is a statistically significant difference in facial satisfaction with maxillofacial satisfaction, dental aesthetic treatment has a negative correlation with it as well as statistically significant differences was not found respectively.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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The Association between Leadership Styles of Adolescent Football Coaches and Players' Social Skills

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ABSTRACT

Background/Objectives: This study was conducted to determine the effect of the leadership style of adolescent football coaches on the social skills of players.

Method/Statistical analysis: To that end, a questionnaire was administered to a total of 215 athletes registered with the Korea Football Association as of 2018. Data were analyzed using SPSS 21.0 for frequency, exploratory factor analysis, reliability, correlation and multiple regression analysis.

Findings: The findings were as follows. First, an analysis of the correlation between the leadership types of adolescent football coaches and the social skills of players showed that the training order had a positive correlation with empathy, self-direction, self-control and self-expression. Democratic behavior, social support and positive reinforcement had a positive correlation with empathy, self-direction and self-control. The authoritative style showed a positive correlation with empathy and self-expression. Second, a review of the association between leadership types of adolescent football coaches and empathy of athletes found a positive effect between the training order type ($\beta=.653$, $p<.001$) and positive reinforcement ($\beta=.102$, $p<.05$), while a negative effect was detected between authoritative guidance ($\beta=-.152$, $p<.001$). Third, a review of the association between the leadership types of adolescent football coaches and the self-direction of athletes found a positive effect between the training order type ($\beta=.255$, $p<.001$), social support ($\beta=.139$, $p<.05$) and positive reinforcement ($\beta=.364$, $p<.001$). Fourth, a review of the association between leadership types of adolescent football coaches and athletes' self-control showed a positive correlation between democratic behavior ($\beta=.302$, $p<.001$) and social support ($\beta=.464$, $p<.001$). Fifth, a review of the association between the leadership types of adolescent football coaches and athletes' self-expression showed a positive impact of authoritative leadership style ($\beta=.152$, $p<.05$).

Improvements/Applications: As democratic behavior and social support play a positive role in self-control, coaches of adolescent football players should adopt these coaching styles for adequate self-control of players.

Keywords: *football coach, leadership type, empathy, self-direction, self-control, self-expression*

INTRODUCTION

The management environment and competitive landscape of corporations and sports teams are rapidly changing. Successful survival is ensured under effective organizational and human source development and

management¹. The management of organizational members in a highly competitive environment requires the maximum level of motivational skills. The leadership style of sports coaches is a key engine that drives their vision and objectives². For example, leaders who guidesports teams must develop and manage the capabilities of the team and its members. In addition, leaders must provide direct and indirect performance capabilities that can contribute to realizing the team vision.

The leadership type of the sports coach has a direct effect on players and becomes an important factor in their psychological development and growth². Therefore,

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the leadership type of sports coaches for adolescents must lead to improved performance, as well as manage their physical strength, contributing to acquisition of techniques and tactics. Coaching activities of the leader in addition to managing match performance, such as managing aspects of everyday life, also important an important role.

While the leadership type of the coach affects athletes of individual sports and team sports differently, the various coaching activities play a key role in maximizing the team's capabilities³. However, these days most coaches suffer from stiff competition faced by the teams or the players' university admissions that lead to emphasis on winning matches above everything else.

Sports groups bring two or more people together to achieve a common goal⁴. In particular, in competitive sports, members of the team are required to perform better than their opponents by tapping into their full potential⁵. In general, sports coaches define the team's goals and contribute to realization of their vision by providing the players with techniques and motivation⁶. Thus, the leadership type of sports coaches defines the overall process underlying the goal realization of the team and its members⁷.

Since evaluation of coaching capabilities is conducted based on the winner, in many cases competent teams or players are fostered under great coaches. Even in the same team, match performance may vary depending on the coach⁸. A leader plays a huge role in an individual's life and occasionally redirects their life. In particular, the role of the leader is especially important for adolescents due to their sensitive personalities. Therefore, the leadership style of coaches has become a subject of academic interest, and plays an important role in various fields. Studies involving leadership style have been actively undertaken in fields such as business management, administrative studies, and psychology⁹. Even in sports, studies focusing on the leadership type and sports coaches have led to high expectations of efficiency in the field. In Korea, too, various studies have been conducted investigating the leadership style of sports coaches^{10,11,12,13}. While such studies have been undertaken in football, too^{14, 15, 16}, studies investigating the social skills of players are lacking.

Social skills refer to appropriate communication and interaction, or the capability to adequately adjust to

the social environment¹⁷. Football players experience great stress during adolescence while forming peer relationships. Good social skills can help maintain smooth peer relationships and address any issues that may arise^{18,19}. Therefore, the need for improving social skills in football players in middle or high school is growing. Students with well-developed social skills can not only lead others effectively, but also maintain a positive relationship, in responding appropriately to others' orders²⁰. Therefore, effective leadership styles of coaches that can help improve social skills in football players to better adjust to school life, are needed.

METHODOLOGY

Subjects: The study population included adolescent football players in the Honam region as of 2018. Convenience sampling was used to select 250 study subjects. A questionnaire was distributed to study subjects who were asked to fill them out on their own. The completed questionnaire copies were retrieved immediately. Excluding those with insufficient or dual responses, a total of 215 copies were used for final analysis. The general characteristics of the study subjects were as listed in Table 1.

Table 1: General characteristics of study subjects

Variable	Category	Frequency (number of people)	Percentage (%)
Age	14 years	26	12.1
	15 years	36	16.7
	16 years	30	14.0
	17 years	43	20.0
	18 years	38	17.7
	19 years	42	19.5
Position	Striker	90	41.9
	Defender	125	58.1
Athletic experience	Less than 2 years	26	12.1
	2 years-3 years	54	25.1
	3 years-4 years	54	25.1
	4 years-5 years	51	23.7
	5 years or longer	30	14.0
Total		215	100

Study tool: The questionnaire comprised 3 questions pertaining to the socio-demographics of the study participant, 27 questions involving the independent variable of leadership style and 33 questions related to the dependent variable of social skills, yielding a total of 53 questions.

The leadership types in this study were analyzed using the revised version of questions of Kim²¹, which in turn represents a translated version of the Leadership Scale for Sports (LSS) developed by Chelladurai & Saleh²². Leadership style was categorized into 5 types: training order type, authoritative guidance type, democratic behavior type, social support type and positive reinforcement. The number of questions for each variable was as follows: 10 questions pertaining to the training order type, 3 questions related to authoritative guidance, 6 questions involved democratic behavior, 5 questions concerned social support and 3 questions represented positive reinforcement.

Social skills were measured using the Social Skill Rating System (SSRS) originally developed by Gresham & Elliott²³ and translated by Mun²⁴, which was then complemented and revised to fit the purpose of this study. Social skills consist of a total of 4 categories of empathy, self-direction, self-control and self-expression. A total of 5 questions related to empathy, 7 questions involved self-direction, 4 questions pertained to self-control and 7 questions concerned self-expression.

Responses to each question were measured on a 5-point Likert Scale, with “not at all” scoring 1 point, “no” scoring 2 points, “average” 3 points, “yes” 4 points, and “very much so” 5 points.

Exploratory factor analysis and reliability: To verify reliability, construct validity verification and exploratory factor analysis were used. Only questions with a factor load of .40 or greater were used when the Varimax method was applied. As this study uses a multi-category scale to measure similar concepts, Cronbach’s alpha coefficient in accordance with internal coherence standards was used for verification of reliability.

Leadership style: Leadership styles were extracted by selecting 5 factors with an Eigen value of 1.0 or greater. Leadership styles were categorized into five factors as follows: training order, democratic behavior, authoritative

guidance, social support and positive reinforcement. Explanatory power was found to be approximately 58.5% of total variance. The KMO standard fitness in this study was .839 with a significance probability of .000, representing a fit for factor analysis. The reliability of the sub-variables of leadership style were as follows: .640 for training order, .688 for democratic behavior, .645 for authoritative guidance, .620 for social support type and .684 for positive reinforcement. These figures indicate a high reliability for internal consistency.

Social skills: For social skills, 4 factors with an Eigen value of 1.0 or higher were extracted. Social skills were categorized into the 4 factors of empathy, self-direction, self-control and self-expression. Explanatory power was approximately 56.4% of total variance. In this study, the KMO standard fitness was .826, and the significance probability was .000, indicating appropriate factor analysis. The reliability for the sub-variables of social skills is as follows: .656 for empathy, .640 for self-direction, .684, for self-control, and .766 for self-expression. These figures indicate a high reliability for internal consistency.

Statistical analysis: SPSS (ver 21.0) was used for statistical analysis of different leadership styles of football coaches affecting the social skills of players. The detailed analysis was as follows: First, a frequency analysis was conducted to review the socio-demographic variables of the study subjects. Second, to review the validity and reliability of each category in the questionnaire, an exploratory factor analysis was carried out and Cronbach’s alpha was calculated. Third, to review the correlation between the leadership type of football coaches and the players’ social skills, a correlation analysis was conducted. Fourth, a multiple regression analysis was conducted to review the effects of the leadership style of the football coach on the players’ social skills. All statistical hypotheses were verified at a significance level of $\alpha=.05$.

RESULTS

Correlation between leadership style and social skills: Pearson’s correlation coefficient was calculated to review any correlation between the leadership style of adolescent football coaches and the adolescent football players’ social skills. The results are presented in Table 2.

Table 2: Correlation between leadership style and social skills

Subvariable	A	B	C	D	E	F	G	H	I
Training order	-								
Democratic behavior	.341 ***	-							
Authoritative guidance	-.074	.249 ***	-						
Social support	.145*	.550 ***	.107	-					
Positive reinforcement	.285 ***	.245 ***	.036	.376 ***	-				
Empathy	.736 ***	.342 ***	.165*	.224 ***	.327 ***	-			
Self-direction	.422 ***	.381 ***	.047	.383 ***	.520 ***	.392 ***	-		
Self-control	.153*	.517 ***	.049	.585 ***	.144*	.234 ***	.284 ***	-	
Self-expression	.151*	-.047	.149*	.024	.015	.152 *	-.063	.015	-
*p<.05, ***p<.001									

As seen in Table 2, the training order type had a positive correlation with empathy ($r=.736$), self-direction ($r=.422$), self-control($r=.153$) and self-expression ($r=.151$). Democratic behavior showed a positive correlation with empathy ($r=.342$), self-direction ($r=.381$) and self-control ($r=.517$). Authoritative guidance had a positive correlation with empathy ($r=.165$) and self-expression($r=.149$). Social support type had a positive correlation with empathy ($r=.224$), self-direction ($r=.383$) and self-control ($r=.585$). Positive reinforcement showed a positive correlation with empathy ($r=.327$), self-direction($r=.520$) and self-control ($r=.144$).

Association between leadership style and social skills

Association between leadership style and empathy: As seen in Table 3, leadership style had a significant effect on empathy. The significance of the entire regression equation was $F=59.170$ ($p<.001$), and the explanatory power was found to be approximately 58.6% ($R^2=.586$) of total variance. The beta value, which represents the relative effect of leadership type on empathy showed a positive effect with training order ($\beta=.653$, $p<.001$) and positive reinforcement types ($\beta=.102$, $p<.05$), but a negative effect with authoritative guidance ($\beta=-.152$, $p<.001$).

Table 3: Association between leadership style and empathy

	B	SE	β	t	F	R ²
Constant	.605	.257		2.357*	59.170***	.586
Training order	.711	.054	.653	13.124***		
Democratic behavior	.121	.067	.106	1.808		
Authoritative guidance	-.116	.036	-.152	-3.244***		
Social support	.048	.055	.049	.870		
Positive reinforcement	.081	.040	.102	2.053*		
*p<.05, ***p<.001						

Association between leadership style and self-direction: As seen in Table 4, leadership type had a significant effect on self-direction. The significance of the entire regression equation was $F=27.723$ ($p<.001$), and explanatory power was approximately 39.9% ($R^2=.399$) of total variance. The beta value or the relative effect of leadership type on self-direction showed a positive effect with the training order type ($\beta=.255$, $p<.001$), social support($\beta=.139$, $p<.05$) and positive reinforcement ($\beta=.364$, $p<.001$).

Table 4: Association between leadership type and self-direction

	B	SE	β	t	F	R²
Constant	.808	.289		2.797**	27.723***	.399
Training order	.259	.061	.255	4.258***		
Democratic behavior	.136	.075	.127	1.806		
Authoritative guidance	.004	.040	.006	.109		
Social support	.127	.062	.139	2.041*		
Positive reinforcement	.270	.044	.364	6.077***		

*p<.05, **p<.01, ***p<.001

Association between leadership type and self-control

Table 5: Association between leadership type and self-control

	B	SE	β	t	F	R²
Constant	1.792	.289		6.208***	29.047***	.410
Training order	.008	.061	.008	.129		
Democratic behavior	.325	.075	.302	4.323***		
Authoritative guidance	-.051	.040	-.071	-1.270		
Social support	.428	.062	.464	6.897***		
Positive reinforcement	-.078	.044	-.104	-1.752		

***p<.001

As seen in Table 5, leadership style had a significant effect on self-control. The significance of the entire regression equation was F=29.047 (p<.001), and explanatory power was approximately 41.0% (R²=.410) of total variance. The beta value or the relative effect of leadership type on self-control showed a positive effect with democratic behavior (β=.302, p<.001) and social support (β=.464, p<.001).

Association between leadership style and self-expression

Table 6: Association between leadership style and self-expression

	B	SE	β	T	F	R²
Constant	4.162	.488		8.533***	2.125*	.048
Training order	-.182	.103	-.133	-1.768		
Democratic behavior	-.115	.127	-.080	-.902		
Authoritative guidance	.146	.068	.152	2.138*		
Social support	.066	.105	.054	.631		
Positive reinforcement	.047	.075	.047	.622		

*p<.05, ***p<.001

As seen in Table 6, leadership types had a significant effect on self-expression. The significance of the entire regression equation was F=2.125(p<.05), and explanatory power was approximately 4.8%(R²=.048) of total variance. The beta value representing the relative effect of leadership type on self-expression showed a positive effect under authoritative guidance type(β=.152, p<.05).

DISCUSSION

This study was conducted to review the effect of leadership styles of football coaches on the social skills of players. A correlation analysis between the leadership types and the social skills of athletes showed that training order had a positive correlation with empathy, self-direction, self-control and self-expression. Under democratic behavior and social support, a positive correlation was observed with self-control, empathy and self-direction, while under authoritative guidance a positive correlation was observed with self-direction and self-expression. A regression analysis showed that the training order and positive reinforcement had a positive effect on empathy, while a negative effect occurred under authoritative guidance. The training order, social support and positive reinforcement patterns had a positive effect on self-direction, while democratic behavior and social support type had a positive effect on self-control.

In addition, authoritative guidance had a positive effect on self-expression. These findings suggest that when training order and positive reinforcement leadership contributed to increased empathy whereas authoritative guidance may decrease empathy. Therefore, football coaches should increase empathy via democratic behavior rather than adopt an authoritative coaching style. Moreover, this study found that the training order, social support and positive reinforcement led to a positive effect on self-direction. Self-direction refers to proactively leading one's tasks. Self-direction in a sports environment suggests pursuit of individual opportunities and a clear expression of likes and dislikes. Fostering an environment that facilitates self-direction of athletes is a major role of the coach and leader. Therefore, to encourage positive self-direction of football players, a leadership based on training order, social support and positive reinforcement is recommended. In fact, the study by Kim²⁵, also supports this finding, based on the argument that the leadership style oriented towards training and order has a positive effect on the self-direction of middle school students who participate in sports.

Self-control is the ability of the self as an agent controlling the self as an object to ensure appropriate behaviors in a given situation. Democratic behavior and social support in football coaching have a positive effect on the self-control of football players by acting as a deterrent against the satisfaction of short-term desires, as well as the direct expression of their emotions.

Notably, democratic behavior or social support rather than training order or authoritative type had a more positive effect on the self-control of players. Given that adolescents in middle or high school have a tendency to rebel when suppressed or overly controlled, adopting a coaching style that recognizes the individual athlete and supports them appears to result in a positive self-control, partly out of a desire to meet expectations.

In summary, training guidance and positive reinforcement have a positive effect on empathy and self-direction, while an authoritative approach has a negative effect on empathy, suggesting the need for appropriate leadership style for coaches of adolescent football players. Moreover, as democratic behavior and social support play a positive role in self-control, coaches of adolescent football players should adopt these coaching styles for adequate self-control of players.

CONCLUSION

This study was conducted to identify the effects of leadership style of adolescent football coaches on the players' social skills. To that end, a total of 215 adolescent football players registered with the Korean Football Association as of 2018 were used as subjects in a questionnaire. Data were analyzed using SPSS 21.0 for frequency, exploratory factor analysis, reliability verification, correlation analysis and multiple regression analysis. The findings were as follows.

First, a review of the correlation between the leadership style of adolescent football coaches and the players' social skills revealed that training order had a positive correlation with empathy, self-direction, self-control and self-expression. Democratic behavior, social support and positive reinforcement had a positive correlation with empathy, self-direction and self-control. Authoritative guidance was positively correlated with empathy and self-expression. Second, a review of the association between the leadership style of adolescent football coaches and the social skills of players found a positive effect between training order ($\beta=.653$, $p<.001$) and positive reinforcement ($\beta=.102$, $p<.05$), but a negative effect under authoritative guidance ($\beta=-.152$, $p<.001$). Third, a review of the association between leadership style of adolescent football coaches and the players' self-direction revealed a positive effect with the training order ($\beta=.255$, $p<.001$), social support ($\beta=.139$, $p<.05$) and positive reinforcement ($\beta=.364$, $p<.001$).

Fourth, a positive effect on players' self-control was observed with democratic behavior ($\beta=.302, p<.001$) and social support provided by the coaches ($\beta=.464, p<.001$). Fifth, the self-expression of players was enhanced under the authoritative style ($\beta=.152, p<.05$).

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Association between Selection Attribution of Marine Tourism in Jeju, Overall Satisfaction and Motivation

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ABSTRACT

Background/Objectives: This study was conducted to identify the association between the selection factors of Jeju marine tourism, overall satisfaction and motivation.

Method/Statistical analysis: To that end, a questionnaire was administered to a total of 290 Korean tourists participating in marine swimming, sight-seeing and skin scuba diving in Jeju. Data were analyzed using SPSS 21.0 for frequency and exploratory factor analysis, reliability verification, correlation and multiple regression analysis.

Findings: The findings were as follows. First, selection attributions of Jeju marine tourism showed a positive correlation with overall satisfaction and motivation. Second, the selection attributions of Jeju marine tourism for overall satisfaction were positively affected by safety measures ($\beta=.668$, $p<.001$), natural environment ($\beta=.251$, $p<.001$) and cost ($\beta=.078$, $p<.05$). Third, safety measures ($\beta=.532$, $p<.001$), natural environment ($\beta=.221$, $p<.001$), cost ($\beta=.268$, $p<.001$) and accessibility ($\beta=.227$, $p<.001$) positively affected the intention to re-visit. Fourth, while safety measures ($\beta=.257$, $p<.001$) and natural environment ($\beta=.606$, $p<.001$) positively affected tourists' recommendation, the cost factor ($\beta=-.155$, $p<.01$) negatively affected their intentions for recommendation.

Improvements/Applications: Safety measures, natural environment, cost and accessibility were positively associated with overall satisfaction. In particular, safety measures and natural environment had a positive effect on the intention to re-visit and the intention to recommend. However, cost had a negative effect on the intention to recommend to others.

Keywords: *Marine tourism, selection attribution, overall satisfaction, intention to re-visit, intention to recommend*

INTRODUCTION

The sea covers 70% of the total surface area of the Earth and has a great influence on the economic, social and cultural activities of mankind. The marine life has been predominantly the domain of fishery; however, as marine tourism increases, leisure and tourism activities are increasingly becoming popular, in addition to such activities in land-locked areas. In particular, conversion of marine resources into tourist attractions assumes great significance ¹. Given the cases of industrialized

countries, marine tourism is seen as an area with high growth potential in terms of participation rate and economic implications ². Launch of cruise routes and development of high function dry suits facilitate marine tourism to realize mankind's aspirations.

Overall, tourism around the world is moving from land-locked areas to marine attractions. In industrialized countries, the participation rate for marine tourism is around 40~50%, and marine tourist sites are being developed through waterside space development projects. Key hubs for marine tourism include beaches, marinas and cruise terminals, with cruise, skin scuba diving, wind surfing and yachts constituting a large share of marine sports. In Korea, too, marine sports activities have increased, along with the development of waterside spaces ¹. In addition, with increased interest in green and blue tourism in Korea, interest in marine tourist activities

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has also grown, with activities not only occurring on the beach, but also on, in and under the sea. Recreational aspects of beaches and marinas are being emphasized³. Marine tourism has also increased the expectation for efficient and optimal usage of resort areas off, on or under sea. Tourism is expected to increase the focus on activities, with alternative tourism focusing on the sea attracting further development.

Jeju Island is emerging as the optimal area for marine tourism, given its natural environment as a volcanic island, growing interest in green and blue tourism and a shift in tourist paradigms. In addition to its attractiveness as a marine tourist destination, it has mild weather, a wide range of marine eco-system and a beautiful natural environment that offers great potential as a marine tourism attraction⁴. Understanding of marine tourists and their behavior is needed to meet their demand for Jejuin marine tourism. Previous studies have analyzed the tourist consumer profile to formulate marketing strategies based on their motivation, selection attributions, tourism satisfaction and behavior. Selection attribution refers to consumers purchasing a bundle of attributes, rather than seeing the product as a single item⁵. Similarly, selection attribute refers to the attitude that leads to purchase based on a product's attributes compared with other attributes^{6,7}.

The factors underlying the selection of a tourist product are important behavior al variables determining the decisions made by tourists during their visit. Moreover, the concept of selection attribution is often used together

with the benefits of participation or selection factors. Selection attribution of tourist products is considered a key variable facilitating forecast satisfaction and motivation. Various empirical studies have been conducted to determine the structural association among these variables; however, studies investigating marine tourism only started to appear in the 2000s when Lee⁸ argued that selection attributions of marine tourism are the driving force for marine tourism. However, empirical studies that address various categories of selection attributions are unavailable, and almost no studies reviewed the association between selection attribution, overall satisfaction and motivation in marine tourism. Therefore, this study was used to conduct an empirical analysis of the factors considered important by Korean tourists who participated in swimming at sea, sight-seeing or skin scuba diving, when selecting marine tourism, and their association with overall satisfaction and motivation.

METHODOLOGY

Study subjects: Korean tourists who participated in swimming at sea, sight-seeing or scuba diving in Jeju from July to September 2017 were selected as the study population. Convenience sampling was used to select 300 study subjects. A questionnaire was distributed and subjects were asked to fill it out themselves. The completed questionnaire was immediately retrieved. Excluding those with insufficient responses or with double-marked responses, a total of 290 copies were used for the final analysis. The general characteristics of the study subjects are listed in Table 1.

Table 1: General characteristics of study subjects

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	153	52.8
	Female	137	47.2
Age	20s	66	22.7
	30s	102	35.2
	40s or older	122	42.1
Companion	Spouse/lover	38	13.1
	Club member/work colleague	93	32.1
	Family/relative	88	30.3
	Friend	71	24.5
Area of residence	Metropolitan area	101	34.8
	Chungcheong	34	11.7
	Gyeongsang	43	14.8
	Jeolla	52	17.9
	Gangwon	60	20.7
Participation type	Swimming	134	46.2
	Off-shore sightseeing	98	33.8
	Skin scuba diving	58	20.0
Total		290	100

STUDY TOOLS

The questionnaire consisted of 5 questions involving socio-demographic characteristics, 18 questions pertaining to selection attribution as an independent variable, 5 questions related to overall satisfaction which is a mediating variable and 4 questions on motivation, which is a dependent variable.

Selection attribution is defined as attributes that affect a consumer's decision-making or selection of alternatives^{6,7}. In this study, it is defined as an important factor that underlying a decision whether or not to participate in marine tourism. Satisfaction is the subjective feeling of an individual regarding the use or ownership of a product or services⁹. Based on previous studies reporting that the overall satisfaction for a single item reflected customer satisfaction better than satisfaction for each attribute and reduced errors in measurement^{10,11,12}, in this study, satisfaction was defined as an overall subjective feeling of the participants in marine tourism after their tourist activities.

It was measured as a single item. Motivation was defined as an individual's will or belief that represents specific future behaviors following a specific perspective^{13,14}. The measurement elements vary across different studies. In this study, it was defined as the will or belief of tourists and their willingness to forward information on a product or service to others. Four sub-variables of selection attributions were used in this study: safety measures, natural environment, cost, and accessibility. Motivation consisted of a total of 2 items, which were intention to re-visit and intention to recommend.

Responses to each question was measured on a 5-point Likert Scale, with "not at all" assigned 1 point, "no" scoring 2 points, "average" 3 points, "yes" considered 4 points and "very much so" resulting in 5 points.

Exploratory factor analysis and reliability: To verify the validity, exploratory factor analysis was used. Using the varimax method, only questions with a factor load of .40 or greater were selected. In addition, to verify the reliability, Cronbach's alpha coefficient was used in accordance with internal consistency standards.

Selection attribution: In this study, 20 selection attributions of marine tourism were used for the survey. An exploratory factor analysis was conducted to convert

the selection attributions to factors. After an analysis of the factors and reliability, items with a factor load of less than 0.6 and 2 items associated with a difficult factor expression were excluded, resulting in a total of 18 questions. A detailed analysis of the results shows that factor load and communality were both .06 or greater. Four factors with an Eigen value of 1.0 or greater were extracted for selection attribution. The initial Eigen values of selection attributions were as follows: Safety measures (9.051), natural environment(1.763), cost(1.166) and accessibility (1.026). Explanatory power was found to be approximately 72.256% of total variance. The KMO value which is used to verify the sample fitness was .905, and Bartlett's test of sphericity was 3721.551(sig=.000), indicating the significance probability. Reliability was .820 for safety measures, .867 for the natural environment, .853 for cost, and .841 for accessibility, indicating a high internal consistency.

Motivation: Motivation for marine tourism in this study was measured using a total of 6 items. To convert motivation into factors, an exploratory factor analysis was conducted. According to analysis of factors and reliability, items with a factor load of less than 0.6, and 2 items with difficulty in factor expression were excluded, resulting in a total of 4 items. A specific review of the results show s that factor load and communality,were both .06 or higher. For motivation, 2 factors with an Eigen value of 1.0 or greater were extracted. The initial Eigen value of motivation was classified into intention to re-visit (2.383) and intention to recommend (1.207), with explanatory power accounting for approximately 89.765% of total variance.

The KMO value representing the sample fitness was .570, and Bartlett's test of sphericity was 609.702(sig=.000), indicating the significance probability. In terms of the reliability for sub-variables of motivation, intention to re-visit scored .792 and intention to recommend scored .767, indicating a high reliability for internal consistency.

STATISTICAL ANALYSIS

SPSS(ver. 21.0) was used for statistical analysis of the association between selection attribution of Jeju marine tourism, the overall satisfaction, and motivation. Frequency analysis was used to review the socio-demographic variables of the subjects. The validity and reliability of each item on the questionnaire was reviewed

via an exploratory factor analysis and Cronbach's alpha was calculated. Participants' overall satisfaction and motivation were analyzed in a correlation analysis of their selection attributions in Jejumarine tourism. A multiple regression analysis was conducted to review the effect of selection attributions of Jeju marine tourism on overall satisfaction and motivation. All statistical hypothesis tests were conducted at a significance level of $\alpha=.05$.

RESULTS

Correlation between the selection attributions of Jeju marine tourism, overall satisfaction and motivation: Pearson's correlation coefficient was calculated to correlate the selection attributions of Jeju marine tourism

with the overall satisfaction and motivation. The results are displayed in Table 2.

As seen in Table 2, safety measures had a positive correlation with overall satisfaction ($r=.911$), intention to re-visit ($r=.739$) and intention to recommend ($r=.612$). Natural environment had a positive correlation with overall satisfaction ($r=.753$), intention to re-visit ($r=.416$) and intention to recommend ($r=.740$). The cost factor had a positive correlation with overall satisfaction ($r=.710$), intention to re-visit ($r=.655$) and intention to recommend ($r=.538$). Accessibility was positively correlated with overall satisfaction ($r=.719$), intention to revisit ($r=.655$) and intention to recommend ($r=.538$).

Table 2: Correlation between the selection attributions of Jeju marine tourism, overall satisfaction and motivation

Sub-variable	Safety measures	Natural environment	Cost	Accessibility	Overall satisfaction	Intention to re-visit	Intention to recommend
Safety measures	-						
Natural environment	.655***	-					
Cost	.699***	.573***	-				
Accessibility	.725***	.597***	.652***	-			
Overall satisfaction	.911***	.753***	.710***	.719***	-		
Intention to re-visit	.739***	.416***	.655***	.655***	.648***	-	
Intention to recommend	.612***	.740***	.538***	.538***	.691***	.328***	-
*** $p<.001$							

Association between selection attribution and overall satisfaction

Table 3: Association between selection attribution and overall satisfaction

	B	SE	β	t	F	R2
Constant	.089	.086		1.035	508.694***	.877
Safety measures	.637	.034	.668	18.941***		
Natural environment	.240	.027	.251	8.784***		
Cost	.066	.026	.078	2.549*		
Accessibility	.033	.032	.033	1.037		
* $p<.05$, *** $p<.001$						

As seen in Table 3, selection attribution showed a significant effect on overall satisfaction. The significance of the overall regression equation was $F=508.694$ ($p<.001$), and explanatory power was approximately 87.7% ($R^2=.877$) of total variance. Beta value representing the relative effect of selection attribution on overall satisfaction showed a positive value for safety measures ($\beta=.668$, $p<.001$), natural environment ($\beta=.251$, $p<.001$), and cost ($\beta=.078$, $p<.05$).

Association between selection attribution and motivation

a. Association between selection attribution and motivation

Table 4: Association between selection attribution and intention to re-visit

	B	SE	β	t	F	R²
Constant	.614	.171		3.585***	119.370***	.626
Safety measures	.579	.067	.532	8.648***		
Natural environment	.240	.054	.221	4.427***		
Cost	.258	.052	.268	5.000***		
Accessibility	.258	.064	.227	4.047***		
***p<.001						

As seen in Table 4, selection attribution revealed a significant effect on the intention to re-visit. The significance of the entire regression equation was F=119.370(p<.001), and explanatory power was approximately 62.6%(R²=.626) of total variance. The beta value, which is the relative effect of selection attribution on the intention to re-visit was positive in terms of safety measures (β=.532, p<.001), natural environment (β=.221, p<.001), cost(β=.268, p<.001) and accessibility (β=.227, p<.001).

b. Association between selection attribution and intention to recommend

Table 5: Association between selection attribution and intention to recommend

	B	SE	β	t	F	R²
Constant	.633	.174		3.628***	101.592***	.588
Safety measures	.272	.068	.257	3.986***		
Natural environment	.640	.055	.606	11.563***		
Cost	-.144	.052	-.155	-2.744**		
Accessibility	.100	.065	.090	1.533		
***p<.001						

As seen in Table 5, selection attribution showed a significant effect on the intention to recommend. The significance of the entire regression equation was F=101.592(p<.001), and explanatory power accounted for approximately 58.8%(R²=.588) of total variance. The beta value showed a positive effect in safety measures (β=.257, p<.001) and natural environment (β=.606, p<.001), whereas a negative effect for cost (β=-.155, p<.01).

DISCUSSION

Experts forecast that the 21st century will be a marine century. In recent years, countries around the world have taken renewed interest in the sea resulting in growing competition in this field. As the importance of the sea grows, interest in marine tourism will also grow in Korea, as has been observed in industrialized countries.

The paradigm for 21st century tourism involves a shift in focus from land-based tourism to sea-based tourism, and from sight-seeing to experience-oriented tourism. The sea covers a large area of the Earth’s surface and can be used in all its dimensions including the sea surface, undersea and the beach. The potential for development is enhanced by space provided for a variety of experiences and activities. Given the potential for development and increased interest in the sea, a basic understanding of marine tourists, their psychology, selection attribution and satisfaction is needed to create the demand for marine tourism. Therefore, this study was conducted to correlate the selection attribution of Jeju marine tourism, with overall satisfaction and motivation. The findings showed that the selection attribution of Jeju marine tourism had a positive correlation with both overall satisfaction and motivation.

Jeju Island consists of multiple tourist facilities and services. The selection attribution of participants in Jeju's marine tourism is affected by various factors. Selection attribution refers to the social, physical, psychological and behavioral characteristics of the tourists related to their perceptions and experiences in marine tourism. Participant tourists compared it with other tourist products based on the selection attributions, based on the benefits and finally selected marine tourism. Marine tourism is closely associated with the changes in tourists' attitudes and values, and increased interest by stakeholders in current and expected demand¹⁵. Marine tourism can be defined broadly to include tourist activities that use the sea or the beach. The activity occurs in a specific space unlike in the inland areas, with different selection attributions than those of regular tourism.

Dawn & Thomas¹⁶ classified the evaluation of satisfaction into three stages: pre-consumption, consumption and post-consumption. In this process, overall satisfaction is affected by commercial services, transport, safety facilities, beliefs and intangible products related to leisure activities. From this perspective, safety measures, natural environment and cost had a positive effect on the overall satisfaction, suggesting a positive correlation between the selection attributions of participants in marine tourism and overall satisfaction. Yoon¹⁷ noted that decision-making related to a tourist destination affects satisfaction by combining with overall attributes of the tourist destination. Jeon, Choi & Sim¹⁸ argued that accessibility, auxiliary facilities, service quality and attractiveness have a positive effect on satisfaction, partially supporting the findings of this study.

All sub-variables of selection attribution had a positive effect on the intention to re-visit. Safety measures and natural environment had a positive effect while cost had a negative effect on the intention to recommend. Among the selection attributions, safety measures and natural environment scored high, indicating that safety measures and natural environment are becoming increasingly important in guiding a tourist motivation. Moreover, it points to the need to address the changing desires of participants to increase their interest and attraction for marine tourism in Jeju. Indeed, safety measures to prevent accidents during marine tourism, as well as efforts to maintain a clean and pleasant natural environment are needed. He Xin¹⁹ noted that in the association between selection attribution

and motivation, a significant impact was found in both intention to re-visit and intention to recommend, suggesting tourists' intentions to re-visit or recommend the destination to others.

CONCLUSION

This study was conducted to identify the association between selection attributions of Jeju marine tourism, overall satisfaction and motivation. To that end, a questionnaire was administered to a total of 290 Korean tourists participating in swimming at sea, sight-seeing or scuba diving in Jeju during 2017. Data were analyzed using SPSS 21.0, for frequency, exploratory factor analysis, reliability verification, correlation and multiple regression analysis. The findings were as follows.

First, the selection attribution of Jeju marine tourism had a positive correlation with both overall satisfaction and with motivation.

Second, a review of the association between the selection attribution of Jeju marine tourism and the overall satisfaction revealed a positive effect on safety ($\beta=.668, p<.001$), natural environment ($\beta=.251, p<.001$) and cost ($\beta=.078, p<.05$).

Third, a review of the association between the selection attribution of Jeju marine tourism and intention to re-visit found a positive effect on safety ($\beta=.532, p<.001$), natural environment ($\beta=.221, p<.001$), cost ($\beta=.268, p<.001$) and accessibility ($\beta=.227, p<.001$).

Fourth, a positive effect of safety measures ($\beta=.257, p<.001$) and natural environment ($\beta=.606, p<.001$) on tourists' recommendations to re-visit, whereas a negative effect based on cost ($\beta=-.155, p<.01$).

Safety measures, natural environment, cost and accessibility were positively associated with overall satisfaction. In particular, safety measures and natural environment had a positive effect on the intention to re-visit and the intention to recommend. However, cost had a negative effect on the intention to recommend to others.

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Conflict of Interest: Nil

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The Desire to Win Determines Match Performance Abilities of Taekwondo Athletes in Elementary School

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ABSTRACT

Background/Objectives: This study was conducted to identify the association between the desire to win and match performance ability of Taekwondo athletes in elementary schools.

Method/Statistical analysis: To that end, a questionnaire survey was conducted involving a total of 239 students in their 4th to 6th year of elementary school, who were registered with the Korean Taekwondo Association as of 2018. Data were analyzed using SPSS 21.0 for frequency analysis, exploratory factor analysis, reliability verification, correlation analysis and multiple regression analysis.

Findings: The findings were as follows. First, the desire to win was positively correlated with all sub-variables of match performance ability. Second, a review of the association between the desire to win and match performance success in elementary school Taekwondo athletes showed a positive effect on all three sub-variables of desire to win ($\beta=.111$, $p<.05$), fighting spirit ($\beta=.429$, $p<.001$) and confidence ($\beta=.187$, $p<.01$). Third, a review of the association between the desire to win in Taekwondo athletes in elementary school and their psychological maturity revealed that there was a positive effect in desire to win ($\beta=.248$, $p<.001$) and confidence ($\beta=.480$, $p<.001$). Fourth, a review of the association between the desire to win in Taekwondo athletes in elementary school and their match performance maturity showed that there was a positive correlation in desire to win ($\beta=.240$, $p<.001$) and confidence ($\beta=.467$, $p<.001$).

Improvements/Applications: Given these findings, the desire to win in Taekwondo students of elementary school can be said to have a positive effect on their match performance ability.

Keywords: *Desire to win, confidence, match performance success, psychological maturity, match performance maturity*

INTRODUCTION

Taekwondo athletes face huge competitive pressure in many matches, leading to tension, anxiety and overall mental stress, which are important factors in determining their chances of winning other players. The high tension and anxiety felt by Taekwondo athletes in matches affect their performance ability¹.

Taekwondo matches require technique but also good stamina, as well as the ability to control, adjust and maintain

one's psychological state to bring out one's full potential². Techniques used in Taekwondo matches are elaborate and complex. They need to be prompt and accurate to strike before the other party reacts. When psychological stability is maintained, better performance is possible.

As in any other sport, performance ability is determined through competition. Victory over the opposing athlete requires excellent techniques and tactics and the stamina to compete in all rounds. In addition to psychological stability, the desire to win and confidence are essential for victory. Therefore, many Taekwondo athletes strive to improve their physical function^{3,4}. Athletes competing in a Taekwondo match note that technical prowess is the most important factor determining performance, and is the result of interaction between one-performance Taekwondo matches are elaborate and complex.

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Often, due to unexpected reasons, athletes are not able to manifest their full capabilities, despite better stamina, technique or tactics ⁵. With improvements in physical technique and high-tech sports gear, the athlete and complex, adjust and maintain one verification, assumed even more importance in recent years ⁶. It has led to measures to resolve psychological issues and enhance psychological control and improvement for the best performance.

If Taekwondo athletes can identify the strategies to effectively control or adjust the various factors that may appear in a match situation, they can successfully address psychological issues. Previous studies report how psychological or social factors affect sports performance in a variety of fields and not just Taekwondo and emphasize self-management ^{7, 8}, psychological satisfaction ^{9, 10}, mental ability to handle the match result ^{11, 12} and psychological techniques for improved match performance ^{1, 13}. Meanwhile, the desire to win enhances performance and a strong goal-driven mentality to overcome a painful or challenging situation in sports, referred to as psychological factor, affects match performance, in association with the psychological strength ¹⁴. The desire to win which refers to the ongoing ability to execute match performance techniques even in a competitive situation can be conceptualized into a desire for success, fighting spirit and confidence. ¹⁵.

The desire to win represents mental prowess and has a positive effect on match performance under appropriate self-management ¹⁶. The strong desire to win and the confidence that one can beat the opposing athlete represent mental prowess in the sport scene. Therefore, the desire to win is one of the most basic psychological factors that athletes must have ¹⁷. Previous studies analyzing the desire to win and match performance ^{8, 18}

show that both theoretically and from experience, the athlete must have ¹⁷. Pressings athlete represent mental prowess the match performance ¹⁵.

Match performance in sports is the result of interaction between physical and psychological factors. From the perspective of sports psychology, it is the association between kinetic function and psychological variables. In general, match performance ability refers to the comprehensive ability in a sports situation including the athlete psychology, it is the association by genetic factors, as well as physique, stamina, workout level and experience, psychological state, experience and conditions of the arena ⁸. As such, even when an athlete is fit for a specific sport and can manage training to maximize his function, unless the external and internal psychological factors are managed, the goal cannot be realized ¹⁹. Therefore, this study reviews the effect of the desire to win among Taekwondo athletes in elementary school on their match performance ability, to provide various data for improved match performance and the ability to appropriately control psychological situations uncondusive to the goal.

METHODOLOGY

Study subjects: Taekwondo students who were in the 4th grade or higher in elementary school and who were registered with the Korean Taekwondo Association as of 2018 were selected as the study population. Elementary students of 4th grade or higher were selected to increase the reliability of the questionnaire, by ensuring that the subjects understand the question. Convenience sampling was used to select a total of 250 subjects. Excluding 11 copies of the questionnaire with insufficient or unreliable responses, a total of 239 copies were used for the final analysis. The general characteristics of the subjects are listed in Table 1.

Table 1: General characteristics of study subjects

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	169	70.7
	Female	70	29.3
Year	4 th year	47	19.7
	5 th year	80	33.5
	6 th year	112	46.9
Athletic experience	Less than 1 year	39	16.3
	1 year–2 years	51	21.3
	2 years–3 years	67	28.0
	3 years or more	82	34.3

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Awards	National competitions	90	37.7
	Regional competitions	123	51.5
	No awards won	26	10.9
Total		239	100

STUDY TOOL

A questionnaire was used as the study tool. The questionnaire consisted of 4 questions involving personal traits, 11 questions pertaining to the desire to win, which is an independent variable, and 13 questions on match performance ability, which is a dependent variable.

The scale to measure the desire to win originally developed by Shin, Kim, Park¹⁵ and reconfigured by Jeon, Choo¹⁸, Kim, Han²⁰ was revised for this study. The desire to win includes fighting spirit, confidence, and desire for success. Match performance ability was measured using the questionnaire that was originally developed by Highlen&Bennett²¹ and reconfigured by Chae²² and Hong¹⁰. Match performance ability consisted of match performance success, psychological maturity, and match performance maturity. Responses to the questions were measured on a 5-point Likert Scale.

Exploratory factor analysis and reliability: To verify the validity, construct validity verification as well as exploratory factor analysis were used. Applying the varimax method, only questions with a factor load of .40 or greater were selected. Since a multi-category scale was used to measure the same concept in this study, Cronbach's a coefficient was used in accordance with the reference for internal consistency to verify the reliability of the study tool.

Desire to win: For desire to win, 3 factors with an Eigen value of 1.0 or greater were extracted. Factors associated with the desire to win were categorized into confidence, desire to win and fighting spirit. The explanatory power

of the desire to win was found to be approximately 68.0% of total variance. KMO standard fitness was found to be .807($p < .001$). The reliability testing of the sub-variables in the desire to win showed a confidence of .661, desire to win.601, and fighting spirit.696, indicating a high internal consistency.

Match performance ability: For match performance ability, 3 factors with an Eigen value of 1.0 or greater were extracted. Factors of match performance ability included match performance success, psychological maturity and match performance maturity. The explanatory power of match performance ability was approximately 60.7% of total variance, and KMO standard fitness was .837($p < .001$). A verification of the reliability of the sub-variables of match performance ability found a match performance success value of .680, psychological maturity value of .643, and match performance maturity value of .639, indicating a high internal consistency reliability.

Data processing: In this study, questionnaire response sheets with insufficient or unreliable responses were excluded from the analysis. Statistical analysis was carried out using SPSS 21.0. Specifically, frequency analysis was conducted for the socio-demographic characteristics of the subjects. Verification of the fitness of the tool was done through factor analysis, and verification of reliability conducted with Cronbach's α . A correlation analysis and multiple regression analysis were carried out for the desire to win and match performance ability in elementary school Taekwondo athletes. The significance level of all data was set at $p < .05$.

RESULTS

Correlation analysis for desire to win and match performance ability

Table 2: Correlation between desire to win and match performance ability

Sub-variable	Desire to win	Fighting spirit	Confidence	Match performance success	Psychological maturity	Match Performance maturity
Desire to win	-					

Conted...

Fighting spirit	.435***	-				
Confidence	.434**	.301***	-			
Match performance success	.379***	.534***	.364***	-		
Psychological maturity .489***		.328***	.610***	.372***	-	
Match performance maturity	.429***	.214***	.562***	.479***	.516***	-
***p<.001						

To identify the correlation between the desire to win and match performance ability, Pearson The significant coefficient was calculated. Table 2 shows the results of the correlation analysis.

As seen in Table 2, the desire to win had a positive correlation with match performance success (r=.379), psychological maturity (r=.489), and match performance maturity (r=.429). Fighting spirit had a positive correlation with match performance success (r=.534), psychological maturity (r=.328), and match performance maturity (r=.214). Confidence had a positive correlation with match performance success (r=.364), psychological success (r=.610), and match performance maturity (r=.562). In other words, the desire to win had a positive correlation with all sub-factors of match performance ability.

Association with the desire to win and match performance ability

Association between the desire to win and match performance

Table 3: Association between desire to win and match performance ability

	B	SE	β	t	F	R ²
Constant	.907	.295		3.073**	40.263***	.339
Desire to win	.126	.071	.111	1.764*		
Fighting spirit	.389	.054	.429	7.220***		
Confidence	.184	.058	.187	3.152**		
*p<.05, **p<.01, ***p<.001						

As seen in Table 3, the desire to win had a significant effect on match performance success. The significance of the entire regression equation was (F=40.263, p<.001), and the explanatory power was approximately 33.9%(R²=.339) of total variance. The beta value, which represents the relative effect of the desire to win on match performance success, and showed a positive effect on the desire to win (β=.111, p<.05), fighting spirit (β=.429, p<.001) and confidence (β=.187, p<.01).

Association between the desire to win and psychological maturity

Table 4: Association between the desire to win and psychological maturity

	B	SE	β	t	F	R ²
Constant	1.284	.238		5.388***	61.219***	.439
Desire to win	.246	.057	.248	4.273***		
Fighting spirit	.060	.043	.076	1.382		
Confidence	.413	.047	.480	8.762***		
***p<.001						

As seen in Table 4, the desire to win had a significant effect on psychological maturity. The significance of the entire regression equation was $F=61.219(p<.001)$. Explanatory power was approximately 43.9% ($R^2=.439$) of total variance. The beta value, which represents the relative effect of the desire to win on psychological maturity, showed a positive effect on the desire to win ($\beta=.248, p<.001$) and confidence ($\beta=.480, p<.001$).

Association between the desire to win and match performance maturity: As seen in Table 5, the desire to win had a significant effect on match performance maturity. The significance for the entire regression equation was $F = 43.852 (p < .001)$, and the explanatory power was approximately 35.9% ($R^2 = .359$) of total variance. The beta value revealed a positive effect on the desire to win ($\beta = .240, p < .001$) and confidence ($\beta = .467, p < .001$).

Table 5: Association between the desire to win and match performance maturity

	B	SE	β	T	F	R ²
Constant	1.328	.249		5.344***	43.852***	.359
Desire to win	.233	.060	.240	3.879***		
Fighting spirit	-.024	.045	-.031	-.524		
Confidence	.392	.049	.467	7.975***		

* $p<.05$, *** $p<.001$

DISCUSSION

This study was conducted to identify the association between the desire to win and match performance ability in Taekwondo athletes at elementary school. Based on the correlation analysis and multiple regression analysis conducted, the following findings are discussed.

The desire to win refers to the desire to successfully end a match. In particular, athletes with a strong desire to win indicate a strong ego and a strong desire not to lose¹⁷. From this perspective, the desire to win is an absolute psychological necessity for athletes. A review of the impact of the desire to win on match performance revealed that fighting spirit and confidence determined success, while the desire to win and confidence affected psychological and match performance maturity. In terms of the psychological factors of Taekwondo athletes, weak mental prowess or desire to win failed to bring out their full potential²³, resulting in failure. Meanwhile, a strong desire to win and do the best in actual matches resulted in the manifestation of athletefull potential. Therefore, the desire to win among elementary school Taekwondo athletes suggests a positive effect resulting in successful performance. In particular, confidence affects psychological success and maturity, which is consistent with the study conducted on judo athletes¹¹ that reported how the Korean style desire to win had a statistically significant effect on successful execution of a match. The desire to win or confidence in elementary school

Taekwondo athletes can have a positive effect in running a match, and confidence positively affects the match outcome. The claim that when the desire to win or fight is expressed, positive thinking can be maintained during a match, which in turn enhances match performance²⁴ is in line with the argument of this study. In addition, the study that found the desire to win has a significant effect on the studentsmatch performance^[20] suggesting that the desire to win is an important psychological factor in match performance.

CONCLUSION

This study was conducted to identify the association between the desire to win and match performance ability of Taekwondo athletes in elementary schools. To that end, a questionnaire survey was conducted involving a total of 239 students in their 4th to 6th year of elementary school, who were registered with the Korean Taekwondo Association as of 2018. Data were analyzed using SPSS 21.0 for frequency analysis, exploratory factor analysis, reliability verification, correlation analysis and multiple regression analysis. The findings were as follows.

First, the desire to win was positively correlated with all sub-variables of match performance ability. Second, a review of the association between the desire to win and match performance success in elementary school Taekwondo athletes showed a positive effect on all three sub-variables of desire to win ($\beta=.111, p<.05$), fighting

spirit ($\beta=.429$, $p<.001$) and confidence ($\beta=.187$, $p<.01$). Third, the correlation between the desire to win and psychological maturity in elementary school Taekwondo athletes revealed a positive effect on the desire to win (psychological maturity in elementary school Taekwondo athlete the correlation between the desire to win and match performance maturity in elementary school Taekwondo athletes revealed a positive effect on the desire to win ($\beta=.240$, $p<.001$) and confidence match performance maturity in elementary school Taekwondo athletes confidence ($\beta=.187$, $p<.01$).

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nill

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The Implementation of a Digital Healthcare Service for People with Disabilities: A Pilot Study

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ABSTRACT

Background/Objectives: The purpose of this pilot study was to implement a digital healthcare service, and identify the satisfaction of people with disabilities either in their homes or in facilities who used this service.

Method/Statistical analysis: People with disabilities residing in community and welfare institutions were recruited. In the pilot study, medical information such as blood sugar, blood pressure, and Braden scale scores were recorded with an online digital healthcare system. Health care providers counseled and educated patients regarding their chronic diseases and rehabilitation-associated risk factors over the course of 6 months. After study completion, their satisfaction was surveyed using the SERVQUAL model.

Findings: To facilitate this pilot study, 1 university hospital, 2 local clinics, and 5 welfare institutions participated and a total of 166 people with disabilities were recruited. Of the sample, 10 participated in a rehabilitation exercise program. Participants answered a questionnaire regarding their satisfaction with digital healthcare services. The numbers of video conferences, and blood sugar monitoring and blood pressure tests were 474, 4415, and 4251, respectively. After completion of the pilot study, the satisfaction level was scored as 89.63 points, ranging from 0 (no satisfaction) -100 (high satisfaction); thus, demonstrating a high level of satisfaction.

Improvements/Applications: This pilot study can be used as a basic model for a digital healthcare system and can contribute to the improvement of awareness of digital healthcare services for people with disabilities.

Keywords: Healthcare system, Disability, Satisfaction, Digital, Compliance

INTRODUCTION

The worldwide prevalence of disability is reported to be about 15.6%, but the prevalence is 18.0% among developing countries and 11.8% among developed ones^[1]. Many people with disabilities have problems not only managing their physical difficulties with daily life, but also from having to assess health-related services. The WHO states that “disability is a global public health issue because people with disability, throughout the life course, face widespread barriers in accessing health and related services, such as rehabilitation, and have worse health outcomes than people without disability” (p. 1)^[1].

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In the “WHO Global Disability Action Plan 2014-2021,” three objectives were proposed: “a) to remove barriers and improve access to health services and programs; b) to strengthen and extend rehabilitation, habilitation, assistive technology, assistance and support services, and community-based rehabilitation; and c) to strengthen collection of relevant and internationally comparable data on disability and support research on disability and related services”(p. 3)^[1]. Among these objectives, access to the health service is the first priority. In particular, if a disabled person contracts a chronic disease, access to the healthcare service becomes a requirement, rather than an option, for life support.

People with disabilities may not be able to move freely due to their limited physical conditions and limited access to a transportation system when they need to visit the hospital. A digital healthcare system (DHS)

that consists of a computer and video tele-monitoring system can be one solution for assistance in accessing healthcare services in that situation^[2].

The definition of “digital healthcare” comprises healthcare-related technology such as digitalized information systems. Mobile digital devices and implanted biosensors to monitor physical functions or chronic disease conditions can be referred to as digital healthcare, in general^[2]. DHS, as driven by the use of internet-based digital health monitor systems, can be involved in the telemedicine practices of their primary healthcare providers. Telemedicine using digital technologies can involve monitoring patients’ self-care of their chronic health conditions at home without the need to visit their healthcare providers. Thus, they will be able to more easily communicate with healthcare providers via technology such as a videoconferencing system^[3]. Such technologies not only improve patient convenience but also lower the cost of care in the improvement of patients’ health outcomes. For example, a telecare system that involves patients’ self-monitoring at home contributed to a reduction in readmissions rates in the US^[4].

To encourage and monitor the physical functions and chronic medical conditions of people with disabilities at home and welfare facilities, a digital healthcare system can be useful in Korea. However, the Korean healthcare insurance system does not provide financial support for digital health devices such as mobile tele-monitoring systems and internet-based videoconferencing counseling. Since the DHS is only in its developing stages, a health policy agreement in terms of the commercialization of medical costs has not been reached. To date, several studies regarding the use of a wireless mobile device to monitor chronic medical conditions such as blood pressure have been conducted, but few have encouraged the monitoring of physical function in disability using an internet-based videoconferencing and health monitoring system. Therefore, the purpose of this pilot study was to develop a DHS for people with disabilities and then analyze participant satisfaction.

MATERIALS AND METHOD

Sample: The sample for this pilot study of the application of and satisfaction with the DHS was recruited from among community-dwelling individuals who either lived in their own houses or disability facilities in D-city, South Korea. A total 166 participated. Among these,

40 were living their own houses and 126 were from 5 disability facilities.

The inclusion criteria were follow as: people with disabilities who: a) had been diagnosed by a physician, b) aged over 18 years, and c) could operate the DHS. Participants who had been admitted to the hospital to treat an acute health problem were excluded from this study.

Procedures: Several steps were involved in this pilot study: a) constructing the DHS, b) recruiting the participants and disability facilities, c) implementing the DHS for a duration of 5 months, and d) surveying participant satisfaction with the DHS.

Measurement

Demographics and utilization of the healthcare system: Participant demographics were collected such as gender, age, educational level, monthly income, duration of the disability, types of disability, and the main caregiver. Utilization of the healthcare system included time spent visiting the healthcare system, types of transportation used when visiting the healthcare system, and distance traveled to the healthcare system.

Outcomes and satisfaction with the DHS: The DHS outcomes measured included the frequency of blood sugar and blood pressure tests, and video conferences over the course of 5 months.

Satisfaction with the DHS was surveyed using a paper-pencil questionnaire. Items in this questionnaire were developed based on the SERVQUAL model^[5]. The SERVQUAL model was based on concepts regarding perceived service quality. It is a multiple-item scale used to assess the consumer’s perceptions. In this pilot study, two different versions were used to collect information concerning satisfaction with the DHS. To identify DHS satisfaction among participants who were living in their homes, a 5-item questionnaire (version 1) was distributed. For participants who were residing in facilities, a 9-item questionnaire was used (version 2). Version 1 consists of items measuring satisfaction aspects including trustfulness, kindness, facilities/equipment, and DHS organization. Version 2 included these and 4 additional items (friendship, professionalism, staff competence, and intention to reuse). The responses for versions 1 and 2 were measured on a scale ranging from 1 (extremely disagree) to 5 (extremely agree). High scores indicated greater satisfaction. The reliability values (Cronbach’s alpha) of versions 1 and 2 were 0.91 and 0.89, respectively.

STATISTICAL ANALYSIS

Descriptive statistics were performed using IBM SPSS Statistics Software. Frequencies, percentages, means, and standard deviations were used to calculate the distribution of the demographics and the degree of DHS satisfaction.

RESULTS

Demographics and utilization of the healthcare system: Table 1 presents the demographics of the participants who were living at home and in welfare facilities [Table 1].

Of the 166 participants, 62.6% were male, and the mean age of the participants who were living at home

was 53 years. Of those who were living in the disability facilities, the mean age was 36 years. Mean years of having the disability was 14 and 23 for those who were living in their own homes and those living in disability facilities, respectively. The main type of disability was brain damage for both types of participants (home 65.0%; facilities 34.1%). Both types of participants visited the healthcare system once a month (home 37.5%; facilities 69.0%). The most frequently used form of transportation was a taxi and a facility vehicle for those who lived in their own homes (47.5%) and those who lived in disability facilities (42.9%), respectively. The travel time to visit the healthcare system was under 30 minutes for both types of participants (home 47.5%; facilities 34.9%).

Table 1: Demographics and utilization of the healthcare system (N = 166)

Demographics		Participants who were living at (in)	
		Home (n = 40), n (%)	Disability facilities (n = 126), n (%)
Gender	Male	15(37.5)	86(68.3)
	Female	25(62.5)	40(31.7)
Age, years	M±SD	53.53(±12.99)	36.98(±12.14)
	Under 39	6(15.0%)	5(4.0)
	40 – 64	28(70.0%)	66(52.4)
	65 over	6(15.0%)	55(43.7)
Educational level	Elementary school	10(25.0)	36(28.6)
	Middle school	5(12.5)	33(26.2)
	High school	12(30.0)	16(12.7)
	College or University	13(32.5)	41(32.5)
Monthly Income	Under 999 \$	28(70.0)	90(71.4)
	1000 \$ – 1999\$	5(12.5)	13(10.3)
	2000 \$ over	7(17.5)	23(18.2)
Main Caregiver	Spouse	9(22.5)	0
	Child (ren)	12(30.0)	27(21.4)
	Parents	4(10.0)	0
	Relatives or friends	8(20.0)	0
	No having	7 (17.5)	99(78.6)
Duration of disability, years	M±SD	14.53±12.24	23.19±6.70
	Under 9	17(42.5)	43(34.1)
	10 – 19	13(32.5)	70(55.6)
	20 – 29	6(15.0)	10(7.9)
	30 over	4(10.0)	3(2.4)
Types of disability	Physical disability	12(30.0)	9(7.1)
	Acquired brain injury	26(65.0)	43(34.1)
	Intellectual disability	0	51(40.5)
	Physical disability + Acquired brain injury	0	7(5.6)
	Physical disability + Intellectual disability	0	10(7.9)
	Others	2(5.0)	6(4.8)

Conted...

Visiting times of Healthcare center	Once a week	13(32.5)	6(4.8)
	Once a month	15(37.5)	87(69.0)
	Once a year	12(30.0)	33(26.2)
Types of transportation	Own vehicle	10(25.0)	54(42.9)
	Taxi	19(47.5)	11(8.7)
	Both own vehicle and taxi	3(7.5)	0
	Others	8(20.0)	61(48.4)
Distance to visit the healthcare center, min	Under 30 min	19(47.5)	44(34.9)
	30min – 59 min	13(32.5)	27(21.4)
	60 min - 90 min	4(10.0)	24(19.0)
	90 min over	4(10.0)	31(24.6)

Contents and outcomes of digital healthcare service: The DHS model was composed of a participant self-monitoring system and healthcare provider videoconferencing system. If the participants who were living either at home or in the disability facilities checked their blood pressure and blood sugar using tele-monitoring devices, that information could be stored in the computer system so the healthcare provider could check it. If some problematic changes were found in the data, a healthcare provider could counsel and educate the participants using the videoconferencing system. Nurses who visited regularly (twice a week) checked the tele-monitoring devices and participants' physical and emotional changes under the guidance of the physicians.

Figure 1 shows the digital healthcare service model.

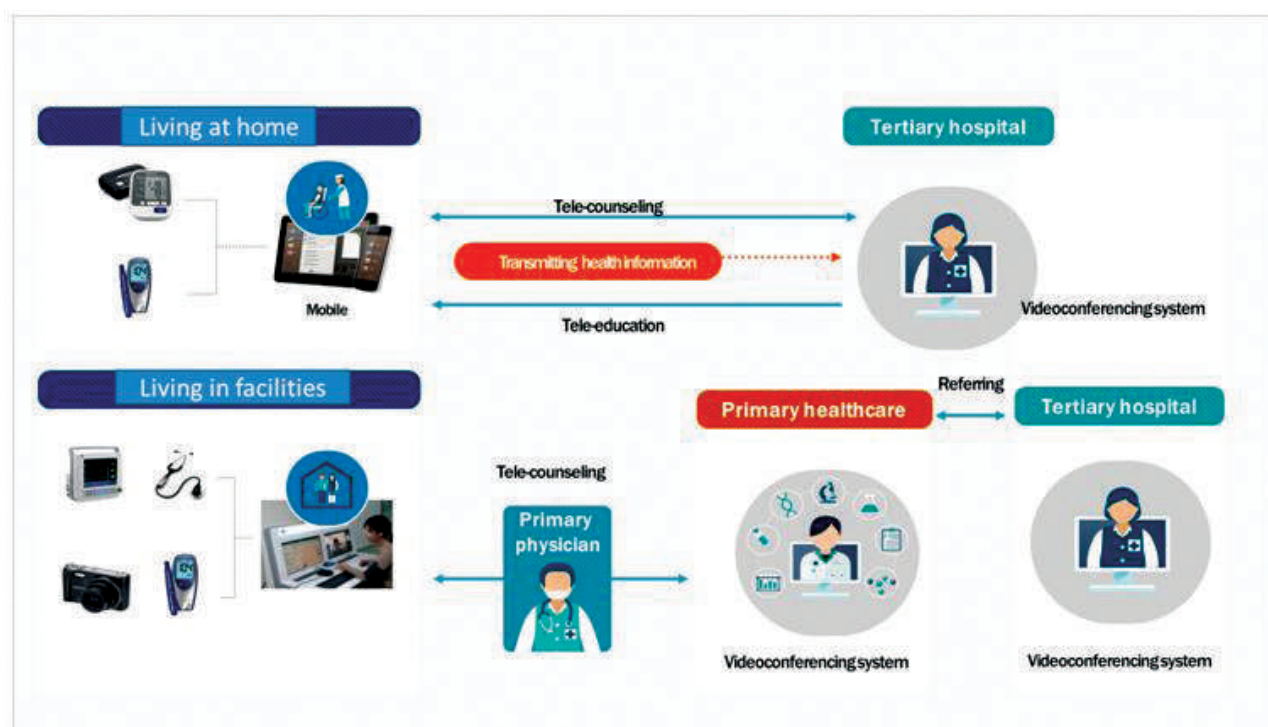


Figure 1: The model of digital healthcare service

The number of blood sugar monitoring tests conducted were 1851 and 2564 for participants who lived at home and in the disability facilities, respectively. The frequencies of blood pressure monitoring were 1716 and 2499 for participants who lived at home and in the disability facilities, respectively. The numbers of counseling sessions via video were 124 and 350 for participants who lived at home and those who lived in the disability facilities, respectively. The outcomes from this pilot study are presented in Table 2.

Table 2: Process outcomes of digital healthcare service

Outcomes	Participants who living at (in)		Total
	Home (n=40), frequency	Disability Facilities (n=126), frequency	
Blood sugar monitor	1851	2564	4415
Blood pressure monitor	1716	2535	4251
Videoconferencing	124	350	474

Satisfaction with the digital healthcare service

Table 3 presents the participants’ satisfaction scores.

The sums of the DHS satisfaction scores were 95.13 and 87.89 points, on a scale ranging from 0-100, for participants who lived in their own houses and those who lived in disability facilities, respectively. That is, the degree of satisfaction was greater among participants who lived in their own houses compared to their counterparts.

Among participants living at home, higher scores were found for all 9 factors (truthfulness, kindness, friendship, professionalism, equipment satisfaction, staff competence, organization, recommendations to others, and intentions to reuse). Those living in the disability facilities also had high scores in truthfulness, kindness, equipment satisfaction, organization, and intentions to reuse the DHS.

Table 3: Satisfaction score of digital healthcare service in participants

Satisfaction	Participants who living at (in)			
	Home		Disability Facilities	
	M ± SD	MIN - MAX	M ± SD	MIN - MAX
Trustfulness	8.72 ± 1.89	5.00 - 10.00	8.50 ± 1.43	4.00 - 10.00
Kindness	19.35 ± 1.44	13.00 - 20.00	35.83 ± 4.24	14.00 - 40.00
Friendship	9.32 ± 1.02	6.00 - 10.00	-	-
Professionalism	9.62 ± 1.00	6.00 - 10.00	-	-
Facilities/equipment	9.58 ± 0.87	7.00 - 10.00	26.40 ± 3.62	12.00 – 30.00
Staff competence	14.63 ± 1.16	9.00 - 15.00	-	-
Organization	14.25 ± 1.37	9.00 - 15.00	8.57 ± 1.41	4.00 – 10.00
Recommendation	4.82 ± 0.59	2.00 - 5.00	-	-
Intention to reuse	4.82 ± 0.59	2.00 - 5.00	8.67 ± 1.62	2.00 - 10.00
Total	95.13 ± 7.65	64.00 - 100.00	87.89 ± 10.25	64.00 - 100.00

DISCUSSION

This pilot study aimed to develop a digital healthcare system and evaluate how satisfied with it people with disabilities were in one rural area of Korea. To develop this DHS, several multidisciplinary professionals, such as a physician, computer programmer, nurses, and a physical therapist, were involved. As a result, mobile communication, videoconferencing, and computer refereeing systems were developed, as was visiting care based on internet networking. Moreover, the participants were satisfied with the DHS.

According to a systematic review of m-Health technology by Free et al^[6], digital devices were used in the existing literature to support clinical decisions, collect data, prescribe medicine, and remind patients of their appointments. In this pilot study, the purpose of the DHS was to make a clinical decision and monitor the changes in the health outcomes of patients with disabilities. Consistent with previous studies^[7,8], the video and audio modes of communication using a computer and mobile device were effective for assessing the data and making a decision. Digital health has been applied to various populations, but little research has focused on disability

care. A health care delivery system geared toward those with disabilities should be driven by patients' needs and their individual situations. A healthcare system that is focused on patient-centered care can explore all necessary factors, including resources^[9]. DHS may contribute to the development of and increase in patient-centered care for people with disabilities.

The effect of DHS in this pilot study was evaluated as participants' satisfaction with DHS. The degrees of satisfaction among the two types of participants (those living at home and in disability facilities) were high. However, digital technology did not satisfy all populations in a previous study. In a study of heart patients, they did not use this technology owing to the emotional burden of having to monitor the patient consistently^[10]. In contrast to that study of heart disease, people with disabilities were satisfied with DHS because they could easily communicate with their healthcare providers via mobile and videoconferencing systems. Visiting nurse care also contributed to improve DHS satisfaction. In this pilot study, the participants were satisfied not only with the equipment/organization but also with the competence of the nursing staff. A regular visiting nurse system that incorporated digital technology was more effective for encouraging patients to maintain their health conditions. DHS satisfaction was higher among those living in their homes than among those living in disability facilities. The home can be one node for a network of digital technologies. In this pilot study, multiple healthcare providers were involved in various roles such as answering patients' questions, interpreting the data supplied by telecare patients, and diagnosing and prescribing medication. Digital health technology that encourages patients' self-monitoring and self-care behaviors has contributed to changing the healthcare environment from "mechanical" medicine to "informational" medicine over the past decade^[11]. The trend toward telemedicine and e-Health practices has become an important area in several countries, whereas the healthcare system in Korea is still in its infancy.

Therefore, this study could be the trial that confirmed the possibility of "e-scaped medicine," as mentioned by Nettleton^[11]. That is, this DHS application may play a role in "medical gaze," as it is distributed over different healthcare providers and various locations^[10,12].

CONCLUSION

Applying the DHS over the course of 5 months promoted participants' satisfaction in terms of trustfulness, kindness, facilities/equipment, DHS organization, friendship, professionalism, staff competence, and intention of reuse. Based on this pilot study, highly technological DHS should be considered as one Korean healthcare system to encourage self-care and self-monitoring.

Ethical Clearance: Taken from Institutional Review Board of Chungnam National University Hospital (CNUH 2017-05-010-002)

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Conflict of Interest: Nil

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Effects of Water Depth on Lower-limb EMG and RPP in Aquatic Squat

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ABSTRACT

Background/Objectives: purpose of this study was to investigate the effect of squat exercise on the muscle activity and myocardial burden of the lower limb according to water depth.

Method/Statistical analysis: Subjects performed aquatic squat at knee and waist levels. The SBP and leg EMG were measured before and after the experiment, and the myocardial burden was calculated by multiplying the measured heart rate and SBP. Statistical analysis was done by Two-way ANOVA, The value of significance was .05.

Findings: Both the aquatic squats showed a significant increase in lower extremity muscle activity and myocardial burden after the operation. Among the two methods, the knee-level squat increased the muscle activity and enhanced myocardial burden rate.

Improvements/Applications: Both the aquatic squats showed a significant increase in lower extremity muscle activity and myocardial burden after the operation. Among the two methods, the knee-level squat increased the muscle activity and enhanced myocardial burden rate.

Keywords: EMG, Lower Limb, Heart Rate, iEMG, Squat

INTRODUCTION

Aquatic exercise is performed using water resistance. It was initially used to treat musculoskeletal diseases and has been used for various purposes in the past¹. Hydrostatic pressure refers to the pressure constantly exerted on the surface of a submerged object. When the body is submerged in the water, the pressure on the submerged end eliminates blood stagnation, and restores circulation². Buoyancy, another characteristic of water, refers to the force of lifting a submerged object, and reduces the load on the joints and diminishes the risk of injury to the lower limb during aquatic exercise^{3,4}. The buoyancy and its effect on the joint depends on the water depth². The hydrostatic pressure and buoyancy reduce the physiological stress during aquatic exercise, and may

have a positive effect on exercise performance by helping joint mobility and muscle strength⁵. In addition, when the body is submerged, the abdominal and the intubation pressure are increased, and the amount of the first pulse is increased, along with rapid venous blood circulation^{6,3}.

The hemodynamic response refers to heart rate and blood pressure. When the heart rate is multiplied by the systolic blood pressure (SBP), the pressure on the myocardium is known as the rate-pressure product(RPP)⁷. During exercise, SBP and heart rate are simultaneously increased, which also enhances myocardial burden rate⁸.

Abdominal muscles continue to use a small force⁹, while walking on the ground in water leading to increased abdominal muscle activity compared with the ground gait¹⁰. High iEMG levels during physical activity suggest enhanced muscle mobilization and energy consumption¹¹.

In a previous study, when the walking speed was 53.3m/min or more, the oxygen intake and heart rate were higher in the waist, knee, ankle, and water

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compared with walking on the ground. However, the walking speed was ^{1,3,4}the oxygen uptake did not differ between the waist height and the ground conditions¹².

In another previous study, it was found that the heart rate and oxygen intake at the thigh level immersion was higher than at the chest level¹³. In addition, a significant correlation was found between depth and physiological variables. The difference in water depth in aquatic exercise affected the exercise load and suggested that the training effect varied according to the water depth^{14,15}. Thus, the aquatic exercise varied from the ground motion and the physiological reaction, and the effect on the joints differed according to the water depth.

However, previous studies investigating most aquatic exercises were limited to upper extremity and

walking. The purpose of this study was to determine the optimum water depth for aquatic squat by comparing the effect of squat exercise according to differences in EMG response and deep burden.

MATERIALS AND METHOD

Subjects: The experimental subjects included 8 males in their 20s, living in C city D university in Chungcheongnam-do. None of the subjects had any health conditions and all participants signed written informed consent after the study goals and experimental procedures were explained. They were instructed that they were free to drop out of their own volition during the experiment. The physical characteristics of the subjects are shown in [Table 1].

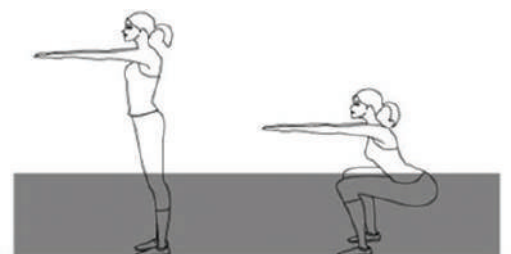
Table 1: Subject characteristics

				(M ± SD)
Subject (N)	Age (yr)	Weight (kg)	Height (cm)	Body Fat (%)
8	26.71 ± 2.73	79.71 ± 5.26	177.2 ± 4.1	17.01 ± 3.99

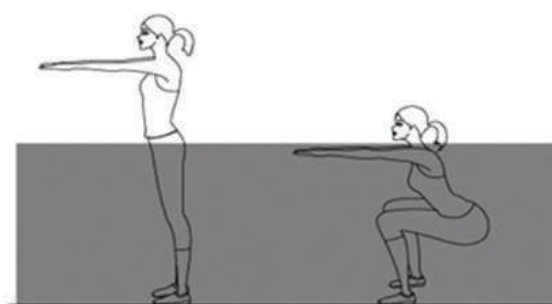
Experimental Method: The experiment was carried out at the Aqua Center of D Spa Medicine Laboratory of A city. The subjects were randomly divided into two groups based on waist and knee depth. To participate in the experiment, we participated in three experiments per person. Each experiment was performed at one-week intervals to provide sufficient rest. In the experiment, blood pressure was measured for 10 min. After the warm-up exercise, a squat was performed and a wireless heart rate monitor was used to measure the heart rate. Immediately after the end of the squat exercise, the blood pressure and the highest heart rate were measured, followed by an isometric squat for 15 s to measure EMG. The EMG patch after blood pressure measurement was attached in about 5 min. Excessive activities were restricted from one week prior to the study until the end of the study and smoking and drinking or medication were prohibited. [Figure 1] shows the experimental design of this study.

according to depth and –the values before exercise were analyzed using repeated two-way ANOVA. In the presence of a significant difference, contrast and simple methods were applied for post-comparison. The statistical significance level was set to a P value of .05.

Aquaticsquat



Knee-deep squat



Waist-deep squat

Figure 2: Aquatic squat

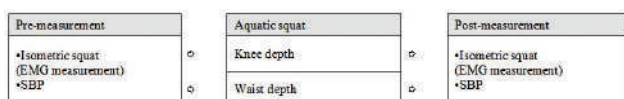


Figure 1: EMG measurement procedure

Statistical analysis was done using the SPSS 22.0 statistical package. The changes in EMG and CPT

The Aquatic squat was conducted at DSpa in A city of Chungcheongnam-do. The squat was performed 9 times for a duration of 3 min at a speed of one every 2 s. The up and down phases were each 1 s long and the knee angle was 90°. The squat was modified by Kim¹⁶ to fit the purpose of this study¹⁶. The water depth was set to the waist and the knee levels, and the water temperature was maintained at 28-30°C. The lower part of the participant's knee was submerged, and the waist depth criteria were locked to the anterior vertebral column. The squat shape according to the water depth is shown in [Figure 2].

EMG: The subject's muscle activity was measured using a surface wire EMG (Laxtha: Korea) and the EMG response before and after each experiment was determined in an isometric squat with a knee bent 90°. The iEMG value was measured for 5s.



Figure 3: The shape of the surface electrode

The subject's muscle activity was measured using a surface-wired EMG and the muscle activity was measured by iEMG. In this experiment, two surface electrodes were connected 1 cm apart from the insertion site of the muscle, and the skin outer layer was removed to minimize the noise during measurement. The skin surface was cleaned with alcohol before the experiment. The data were calculated by setting the offset control to 0 and the band pass filtering to 10 ~ 400Hz. The measurement posture was set in an isometric squat position, and the site was set to Vastuslateralis, Vastusmedialis, anterior tibialis, Gastrocnemiusmedialhead. The measurement time was 15 s, and the EMG data for the middle 5 s and not the initial or terminal 5 s were used¹⁷. The shape of the surface electrode is shown in [Figure 3].

Heart rate: The heart rate was measured using the Polar (S610i, Finland) wireless heart rate monitor with a wireless transmitter on the chest, and the highest value was measured immediately after squat.

Systolic blood pressure: The cumulative hemorrhagic shrinkage was measured at rest and immediately after exercise, and an automatic blood pressure monitor (EASY X 800, R) was used. The blood pressure monitor was placed next to the test site of exercise for immediate measurement after exercise. After the aquatic squat, the right upper arm was positioned at the heart level and the blood pressure measured immediately. After the squat, blood pressure was measured within one minute.

Rate Pressure Product: The RPP was calculated using the formula: heart rate* systolic blood pressure

RESULT

iEMG response before and after aquatic squat at knee and waist depth

iEMG response of vastuslateralis: As shown in [Table 2], a statistically significant difference in the muscle activity of the vastuslateralis was detected at knee and waist levels, without any statistically significant difference in the muscle activity of the lateral broad-spectrum muscle before and after the squat at each depth. Conversely, the interaction with water depth before and after exercise was statistically significant ($p = .002$). As a result, in the aquatic squat at the knee level, the iEMG increased after the exercise, and the aquatic squat at the waist depth showed a decrease in the iEMG after the exercise.

iEMG response of vastusmedialis: As shown in [Table 2], a statistically significant difference was observed in the muscle activity of vastusmedialis according to the depth of the knee and waist. No statistically significant difference in the vastusmedialis activity was observed before and after the squat exercise at each water depth. On the other hand, the interaction between water depth and muscle activity before and after exercise was statistically significant ($p = .01$). As a result, in the aquatic squat at knee depth, the iEMG increased after the exercise, and the aquatic squat at waist depth showed a decrease in iEMG after the exercise.

iEMG response of tibialis anterior: As shown in [Table 2], a statistically significant difference was found in the muscle activity of the tibialis anterior according to the depth of the knee and waist height. No statistically significant difference in the tibialis anterior activity was detected before and after the squat exercise at each water

depth. On the other hand, the interaction between water depth and muscle electrical activity before and after exercise was statistically significant(p=.01).As a result, in the aquatic squat at knee depth, the iEMG increased after the exercise, and the aquatic squat at waist depth showed a decrease in iEMG after the exercise.

iEMG response of gastrocnemius medialhead: As shown in [Table 2], a statistically significant difference in

the activity of gastrocnemius was found according to the knee and waist height. The activity of the gastrocnemius muscle before and after the squat exercise,measured at each water depth was also statistically significant. Also, the interaction between water depth and electrical activity before and after exercise was statistically significant (p <.05). As a result, in the aquatic squat at knee and waist depth the iEMG decreased after the exercise.

Table 2: Two-way ANOVA test results for iEMG during aquatic squat exercise (µV)

Muscle	Water exercise	Pre	Post	Source	F	P
Vastuslateralis	Knee-deep aquatic squat	64.99 ± 8.48	75.02 ± 11.69	Method(M)	16.112	.007
	Waist-deep aquatic squat	67.99 ± 7.81	63.44 ± 12.48	Time(T)	0.743	.422
				(M)X(T)	27.147	.002
Vastusmedialis	Knee-deep aquatic squat	59.79 ± 6.26	75.60 ± 10.28	Method(M)	9.278	.023
	Waist-deep aquatic squat	61.23 ± 4.07	57.55 ± 14.66	Time(T)	3.04	.132
				(M)X(T)	13.92	.01
Tibialis anterior	Knee-deep aquatic squat	60.64 ± 4.72	69.83 ± 7.26	Method(M)	22.701	0.003
	Waist-deep aquatic squat	61.81 ± 6.37	46.29 ± 8.16	Time(T)	3.022	.133
				(M)X(T)	24.586	.003
Gastrocnemius medialhead	Knee-deep aquatic squat	2.47 ± 0.07	2.33 ± 0.07	Method(M)	236.576	.000
	Waist-deep aquatic squat	2.84 ± 0.09	2.78 ± 0.05	Time(T)	9.042	.024
				(M)X(T)	6.249	.047

M±SD. *p<.05, **p<.01,***p<.001

Changes in RPP during aquatic walking according to waist depth: As shown in [Table 3], a statistically significant difference in the RPP was found according to the depth of the knee and waist height. Statistically significant difference in the RPP was detected before and after the squat exercise at each water depth. The interaction between water depth and electrical activity before and after exercise was statistically significant(p=.001). As a result, it was shown that the RPP increased after exercise rather than before exercise in all exercise conditions. In the ground walking, after exercise the RPP was slightly increased to 2,215 at knee depth, to 8,973 after exercise and 14,282 after exercise in waist-deep water, suggesting significant increases.

Table 3: Two-way ANOVA test results for RPP during aquatic squat exercise (µV)

Muscle	Water exercise	Pre	Post	Source	F	P
Vastuslateralis	Knee-deep aquatic squat	11149.14 ± 1803.48	20475.00 ± 2204.73	Method (M)	26.277	.000
	Waist-deep aquatic squat	9933.71 ± 2263.54	15082.14 ± 2970.70	Time (T)	280.022	.000
				(M) X (T)	24.074	.000

M ± SD. *p<.05, **p<.01,***p<.001

DISCUSSION

The purpose of this study was to investigate the differences in aquatic squat movement according to water

depth. We analyzed the heart rate and lower extremity muscle activity following knee-deep and waist-deep aquatic squat exercise. Therefore, we analyzed the changes in myocardial burden and muscle activity during

aquatic squat using buoyancy and hydrostatic pressure, which are characteristics of water. The depth of water was based on waist and knee heights.

Subjects aquatic squat for 3min at each water depth. The SBP and EMG were measured before and after the aquatic squat. The heart rate was the highest immediately after exercise.

The squat exercise is a typical exercise to train the lower leg muscles, and increase the muscular strength^{18,19}. The squat movement involves the ankle, the knee, and the hip joints, and the coordinated movements of various muscle groups²⁰. As a result, the squat movement has been widely used to enhance performance and as a therapeutic exercise²¹.

The squat increases the strength of the knee joint and can be performed by various exercise methods. However, it is a difficult exercise^{22, 23}. In addition, the unstable posture during squat exercise may trigger injuries²⁴.

However, aquatic exercise reduces the impact on the joints during exercise due to buoyancy, and is considered safe for the elderly and patient populations^{25, 26}. In addition, aquatic exercise has been shown to prevent the recurrence of tensions or injuries that often occur in other exercise programs, and the effects are comparable to those of resistance exercise²⁶.

The muscle activity of the vastus lateralis was statistically significant before and after the squat exercise. Significant differences were found in the muscle activity of the vastus lateralis before and after the squat, and a significant difference in the interaction effects between the method and the timing. In the iEMG reaction of the vastus lateralis muscles, the aquatic squat at kneedepth showed an increase of 10.03 (μV) from 64.99 ± 8.48 (μV) to 75.02 ± 11.69 (μV) after the experiment. After the experiment at ± 7.81 (μV), the value of 4.55 (μV) decreased to 63.44 ± 12.48 (μV). This result was similar to that of previous studies that showed higher muscle activity in the lower extremity muscles as the weight increased. The muscle activity decreased because of reduced body weight at waist level than at knee depth²⁷.

A statistically significant difference was detected in the activity of vastus medialis before and after the squat movement according to the water depth. A statistically significant difference in the activity of vastus medialis was

detected before and after the squat between the methods. A statistically significant difference in interaction effect was also observed. In the iEMG reaction of the vastus medialis, the aquatic squat at kneedepth showed an increase of 15.81 (μV) from 59.79 ± 6.26 (μV) to 75.60 ± 10.28 (μV) before the experiment. After the experiment at ± 4.07 (μV), the value decreased by 3.68 (μV) to 57.55 ± 14.66 (μV). In the previous study, the use of wider and inward roots as the main roots increased at lower loads, however, the use of coaxial roots as well as the wider and inner wider roots was similar as the load increased. These results suggest that the depth of the knee was shallower than that of the waist²⁸.

A statistically significant difference in the muscle activity of the tibialis anterior was observed before and after the squat movement according to the water depth. A statistically significant difference in the muscle activity of the tibialis anterior was found both before and after the squat movement between the methods. Significant differences were found in interaction effects. In the iEMG response of the anterior tibialis, the aquatic squat at the depth of the knee showed an increase of 9.19 (μV) from 60.64 ± 4.72 (μV) to 69.83 ± 7.26 (μV) after the experiment. After the experiment at 6.37 (μV), there was a decrease of 15.52 (μV) to 46.29 ± 8.16 (μV). The ankle activity of the tibialis anterior was lowered following waist-deep squat exercise, and the anatomical basis of the ankle was the ankle spine (ASIS) %, 25%, and 10%, respectively.

A significant difference in altered severity burden was noted before and after the squat movement according to the water depth. A statistically significant difference in severity burden was found between the methods and the periods. In all exercise conditions, the cardiac burden tended to increase after exercise. However, in the ground squat, the cardiac burden after exercise increased significantly before exercise, and the knee and waist depth increased slightly after exercise compared with pre-exercise values suggesting that the buoyancy of the water reduces the effect of the weight load during the squat, and at waist depth, the water level decreased to 41% of the body weight. Such decrease in weight facilitates free movement in the water than in the ground. As a result of the reduced biomechanical stress, which is the pressure affecting the body via interaction with external forces, the risk of injury and the effect on joints are reduced, and the aquatic squat is less severe than the ground squat²⁹.

The analysis of changes in heart muscle activity and heart rate during squat exercise according to the water depth indicates that stability and effect of aquatic exercise are superior to exercise on the ground due to buoyancy, resistance, hydrostatic pressure, and viscosity. The increase in maximal oxygen uptake and cardiopulmonary endurance in aquatic exercise can be effectively used in rehabilitation.

CONCLUSION

The purpose of this study was to compare the iEMG and the severity of vastus lateralis, vastus medialis, tibialis anterior, gastrocnemius medial head during squat exercise according to the differences in water depth. We measured the iEMG and cardiac burden by randomly assigning walking and squat exercises to 8 20-year-old adult males. The results were as follows.

First, the muscle activity of the vastus lateralis before and after exercise increased after the submergence squat exercise at knee depth and decreased after the submergence squat exercise at waist depth. The differences showed statistical significance.

Second, the muscle activity of the vastus medialis before and after the exercise decreased after the submergence squat exercise at waist depth, and the iEMG increased after the aquatic squat exercise at knee height. The differences showed statistical significance between different methods.

Third, the muscle activity of the tibialis anterior before and after exercise increased iEMG after the knee squat exercise. The iEMG decreased after the waist-deep aquatic squat exercise, and a statistically significant difference was observed between the methods and the interactions thereof.

Fourth, the muscle activity of the gastrocnemius medial head before and after the exercise decreased iEMG after aquatic squat exercise at knee and waist depth, with statistically significant differences across the different methods, with time.

Fifth, the altered severity burden during the walking exercise before and after the exercise was increased in both conditions, and was the highest after walking at waist depth. A statistically significant difference was detected in liver interactions.

Therefore, squat at knee depth is more effective for intense training, and squat at waist depth is more effective for stability of the squat using aquatic exercises.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Factors Affecting on Nursing Performance of Delirium for General Hospital Clinical Nurses

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ABSTRACT

Background/Objectives: This cross-sectional study attempted to identify factors affecting nursing performance of delirium among general hospital clinical nurses.

Method/Statistical analysis: Study participants were 158 registered nurses in general hospitals. Data were collected from May 9 to May 11 2018, using structured questionnaires. Data were analyzed with SPSS 23.0.

Findings: Nursing performance of delirium had significant positive correlations with self-confidence in caring for patients with delirium ($r=.51, p<.001$), ethical awareness ($r=.18, p=.023$), and the importance of delirium nursing ($r=.49, p<.001$). In this study, factors influencing nursing performance of delirium were self-confidence in caring for patients with delirium and the importance of delirium nursing with R^2 value 43%.

Improvements/Applications: This study's results can be used as basic data to develop educational programs and to improve work environments in developing strategies to enhance nursing performance for patients with delirium.

Keywords: Delirium, Nurse, Factor, Performance, Importance

INTRODUCTION

According to recent statistics from the National Statistical Office^[1], the proportion of elderly people aged 65 or older in Korea increased rapidly from 9.8 % in 2007 to 13.8 % in 2017. As the proportion of the elderly in the inpatient population increases due to the aging of the population, there is an increasing interest in management of the elderly health problems such as falls and delirium. In particular, delirium is a neuropsychiatric symptom accompanied by a wide range of symptoms such as impaired cognitive function and psychopathy, disruption of the sleep arousal cycle, impaired perception, impaired thinking, impaired language function, and mood instability^[2]. It is known that delirium is more prevalent in elderly, cardiac patients, burn patients, patients with cognitive impairment, withdrawal patients, and acquired immunodeficiency

patients^[3]. The incidence of delirium occurs in 14 ~ 56% of inpatients abroad^[4], and delirium in the elderly patients occurs sporadically in the recovery room^{5[6]} in Korea, 5.4% of patients admitted to hospital and general hospital experience delirium^[7]. It occurs mainly in the intensive care unit (55.3%)^[8], but it can occur in various medical fields such as 22.2% in patients after orthopedic surgery^[9], and 57.7% in terminal cancer patients^[10].

As a result of delirium, the patient has a deteriorated prophylactic cognitive ability and functional dependence due to lowering of the body and cognitive function, leading to a longer hospital stay due to pathological condition, the burden of care increases. In addition, the burden on nurses is increased, which causes stress and causes difficulties^{[11][12]}. Therefore, the clinical nurse needs to make an effort to find delirium early and to actively mediate it in the recovery of the surgery and admission of the patient.

In the management of delirium, the nurse is the first witness to recognize the early symptoms of delirium as it has a long contact time with the patient from admission to discharge. However, according to the basic survey

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on the delirium of general hospital nurses^[13], although 80.4% of nurses have experienced delirious nursing, 77% of the nurses have only 0-2 delirium interventions. It is important to develop a multidisciplinary delirium nursing intervention education program in consideration of delirium due to various factors. Also, it is necessary to investigate the factors of the nursing provider in order to perform delirious nursing.

According to a preliminary study in Korea, nurses who take care of patients with a delirium in clinical practice can have difficulties in understanding the patient's uncooperative behavior, finding the cause of the disorder, and efficient management of the patient^[14]. In other words, delirious patients are more anxious and aggressive than other subjects, and it is difficult to cooperate with them. Therefore, the nursing performance of delirium is correlated with stress on delirium^{[11][14][15]}. However, some recent studies have shown that stress on delirium is not correlated with delirium nursing performance^{[16][17]}. Therefore, it is necessary to repeat the study to confirm the relationship between delirium nursing performance and delirium nursing stress.

In the prior study on influencing factors related to the performance of delirium care, the self-confidence of delirium nursing, working environment, education experience on the delirium, and clinical experience were the factors that showed the greatest confidence in the delirium performance at 32%^[16]. In addition, the awareness of importance of delirium nursing and self-efficacy are given 32.3% explanatory power^[18]. The nurses' self-efficacy can be expressed as self-confidence in nursing practice. They can motivate and change the nurse's job performance in the clinic, and can handle the work efficiently. It is a factor to get good quality nursing ability in the face of failure even if it fails^[19]. Based on the results of the study^[20-22] that the higher the self-efficacy, the better nursing performance and job performance, and the higher awareness of the importance of delirium nursing, the better delirium nursing intervention, in addition to the nursing work environment, delirium nursing education experience, and clinical career, it can be inferred that nurse's perception such as the importance awareness and self-confidence of delirium nursing can have a significant effect on delirium nursing performance.

On the other hand, as the science and technology develop, the medical field in the hospital is changing and developing, and in order to respond appropriately to the

new environment due to their leading development, the practice based on the ethical basis should be emphasized. Since the nurse is the closest medical practitioner to the life and death of the patient, the nursing practice is the decision of the nurse every moment and the decision of the nurse is based on the personal ethical consciousness^[23]. As a result, the ethical awareness of nurses has become a very important part of the nursing field. According to recent preceding studies on trends in nursing ethics, ethical awareness accounted for 33.7% of the research subjects related to ethics. Detailed topics include life ethics consciousness, end-stage medical decisions, do not resuscitate (DNR), and euthanasia^[24]. While the delirium we encounter at the actual clinical practice may also include ethical problems in carrying out nursing, studies related to these are insufficient.

The purpose of this study was to investigate the relationship between delirium nursing performance and delirium nursing stress, delirium nursing self-confidence, ethical awareness, and the importance of delirium nursing in university hospital clinical nurses who provide nursing services directly to delirium patients. Also, the purpose of this study was to investigate the factors affecting delirium nursing performance and to provide basic data for effective program development to improve delirium nursing performance. Therefore, this study aims to provide basic data for effective program development to improve the performance of delirium nursing in the future. The purpose of this study is to provide basic data on effective delirium nursing practice by identifying factors affecting delinquent nursing performance of clinical nurse. The specific purpose is as follows. 1) To assess correlation between stress of delirium nursing, self-confidence in caring for patients with delirium, ethical awareness, the importance of delirium nursing, and the performance of delirium nursing. 2) To assess the influence of participants' delirium nursing stress, self-confidence in caring for patients with delirium, ethical awareness, the importance of delirium nursing on the performance of delirium nursing.

MATERIALS AND METHOD

Design: This descriptive investigative study assessed the effects of nurse' delirium nursing stress, self-confidence in caring for patients with delirium, ethical awareness, the importance of delirium nursing on the performance of delirium nursing.

Participants: Participants comprised 158 nurses in city D selected through non-random convenience sampling. G*Power 3.1.5 was used to calculate the appropriate sample size of 157 participants for regression analysis with $\alpha = .05$ (type-I error), 80% power, and 0.15 medium effect size, wherein independent variables were delirium nursing stress, self-confidence in caring for patients with delirium, ethical awareness, the importance of delirium nursing, and the dependent variable was the performance of delirium nursing. Questionnaires were administered to 172 prospective subjects who met the inclusion criteria; after excluding insincere responses, 158 returned questionnaires were analyzed. Data were collected from May 9 to May 11, 2018 by researchers or trained research assistants who explained the research purpose, survey, and procedure for completing the consent form. Self-report questionnaires were distributed only to those who consented to participate. The survey took about 20 minutes to complete.

Measures: The structured questionnaire used in this study—adapted from existing tools—comprised 83 questions on delirium nursing stress (20 items), self-confidence in caring for patients (15 items), ethical awareness (33 items), importance of delirium nursing (23 items), performance of delirium nursing (23 items), and general characteristics (5 items).

Delirium nursing stress: Stress is a relationship between human beings and the environment that is assessed by oneself as exceeding the limits of an individual's ability to threaten their well-being^[25]. The tool to measure delirium nursing stress was originally developed by^[26], was modified by^[27]. It comprises 20 items scored on a 10-point Likert scale ranging from “Not at all” (0 point) to “Very much so” (10 points), with higher scores implying delirium nursing stress. Cronbach's α was 0.85 in^[28] study and 0.88 in this study.

Self-confidence in caring for patients: Self-confidence in caring for patients refers to the degree to which nurses can perform delirium nursing efficiently independently^[29]. The tool to measure self-confidence in caring for patients was originally developed by^[29], was modified by^[30]. It comprises 15 items scored on a 10-point Likert scale ranging from “Not at all” (0 point) to “Very much so” (10 points), with higher scores implying greater confidence in nursing performance. Cronbach's α was 0.96 in^[30] study and 0.96 in this study.

Ethical awareness: Nursing ethics is the code of conduct of nurses based on moral ideals of goodness and evil^[31]. We used the 38-item ethical values Scale developed by^[32] and used by^[33]. Items were scored on a 5-point Likert scale ranging from “Not at all” (1 point) to “Very much so” (5 points), with higher scores indicating greater positive ethical awareness. The Cronbach's α was 0.68 in^[33] study and was 0.67 in this study.

Importance of delirium nursing: Importance refers to the degree to which the value or weight of the work is considered important based on certain criteria. Recognition is to know things clearly and understand them correctly^[34]. In this study, the importance of delirium nursing means how important it is to delirium nursing. we used the 23-item that were originally developed by^[35]. Items were scored on a 4-point Likert scale ranging from “Not at all” (1 point) to “Very much so” (4 points), with higher scores indicating greater perception of delinquent nursing. The Cronbach's α was 0.65 in^[35] study and 0.86 in the present study.

Performance of delirium nursing: Performance of delirium nursing is the identification of the risk factors for delirium in nursing subjects, prevention of delirium, and the degree of nursing activity for the recovery of delirious patients^[11]. we used the 23-item that were originally developed by^[35]. Items were scored on a 4-point Likert scale ranging from “Not at all” (1 point) to “Very much so” (4 points), with higher scores indicating greater performance of delinquent nursing. The Cronbach's α was 0.65 in^[35] study and 0.90 in the present study.

Ethical Consideration for Research Subjects: The research protocols were approved (IRB No. KYUH 2018-05-001) by the institution's research ethics committee before conducting the study and were carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki). Information obtained for sampling was not used for any purpose other than this study, and data were only collected after providing assurance of anonymity and protection of personal information to voluntary participants from whom written informed consent had been obtained.

DATA ANALYSIS

Data were analyzed using SPSS Statistics 23.0 (IBM Corp., Armonk, NY). Descriptive statistics, including frequencies, percentages, means, and standard deviations

were used to assess participants' general characteristics, levels of delirium nursing stress, self-confidence in caring for patients with delirium, ethical awareness, the importance of delirium nursing on the performance of delirium nursing. Relationships between study variables were analyzed using Pearson's correlation. Finally, a multiple regression was used to identify predictors of performance of delirium nursing.

RESULTS AND DISCUSSION

Significant positive correlations were observed between the performance of delirium nursing and self-confidence in caring for patients with delirium ($r=.51, p<.001$), ethical awareness ($r=.18, p=.023$), and the importance of delirium nursing ($r=.49, p<.001$). Significant positive correlations were observed between the importance of delirium nursing and self-confidence in caring for patients with delirium ($r=.17, p=.038$), and ethical awareness ($r=.16, p=.019$). Finally, significant positive correlations were observed between self-confidence in caring for patients with delirium and work stress in the sub-area of the delirium nursing stress ($r=.20, p=.011$) in Table 1. In this study, the relationship between delirium nursing performance and delirium nursing stress, delirium nursing self-confidence, ethical awareness, and delirium nursing importance was positively correlated. In the study by [36] and [16], it is concluded that delirium nursing performance has a

positive correlation with self-confidence. The results of this study suggest that delirium nursing programs can be used to improve delirium nursing performance by enhancing self-confidence by repeated learning and education^[37]. There was no direct previous study of the relationship between delirium nursing performance and ethical awareness. However, there was a positive correlation between the level of ethical awareness and the nursing performance of nurses performing general nursing practice and patient safety management activities^{[38][39]}, as the nurses not only included delirium nursing but also all nursing activities. According to the results, delirium nursing is also part of performing nursing work, so it can be a basis for the correlation that higher ethical awareness will lead to higher delirium nursing performance. Therefore, nurses who take care of life need to reflect on the ethical awareness during delirium nursing work, and it is possible that the delirium nursing performance can be improved by developing and applying the ethical-related delirium scenario to establish desirable ethical viewpoint. The importance of delirium nursing was positively correlated with performance. The results are the same as those of^[40]. In the study of^[41], the higher the perception of importance of nursing intervention, the higher the performance of nursing intervention. Based on the results of this study, it can be deduced that delirium nursing performance will be higher when the recognition of the importance of delirium nursing is improved.

Table 1: Correlations between Major Variables and Performance of Delirium Nursing

	Self-confidence	Ethical Awareness	Importance	Performance
	r(p)			
Stress of Delirium Nursing	.15(.070)	-.01(.885)	-.01(.929)	-.01(.868)
Delirium Nursing Stress	-.04(.595)	-.03(.715)	-.09(.271)	-.07(.393)
Interpersonal Stress	.11(.176)	-.08(.351)	-.03(.694)	.02 (.805)
Nursing Work Stress	.20(.011)	-.00(.990)	.05(.561)	.00(.950)
Self-confidence		.11(.159)	.17(.038)	.51(<.001)
Ethical Awareness			.16(.049)	.18(.023)
Importance				.49(<.001)

Multiple regression analysis, with the variables for which results were significant in the univariate analyses ($p<.05$) as independent variables (i.e., delirium nursing stress, self-confidence in caring for patients with delirium, ethical awareness, the importance of delirium nursing), was performed to identify factors predicting the performance of delirium nursing. Normal

p-p residual plots, scatter plots, Durbin Watson statistics, tolerance levels, and variance inflation factors were calculated to check the fundamental assumptions of multiple regression analysis. The Durbin Watson statistic was 1.95, which indicated low risk of autocorrelation. Tolerance levels ranged from 0.65 to 0.93, and variance inflation factors ranged from 1.00 to 1.03, suggesting

that multicollinearity was not an issue. The explanatory power of the regression model was 43.0%. Self-confidence in caring for patients with delirium ($F=55.57$, $p<.001$) and importance of delirium nursing ($F=58.25$, $p<.001$) were significant predictors of the performance of delirium nursing in Table 2.

The effect of delirium nursing on delirium nursing self-confidence (26%) was increased by the importance of delirium nursing, which showed an explanatory power of 17%, indicating a total explanatory power of 43%.

This is similar to the results of the study that self-confidence^[16], self-efficacy, and importance^[18] are the major factors affecting delirium nursing performance. In conclusion, delirium nursing performance is found

to increase with increasing confidence and importance of delirium nursing. Therefore, in order to increase the delinquent nursing performance of clinical nurses, it is necessary to develop various delirium nursing simulation programs and to actively mediate ways to develop self-confidence through opportunities to intervene directly or indirectly through delirium nursing situations. It is important to recognize the importance of nursing practice and prevention activities of delirium nursing and the importance of nurses' role in delirium nursing. Therefore, the delirium nursing education program consisting of induction factors for delirium, awareness of changes in consciousness of delirious patients, and nursing prevention activities should be given priority in the undergraduate education.

Table 2: Correlations between Major Variables and Performance of Delirium Nursing

Influence factor	Model 1				Model 2			
	β	t	p	VIF	β	t	p	VIF
(Constant)		19.97	<.001			2.63	.010	
Self-confidence	.51	7.46	<.001	.00	.44	7.21	<.001	1.03
Importance					.41	6.72	<.001	1.03
	R ² =.26; Adj. R ² =.26; F=55.57(<.001); R ² change=.26				R ² =.43; Adj. R ² =.43; F=58.25(<.001); R ² change=.17			

The purpose of this study was to investigate the factors affecting the delinquent nursing performance at the time of the lack of previous studies on the factors affecting delirium nursing performance. It is thought that delirium may have a positive effect on the prevention and early detection of delirium, and the health promotion and recovery of delirium subjects, considering these factors when developing and applying delirium nursing performance improvement program. In addition, the analysis of the causal factors of delirium based on the results of this study will have educational and clinical significance in the management of effective delirium patients.

CONCLUSION

The purpose of this study was to investigate the factors affecting delirium nursing performance in 158 clinical nurses. Delirium nursing performance was positively correlated with delirium nursing self-confidence, ethical consciousness, and delirium nursing importance. The effect of delirium nursing on delirium nursing self-confidence (26%) was increased by the importance of

delirium nursing, which showed an explanatory power of 17%, indicating a total explanatory power of 43%. Based on these results, it is necessary to consider delirium nursing self-confidence, delirium nursing importance, and ethical consciousness in the development of program to improve the clinical nurse's delirium nursing performance. This can be expected to maximize its effectiveness when linked to undergraduate curriculum.

This study has several limitations. First, the convenient sampling method employed in this study may limit the generalization of this study's findings. Second, a cross-sectional design adopted in the study may contaminate the results with temporary psychological or physiological conditions of the participants. To increase the validity of these findings, a random sampling or a longitudinal study including various specialties and settings is recommended. Also, in order to increase the reliability and validity of the results of the study on the ethical awareness which was correlated with the delinquent nursing performance, it is necessary to develop a tool for the delirium nursing ethical awareness by further study.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Effects of Integrative Dementia Prevention Program on Cognition, Depression, and Quality of Life in the Elderly

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ABSTRACT

Background: Number of aged people has been rapidly increased. due to increase of aged people in our country at present, geriatric, chronic disease is rapidly increased and it was emerged as a social issue.

Objectives: In this study, in order to prevent dementia that is senile disease creating various social problems at an early stage, integrated dementia prevention program was presented and its effectiveness is intended to be verified. 24 people normal elderly living in the community.

Method: Progress of this study and data collection period was 3 months from June to August, 2014 and objective of the study was explained to test subjects before starting the test and a consent form for participation in the study was received from them. In the study, intervention period was 10 weeks and it was progressed based on 3 times week and integrated dementia prevention program was directed to be performed for 60 minutes per 1 time.

Statistical analysis: In this study was to use a pre-post test, statistical program Spss 18.0 version was used.

Findings: Cognitive function change of test subjects who participated in integrated dementia prevention program is as evaluation score was significantly increased ($p < 0.01$) in MMSE-K and MOCA-K that evaluate cognitive ability before/after participation in the program, cognitive function was shown to be improved. Depression change of test subjects who participated in integrated dementia prevention program is as evaluation score was significantly decreased ($p < 0.01$) in GDS-K score that evaluates depression level before/after participation in the program, depression was shown to be decreased. Quality of life change of test subjects who participated in integrated dementia prevention program is as evaluation score was significantly increased ($p < 0.01$) in EuroQol-5D that evaluates quality of life before/after participation in the program, quality of life was shown to be improved.

Improvements: Cognitive abilities of the subjects were improved, decreased depression and improved quality of life.

Applications: We have to develop diversified intervention programs for preventing dementia and it is expected that more systematic program would be developed and be widely utilized in the elderly of local community and each institution.

Keywords: Dementia, Cognition, Depression, Occupational therapy, Elderly.

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INTRODUCTION

At present, environment of life has been greatly improved owing to development of medical technology and science and consequently, as human average life is increased together with enhancement of quality of life,

number of aged people has been rapidly increased. Due to increase of aged people in our country at present, geriatric, chronic disease is rapidly increased and it was emerged as a social issue¹. According to data of Statistics Korea in 2015, our country has already entered into aging society in 2000 and in 2015, the elderly population aged over 65 was 6.62million that accounts for 13.1% of the total population and in 2030, it is forecasted that such population would exceed 20% and we will enter into super aging society². As the population is increased, geriatric diseases are also increased and among these, the disease having the highest incidence rate as a social issue is dementia. Number of dementia patient in our country was app. 540,000 and its number is being increased rapidly and it is estimated that in 2050, number of dementia patient would reach app. 280,000 by it being increased by 2 times every 20 years in the future³. Dementia is an organic mental disease in which cognitive function and mental function such as judgment, language, emotion being undertaken by human cerebrum are degenerated and it is learned as complex clinical syndrome causing problem in daily life, social activity and inter-personal relation by accompanying symptoms including depression, delusion⁴. Like this, as a disease decreasing quality of life of patients themselves and requiring sustained care of supporter as well, dementia causes serious mental, psychological, physical, economic burden to the supporters⁵. Like this, we have to promptly recognize problems of dementia and now is the time to exert an effort of overcoming dementia at nationwide level for decreasing its incidence rate and moderating development speed by controlling dementia at an early stage^{6,7}. In this study, in order to prevent dementia that is senile disease creating various social problems at an early stage, integrated dementia prevention program was presented and its effectiveness is intended to be verified.

METHOD

Participants: Subjects of the study were 24 normal elderly women aged ≥ 65 years, who had visited a dementia support center located in the D region, Seoul, from June to August 2014.

Design: This study is an experimental research for observing change of cognitive function, depression, quality of life by providing normal elderly living in local community with integrated dementia prevention program and pre-post design for a single group was performed.

Measures: In this study, to assess the cognitive functions of elderly subjects, the following tools were used: 1) Mini-Mental Status Examination, Korean version (MMSE-KC) and 2) Montreal Cognitive Assessment, Korean version (MOCA-K). For assessment of depression, the Korean version of the Geriatric Depression Scale (K-GDS) was used. Lastly, quality of life was measured by EuroQol five dimensions questionnaire (EuroQol-5D).

Mini Mental State Examinations–Korea (MMSE-K): As cognitive function scale, Korean type MMSE-K that was standardized by Gwon, Yong-Cheol and Park, Jong-Han⁹ by targeting the elderly of our country based on Mini Mental State Examinations developed by Folstein, Folstein and MeHug⁸ was used. This Tool is composed of total 30 points including disorientation 5 points for time, that for place, memory registration 3 points, memory recall 3 points, concentration (attention), calculation 5 points, language function 7 points and understanding/ judgment 2 points and it is analyzed that the more score is high, the more is cognitive function high. Reliability at the time of developing this tool was Cronbach's α .86 and reliability of MMSE-K evaluation tool was .79¹⁰.

Montreal Cognitive Assessment–Korea (MOCA-K): MoCA-K is a tool being prepared based on The Montreal Cognitive Assessment (MoCA) developed by Nasreddine¹¹ in order to sort out mild cognitive impairment through its modification, supplement, Korean language translation and validity evaluation. This tool is composed of 7 areas including space execution power (5 question items), vocabulary (3), attention (8), writing skill (3), imagination (2), progressive recollection (5), disorientation (6) in order to evaluate general cognitive ability and based on full score of 30 points, difference of cognition depending on education level was compensated by adding 1 point of target who has education level below 6 years. This tool is an evaluation tool for sorting out mild cognitive impairment and its restricted line is below 22 points that means cognitive impairment. Reliability at the time of developing evaluation tool was Cronbach's α .83¹¹ and that of MoCA-K that is translation tool was Cronbach's α .81~.84¹⁰.

Geriatric Depression Scale–Korea (GDS-K): In order to evaluate geriatric depression level, that was designed by Kee¹² through modification of developed by Yesavage and Sheikh to be matched with reality of our country was used. This evaluation tool is composed of total 15 question items including 5 items of positive form and

10 items of negative form. “No” to 5 items (1, 5, 7, 11, 13) of positive form becomes 1 point and “Yes” to remaining 10 negative items 1 point. Total score of 0-5 points is regarded as normal, 6-10 mild depression and 11-15 serious depression and the more score is high, the more gets depression level serious. In this study also, reliability Cronbach’s alpha value was .85.

EuroQol-5 dimensions (EQ-5D): In order to measure, compare quality of life of research targets, evaluation tool of EuroQol-5 was used. This evaluation tool is composed of EQ-5D utility value (EQ-5D index) and EQ-5D visual analogue scale (EQ-5D vas) comprising 5 question items asking present health condition and this is health related quality of life scale¹³.EQ-5D utility value evaluates 5 question items such as exercise, bathing, daily life activity, pain/inconvenience, anxiety/depression in 3 stages and score of answer of such items is estimated through estimation model for Korean quality of life¹⁴.

Progress of this study and data collection period was 3 months from June to August, 2014 and objective of the

study was explained to test subjects before starting the test and a consent form for participation in the study was received from them. In the study, intervention period was 10 weeks and it was progressed based on 3 times/week and integrated dementia prevention program was directed to be performed for 60 minutes per 1 time. This program was performed by dividing it into detailed program of 4 types including physical activity (muscular strength, balance), meta memory class, reminiscence therapy, self-esteem training.

RESULTS

Changes in cognitive functions before and after the integrative dementia prevention program: Cognitive function change of test subjects who participated in integrated dementia prevention program is as shown in table 1. As evaluation score was significantly increased ($p < 0.01$) in MMSE-K and MOCA-K that evaluate cognitive ability before/after participation in the program, cognitive function was shown to be improved.

Table 1: Comparison of cognitive functions before and after the intervention program

Evaluation	Pre-test ($M \pm SD$)	Post-test ($M \pm SD$)	<i>t</i>	<i>p</i>
MMSE-KC	28.04 ± 2.42	28.92 ± 1.38	-2.94	.007*
MOCA-K	24.21 ± 2.71	26.08 ± 2.60	-4.62	.000*

The values are mean ± standard deviation, MMSE-KC: Mini-Mental Status Examination, Korean version, MOCA-K: Montreal Cognitive Assessment, Korean version, * $p < 0.05$ by Paired t test

Changes in depression before and after the integrative dementia prevention program: Depression change of test subjects who participated in integrated dementia prevention program is as shown in table 2. As evaluation score was significantly decreased ($p < 0.01$) in GDS-K score that evaluates depression level before/after participation in the program, depression was shown to be decreased.

Table 2: Comparison of depression before and after the intervention program

Evaluation	Pre-test $M \pm SD$	Post-test $M \pm SD$	<i>t</i>	<i>p</i>
K-GDS	3.25 ± 3.32	1.25 ± 2.21	5.00	.000*

The values are mean ± standard deviation, K-GDS: Geriatric Depression Scale Korean Version, * $p < 0.05$ by Paired t test

Changes in quality of life before and after the integrative dementia prevention program: Quality of life change of test subjects who participated in integrated dementia prevention program is as shown in table 3. As evaluation score was significantly increased ($p < 0.01$) in EuroQol-5D that evaluates quality of life before/after participation in the program, quality of life was shown to be improved.

Table 3: Comparison of quality of life before and after the intervention program

Evaluation	Pre-test <i>M ± SD</i>	Post-test <i>M ± SD</i>	<i>t</i>	<i>p</i>
EuroQol-5D	73.33 ± 10.49	81.67 ± 14.27	-3.92	.001*

The values are mean ± standard deviation, EuroQol-5D: EuroQol five dimensions questionnaire, * $p < 0.05$ by Paired t test

DISCUSSION & CONCLUSION

This study is a similar test research being performed based on pre/post design for a single group for exploring what is an effect of integrated dementia prevention program for the elderly of local community on geriatric cognitive function, depression, quality of life. When observing the result of this study, it could be concluded that integrated dementia prevention program showed a result of improving cognitive function ability, reducing depression and enhancing quality of life of normal elderly¹⁶. This result was similar to the research result of Hwang, Yoon-Jeong and Chung, Won-Miet al¹⁵ and it could be concluded that providing the elderly with dementia or general elderly with diversified dementia-related program would enhance geriatric function. In view of above result, we have to develop diversified intervention programs for preventing dementia and it is expected that more systematic program would be developed and be widely utilized in the elderly of local community and each institution. As a limitation of this study, it is hard to generalize the result of this study as number of test subject was limited and it targeted only female subject.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Effects of Communal Exercise with ‘Parkinson Home Exercise’ Application on Gait Ability for Parkinson’s Disease Patients

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ABSTRACT

The purpose of this study was to invest the effect of communal exercise with ‘ Parkinson home exercise’ application on gait ability. Twenty nine subjects were randomly divided into three groups; CSG (Communal Exercise with Smart app Group), ISG (Individual Communal Exercise with Smart app Group) and CG (Control Group). The subjects were instructed to carry out 10 weeks exercise program. Values were measured before and after the exercise program and the differences were analyzed by two-way repeated measures ANOVA and Scheffe post-hoc test ($P<.05$). In the present result, ambulation time and single leg support (%) were significantly increased among groups; CSG was the most significant among groups ($P<.001$). Double leg support (%) and distance time were significantly difference among time ($P<.001$). These findings indicate that communal exercise with smart app. can be effective in gait ability for PD patients.

Keywords: Parkinson’s disease, Communal exercise, ‘Parkinson home exercise’ application, spatial parameters, temporal parameters

INTRODUCTION

Exercise is an important therapeutic intervention for patients with Parkinson’s disease because of its beneficial effects such as gait ability improvement, fall prevention, and improvement in physical performance¹.

However, although exercise is an essential therapeutic intervention for such patients, it is realistically difficult for patients to participate in voluntary and constant physical exercise as the lesion progresses, because they lose confidence, avoid interpersonal relationships, and are unable to lead an independent life^{1,2}.

Accordingly, the Association of Physical Therapists in Parkinson’s Disease (ADDP) developed the Parkinson home exercise application for smart phones so that

patients can receive visual and auditory feedback whenever and wherever they are. However, regardless of the quality of the program, its effect is limited if patient participation is low. It is important to motivate patients to participate in programs consistently. Such motivation can be provided through active recommendations for participation from supervisors and development of an environment where patients can work out with other patients in a similar situation³. In particular, communal exercise improves interpersonal relationships and enhances social functioning. This greatly contributes to improvement in physical performance⁴

Thus the aim of this study is to prove the effects on gait ability of group exercise program with external stimuli of smart app., which feeds a visual and auditory signal back to the patients of PD.

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PROCEDURE FOR PAPER SUBMISSION

Subjects: The participants of this study were twenty-nine patients diagnosed with non-demented PD in a community-dwelling in South Korea. The participants

were randomly divided into the Communal Exercise with Smart app. Group (n=10,CSG), Individual Exercise with Smart app Group(n=10, ISG) and Control Group(n=9, CG). Selection criteria were a diagnosis of PD according to department of neurosurgery of Y Hospital, classification at modified Hoehn and Yahr(H&Y) stage 1 through 3 and able to gait of independence.

Subjects were excluded if they had other neurologic problem such as acute medical problems that could affect gait, a score below 23 on the Mini-Mental State Examination and fallen more than once in the prior year. The physical characteristics of the subjects are shown in Table 1.

Table 1: Physical characteristics

Groups	Gender	Age (yrs)	Hoehn & Yahr stage	BMI (kg/m ²)	Duration of disease(yrs)	MMSE-K
CSG (n=10)	M1, F9	71.10 ± 5.10	2.71 ± .48	23.62 ± 1.42	6.22 ± .78	20.70 ± .94
ISG (n=10)	M1, F9	73.50 ± 6.93	2.42 ± .51	22.45 ± 1.61	5.90 ± .87	21.40 ± 1.07
CG(n=9)	M1, F8	72.75 ± 7.94	2.53 ± .53	25.12 ± 2.13	6.25 ± 7.70	20.75 ± 1.03

Communal Exercise with Smart app Group (CSG), Individual Communal Exercise with Smart app Group(ISG), Control Group (CG),. Values are mean± SD.

Table 2: Parkinson home exercise program

Week	Order	Exercise type(time)	Contents	Intensity	Frequency
Week 1-3	Smart app. program	Relaxing exercise(5min)	Relaxing arms, leg	RPE 13-15	3days/ week
		Relaxation using breathing(5min)	Feel your breathing Experience deep breathing		
		Flexibility(10min)	Stretching on lying, sitting		
		Balance & coordination training(10min)	Standing up Stepping away		
		Walking(10min)	Walking straight		
Week 4-6		Relaxing exercise(5min)	Moving and relaxing back		3days/ week
		Relaxation using breathing(5min)	Relaxation using breathing		
		Flexibility(10min)	Stretching on sitting, standing		
		Walking with rhythms(10min)	Walking with rhythms		
		Balance & coordination training(10min)	Lunge, reaching Chair forward, backward		
Week 7-10	Relaxing exercise(5min)	Tensing and relaxing neck & trunk	3days/ week		
	Relaxation using breathing(5min)	Relaxation using breathing			
	Flexibility(10min)	Stretching on sitting, standing			
	Starting/Freezing(10min)	let go 1,2,3' start, stop, turn, back, forward, big steps.			
		Balance & coordination training(10min)	Stepping away		
	Cool down (10min)	Breathing exercise	Segmental, diaphragmatic and deep breathing	RPE 8-9	

Study design: Subjects were randomly separated into CSG, ISG and CG in order to evaluate single limb support(%), double limb support(%), ambulation time and distance time before and after the 10 weeks exercise intervention. The process of this study is as following figure 1.

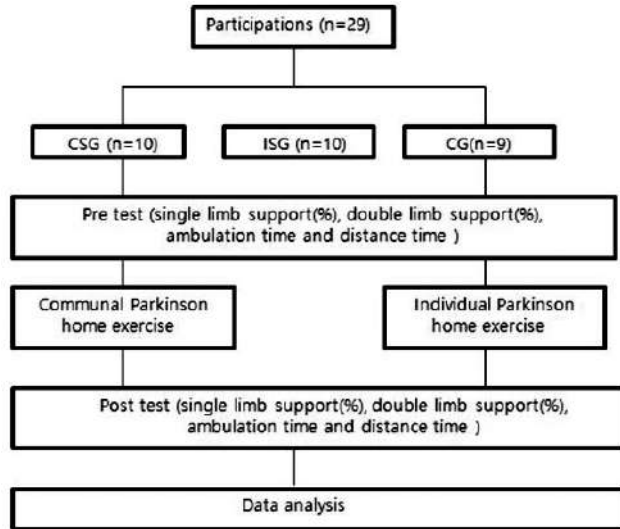


Figure 1: The screening g process

Measures of gait parameters: The GAITRite system(GAITRite, CIR systems Inc., Clifton, NJ, USA, 2008) is made of 5m length walkway and 16,128 sensors. Over the walking of the subject, the system automatically detect pressures through the sensors, and delivers the data to the computer to calculate gait parameters. The subjects walk three times and the calculated average of the three trials was used to analyze the data.

Exercise intervention: Subjects performed a communal exercise program using a smart application for 60 min, three times per week, for a period of 10 weeks, which focused on improving their deep breathing, relaxation levels, flexibility, strength, balance, and gait pattern.

The subjects and caregivers were instructed how to use the smart application and how to perform the exercise program. The exercise program used a smart application named “Parkinson home exercise application” (APPDE, 2009), which has been developed by the Association of Physiotherapists in Parkinson’s Disease Europe (APPDE).

Saving Files in TIFF: Most graphing programs allow you to save graphs in TIFF; however, you often have no control over compression or number of bits per pixel. You should open these image files in a program such as Microsoft *Photo Editor* and re-save them using no compression, either 1 or 8 bits, and either 600 or 220 dpi resolution (File > Properties; Image > Resize). See Section III.C for an explanation of number of bits and resolution.

Data Analysis: With all data obtained from this study, we calculated Mean (M) and Standard Deviation (SD) using SPSS/PC 18.0 statistic program for Windows. We carried out two-way repeated measures ANOVA analysis used to demonstrate the differences among values from the experimental groups (CSG, ISG, and CG) and measuring period (before/ after 10-weeks intervention). In addition, when the statistical significance in the data was shown, post-verification of Scheffe post-hoc test analysis was conducted. Statistical significance was adopted at P < 0.05 in this study.

RESULTS

The change of temporal parameters: As shown in table 3, after 10-weeks intervention, CSG and ISG groups showed the significant improvement in single limb support(%), double limb support(%) and ambulation time; ambulation time change of CSG was the most remarkable among three groups(P<.01).

Table 3: Change of temporal gait ability

Item	Groups	Pre test	Post test	2-way ANOVA	F	P	post-hoc	
Ambulation	CSG	6.66 ± 1.42	3.00 ± 0.78	Group	7.078	0.004**	a>b a>c	
	ISG	6.48 ± 1.09	5.68 ± 1.27	Time	130.531	0.000***		
	CG	6.47 ± 0.86	6.50 ± 0.84	Group*Time	74.951	0.000***		
Single limb support(%)	Left	CSG	30.25 ± 2.77	33.00 ± 3.06	Group	3.019	.066	a>c
		ISG	31.66 ± 3.32	34.12 ± 3.86	Time	84.977	0.000***	
		CG	34.94 ± 2.12	34.86 ± 2.00	Group*Time	22.640	0.000***	
	Right	CSG	30.71 ± 2.62	33.52 ± 2.93	Group	3.723	0.038*	
		ISG	31.95 ± 2.97	33.62 ± 2.84	Time	95.747	0.000***	
		CG	35.16 ± 1.99	35.30 ± 2.14	Group*Time	23.828	0.000***	

Conted...

Double limb support(%)	Left	CSG	39.26 ± 2.56	36.58 ± 2.13	Group	2.898	0.073
		ISG	40.08 ± 2.45	37.82 ± 2.31	Time	79.370	0.000***
		CG	40.09 ± 1.22	40.33 ± 1.60	Group*Time	25.960	0.000***
	Right	CSG	39.97 ± 2.18	37.76 ± 1.53	Group	1.795	0.186
		ISG	40.04 ± 2.55	37.96 ± 2.37	Time	61.706	0.000***
		CG	40.38 ± 1.48	40.44 ± 1.51	Group*Time	16.343	0.000***

CSG: Communal Exercise with Smart app Group, ISG: Individual communal Exercise with Smart app Group CG: Control Group. Values are mean± SD.*P< 0.5**P< .01, ***P<.001. a: CSG, b: ISG, c: CG

The change of spatial parameters: As shown in table 4, after 10-weeks intervention, CSG and ISG groups showed the significant improvement in distance time. Distance time showed significant differences among groups(P<.05).

Table 4: Change of spatial gait ability

Item	Groups	Pre test	Post test	2-way ANOVA	F	P
Distance time	CSG	303.02 ± 37.83	361.69 ± 25.48	Group	3.536	0.044*
	ISG	304.03 ± 29.00	309.94 ± 28.01	Time	74.691	0.000***
	CG	302.01 ± 19.87	303.28 ± 18.66	Group*Time	53.277	0.000***

CSG: Communal Exercise with Smart app Group, ISG: Individual communal Exercise with Smart app Group CG: Control Group. Values are mean± SD.*P< 0.5**P< .01, ***P<.001. a: CSG, b: ISG, c: CG

DISCUSSION

Gait disability, reduced mobility, falls risk and social isolation affect bad influences on PD patients' physical and mental health, social interaction, and quality of life¹². Most of all, gait disability is associated with increased risk of falls and hospitalization, decrease of independence and even higher risk of mortality^{3,5}. Therefore gait disability is the best barrier for them to restrict physical performance and to reduce the mental health, social interaction and health-related quality of life^{6,7,8}.

Most useful method to improve gait ability is regular exercise⁹. But it is very hard for them due to complex symptoms representing disorders of cognition, language, depression and fatigue, self-care, communication as well as motor disorder. Therefore, resent researches are reported that communal exercise improved physical performance and emotional stability by enhanced familiarity and social integrity function⁴. The social interaction and physical performance were improved as a consequence of the communal exercise undertaken by the PD patients¹⁰. On the other hand, Association of Physiotherapists in Parkinson's Disease (APPDE) released 'Parkinson home exercise' which provides easy

exercise guide and audio-video stimulus. It makes PDs easy to exercise¹.

The spatiotemporal parameters of gait in PD patients were improved by the external audio-video stimulus^{4,11}. Besides, they felt similarity during the communal exercise and it made better social integrity function³. The aforementioned social facilitation effect from communal exercise motivated their willing to overcome the physical disorder, competitive spirit and can-do attitude^{4,11}.

Thus, we have investigated the effect of a communal exercise program with the smart phone app. on gait ability by comparing with the effect of an individual exercise group and a control group.

As a result of this study, communal exercise program with smart phone app. for PDs was effective to improve gait ability. After 10-weeks exercise, temporal parameters of CSG and ISG groups showed the significant improvement in single limb support(%), double limb support(%) and ambulation time. Especially the change of ambulation time in CSG was the most remarkable among three groups (P<.01). And

spiral parameters of CSG and ISG groups showed the significant improvement in distance time, which was showed significant differences among groups ($P<.05$). These finding indicates that the communal exercise with smart phone app. have benefit on gait ability comparing to individual exercise. According to recent research reported that outcomes relating to gait significantly improved in walking speed and balance of PD following the exercise intervention². But it was very difficult to find any precedent study and similar research using smart application for PDs' communal exercise. Therefore comparison result and conclusion could not be drawn. The present study examines community-dwelling patients, who tend to have weaker socioemotional relationships with families, relatives, neighbors, etc. These patients could improve their gait ability more when they worked out with peers than when they worked out alone because a group workout actively motivated them.

As a conclusion, this communal exercise using audio-video feedback by smart phone application has positive effect on gait ability. The communal exercise motivated PD patients' emotional stability by enhanced familiarity and social integrity function and the audio-video feedback helped their physical performance of the exercise.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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On the Effect of College Students' Attitude towards computer on their Academic Procrastination

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ABSTRACT

Background/Objectives: The central goal of the present research is to identify how college students' attitude towards computer affects their studying/learning and academic procrastination.

Method/Statistical analysis: The subject group consisted of a group of 209 students taking general education courses at N University located in Choongnam, Korea. The collected data from a survey questionnaire was analyzed by using a set of statistical methods: a frequency analysis for demographic characteristics, a correlation analysis as well as a regression analysis.

Findings: It was found that the subfactors of the attitude under discussion - confidence, usefulness and desire to learn-showed a significant positive correlation among one another, while the negative feeling of anxiety or fear was not significantly correlated with other subfactors. Overall, however, the attitude toward computer was closely correlated with academic procrastination: the higher the attitude toward computer, the lower academic procrastination.

Improvements/Applications: The findings of the current research are expected to help us recognize the importance of the attitude towards computer and to help students improve their learning capacity.

Keywords: *College Students, Attitude towards computer, Academic Procrastination, confidence, usefulness, learning capacity*

INTRODUCTION

There is no doubt that modern society can be characterized as an era of mass media information. In particular, computer is considered as a typical media of the present times that helps college students perform their academic activities, search information, enjoy their leisure time and do shopping. And the list of the things they can do with a computer can include much more than these.

Elementary and secondary school students in Korea live a very tight life: they stay at school from very early in the morning to very late in the evening. Even in this structured schedule, some adolescents struggle with a serious problem of addiction to games or internet. The current research started with a question of how college students are now utilizing computer(Soonhee Kweon et al, 2008)¹.

In reality, college students are considered as a grown-up adult and/or as an intellectual individual.

That is perhaps partly responsible for the fact that not much research has been conducted into college students' addiction to internet games or smart phones or into their psychological problems. Also, very few researches have been reported into their attitude toward computer.

College students may control their everyday schedule for weekdays by choosing their classes and also plan for their free time during the weekend and vacation times. It might be meaningful to examine how they use computer in their everyday life and also what attitude toward computer they have, partly because it might be closely related with their academic learning.

Dukran Park et al(2015)² reported that students' and ordinary people's perception of computer exerted an influence in a way or another on their performance and effect of learning and considered it as a core element for learning. The definition of the attitude towards varies from scholar to scholar and it may also differ depending on measurement tools. However, it might be generally

defined as one's feelings and utilization of computer, which clearly affect his or her everyday life.

A positive attitude towards is expected to help college students gain much knowledge and abilities that might contribute to the development of society (Ami Cho, 1999)³ It is also expected that sound and solid culture of computer utilization would help adolescents and students lead desirable lives.

THEORETICAL BACKGROUNDS

Understanding the attitude towards computer:

Computer has long been used as an essential tool in modern society. At present, it may not be dispensable in every aspect of our everyday lives. In particular, computer has greatly changed the scene of education: the education paradigm solely based on off-line has long disappeared. The so-called cyber learning or e-learning has been a great portion of education and training for students at every level (Bona Kim et al, 2010)⁴ Thus, it should be natural that students' attitude toward computer would impact their learning (Hyunjin Kim, 2013)⁵.

Utilization of computer could be the two sides of the same coin: it might result in both positive and negative results. Of the negative aspects of computer, addiction to games and entertainment, formation of mistaken values and being misled to crimes have often been cited (Chisun Oh, 1999)⁶.

In short, the attitude towards computer refers to one's attitude of how he or she would use computer. An attitude literally means the way in which an individual feels or thinks about a certain thing or phenomenon. Thus, the attitude towards computer means an individual's feeling about the use and effect of computer (Hyekyung Suh et al, 2004)⁷

Nowadays, even toddlers learn to use computer and adolescents use it for entertainment, music and shopping as well as for learning and information-searching. It might be safe to say that computer is now being used nationwide by everybody including seniors.

College students are naturally expected to be good at using computer. Thus, there seems to be little interest in the influence of their attitude towards computer on their learning and studying. However, it is a very meaningful question to ask how their perception and utilization of computer affects their college life. Above all, college

students are at the last stage of education getting prepared to enter the real world. Thus, any factor leading to academic procrastination would be a big obstacle for them in their preparation for their careers (Jiwon You, 2013)⁸ The present study, thus, attempts to see whether and how their attitude towards computer affects academic procrastination.

Understanding Academic Procrastination: Academic procrastination of college students might result from a variety of reasons. It might happen partly because they need to do various things in addition to studying: club activities, voluntary service, leisure activities, and overseas traveling. Meeock Suh (2014)⁹, for example, classified the reasons into two categories: internal and external. The former includes lack of desire for studying, lack of confidence in learning, intentional procrastination, failure in information processing and psychological problems such as perfectionism.

The external causes for academic procrastination can be exemplified by difficulty in handling learning materials and projects, excessive amount of assignments, team projects and various extracurricular activities. As mentioned above, very few researches have tackled the issue of the effect of the attitude towards computer on academic procrastination. In reality, college students use computer for other activities than studying: listening to music, watching video files, playing games and shopping. It can be easily assumed that these nonacademic activities would, in turn, turn out to be major hindrances to learning and studying. The results of the current analysis are expected to offer suggestions or guidelines to help them use computer in a desirable way.

RESEARCH METHOD

Scale for Computer Attitude: This research adopted Chisun Oh & Youngbae Kang's (1999)¹⁰ model used in their paper 'Adolescents' Attitude toward Computer and their Experiences' to measure computer attitude. It consists of 17 items belonging to four categories: confidence in computer use (4 items), usefulness (5 items), desire to learn computer (5 items) and negative emotions against (3 items). Each item was measured on a five-point Likert scale, a higher score meaning a better attitude toward computer (Cronbach's $\alpha = .603$).

Scale for Academic Procrastination: The subjects' academic procrastination was measured by adopting Sherer, M (1997)¹¹, Younhee Song's (2012)¹² scale,

which was intended to distinguish students with chronic academic procrastination from others. The measurement tool was composed of 19 items including such statements as ‘I procrastinate in doing something until the last minute.’ and ‘I often hurry up frantically to meet the deadline.’ A higher score, with 9 reverse items, signified a lower level of academic procrastination. Cronbach a was obtained at .848.

Analysis Method: The current research proceeded with a set of statistical analyses: a frequency analysis of the subject group’s gender, year and major field, and the mean and standard deviation of technical statistics of their attitude toward computer and academic procrastination,

a correlation analysis of the two variables of attitude toward computer and procrastination, and, finally a regression analysis to identify the effect of computer attitude on academic procrastination.

RESEARCH RESULTS

General Characteristics of Research Subjects:

The subjects of the current research consisted of a group of 209 college students who were attending at N University located in Cheonan, Korea, and taking a computer-related class in the academic year of 2016. A questionnaire was handed out to 230 students, but 209 of them were collected for final analysis.

Table 1: General Characteristics of Research Subjects

Total	Gender		Year				Major				
	M	F	1	2	3	4	Engineering	Business	Welfare	Health related	Arts & Sports
N	136	73	10	83	69	47	59	63	28	37	22
209	(65.1)	(34.9)	(4.8)	(39.7)	(33)	(22.5)	(28.2)	(30.1)	(13.4)	(17.7)	(10.5)

As shown in Table 1, 136 (65.1%) subjects of the group were male and the rest (73, 34.9%) were female students. In terms of their grades, sophomores accounted for the largest portion of 83(39.7%), followed by juniors (69, 32.5%), seniors (47, 22.5%) and freshmen (11, 5.3%). As far as their major fields are concerned, it might be assumed that the group showed a nearly even distribution, considering the number of students enrolled at each school of the university: business (63, 30.1%), engineering (59, 28.2%), health sciences (37, 17.7%), welfare (28, 13.4%) and arts & sports (22, 10.5%).

Attitude towards computer & Academic Procrastination according to their Gender and Grades: The mean and standard deviation of their attitude towards computer and academic procrastination according to their gender and grades are found below.

Table 2: Attitude towards computer & Academic Procrastination depending on their Gender and Grades

Factors	Character	M	SD
Attitude towards Computer	Male	3.1032	0.4228
	Female	3.1547	0.3784
Academic procrastination	Male	3.7024	0.5052
	Female	3.8125	0.4546
Attitude towards Computer	Freshmen	3.2412	0.3955
	Sophomore	3.1779	0.47973
	Junior	3.1373	0.3353
	Senior	3.0501	0.3593

Conted...

Academic procrastination	Freshmen	4.0105	0.2576
	Sophomore	3.7273	0.4795
	Junior	3.7941	.4747
	Senior	3.6293	0.5441

As illustrated in Table 2, female students were found having a better attitude towards computer and a lower academic procrastination than male students. In terms of grades, in turn, freshmen had a better attitude towards computer and a lower academic procrastination than any other upper class students.

Attitude towards computer & Academic Procrastination depending on their Major Fields

Table 3: Attitude towards computer & Academic Procrastination depending on their Major Fields

Valuables	Major Fields	M	SD
Attitude towards Computer	Engineering	3.1466	0.4482
	Business	3.0691	0.3571
	Health-related	3.145	0.3147
	Welfare	3.221	0.5063
	Arts and Sports	3.1765	0.3177
Procrastination of learning	Engineering	3.7734	0.4722
	Business	3.7226	0.5078
	Health-related	3.6184	0.5296
	Welfare	3.8208	0.4394
	Arts and Sports	3.7273	0.5225

As shown in Table 3, those students majoring in welfare-related fields recorded the most positive attitude towards computer and the least academic procrastination. In contrast, business majors were the last in terms of attitude towards computer, while the students majoring in health-related fields were found having the greatest academic procrastination.

Table 3 Attitude towards computer & Academic Procrastination depending on their Major Fields

Results of Correlation Analysis: An analysis of the correlation was conducted between a set of subfactors of the attitude towards computer and academic procrastination.

Table 4: Correlation analysis of the attitude towards computer and academic procrastination

Variables		[1]	[2]	[3]	[4]	[5]	[6]
Confidence	[1]	1					
In ability to use computer							
Usefulness of computer	[2]	.473**	1				
Desire to learn computer & computer experience	[3]	.316**	.279**	1			
Anxiety or fear of computers	[4]	.059	-0.34	-0.44	1		
Total attitude towards Computer	[5]	.788**	.788**	.530**	.05	1	
Total academic procrastination	[6]	.113	.142*	.037	-0.005	.156*	1

* P<.05, **. P<.01

As illustrated in Table 4, the subfactors of confidence, usefulness and desire to learn showed a significant correlation among one another, while the negative feeling of anxiety or fear was not correlated with other subfactors, as expected. Overall, however, the attitude toward computer was closely correlated with academic procrastination: the higher the attitude toward computer, the lower academic procrastination.

A regression analysis of the attitude towards computer and academic procrastination

Table 5: A regression analysis of the attitude towards computer and academic procrastination

Model	Sum of squares	df	Mean square	F	Sig. p
regression	1.211	1	1.211	5.145	0.024
residual	48.703	207	0.235		
Total	49.914	208			

As shown in Table 5, a regression analysis found that the attitude toward computer significantly affected academic procrastination of the subjects, which means that the better attitude towards computer students have, the lower their academic procrastination they show.

A regression analysis of the attitude towards computer and academic procrastination

Table 6: A regression analysis of the attitude towards computer and academic procrastination

Variables	Model	Sum of squares	df	Mean square	F	Sig. p
Confidence in ability to use computer	regression	0.632	1	0.632	2.656	0.105
	residual	49.281	207	0.238		
	Total	49.914	208			
Usefulness of computer	regression	1.004	1	1.004	4.25	0.04
	residual	48.894	207	0.236		
	Total	49.914	208			

Conted...

Desire to learn computer & computer experience	egression	0.067	1	0.067	0.277	0.599
	residual	49.847	207	0.241		
	Total	49.914	208			
Anxiety or fear of computers	regression	0.001	1	0.001	0.004	0.947
	residual	49.912	207	0.241		
	Total	49.914	208			

As shown in Table 6, among the sub-variables of computer attitude, only the usefulness factor for computer had a significant effect on academic procrastination and other factors had no significant effect. However, when the attitude toward the whole computer has a significant effect on the academic procrastination, the usefulness of the computer is highly related to the academic achievement. A regression analysis found that the attitude toward computer significantly affected academic procrastination, which means that the better attitude towards computer students have, the lower their academic procrastination they show

Concluding Remarks: After being admitted to a college through very tough competition, college students in Korea, then, exert every effort to acquire necessary skills and abilities required by society. Of extensive learning and training for that purpose, computer application skills are a very important and necessary part. The present research attempted to identify their attitude towards computer and also the impact of the attitude on their academic life at college.

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Conflict of Interest: Nill

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On the Relationship between College Students' Personality Types and their Ego-Resilience & Self-Efficacy- Based on the MBTI Personality Assessment

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ABSTRACT

Many college students try to grow and change with the help of understanding themselves based on personality tests. The present study aims to examine how their personality types influence their ego-resilience and self-efficacy. The concept of ego-resilience might involve one's effort to control one's emotions, how difficult one's situation might be, and adapt oneself. Self-efficacy, in turn, basically refers to an individual's belief in himself or herself. For that purpose, a group of 218 sophomore and junior students at D University located in Gyeongbuk Province and N University in Cheonan participated in the study. The analysis methods include the program of SPSS 19.0, a frequency test, independent sample t-test, a correlation analysis and a regression analysis. It was found that a significant difference existed between the two types of personality in terms of their ego-resilience and self-efficacy. A similarly significant difference was also found between a set of subfactors of ego-resilience and self-efficacy. A variety of educational programs taking these into consideration might be necessary to help college students develop themselves. In other words, customized distinctive training for a particular type is expected to be effective in producing talented manpower at college.

Keywords: ego-resilience, MBTI test, personality, introversion, extroversion, self-efficacy.

INTRODUCTION

Colleges endeavor to produce competent manpower who can contribute to the development of society by using their abilities and talent. For that purpose, colleges prepare a variety of programs to train their students that may affect curriculum and teaching methods. However, it is not easy to bring about desirable changes in students' lives, not matter how good the education/training programs and teaching methods, partly because the students vary in the level of their participation and concentration. In Particular, there seems to be agreement that the quality of college life crucially depends the will and attitude of each individual student. Thus, the personality traits of a student would have a significant influence on his or her college life.

Seligman (2002)¹ explained that an individual tries to identify his or her strong personality traits and develop them with an aim to use them as well as their talent. J. Kim and E. Lim (2014)² also defined 'personality' as an intrinsic individual concept characterizing one's behavior and style of adaptation in life. Many researches

have reported that personality types might influence one's interpersonal relationship, school life, self-efficacy, learning experiences, decision on career and mental stress.

The current research started with keen interest in how college students' personality traits would affect their everyday lives as well as their college lives. Using the conventional Myers-Briggs Type Indicator (MBTI) tests identifying an individual's personality, we aim to examine whether and how their introversion and extroversion influence their ego-resilience and self-efficacy.

Many researches have been conducted, with recognition of the importance of personality and character, on the types of personality, but most of them are based on a set of 16 types and a set of 8 indicators. Very few attempts have been made on the relationship between introversion/extroversion and college students' behavior in their academic lives.

Thus, the present research, based on the dichotomy of introversion and extroversion, focuses on the effect of their personality types on their ego-resilience which

might indicate their ability to cope with external changes and control and manage internal states. Also, under discussion is their self-efficacy, which may refer to the degree of an individual's belief and trust in his or her performance of given tasks and ability to do the tasks in the future. The results of analysis are expected to help college students change and grow in the future. It is also expected that this research will provide base data for any attempt to develop an education curriculum individually customized for students and shed some light on the growth and self-improvement of college students.

THEORETICAL BACKGROUND

The concept and distinction of introversion/extroversion might be based on psychological types of Jung's philosophy and it is well represented in Myers & Briggs' MBTI test of personality types. The contrast and index might explain one's preference of different direction in using one's energy and attention and managing one's thought and behavior: internal or external. Extroverts cherish experiences and are behavior-oriented. Also, they are good at and enjoy expressing their thoughts and interacting with other people. Introverts, on the other hand, tend to be considerate and thoughtful. They take things seriously and, as a consequence, might be slow in making decisions or putting into action. Such personal characteristics should be taken as unique, not as weak or strong, and be developed further so that they can be used in any effort to develop themselves.

Ego-resilience refers to one's capacity that helps maintain balance and flexibly respond and adapt to changing environmental needs often coupled with stressful events or occasions (Block and Block 1980)³. Such an ability would enable one to cope with present difficulties, depression or stressful situations and control one's emotions by appealing to interest in various things and orientation towards the future (E. Park, E. Lee, 2013)⁴. In this extremely competitive society with a serious social problem of youth employment, collegians as adults should enhance their ego-resilience and grow to become desirable citizens by overall understanding of themselves.

Self-efficacy refers to the extent of an individual's feeling and sense of satisfaction followed by his or her completion of a certain task. It may also mean one's belief in his or her own ability to complete tasks and reach goals. It might be assumed that a particular person's self-efficacy might depend on his or her personality traits.

K. Han (2005)⁵ reported that self-efficacy exerts a significant influence on personal management of health and that it also helps reduce stress – physical, emotional and cognitive – with the help of cushioning role of self-control.

Y. Park and E. Kim (2001)⁶ also reported that self-efficacy had a positive effect on the ability to cope with stress and it may also affect overall satisfaction with life. Self-efficacy refers to an individual's belief in his or her own ability and, thus, is closely related with his or her personality traits. Thus, it should be meaningful to examine the relationship between self-efficacy and the two types of personality: introversion and extroversion.

RESEARCH METHOD

Research Subjects: The current research was conducted with a personality type test and a questionnaire which was handed to a group of 270 students taking liberal arts classes. 218 of the group participated in the research, submitting their answers to the survey: 130 from D University located in Gyeongbuk Province and 88 from N University in Cheonan. The class at D University was mainly for senior students and the one at N University for juniors and seniors.

The main reason for selecting these upper class students was our assumption that they were likely to be more interested in their careers, college life and personality types. It was found that 124 of the group might belong to extroverts (48 male and 76 female), whereas 94 could be classified as introverts (59 male and 35 female).

Table 1 illustrates the general characteristics of the participants.

Table 1: Illustrates the general characteristics of the participants

Type	Gender		Year		Major					
	M	F	3	4	Humanities	Social Science	Engineering	Management	Others	total
Extra version type	48	76	37	87	23	33	18	45	5	100
	(38.7)	(61.3)	(29.8)	(70.2)	(18.5)	(26.6)	(14.5)	(36.3)	(4)	
Intra version type	59	35	40	54	25	24	22	14	9	100
	(62.8)	(37.2)	(42.6)	(57.4)	(26.6)	(25.50)	(23.4)	(14.9)	(9.6)	

RESEARCH SCALE

MBTI Personality Type Test: The measurement tools for this study include a version of MBTI personality test and a ego-resilience scale. The MBTI-style test adopted for this study consisted of 32 items used in B. Kim(2003)⁷s research, which was modified by Hogan and Champagne(1979)⁸ from the self-reporting test developed by Myers and Briggs⁹.

Ego-resilience: Ego-resilience, in turn, was measured by adopting Atsushi(2002)¹⁰, which contain subfactors of emotion control, variety and interests and concern and positive future-orientedness.¹¹ A set of 21 items were measured on a five-point Likert scale. A higher score meant a higher ego-resilience.

Self-efficacy: A. Kim’s(1997)¹² slightly modified version of Sherer et al. (1982)¹³ was adopted to measure self-efficacy for the current research. The subfactors of self-efficacy in this measurement tool include confidence, self-control, preference for difficult tasks measured on a

five-point Likert scale. A higher score was meant to be a higher self-efficacy.

ANALYSIS METHOD

The program of SPSS Version 19.0 was used to analyze the collected data. A frequency test to analyze characteristics of the subjects and technical statistics to obtain the mean and standard deviation for each scale were also conducted. An independent sample t-test, correlation analysis and regression analysis were made in order to identify the characteristics of introversion/extroversion and their effect on ego-resilience and self-efficacy.

RESULTS OF ANALYSIS

This section presents the results of analyzing the subjects’ ego-resilience and self-efficacy depending on their different personality types.

Technical Statistics of Measurement Variables: Table 2 shows the mean and standard deviation of measured data for the subfactors of ego-resilience and self-efficacy.

Table 2: Mean and Standard Deviation Variables

Factors	N	M	SD
Interests and concern	218	2.8571	0.69215
Emotion Control	218	2.5946	0.57678
Positive future Orientedness	218	2.5008	0.77326
Ego-resilience(M)	218	2.6553	0.57431
confidence	218	2.7857	0.65763
self-control,	218	2.7297	0.64366
Preference for difficult tasks	218	2.5706	0.70617
Self-Efficacy(M)	218	2.7081	0.62295

Independent sample t-test: As shown in Table 3 presenting the analysis results of the t-test, different types of personality would have different impact on their ego-resilience and self-efficacy.

Table 3: Independent sample t-test and Personality Types

Categorization	Levene’s test for Equality of variances		t-test for Equality of Means			
	F	Sig.	t	df	Sig. p (2-tailed)	Mean difference
Ego-resilience	2.064	0.152	6.065	216	.000***	0.44137
			6.168	210.789	.000	0.44137
Self-Efficacy	5.048	0.026	9.413	216	.000	0.67686
			9.724	215.678	.000	0.67686

*p<.05, **p<.01, ***p<.001

As shown in Table 3, a statistically significant difference was found between introverts and extroverts in their ego-resilience: $t=6.065$, $p=.000$. Also, an independent sample t-test found a significant difference between the two types in their self-efficacy ($t=9.724$, $P=.000$).

Correlation between Measurement Variables of Personality Types: Person correlation analysis was performed to see the relationship among the variables and factors of ego-resilience and self-efficacy. The results of analysis were found below in Table 3.

Table 3 Correlation between Ego-resilience and Self-efficacy

Table 4: Correlation between Ego-resilience and Self-efficacy

Categorization		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Interests and concern	[1]	1							
Emotion Control	[2]	.583**	1						
Positive future Orientedness	[3]	.553**	.660**	1					
Confidence	[4]	.124	.150*	.122	1				
Self-control	[5]	.254**	.241**	.217**	.569**	1			
Preference for difficult tasks	[6]	.140*	.082	.056	.278**	.463**	1		
Ego-resilience (M)	[7]	.837**	.870**	.859**	.154*	.277**	.109	1	
Self-Efficacy (M)	[8]	.284**	.267**	.233**	.756**	.936**	.530**	.306**	1

* $p<.05$, ** $p<.01$, *** $p<.001$

As shown in Table 4, the subfactors of ego-resilience variety in interests, emotion control and positive future-orientedness-had a high corelation with those of self-efficacy - confidence and self-control. It was also found that the subfactor of preference for difficult tasks had a weak correlation with variety in interests and no correlation with emotion control and positive future-orientedness. In conclusion, it might be assumed that the two factors of ego-resilience and self-efficacy are correlated to some extent.

A regression analysis of the attitude towards computer and academic procrastination

Table 5: A regression analysis of the Self-resillienceand Self-efficacy

Categorization	Model	Sum of squares	df	Mean square	F	Sig. p
Interests and concern	regression	6.779	1	6.779	18.912	.000***
	residual	77.431	216	.358		
	Total	84.210	217			
Emotion Control	regression	6.021	1	6.021	16.632	.000***
	residual	78.189	216	.362		
	Total	84.210	217			
Positive future Orientedness	egression	.4590	1	.4590	12.451	.001**
	residual	79.620	216	.369		
	Total	84.210	217			

* $p<.05$, ** $p<.01$, *** $p<.001$

As shown in Table 5, Interest and interest, emotional control and positive future orientation, which are sub-factors of ego-resilience, have a statistically significant

effect on self-efficacy. As a result, it can be predicted that ego - resilience and self - efficacy may have a significant effect on each other regardless of personality type.

CONCLUDING REMARKS

This study found that introverts and extroverts had a significant difference in their ego-resilience and self-efficacy. Also, a close correlation between the measurement variables existed according to two personality types. Such a finding is expected to help college students find right paths to develop themselves by understanding their characteristics. Also, it might be suggested that college education take different personality types into more consideration in preparing any curriculum customized for a particular type of students. Better understanding of oneself is a requisite in enhancing self-efficacy and ego-resilience and growing into a competent member of society.

Ethical Clearance: Not required

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A Study of a Model of Christian Alternative Schools

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ABSTRACT

Background/Objective: This study intends to inquire into theoretical background of general alternative education and alternative schools, and deal with the significance necessity, definition, philosophy of education, purpose, curriculum and quality and qualifications of teachers with respect to Christian alternative schools.

Method/Statistical analysis: This paper seeks to offer an alternative to Christian schools in the Korean public school system as it faces an overall challenge in recent years. The education philosophy, goal, purpose of establishment, instruction methods and specific cases are analyzed for Christian schools that have been established based on the spirit of Christianity in Korea, as an alternative to existing schools. The study seeks to identify a model for Christian alternative schools that can be applied to the Korean environment and what would be the best characteristics for such schools.

Findings: There are many existing studies that analyzed cases of various alternative schools in Korea. However, there is a lack of studies that compiled data on how Christian alternative education and Christian alternative schools are practiced. This study will contribute to serving as a useful reference material for those who want to establish Christian alternative schools. Moreover, this study intended to inquire into a model of Christian alternative schools applicable in Korea as well as the aspect of the most desirable Christian alternative school. To be concrete, regarding the most desirable Christian alternative schools, this study proposed principles and realistic alternatives for people who intend to establish and operate Christian alternative schools on the basis of concrete Christian worldview in terms of philosophy of education, purpose, educational purposes, educational goals, curriculum, characteristic project (education), qualifications and role of teachers. Specifically, the paper seeks to present the principles and realistic alternatives based on a Christian world view applied to the education philosophy, goal, purpose of establishment, curriculum, specific projects (instruction) and qualification of instructors.

Improvements/Applications: As such, this paper is expected to offer valuable insight into those seeking to establish a Christian alternative school. This study will make it possible to understand a model of Christian alternative schools which is the most desirable and applicable in Korea.

Keywords: *leadership; Christian alternative school; education; philosophy of education; curriculum; School*

INTRODUCTION

Significance of Christian alternative school: This term “Christian alternative school” is considered a term used for the first time in this present study. “Christian alternative school” refers to a faith community school where students directly experience and practice their faith in the wings of Christian faith, supplied with characteristics and form of general alternative schools. Most of all, regarding the purpose of establishment and philosophy of education, they are based on Christian worldview for educational purposes and goals of educational activities. Through the concepts of a small school, special learning methods, love for nature, work-

based activities, community life and faith education and training different from what is provided by general Christian schools, it offers the most desirable education fostering true disciples of Jesus Christ.

Kim Tae-yeon asserts that “A Christian alternative school is a learning community where all educational activities are carried out based on Christian worldview intending to actively expand the Kingdom of God on earth, and students are prepared to have frontier spirit for the Kingdom of God by being trained as disciples of Christ in the ‘vivid harmony’ with other beings and all members (teachers, students, parents and staff) are making utmost efforts for true education of the supreme quality.”

Unlike other schools, Christian alternative schools are characterized by a community of faith. In Christian schools, people did not gather in search of interests but under the confession of faith with the concern of education. Therefore, basically, Christian community attributes feature such schools. In a broad sense, a Christian alternative school can be considered a part of church. However, a Christian alternative school presents dissimilarities from a church in the sense that it is a specialized educational institution. Basically, a school focuses on education, among many other areas of human life. Moreover, the intrinsic function of school lies in accumulating professional skills and methods required for education and effectively handing down them. Comparably, the main function of church resides in glorifying and worshipping God. Furthermore, church also plays a role in proclaiming and delivering Word of God.

A Christian alternative school teaches the same truth as church and the ultimate objective lies in the same but it has intrinsic roles of its own different from those of church. Christian schools are required to cooperate with churches, and churches also need to respect the intrinsic roles of Christian schools and help schools. The mutual cooperation and balance are highly important.

In summary, a school serving the Kingdom of God and people of the Kingdom is a Christian school. A Christian alternative school is a place fostering the saved people who thoroughly recognize the creation and reign of God. It has to be a completely biblical school. A school based on the core of biblical messages is a Christian alternative school.

BACKGROUND

Philosophy of education of Christian alternative schools: “The philosophy of education of Christian alternative schools, in short, resides in God-centered education. This is a contrast to humanism commonly pursued by general education. Theocentrism as a philosophy of education of Christian schools means that education does not happen centered on humans but on God. In God-centered education, the agent of education is not humans but God, and the ultimate goal is also with God. Moreover, it signifies that the contents and methods of education are also based on the will and truth of God.”¹

Christian alternative schools must establish their identity from the biblical and Christian worldview, and

are required to have distinct conviction and devotion in philosophy of education. The philosophy of education must be described on the basis of Christian faith and fulfilled in the reality of education.

Educational purposes and educational goals of Christian alternative schools

Educational purposes: Considering that the educational purposes of Christian alternative schools are identical to those of Christian schools, this study intends to make reference to educational purposes of Christian schools first. Regarding the purposes of Christian schools based on Christian worldview, Van Brummelen mentioned core biblical commands of Christian worldview in four directions, and these four concepts are not separable but complementary and supportive.

Firstly, students are to research the created world of God based on creation command and cultural mandate (Genesis 1: 26-28, 2: 15), and while studying, students are to have mission as servants of the created world. Even though the created world is decadent, students must have mission as servants. In spite of being a corrupt created world, it is fundamental that a Christian school should proclaim marvel to the creation of God, and lead students to tread on the path of Lord by serving God and neighbors with the talents given by God. Teachers are required to instruct students how God created the world for the benefit of people and how people should take care of the world. Moreover, teachers should help students in realizing that each one has been called to serve God as the body of Christ and individually members of I, in each field of the society. Teachers with frontier mind should guide students to dedicate themselves to serving the Kingdom of God with joy and act with creativity while they are experiencing, learning and applying academic rules.

Secondly, based on the given command (Matthew 28:18-20), teachers should make clear that in God we live and move and have our being (Acts 17:28). Teachers must encourage each student to have a personal relationship with God, and as a teacher who tied a personal relationship with Christ should be a leading model of obedient and joyful life. It is necessary for teachers to recognize authority of Christ to make an effort to reveal Christ in the teaching of the classroom, and teach students all things taught by Christ. Also, teachers should teach students that Christ set an example for teaching and asked a meaningful answer. For example,

teachers are to teach that Christ set an example for serving and modesty required as Christians by washing the disciples' feet.

Thirdly, based on the great commandments (Matthew 22:37-39), teachers are to love their students as themselves when they teach students. When there is love, teachers can truly teach students. When teachers teach students with love, this will be a key to "not being conformed to this world, but being transformed by the renewal of the mind" of students (Romans 12:2). Education means changes. Only love can change students. Students should be encouraged to make a commitment to Christ and Christian way of life and willingly serve God and neighbors.

Fourthly, based on faith fellowship (Galatians 6:2, 6:10; Acts 2:42-47), praise and thankfulness must be included and specified in the curriculum. Teachers and students must feel thankful to the grace of God both personally and collectively. Through serving school and society, the school community should encourage students to praise a variety of graces. Students are to be guided to show thankfulness for the grace of others and learn how to help one another. Christian alternative schools must create fellowship in Holy Spirit, work and study together in order for students to experience a great community of which Head is Christ.

The purpose of Christian alternative schools ultimately resides in teaching students to recognize that they are the image of God. The classroom should provide students with background in which students realize Christian view of the world for real as well as fulfill and develop this view of the world. The classroom must become a community glorifying and praising God, where students realize God's love and become the members of Christ, in the middle of mutual trust between teachers and students and exploration of created world of God"²

In the book published by Research Society of Christian Schools of ACTS Education Research Center, which has been forming and preparing a Research Center since 1998 to establish a Christian alternative school, Christian School we are dreaming of, the concept of Christian alternative school is defined as follows:

The base of a school we are dreaming of resides in evangelical faith. In other words, it is a school founded on the salvation only by believing in Christ.

The education provided in this school must be based on Christian worldview and the criteria must originate from the Holy Scripture of the Word of God. The base of biblical human view lies in the fact that humankind was created by the image of God. Therefore, humankind is a holistic being and uniquely created to maintain each one's individuality. Human has capacity and possibility of ruling, but is a limited being only discovered in God at the same time. Being a mere God's handiwork, human and nature cannot serve as a basic fundament for knowledge and values. Only God can be absolute standards. In particular, for humankind in complete decadence, the only base to understand true holistic knowledge is by way of restoring relationship between God and humankind through Christ, and the Holy Scripture serves as a criterion for this knowledge. The purpose of saved life of humans described in the Holy Scripture consists in ultimately serving God by restoring orders of God in the individual life, as well as serving others and administrating nature.

Therefore, based on the Words presented by the Holy Scripture, it is possible to establish the educational purposes of school as follows:

Firstly, it is to lead students to have a personal relationship with God and achieve recovery in each one's life (Matthew 28:18-20). Secondly, it is to lead each student to realize his or her own calling given by God and become a competent disciple of Christ serving God and neighbors (Genesis 1:26-28)

EDUCATION GOAL

Firstly, in terms of revealing the base and frame of Christian discernment in life, students must seek Christian vision of life and existence based on standards of Word of God as well as Christian way of life.

Secondly, in terms of promoting development by concept, capacity and creativity, students are supposed to realize how each one was called to serve God as members of Christ in each sector of the society, and develop the capacity of using, taking care of, forming and enjoying the world of God to the maximum.

Thirdly, by leading students to experience the meaning of life based on Christian worldview, students are supposed to willingly make personal and collective decisions from the biblical perspective and develop values and inclination in harmony with Christian principles.

Fourthly, students are encouraged to devote themselves to Christ and Christian way of life and readily serve God and neighbors. Students are guided to experience how to give God the entirety of life including thoughts, words and behaviors; furthermore, they are supposed to dedicate themselves to cooperating with other members in developing Christian way of life.³

Curriculum of Christian alternative schools: The curriculum of Christian alternative school aims to make students praise sovereignty of Christ over all creatures. The purpose of curriculum of Christian alternative school is to discover wisdom and knowledge originated in the revelation of God, and to make students become committed servants of God through this. This must be a means of enlightenment of the world of God as well as the position of each student within. In the end, the curriculum must recognize God-centered base in terms of core and purposes, and it should be structured allowing students to have understanding and discriminative awareness of the world of God and love and serve God in the world in which they live.

For this reason, regarding the center of the curriculum of Christian alternative schools, it means that for God and His minister of creation, bondage and conservation, the Holy Scripture serves as a starting point for the center of the curriculum, namely, origin, definition and purpose. Besides, this means that nothing is value neutral in the curriculum, and the learning activities are focused on worshipping and serving God in all aspects of life.

True knowledge starts with God of revelation and includes all forms of life, demanding that students and teachers dedicate themselves to God and serve God in all spheres of the world. Like this, the curriculum of Christian alternative schools must be structured in order that the revelation of God should be at the root of it.

The curriculum of Christian alternative schools possesses both religious aspects and educational aspects at the same time. Knowledge is ultimately displayed in the analytic frames of standards influencing students' world view and way of life; therefore, these two terms enrich each other and are closely related.

“When God created humankind, He created us allowing a deeper understanding of truth and its new application to different situations and generations. Furthermore, human activities constantly pursue new phases of truth that God already reserved in the structure

of the universe. For this reason, it is possible to add new materials to the curriculum and a general reexamination is equally required according to the lighting direction of the Holy Scripture. Considering that knowledge as a whole is for the glory of God, life as an entirety and whole people, this is what the curriculum aims at.”⁴ Consequently, the most fundamental mission of Christian alternative schools and teachers can be summarized as the integration of faith into learning (subjects).

“Moreover, there are educational aspects in the curriculum of Christian alternative schools. Christians, as good servants of God, should show exceptional zeal for learning of the world created by God. An authentic Christian alternative school ought to achieve the integration of religious aspects into educational aspects, in other words, a true biblical integration between church attributes and school attributes. This does not allow complementary correlations. The integration of two horizontal and vertical elements must be realized as shown in the following diagram (Figure 1). Figure 1 explains that all curriculums of Christian alternative schools should consolidate the curriculums by origin of the Bible, and be educated and structured with Bible-based content.



Figure 1: Relationship between Bible and Subject⁵

In other words, in the center of all curricula, there must be the Word of God. Through the Word of God, all sciences must be reinterpreted. The entirety of these acts must be moving forward the glory of God. This integration should form the characteristics of the curriculum of Christian alternative schools.”⁶

Qualifications and roles of teachers of Christian alternative schools: To be teachers of Christian alternative schools, they must be equivalent to the Disciples of Christ who are devout filled with the Holy Spirit and have a strong sense of duty. This chapter intends to describe the qualifications of teachers as follows:

Firstly, teachers must play a role as kings. This does not necessarily mean that teachers must sovereign over students. It simply means that they should use correct authority to operate the class and instruct students. Naturalist and progressivist teachers are like gardeners, so they are not supposed to impose any restrictions on students.

Secondly, teachers should play a role as prophets. In other words, teachers must proclaim the will of God to students. Not only through the Holy Scripture but also through general knowledge from the subjects, teachers must convey the truth of God to students. The given mission of teachers resides in teaching students to follow the intention of God by discerning plans of God toward nature and society. Exactly like the prophets who proclaimed the will of God to Israelis who led their lives arbitrarily, teachers are responsible for making a clear proclamation of what to live for.⁷

Thirdly, “Teachers must have love for students and assurance of possibilities of students. It is because education which is not based on love is not able to change the life of students. Students can grow to the same extent as the belief of teachers in possibilities of their students. Everyone is a being with the image of God, so no one can restrict the possibilities. Therefore, only the ones who know how to love students and see the possibilities in them in accordance with these biblical perspectives are qualified to be teachers.

Fourthly, they must be the ones who have professional knowledge of the subject and make efforts to develop creative teaching methods. It is because it is not possible to attract interests of students in learning without a broad and deep understanding of the subject. All knowledge and sciences existent in the world are under the rule of God; therefore, we Christians should not neglect knowledge and sciences. For this reason, teachers should prepare a variety materials related to subjects beyond textbooks, in particular, by steadily researching the connection between the content of subject and the real world, teachers should find the best way to avoid uniform teaching methods to deliver the truth meaning. Diverse methods of teaching and learning should be developed to apply to classes depending on the content of subjects and level and reaction of students.

Fifthly, they must be the ones who have Christian historical consciousness to build dreams in students. Only

the one who has a dream can make another dream. Only the teachers, who fulfill the dreams given by God based on correct historical consciousness, are able to lead students in a correct manner. This way, students can finally become the ones who dream the dream given by God”⁸

Sixthly, “Teachers must zealously read the Holy Scripture and meditate on the Word. The Word of God wants to rule characters and thinking of all teachers. Only when the characters of teachers do not have dominating attitudes but serving attitudes like Christ, teachers can teach students with truly serving mind.

Seventh, teachers must have biblical perspectives not only in the aspect of characters but in the aspect of knowledge at the same time. It is because it is hard to say that a teacher with a good character has good biblical knowledge accordingly.”⁹

Eighth, all teachers are to be cheered up and encouraged by the Holy Scripture. The Holy Scripture says that God is our true teacher. The Bible also indicates that God gives lessons to us, reproaches us and educates us in a correct and righteous way through the Word of God. For this reason, the one who is filled with the Word of God can become a good teacher.

Lastly, teachers play a role as chief officiating priests. This role means that teachers beg God for the benefit of students. Even when students commit fault for being immature, teachers must be ready to kneel down in front of God, on behalf of the guilty students. Teachers, who do not offer intercessory prayers on behalf of their students, are considered the ones who are not properly fulfilling their duties as teachers.

The following extract is taken from a text written by Lim Tae-gyu (Gwangyeong High School teacher, Seoul) belonging to a Research Society preparing the establishment of a Christian alternative school.

“Teachers should meet the following three qualifications. Firstly, teachers must have educational vision expecting that students under their responsibility will transform and the Kingdom of God will expand through their students. Secondly, teachers are required to obey constant training of Christian thoughts and character and must continuously build Christian maturity. Thirdly, teachers should have precise and profound knowledge of specialized area and research and practice teaching method oriented to creativity and

biblical approach. Delivering the content of education in a proper and correct way toward Christian orientation depends on the role of each teacher. Ecclesiastical content can be delivered in a non-Christian manner and non-Christian content can bring Christian educational effects through Christian illumination. Most of all, the influence of character given by teachers can be the most crucial key to Christian education.”¹⁰

This was extracted from a research content aiming at establishment of a Christian alternative school in a gathering for founding Dream High School. Dream High School is a research gathering composed of professors and teachers intending to devote themselves to establish a Christian school through Research Society of Christian Schools. Lim Tae-gyu (Gwangyeong High School teacher) is a leader of the gathering and this school is supposed to open in 2003.

CONCLUSIONS

This study inquired into philosophy of education, purpose, purpose of establishment, educational methods, curriculum, qualifications and roles of teachers of Christian alternative schools, founded on the basis of Christian spirit among alternative schools in South Korea, as an alternative to the current reality in which Christian schools, which are within the public education system, lose the essence and wander about in front of overall crises of the immediate education. Moreover, this study intended to inquire into a model of Christian alternative schools applicable in Korea as well as the aspect of the most desirable Christian alternative school.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Novel Ensemble Learning Method for Classification and Regression Based on Weighted Stacking of Estimators

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ABSTRACT

In machine learning, ensemble methods are emerging and powerful strategies to improve the robustness and accuracy of both the supervised and unsupervised learning solutions. The basic principle of ensemble strategy is to work on a combination of diversified base classifiers and regressors to strengthen the both kind of weak classifiers and regressors and are available for a single task, merging all of the results which leads to better performance of the classifiers and regressors. In this study, an attempt has been made to implement study and analyze the importance of ensemble strategies on either classification and regression techniques to predict the class label or future value respectively. Here, for experimentation two sets of different datasets are used for both of the tasks and the proposed estimator based on weighted stacking has been experimented and evaluated in two levels using RF, a variant of ANN i.e. Multi-Layer Probabilistic Neural Network (MLPNN), a lazy learner k -NN if first level of experimentation to get the individual predictions of those heterogeneous models and the in second level of experimentation, the weighted stacking ensemble learning has been experimented with SVM and the performance of the all the individual models along with stacked SVM have been evaluated using various performance matrices such as; specificity, sensitivity and F-score as well as T-test based statistical analysis has been considered to accept the performance of the proposed model.

Keywords: Classification; regression; ensemble learning; Weighted stacking; Random Forest; Multi-Layer Probabilistic Neural Network; k -Nearest Neighbor; Support Vector Machines

INTRODUCTION

Broadly, data classification can be defined as the process of arranging the data into relevant categories for ease of extracting the data or information out of this data properly and can be protected more efficiently. This classification task, not only focuses on easier extraction of data, it has of particular importance with respect to risk management, compliance as well as data security^{1,2}. In machine learning, classification can also be defined as a process to predict the unseen data or future data^{3,4}. The classes are basically represented as areas or volumes called

as decision regions and the decision boundary differentiates between the different classes. In machine learning, there are many state of the art classification algorithms such as; Artificial Neural Network (ANN)⁵, Decision Tree⁶, Random Forest (RF)⁷, k -Nearest Neighbor (k -NN)⁸ and Support Vector Machines (SVM)⁹ etc. are available and also, many researches are going on to develop many hybridized and optimized classifiers. Similarly, regression and prediction also falls under the category of supervised learning strategy like classification and both works on recalling the past experiences. This general method of predicting the future based on past experiences is the core of classification and regression analysis. In machine learning, the classifiers are also being used to predict the future value. The classification is a process to predict the class label on unseen data, and can be categorized as; binary classification i.e. trying to know simply the yes/no and multi class classification i.e. trying to put an example into one of a number of classes, whereas; regression tries to predict a real value such as; to predict the value of stock tomorrow based on its past performance^{10,11}.

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There are several issues need to be addressed while formalizing the learning process, such as; (a) the performance of the learning algorithms for both classification and regression tasks need to be measured on unseen data, known as testing phase; (b) measuring the performance of the classifiers and regressors should depend on the type of problem we are trying to solve; and (c) there should be a strong relationship between the data that both the type of algorithms uses at the training time and the testing time^{12,13}. In machine learning, ensemble methods are emerging and powerful strategies to improve the robustness and accuracy of both the supervised and unsupervised learning solutions^{14,15}. The basic principle of ensemble strategy is to work on a combination of diversified base classifiers and regressors called as 'models' to strengthen the both kind of weak classifiers and regressors and are available for a single task, merging all of the results which leads to better performance of the classifiers and regressors. In other words, ensemble learning strategies can be defined as, to combine the multiple base classifiers or base regressors to produce the enhanced result in comparison to a single classifier or regressor^{16,17}. Voting, averaging, weighted average is widely used ensemble learning strategies in machine learning domain. Voting is a simple ensemble technique, in which the multiple models are used to make predictions for each data input and the predictions made by each model are called as a 'vote' and the predictions that we get from the majority of models for each data input are used as the final prediction for that data input. Similarly, while the predictions are made for each data point by averaging the predicted results of all the models used for classification and regression is known as 'averaging'. Weighted average strategy is an extension to the averaging strategy, where, different weights are assigned to all the models and those weights defines the importance of each model used for prediction. The advanced form of ensemble learning such as; stacking, blending, bagging and boosting are also being used widely for classification and regression tasks. Staking ensemble learning used prediction results from multiple models to design a new model and this new model is used for final prediction on the test set. In bagging, the random subsets are created from the original datasets using bootstrapping method including all the features then, a user specified estimator is used for all those smaller subsets of data and finally, the predicted results from all the models are combined to find the prediction. But, in boosting ensemble strategy, the each subsequent

model attempts to correct the error of the previous models whereby, the succeeding models are dependent on the predictions of previous models^{18,19}.

In this study, an attempt has been made to implement study and analyze the importance of ensemble strategies on either classification and regression techniques to predict the class label or future value respectively. Here, for experimentation two sets of different datasets are used for both of the tasks and the proposed estimator based on weighted staking has been experimented and evaluated in two levels using RF²⁰, a variant of ANN i.e. Multi-Layer Probabilistic Neural Network (MLPNN)^{21,22}, a lazy learner k -NN²³ in the first level of experimentation to get the individual predictions of those heterogeneous models and the in second level of experimentation, the weighted staking ensemble leaning^{24,25} has been experimented with SVM and the performance of the all the individual models along with stacked SVM have been evaluated using various performance matrices such as; specificity²⁶, sensitivity²⁷ and F-score²⁸ as well as T-test based statistical analysis²⁹ has been considered to accept the performance of the proposed model.

The rest of the paper has been outlined as follows; in section 2, the related work on ensemble strategies for both the classification and regression problems have been explored, the methodologies adopted for experimentation are discussed in section 3; section 4 outlines the proposed ensemble learning strategy; the experimentation and result analysis are given in section 4 and finally, section 5 concludes the paper with future scope of this proposed work.

Staking normally uses the concept of competition among the multiple base classifiers or regressors to train the same set of data using average, max, min etc to obtain a higher degree of prediction accuracy. It uses two layer approach of learning. The prediction output of the base learners act as the input to the second layer of algorithm to optimally combine the model prediction to obtain a good estimator. It has been found that, staking yields better performance than the trained base classifiers or regressors and is being used to estimate the bagging error rate. The advantages of stacking have been improved by adding the weighted version of data. The predictions of base models are combined through weighted majority voting or weighted sum to estimate the final prediction. The above mentioned advantages motivated to persue this work to evaluate the performance of both classifiers and regressors to estimate the predicted result.

MATERIALS AND METHOD

In this section, we introduce the various learners used for classification and regression as well along with the staking and weighted staking methods. The performance evaluation measures are also been discussed here briefly. The various learners used for experimentation are, RF^{7,20,37,38}, MLPNN^{21,22}, *k*-NN^{8,23} and SVM^{9,50}. RF^{7,20} is a supervised learning approach; it creates a forest of decision trees, trained with bagging in which this bagging approach employs a combination of learning strategies to increase the prediction result. The most commonly used ANN is MLPNN, a probabilistic neural network (PNN) is an alternative to MLPNN. This combination of back propagation and PNN predicts the unknown pattern and minimizes the misclassification rate^{29,30}. The *k*-NN falls under the category of lazy learners and it stores all the information about the available patterns and classifies new instances based on similarity measures such as; distance functions and it is also a non-parametric learning approach^{8,23}. SVM works on the principle of fitting a boundary to a region of points which belong to one class and once the boundary between the classes based on training data are fitted, SVM will be able to predict the class label of test data. The main advantages of this learning strategy is that, once a boundary is obtained, most of the training data is redundant and all it needs is a core of points named as support vectors to identify and set the boundary to classify or predict the new instances^{9,50}.

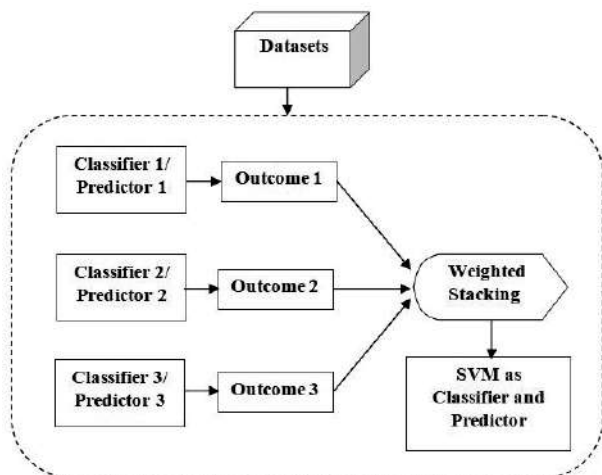


Figure 1: Broad scope of the proposed classification and regression strategy based on weighted stacking

Stacking is a simple ensemble learning strategy of combining the diversified base learners or classification models and uses a first-level or base level prediction

approaches from a few basic classifiers and the uses another model at the next level to predict the output from the first level of predictions^{31,32}. To validate and measure the recognition performance of the proposed weighted stacking based estimator, the sensitivity, specificity and F-1score are being used and experimented^{33,34}. Basically ensemble learning methods are used to enhance the performance of weak learning methods and produce better results. Voting classifier is a technique that can be used for both classification and regression problems. Basically, this method is applied to extract the best result out of a set of results. Weighted majority voting technique generally applies some weightage to each estimator output instead of taking only outputs. The stacking, which can be used for ensemble learning, generally considered as multilevel ensemble learning, because it uses more than one level of learning estimators instead of only one has been used for experimentation.

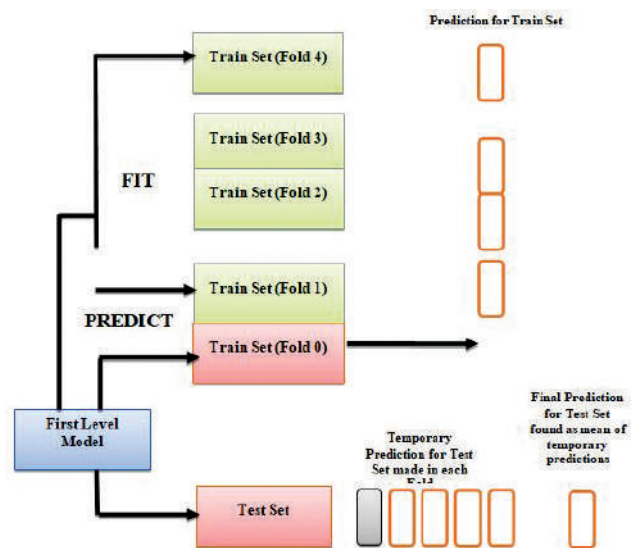


Figure 2: Working procedure for first level and one fold stacking procedure in ensemble learning

In this work, we have proposed a new method for ensemble learning based on weighted stacking approach. Here, in each level of stacking there are different weights given to decide the estimator performance. There are mainly two levels for stacking is done using three first level models and then, the outputs of these predictions are used as features for 2nd level of prediction. Generally, any model can be used in 1st and 2nd level, but here, the three model classifiers such as; random forest, multi layer probabilistic neural network and *k*-nearest neighbor are used for prediction. The outcomes of those classifiers for classification and prediction has been used as input to the stacking ensemble strategy, and then SVM^{35,36}

has been used for both classification and regression on different sets of datasets as discussed earlier and detailed in **Table 1** and **Table 2**. The broad scope of this study and the working procedure for first level and one-fold stacking in ensemble learning are outlined in **Figure 1** and **Figure 2** respectively.

FINDINGS

This section presents the conducted experiments on classification as well as regression tasks on two sets of

three different datasets as discussed in **Section 4.1**. The effectiveness of the proposed ensemble learning was investigated through two levels of experiments using four state of the art classifiers and one weighted stacking ensemble strategy.

Datasets description: For experimentation and to analyze the performance of the proposed weighted stacking based ensemble learning for both classification and regression the following two sets of datasets are used as given in Table 1 and Table 2 with their descriptions.

Table 1: Datasets used for classification problem

Dataset	#Instances	#Classes	#Attributes	Type	Missing Values
Chronic Kidney Disease	400	2	25	Real	Yes
Diabetic Retinopathy Debrecen	1151	2	20	Real	No
Cardiotocography	2126	3	23	Real	No

Table 2: Datasets used for regression problem

Dataset	#Instances	#Attributes	Type	Missing Values
Parkinsons Telemonitoring	5875	26	Real	No
Wine Quality	4898	12	Real	No
Energy Efficiency	768	8	Real	No

Parameters setup

Table 3: Parameters used for experimentation

Classification/ Regression strategies adopted for experimentation	Parameters considered with their values associated
RF	Max depth=5
MLPNN	Optimizer=Limited Memory BFGS, learning rate=0.5, hidden layer size= based on input size
k-NN	No. of neighbors= 7
Stacking	No. of folds = 5, stratified = True
SVM	Kernel = radial basis function

In this work, four classifiers such as; RF, MLPNN, k-KK and SVM and one staking based ensemble method has been experimented for both classification and regression. The values of the parameters are detailed in **Table 3** and are used those parameters are used to assess the performance of proposed ensemble learning based on weighted stacking.

RESULT ANALYSIS AND DISCUSSION

To enhance the performance weak or base learners, the ensemble strategies have been proposed. In this work, a voting based ensemble strategy has been devised

to enhance the performance of both classification and regression problem. Two different sets of three datasets each for classification as well as regression are being experimented. Voting classifier is a technique has been used for both classification and regression problems and basically, this method is applied to extract the best result out of a set of results. Weighted majority voting technique generally applies some weightage to each estimator output instead of taking only outputs. The stacking, which can be used for ensemble learning, generally considered as multilevel ensemble learning, because it uses more than one level of learning estimators instead of only one has been used for experimentation.

In this work, the weighted stacking based ensemble learning approach works in two levels and in each level of stacking there are different weights given to decide the estimator performance. There are mainly two levels for stacking is done using three first level models and then, the outputs of these predictions are used as features for 2nd level

of prediction. Generally, any model can be used in 1st and 2nd level, but here, the three model classifiers such as; RF, MLPNN and k -NN are used for prediction. The outcomes of those classifiers for classification and prediction have been used as input to the stacking ensemble strategy, and then SVM has been used for both classification and regression.

Table 3: Accuracy obtained for classification problem

Datasets Experimented	Accuracy Measure			
	RF	MLPNN	k -NN	Stacking with SVM
Chronic Kidney Disease	0.93	0.95	0.90	0.96
Diabetic Retinopathy Debrecen	0.78	0.80	0.77	0.89
Cardiotocography	0.83	0.85	0.78	0.90

Table 4: Improvement of proposed Stacking with SVM with respect to RF, MLPNN and k -NN for classification problem

Datasets Experimented	Difference from RF	Difference from MLPNN	Difference from k -NN
Chronic Kidney Disease	0.03	0.01	0.06
Diabetic Retinopathy Debrecen	0.11	0.09	0.12
Cardiotocography	0.07	0.05	0.12

The accuracies are being observed for individual base models as well as staking based SVM model as shown in **Table 3** and **Table 5** for classification and regression type of problems respectively. From **Table 3** and **Table 4** for classification problem, it can be seen that, proposed weighted staking based estimator for classification is showing more accurate result with 96%, 89% and 90% for Chronic Kidney Disease, Diabetic Retinopathy Debrecen and Cardiotocography datasets respectively. The improvement observed of RF is 3%, 11% and 7%, for MLPNN is 1%, 9% and 5% and similarly for k -NN 6%, 12% and 1% for three datasets arranged sequentially in **Table 4**.

Table 5: Accuracy obtained for regression problem

Datasets Experimented	Accuracy Measure			
	RF	MLPNN	k -NN	Stacking with SVM
Parkinsons Telemonitoring	0.84	0.90	0.81	0.92
Wine Quality	0.88	0.92	0.78	0.95
Energy Efficiency	0.87	0.90	0.81	0.95

Table 6: Improvement of proposed Stacking with SVM with respect to RF, MLPNN and k -NN for regression problem

Datasets Experimented	Difference from RF	Difference from MLPNN	Difference from k -NN
Parkinsons Telemonitoring	0.08	0.02	0.11
Wine Quality	0.07	0.03	0.17
Energy Efficiency	0.08	0.05	0.14

Table 7: Performance recognition rate of classification with respect to Specificity, Sensitivity, and F1-score

Classifiers/ Regressors	Performance Measures	Datasets experimented		
		Chronic Kidney Disease	Diabetic Retinopathy Debrecen	Cardiotocography
RF	Specificity	0.91	0.82	0.84
	Sensitivity	0.91	0.82	0.84
	F1-Score	0.91	0.82	0.84
MLPNN	Specificity	0.94	0.82	0.83
	Sensitivity	0.94	0.82	0.83
	F1-Score	0.94	0.82	0.83
KNN	Specificity	0.96	0.74	0.77
	Sensitivity	0.96	0.74	0.77
	F1-Score	0.96	0.74	0.77
Stacking with SVM	Specificity	0.97	0.91	0.93
	Sensitivity	0.97	0.91	0.93
	F1-Score	0.97	0.91	0.93

Table 8: Performance recognition rate of regression with respect to Specificity, Sensitivity, and F1-score

Classifiers/ Regressors	Performance Measures	Datasets experimented		
		Parkinson’s Telemonitoring	Wine Quality	Energy Efficiency
RF	Specificity	0.86	0.84	0.85
	Sensitivity	0.86	0.84	0.85
	F1-Score	0.86	0.84	0.85
MLPNN	Specificity	0.92	0.93	0.95
	Sensitivity	0.92	0.93	0.95
	F1-Score	0.92	0.93	0.95
KNN	Specificity	0.79	0.75	0.86
	Sensitivity	0.79	0.75	0.86
	F1-Score	0.79	0.75	0.86
Stacking with SVM	Specificity	0.94	0.97	0.96
	Sensitivity	0.94	0.97	0.96
	F1-Score	0.94	0.97	0.96

Similarly, for regression, the accuracies observed from **Table 5** are 92%, 95% and 95% for Parkinsons Telemonitoring, Wine Quality and Energy Efficiency datasets respectively. The improvement of proposed estimator for regression observed are, 8%, 7% and 8% with respect to RF, 2%, 3% and 5% with respect to MLPNN and 11%, 17% and 14% with respect to *k*-NN for all three datasets arranged sequentially in the **Table 6**. For both types of problems, the proposed staking based SVM estimator is giving superior result with respect to the laze leaner *k*-NN with greater improvement of RF and MLPNN.

For more validation and better observation of proposed weighted staking based estimator, the various

other performance measures such as; specificity, sensitivity and F1-score are being computed for both classification as well as regeression problems and are given in **Table 7** and **Table 8** as well as the values are shown in histograms in **Figure 3** and **Figure 4** for both classification and regeression problems with respect to two different sets of datasets as discussed earlier. For classification problem type, it can be better visualized that, proposed estimator is approaching towards 100% more accurate with 97%, 91% and 93% for Chronic Kidney Disease, Diabetic Retinopathy Debrecen and Cardiotocography datasets respectively. Similarly, for regression, it can be seen that, proposed estimator, giving 94%, 97% and 96% for Parkinsons Telemonitoring, Wine Quality and Energy Efficiency datasets respectively.

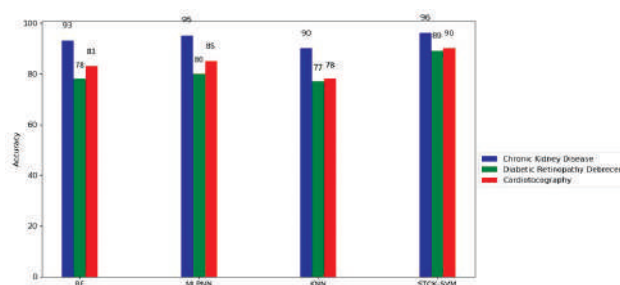


Figure 3: Histogram for performance recognition rate observed for classification problem for Chronic Kidney Disease, Diabetic Retinopathy Debrecen and Cardiocography datasets

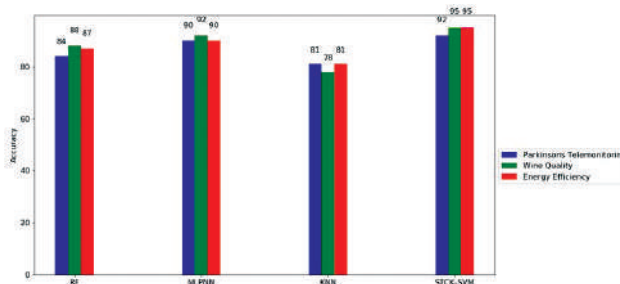


Figure 4: Histogram for performance recognition rate observed for regression problem for Parkinsons Telemonitoring, Wine Quality and Energy Efficiency datasets

Statistical analysis using paired T-test: Finally, to evaluate the significance of stacked ensemble method, paired T-test was carried out. The results obtained by best individual method (MLPNN) and stacked ensemble were compared pair wise for five independent runs. The null hypothesis was the case, whereby no differences between the results of the two methods consisting of non-regularized and regularized of same category were observed. The results are tabulated in **Table 9** and **Table 10** for classification and regression problems respectively. It can be observed from tables that, the null hypothesis is rejected as the p-values are closer to zero, which strengthens the argument that, proposed regularized Gradient Boosting approach achieved improved performance than the non-regularized methods.

Table 9: Paired T-test of classification problem (all three datasets)

Runs	Chronic Kidney Disease		Diabetic Retinopathy Debrecen		Cardiocography	
	Hypothesis Test	p-Value	Hypothesis Test	p-Value	Hypothesis Test	p-Value
1	1	0.004474351	1	0.001745848	1	0.00772727
2	1	0.004376581	1	0.001763544	1	0.00723645
3	1	0.004432856	1	0.001658974	1	0.00745726
4	1	0.004743567	1	0.001738465	1	0.00765187
5	1	0.004267655	1	0.001748983	1	0.00735478

Table 10: Paired T-test of regression problem (all three datasets)

Runs	Parkinsons Telemonitoring		Wine Quality		Energy Efficiency	
	Hypothesis Test	p-Value	Hypothesis Test	p-Value	Hypothesis Test	p-Value
1	1	0.02316396	1	0.042158879	1	0.035061108
2	1	0.02426353	1	0.042165374	1	0.035182873
3	1	0.02326354	1	0.042263667	1	0.034762783
4	1	0.02387623	1	0.041773664	1	0.035002388
5	1	0.02316538	1	0.042377488	1	0.035288384

DISCUSSION ON OBSERVATIONS

In summary, the main contributions of this work are:

- (a) The predictions for both classification and regression problems are being addressed with experimentation and validation for the proposed weighted stacking based estimator is showing above 90% accurate results.
- (b) The proposed estimator beats the most state-of-the-art academic benchmark datasets with respect to standard base learners for both classification and regression.
- (c) The ensemble based estimator, provides an insight about the data and learning strategies with respect to standard base or weak learners and are being compared with proposed ensemble learning with overall decrease in complexity and increase in accuracies as well as validity.
- (d) To establish the robustness of the model, various other performance measures such as; specificity, sensitivity and F1-score are being computed and the results obtained are very promising for the classification and regression problems.
- (e) From the statistical test, it can be observed that, the null hypothesis is rejected as the p-values are closer to zero, which strengthens the argument that, proposed regularized Gradient Boosting approach achieved improved performance than the non-regularized methods.

CONCLUSION AND FUTURE SCOPE

In this paper, a novel weighted stacking based estimator for both classification and regression problem has been addressed which works in two levels of experimentation and the accuracies are observed and validated through specificity, sensitivity and F1score as well as statistical significance T-test as been conducted to validate the model. Two of datasets with three datasets for each problem type has been collected from academic benchmark site for experimentation. The three different types of learners such as RF, MLPNN and k-NN are being individually used for classification and regression and also the predicted outputs of those individual learners are being used for second level of experimentation with weighted staking and SVM as learning strategy for both classification and regression. The accuracies observed

are very promising and also the improvements of staking based SVM for problem types is out performing with respect to three base or weak learners used in this study for experimentation. This work can be extended with respect to other heterogeneous learners and also various other ensemble strategies can be used to experiment with different datasets.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not Required

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Regulatory Effects of Gami-Shinkiwihan on Osteoporosis Induction

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ABSTRACT

Background/Objectives: In recent times, the number of men with osteoporosis has increased, and interest on this topic has also increased. This research was conducted to look into the regulatory effects of Gami-Shinkiwihan on osteoporosis induction.

Method/Statistical analysis: The experimental subjects were split into three groups: a control group consisting of 8-week-old male ICR mice that had undergone no treatment, an osteoporosis-elicited group (OPE group) consisting of 24-month-old ICR male mice that had undergone no treatment, and a Gami-Shinkiwihan treatment group (GS group) consisting of 24-month-old ICR male mice that had undergone Gami-Shinkiwihan (0.56 g/kg/day) treatment for 10 weeks. After the experiment, the mice from all the experimental groups were dissected, and they were analyzed through histochemical and immunohistochemical methods.

Findings: Compared to the OPE group, in the GS group, the osteoporosis-induced area was decreased, the RANKL positivity was decreased, and the osteoprotegerin (OPG) positivity was increased. Compared to the OPE group, in the GS group, the bone matrix distribution was increased and the osteocalcin (OPC) and osteopontin (OPN) positivity was increased.

Improvements/Applications: The outcomes of this research suggest that Gami-Shinkiwihan inhibits osteoclastogenesis, by decreasing RANKL levels and increasing OPG levels, and increases bone matrix distribution and OPC and OPN activities in the osteoblast.

Keywords: Gami-shinkiwihan (GS), Osteoporosis, Osteoprotegerin (OPG), Reaction of activation of nuclear factor kappa B ligand (RANKL), Osteocalcin (OPC), Osteopontin (OPN)

INTRODUCTION

With an extended life expectancy and an increasingly aging population owing to advances in medicine and science, chronic degenerative diseases have become a major cause of death in the modern society. Osteoporosis has become the most important health problem in elderly and middle-aged people, because a reduction in bone

mass in both men and women occurs with increasing age. The incidence of fractures due to osteoporosis, which is caused by the complex action of various factors such as increasing aging population, is increasing. In addition, the resulting increase in medical costs may result in serious socioeconomic losses ^[1].

Osteoporosis is an important metabolic bone disease characterized by a decline in bone formation and an increase in bone resorption, bringing about a reduction in the absolute bone mass per unit mass, a thinning of the bony cortex, a decrease in the quantity and size of bony trabeculae, and a consequent increase in fracture that may be caused by even a small external impact ^[2, 3]. In other words, the early treatment and prevention of osteoporosis is valuable since due to a gradual

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decrease in bone mass, osteoporosis is asymptomatic until fracture occurs, and despite recent development of various treatments, the recovery from osteoporosis is very difficult once it has progressed [4].

The peak bone mass is greater in men than in women, and the bone size is larger in men than in women. Overall bone loss according to age is smaller in men than in women because compensatory action in the exosteam is greater and bone resorption in the endosteum is smaller in men than in women [5,6]. Thus, in the past, osteoporosis was thought to be a disease that is often observed only in women, and most osteoporosis studies and medical care are focused on women. However, as the society is rapidly aging lately, the number of men with osteoporosis has also rise. In addition, Cooper et al. [7] reported that 30% of 1.7 million hip fractures worldwide in 1990 occurred in men, and an epidemiological survey [8] in Canada estimated that the incidence of fracture in men will be similar to that in women by 2025. As such, osteoporosis in men is newly recognized as one of the most important diseases.

In oriental medicine, osteoporosis is considered to occur since the “yin” or “yang” in the kidneys is clinically weak, with focus on the relationship between the kidney and bone. Its treatment is also focused on a prescription to invigorate the energy in the kidney.

There are previous studies on the efficacy of herbal medicines for osteoporosis, including a research by Choi et al. [9] regarding the effects of Kamijoagiem on osteoporosis by noting that the energy in the kidney was so hot that the water in the kidney may become scarce, and the bone space is not filled with bone marrow; a study by Choi et al. [10] regarding the effects of Eucommiae cortex and Herba Cynomorii on osteoporosis; a study by Lim et al. [11] regarding the effects of bakuchiol, the main constituent of *Psoralea corylifolia* L extract, on osteoporosis; and a research by Lee et al. [12] regarding the effects of *Radix Rehmanniae Preparata* on osteoporosis. This indicates that the previous studies have mainly been conducted on osteoporosis due to a lack of kidney-“yin” energy and kidney-“eum” energy with focus on treatments and prescriptions for invigorating the kidney energy.

However, these studies have conducted only on osteoporosis in women, and there are no studies on oriental medicine prescriptions to be used for osteoporosis in men.

Gami-Shinkiwhanis Shinkiwhan^[13], a typical herbal medicine that helps to invigorate insufficient energy in the kidneys to function properly, added with medicinal herbs including *Rubus coreanus*^[14], *Fructus lycii*^[15], *Bombyx batryticatus*^[16], *Fructus amomi Amari* ^[17], *Eucommiae cortex*^[18], and *Acanthopanax cortex* ^[19] that can further strengthen the energy in the kidney. Moreover,

it is an herbal medicine prescription that is intended to strengthen its intrinsic action through the addition of the 6 herbs.

The authors investigated the effects of Gami-Shinkiwhan on the induction of male osteoporosis and its induction mechanism using histochemical and immunohistochemical methods, in this study.

Materials and Methods

Materials

Experimental animals and classification of experimental groups

In our experiment, 8-week-old and 24-month-old ICR mice were used. The mice were confined in the laboratory for 1 week and then experiments were performed on it.

The experimental animals were split into three groups: a control group, an osteoporosis-elicited group (OPE group), and a Gami-Shinkiwhan treatment group (GS group).

The control group is made up of 8-week-old ICR male mice without restriction on diet and drinking water. The OPE group consisted of 24-month-old ICR male mice without restriction on diet and drinking water. The GS group was put Gami-Shinkiwhan at a dose of 0.56g/kg/day into 24-month-old ICR male mice for 10 weeks without diet restriction.

The present study was conducted after obtaining approval (smecae 16-05-05) from the Animal Experiment Ethics Committee at Semyung University, South Korea.

Manufacture of Gami-Shinkiwhan

The Gami-Shinkiwhan used in our experiment is composed of medicinal herbs Sukjihwang, Sansuyu, Sanyak, Omija, Ikjiin, Mogdanpi, Bockboonja, Ogapi, Googija, Baekbokryung, Taeksa, Doochung, Baekgangzam. A total of 2000 ml of distilled water was added to 470g of medicinal herbs and the solvent was boiled for 2 hours at 100° C for extraction. The extracted solution was centrifuged to remove impurities and was concentrated under depressurized on a rotator evaporator (Eyela, Japan), followed by lyophilization to obtain 21.9 g of powder.

Methods

Experimental tissue specimen production

All the mice from the experimental groups that completed the experiment were anesthetized with ether and were dissected. The femurs were separated from the thighs

and were replated for 24 hours in 10% NBF. They were treated with a decalcification solution (BBC, UK) for 12 hours, washed, and embedded in paraffin using conventional methods to make serial sections with a thickness of 5 μ m.

Histochemical methods for osteoporosis observation:

Masson's trichrome staining was accomplished to make an objective observation changes in the femur. First, the femurs were treated with Bouin solution for 1 hour at 50-60°C. Then, picric acid was eliminated using ethanol 70%. They were responded with Weigert's iron hematoxylin for 10 minutes to perform nuclear staining and were treated with phosphomolybdic-phosphotungstic acid, Biebrich scarlet-acid fuchsin for 15 minutes, and aniline blue for 5 minutes for observations using an optical microscope (BX50, Olympus, Japan).

Phloxine-tartrazine staining was carried out watching changes in the dispersion of collagen fibers and bone matrix in the femur narrowly. The femur tissue sections were stained with Mayer's hematoxylin for 5 min and were responded with phloxine solution for 30 min. They were then fractionated in tartrazine solution and then were reversed for observation.

Histochemistry for observation of osteoporosis development:

Immunohistochemical staining was conducted to observe changes in the osteoprotegerin (OPG) and reaction of activation of the nuclear factor kappa B ligand (RANKL) involved in the pathogenesis of osteoporosis. First, bone tissue sections underwent proteolysis for 5 minutes with proteinase K (20 μ g/ml) and were responded, for 2 hours, with 10% normal goat serum, a blocking serum. The bone sections were reacted with mouse anti-RANKL (1:50, Santa Cruz Biotechnology, USA) and mouse anti-OPG (1:50, Abcam, USA), primary antibodies, in a humidified chamber at 4°C for 3 days. Then, they were connected

with biotinylated goat anti-mouse IgG1 (1:100, DAKO, USA), a secondary antibody, at room temperature for 1 days, and then responded with the avidin biotin complex kit (Vector Lab, USA) for 1 hour at 36°C. They were color-developed in 0.05-M tris-HCl buffer solution (pH 7.4) containing 0.01% HCl and 0.05% 3,3'-diaminobenzidine and underwent contrast staining with hematoxylin.

Immunohistochemistry for observation of osteoblasts:

Immunohistochemical staining was carried out using mouse anti-OPC (1:50, Santa Cruz Biotechnology, USA) and mouse anti-OPN (1:50, Santa Cruz Biotechnology, USA) to investigate changes in the distribution of osteocalcin (OPC) and osteopontin (OPN) produced in osteoblasts.

Image analysis: To investigate immunohistochemical results and the distribution of osteoporosis-induced areas, image analysis was accomplished using Image Pro Plus (Media Cybernetics, USA) and the results are shown as means \pm standard deviation. The areas randomly selected from each group were photographed at x40 or x400 magnification to perform image analysis with positive pixels/ 20,000,000 pixels. Statistical analysis was conducted using SPSS software program (SPSS 23, SPSS Inc., USA). One-way ANOVA was used to test significance ($P < 0.05$), and Duncan's multiple range test was used for post-hoc testing.

RESULTS

Regulatory effects of Gami-Shinkiwihan on osteoporosis induction:

Make a comparison between the OPE group and the control group, the proportion of osteoporosis-induced area was rise by 141% in the OPE group, whereas it was decreased by 45% in the GS group, make a comparison between the OPE group and GS group in figure 1.

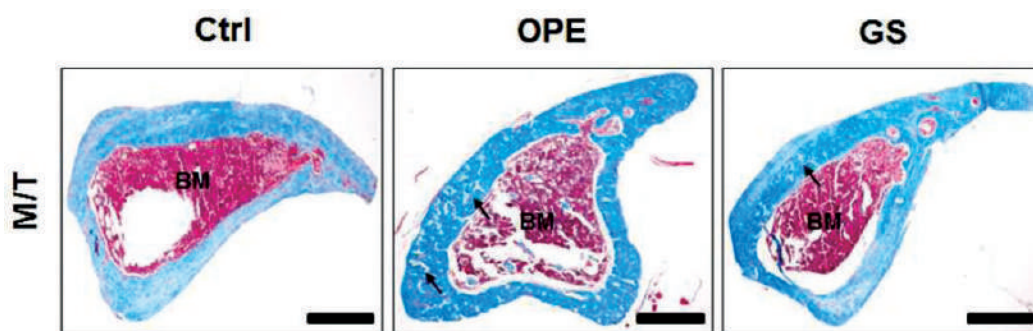


Figure 1: Regulatory effects of Gami-Shinkiwihan on osteoporosis induction. Arrow, osteoporosis area; BM, bone marrow; bar size, 100 μ m; M/T, Masson's trichrome; Ctrl, control; OPE, osteoporosis-elicited group; GST, Gami-Shinkiwihan treatment group.

Regulatory effects of Gami-Shinkiwihan on osteoporosis induction: The results showed that the RANKL positivity was increased by 310% in the OPE group drawn a comparison with the control group, was decreased by 14% in the GS group drawn a comparison with the OPE group, was declined by 75% in the OPE group compared to the control group, and was increased by 180% in the GS group drawn a comparison with the OPE group as shown in figure 2, table 1, and table 2.

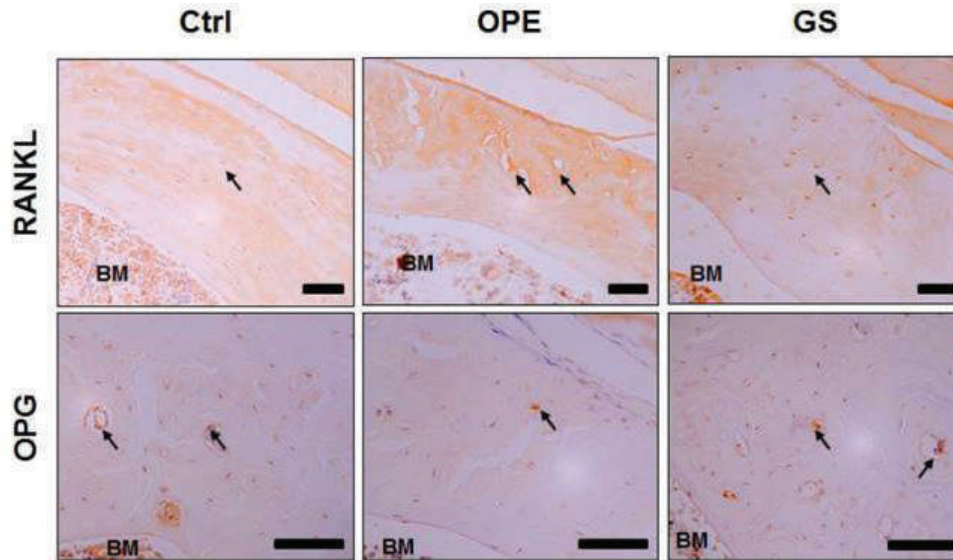


Figure 2: Regulatory effects of Gami-Shinkiwihan on osteoporosis induction. Arrow, positive reaction; BM, bone marrow; bar size, 50 μm; RANKL, the receptor for the activation of the nuclear factor kappa B ligand; OPG, osteoprotegerin; Ctrl, control; OPE, osteoporosis-elicited group; GST, Gami-Shinkiwihan treatment group

Table 1: Analysis of reaction of the activation of the nuclear factor kappa B ligand (RANKL) Distribution

Objective	Group		
	Control	OPE group	GS group
RANKL	47,614±1,474	195,312±4,788	168,320±2,928*

Values are expressed as mean±standard deviation (n = 8). Image analysis for 20,000,000 pixel cells.*p <0.05 compared to the osteoporosis-elicited (OPE) group.

Table 2: Analysis of osteoprotegerin (OPG)distribution

Objective	Group		
	Control	OPE group	GS group
OPG	62,055±1,266	15,610± 697	43,719±1,494*

Values are expressed as mean±standard deviation (n = 8). Image analysis for 20,000,000 pixel cells.*p <0.05 compared to the osteoporosis-elicited(OPE) group.

Regulatory effects of Gami-Shinkiwihan on osteoblast activity: Phloxine-tartrazine staining, which was performed to observe changes in collagen fiber and bone matrix distribution in the femur, revealed that the bone matrix dispersion was higher in the GS group than in the OPE group.

Immunohistochemical staining using mouse anti-OPC and mouse anti-OPN, which was performed to investigate osteocalcin (OPC) and osteopontin (OPN) distribution, revealed that compared to the control group the OPC positivity was decreased by 65% in the OPE group and compared to the OPE group, was increased by 253% in the GS group. In addition, compared to the control group, the OPN positivity was declined by 50% in the OPE group and compared to the OPE group, was increased by 171% in the GS group in figure 3, table 3, and table 4.

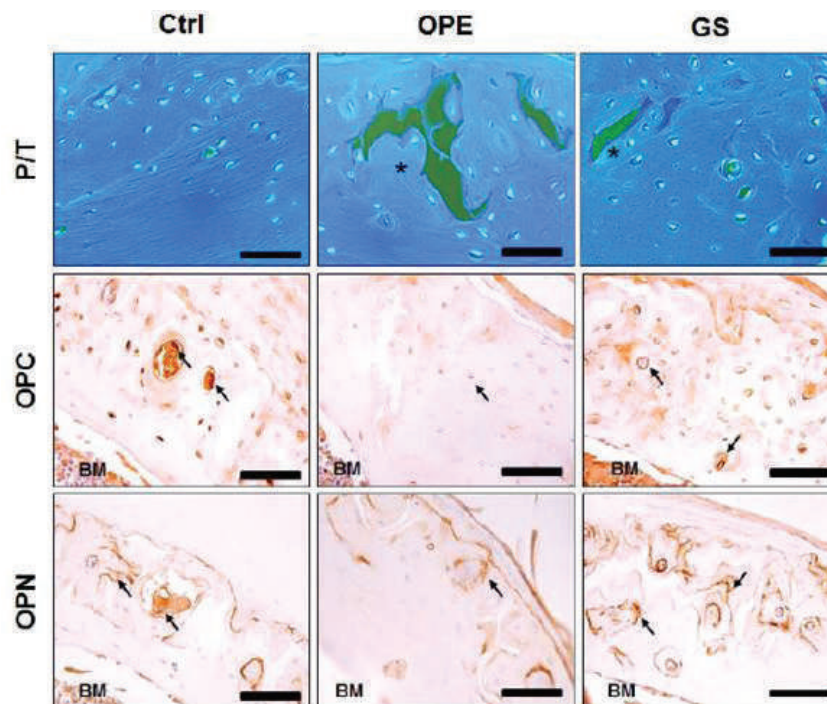


Figure 3: Regulatory effects of Gami-Shinkiwhan on osteoblast activity. Asterisk, bone matrix-vacated region; Arrow, positive reaction; BM, bone marrow; Bar size, 50 μm; P/T, phloxine-tartrazine staining; OPC, osteocalcin; OPN, osteopontin; Ctrl, control; OPE, osteoporosis-elicited group; GST, Gami-Shinkiwhan treatment group.

Table 3: Analysis of osteocalcin (OPC) distribution

Objective	Group		
	Control	OPE group	GS group
OPC	123,537±2,254	43,778±1,489	154,563±2,589*

Values are expressed as mean±standard deviation (n = 8). Image analysis for 20,000,000 pixel cells.*p < 0.05 compared to the osteoporosis-elicited(OPE) group.

Table 4: Analysis of osteopontin (OPN) distribution

Objective	Group		
	Control	OPE group	GS group
OPN	58,296±1,324	29,086±1,023	78,905±1,264*

Values are expressed as mean±standard deviation (n = 8). Image analysis for 20,000,000 pixel cells.*p < 0.05 compared to the osteoporosis-elicited(OPE) group.

DISCUSSION

Bone tissue continues its lifelong changes with bone formation and bone resorption to maintain homeostasis of bone mass and the skeleton, thereby destroying the old bone and creating a new bone. In other words, the bone tissue is continuously remodeled. Osteoclasts and osteoblasts are involved in such bone remodeling. The bone remodeling includes old bone destruction or resorption by osteoclasts differentiated from hematopoietic stem cells, where calcium is released into the bloodstream and is used to maintain body function. whereas, osteoblasts produced from mesenchymal stem cells form a new bone, resulting in bone remodeling. Ultimately, the bone tissue homeostasis is kept through a constant equilibrium between bone forming and bone destruction rates. When the bone destruction rate is accelerated, fractures easily occur due to bone weakening, and osteoporosis is a bone metabolic disease caused by such andisequilibrium between osteoclasts and osteoblasts [20,21].

Osteoporosis is a degenerative disease dominated by an increase in fracture incidence and low bone mass due to an imbalance between osteocytes resulting from metabolic skeletal abnormality due to aging. The World Health Organization (WHO) defines as osteoporosis is a systemic skeletal disease characterized by low bone mass and microstructural deterioration of bone tissue with a consequent increase in bone fragility and susceptibility of fractures [22].

Modern society is now entering an aging society with rapid socioeconomic growth and improved healthcare. As the mortality of male elderly people is gradually lowered owing to increasing interest in health, the number of male elderly people is expected to increase [23]. The prevalence rate of male osteoporosis is also estimated to gradually increase as bone mineral density in men decreases with age as in women [1]. Accordingly, the social and medical interest in osteoporosis, which was thought to be a disease that occurs only in women, is directed to male osteoporosis, and studies regarding the treatment and prevention of osteoporosis in men are actively conducted.

Although there are previous studies on bone mineral density in men, including studies on factors related with bone mineral density in Korean middle-aged men [24], the relationship between bone mineral density and testosterone in middle-aged men [25], and health behavior and biochemical makers related to bone mineral density in adult men [26], there are no study investigating osteoporosis induction and its induction mechanism in men.

In addition, treatment of male osteoporosis is in line with female osteoporosis treatment. Yoon et al. [27] stated that one of the treatment options for osteoporosis is the inhibition of osteoclastic differentiation. Drugs such as estrogen, calcitonin, and bisphosphonates have been widely used as inhibitors of bone resorption through the degradation of osteoclast function [28]. However, these drugs have given a presentation to be related with some adverse effects such as a growth in low bone mineral density, weight gain, gastrointestinal damage, hypokalemia, atrial fibrillation, and osteonecrosis of the jaw [29,30]. Therefore, to minimize such adverse effects, it is necessary to develop substances for the treatment and prevention of osteoporosis, which can minimize bone loss and promote bone formation using natural materials with low toxicity.

In oriental medicine, osteoporosis is thought to occur due to a lack of “yin” and “yang” in the kidney and has thus been treated using herbal medicines that can strengthen the energy of the kidney.

The Gami-Shinkiwahan used in this study is an herbal medicine prescription of Shinkiwahan added with six herbal drugs, namely *Bombyx batryticatus*, *Rubus coreanus*, *Acanthopanax cortex*, *Eucommiae cortex*, *Fructus amomi amari*, and *Fructus lycii*, and is intended to further strengthen the action of Shinkiwahan that can boost the energy of the kidney.

There are previous studies on Gami-Shinkiwahan including a study reporting that Gami-Shinkiwahan increased the level of serotonin in the hippocampal tissue, reduced the actions of caspase-3 and HDAC3 associated with apoptosis, and was involved in an increase in SHH associated with hippocampal tissue proliferation, thereby improving depression due to aging [31]; a study reporting that Gami-Shinkiwahan inhibited the apoptosis of Sertoli cells and seminiferous cells in the seminiferous tubules and increased the production of Sertoli cells, sperm, and testosterone, thereby improving male reproductive

dysfunction due to aging [32]; and a study suggesting that Gami-Shinkiwah increased the production of NO, inhibited PDE5 activity through the activation of eNOS in the corpus cavernosum tissue, and blocked the extracellular calcium influx through the activation of cGMP, thereby relaxing penile cavernosal smooth muscle [33]. In addition, a study reported that Gami-Shinkiwah made the spongy matter in the femur dense to suppress the development of osteoporosis due to aging and reduced fat deposits in the quadriceps femoris to suppress muscle atrophy due to aging, thus indicating that Gami-Shinkiwah may be effective for musculoskeletal diseases due to aging [34]. However, there is no report on the effects of Gami-Shinkiwah on the induction of osteoporosis and its induction mechanism.

In this regard, the authors of this study examined the regulatory effects of Gami-Shinkiwah, which works to invigorate the kidney, on the induction of male osteoporosis due to aging and its induction mechanism using histochemical and immunohistochemical methods.

By observing these changes in the femur, in the GS group, the proportion of osteoporosis-induced area was declined compared to the OPE groups significantly. This means that osteoporosis induction was suppressed by the administration of Gami-Shinkiwah, indicating that Gami-Shinkiwah is effective in suppressing osteoporosis induction.

In addition, the results of the experiment on the pathogenic mechanism of osteoporosis showed that in the GS group, the RANKL positivity was decreased compared to the OPE groups significantly, whereas compared to the OPE group, the OPG positivity was increased in the GS group significantly.

Meanwhile, RANKL and OPG are released from osteoblasts and are involved in osteoclastic differentiation.

The activated immune cells binds to receptor (RANK) or RANKL produced by osteoblasts located in osteoclasts and precursor cells to promote osteoclast formation and activity, and activated osteoclasts form an actin ring composed of a fibrous actin sequence between the cell membrane and bone matrix to secrete proteases and proton, thereby absorbing bone matrix and then reducing bone mineral density. On the other hand, OPG acts mainly to inhibit binding of RANKL to RANK, thereby reducing bone resorption and inhibiting RANKL-induced osteoclastic differentiation [35,36].

In other words, the results of this research showed that when Gami-Shinkiwah was administered, the RANKL positivity was decreased, whereas the OPG positivity was increased, indicating that Gami-Shinkiwah influenced RANKL and OPG activity, thereby inhibiting osteoclast formation and activity.

Compared to the OPE group, the bone matrix distribution of collagen fibers in the femur was observed more in the GS group, indicating that Gami-Shinkiwah brought about an increase in bone matrix, thereby inhibiting the induction of osteoporosis.

OPN is a non-collagenous bone protein produced by osteoblasts and is known to promote the adhesion and migration of bone cells involved in bone metabolism to bone tissue and to increase bone mineralization. Therefore, OPN is mainly used as an early biomarker of bone formation [37]. OPC is synthesized by osteoblasts at the time of bone remodeling and is a specific biochemical marker of bone turnover. Approximately 30% of newly synthesized OPC is secreted into the blood. Therefore, measuring its blood concentration can detect the activity of osteoblasts, which reflects the degree of bone regeneration [38].

The results of our experiment showed that compared to the OPE group, the OPC positivity and OPN positivity were rise in the GS group. This indicates that Gami-Shinkiwah increases bone formation and thus has an effect of suppressing the induction of osteoporosis.

Taken together, it is thought that Gami-Shinkiwah inhibits the induction of osteoporosis by inhibiting osteoclast formation and activity, increasing bone matrix by decreasing RANKL and increasing OPG, and increasing bone formation by increasing OPC and OPN.

CONCLUSION

We conducted our experiment to investigate the regulatory effects of Gami-Shinkiwah, an herbal medicine which works to invigorate kidney energy, on osteoporosis induction and its mechanism in the aged male mice receiving Gami-Shinkiwah by using histochemical and immunohistochemical methods in the present study. The results are as follows:

1. Gami-Shinkiwah significantly decreased the increased osteoporosis-induced area in the OPE group.

2. Gami-Shinkiwihan significantly decreased the increased RANKL positivity in the OPE group.
3. Gami-Shinkiwihan significantly increased the decreased OPGpositivity in the OPE group.
4. Gami-Shinkiwihan increased the decreased bone matrix distribution due to aging.
5. Gami-Shinkiwihan significantly increased the decreased OPC positivityin the OPEgroup.
6. Gami-Shinkiwihan significantly increased the decreased OPN positivity in the OPE group.

From the aforementioned results, it is thought that Gami-Shinkiwihan inhibits the induction of osteoporosis by decreasing RANKL activity, increasing OPG activity, increasing decreased bone matrix distribution due to aging, and increasing the activities of OPC and OPN, which are produced in osteoblasts.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Antibacterial and Antioxidant Activity of *Pleurotus eryngii* Extracts

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ABSTRACT

Background/Objectives: To evaluate antibacterial and antioxidant activities using *Pleurotus eryngii* extracts.

Method/Statistical analysis: TPC, TFC, DPPH, and ABTS activities were examined for antioxidant effects. In order to determine the antimicrobial activity, we also studied these extracts using six multi-resistant bacteria through paper disc diffusion.

Findings: The content of total polyphenols ranged from 1.67 mg GAE/g extract in acetone extract to 1.31 mg GAE/g extract in EtOH extract. The content of total flavonoid varied from 7.77 mg CE/g extract in EtAC extract to 0.61 mg CE/g extract in EtOH extract. At the result of DPPH activities of all extracts were higher than the ascorbic acid solution. DPPH activity of EtAC extract was the highest value at 81.0%. In addition, the highest ABTS activity was observed in EtOH extract at 88.4%. DPPH activity showed a stronger correlation with TPC and TFC. EtOH extract and acetone extract showed antimicrobial activity against six microorganisms. The EtOH extracts were the most effective against *Enterobacter cloacae*, and the most significant acetone extracts were the most effective for *Escherichia coli*.

Improvements/Applications: Based on this study, *Pleurotus eryngii* can be a good candidate for natural antioxidants and antimicrobials.

Keywords: antimicrobial, antioxidant, flavonoid, *Pleurotus eryngii*, polyphenol

INTRODUCTION

Various diseases such as brain diseases, heart diseases, atherosclerosis and autoimmune diseases are increasing in humans of the modern society due to changes in diet as well as excessive stress. Additionally, the incidence rate of various cancers is increasing due to incremented use of environmental

chemicals. Because there are many natural plants with intrinsic biological activities that may prevent various oxidation reactions, studies are continuously conducted to discover natural products with antioxidant effects that maintain health and delay aging, as well as natural products with antineoplastic effects that prevent cancer; most importantly however, studies are more actively developed to especially discover biologically active substances derived from natural products^[1,2].

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Plants have various antimicrobial substances including secondary metabolites or their derivatives such as alkaloids, terpenoids, quinolones, flavonoids, phenolic compounds and volatile oil^[3]. Mushrooms are generally recognized to be effective in Chinese medicine and traditional medicine, and are known to be effective in the treatment of chronic diseases by

increasing the defensive system of the human body through diseases such as phagocytosis^[4]. Among the various natural products, mushrooms especially have their characteristic scent and taste, and are recognized as a low-calorie food with abundant nutrients. Additionally, mushrooms contain β -glucan and are reported for their effects of preventing various diseases through their anti-neoplastic and immunostimulatory actions as well as effects of lowering cholesterol; for this reason, they are used as ingredients in functional health foods as well as in medical products, thereby increasing the annual mushroom production rate by 3~4%^[1,2,5].

The scientific name of Saesongi mushroom is *Pleurotus eryngii*. Its general name and the name of species is registered as King Oyster Mushroom, while its product name is registered as Saesongi mushroom^[5]. Dried *P. eryngii* not only offer approximately 37.7% of protein content with abundant amino acids, but also contain β -glucan, polysaccharopeptides and polysaccharides such as polysaccharide-protein conjugates, Vitamin C, minerals and Vitamin B12 (treatment factor to pernicious anemia), substance not commonly seen in other mushrooms^[5,6]. *P. eryngii* have solid and excellent flesh due to the compact plectenchyma in their fruiting body and have less water content than other mushrooms, offering their value as a functional edible mushroom^[5,7]. *Pleurotus ostreatus*, which belongs to the same *Pleurotus* family as *P. eryngii*, contains lovastatin and therefore lowers cholesterol, and is additionally reported to be effective in breast cancer as well as in colon cancer^[8].

This study was compared and analyze the antioxidant as well as the antimicrobial activity of *P. eryngii*, a mushroom with characteristics of a functional food product, extracted to solvents such as acetone, ethanol (EtOH) and ethyl acetate (EtAC); this was achieved by measuring not only the antioxidant activity such as the antioxidant (DPPH, 1,1-diphenyl-2-picrylhydrazyl; and ABTS, 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) radical scavenging activity, total polyphenol contents (TPC), and total flavonoid contents (TFC) but also the antimicrobial activity against 6 multi-drug resistant bacteria.

MATERIAL AND METHOD

Materials: *P. eryngii* used in this study were purchased in a sliced form from Duriban farm (Gwangju, Korea), and were used in a powdered form after natural air drying. Aluminium(III) chloride hexahydrate, ascorbic acid,

catechin, 2,2-diphenyl-1-picrylhydrazyl, 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) diammonium salt, Folin-Ciocalteu reagent, and gallic acid used in the antioxidant activity test were purchased from Sigma-Aldrich Co. (St. Louis, MO, USA), and extra pure reagents were used for acetone, EtOH, and EtAC. The 6 species of bacteria used for the antimicrobial assay using *P. eryngii* extracts were 3 species of Gram-positive bacteria containing *Micrococcus luteus* (KCTC1915), *Staphylococcus aureus* (KCTC1928), and *Bacillus subtilis* (KCTC1918) and 3 kinds of Gram-negative bacteria including *Pseudomonas aeruginosa* (KCTC1637), *Enterobacter cloacae* (KCTC1685), and *Escherichia coli* (KCTC2441). All bacteria were harvested from Korean Collection for Type Cultures (KCTC, Daejeon, Korea), and activated from subculture in according to each of their culture conditions.

Preparation of *P. eryngii* extracts: 400 mL of solvent were added to 50 g of powdered *P. eryngii*, which was then extracted and filtered (Advantec MFS, Tokyo, Japan) for 48 hr in room temperature. Rotary evaporator (EYELA A-1000S, Tokyo, Japan) was used to remove the solvents of the filtrate, and the concentration was set to 50 mg/mL by diluting in dimethyl sulfoxide (DMSO, Sigma-Aldrich Co., St. Louis, MO, USA). After such process, the extracts were used in the test with storage at -20°C. Solvents used for *P. eryngii* were EtAC, acetone and EtOH, which each have different polarities but allow easy removal.

TPC of *P. eryngii* extracts: The TPC was measured via chromogenic assay revealing blue color obtained from reaction between Folin-Ciocalteu reagent and phenolic compounds contained in the *P. eryngii* extracts^[9]. 45 μ L of 1 N Folin-Ciocalteu reagent (Sigma-Aldrich Co., MO, USA) were mixed to 45 μ L of *P. eryngii* extracts, and the mixture reacted at normal room temperature for 3 minutes to promote the reaction. After mixing 910 μ L of 2% Na₂CO₃, the mixture was fixed for 30 min. And then the absorbance was measured at 760 nm using a spectrophotometer (MECASYS, Daejeon, Korea). At the TPC results were presented as mg gallic acid equivalent (GAE)/g extract by drawing a calibration curve with concentration of 100.0, 50.0, 25.0, 12.5, 6.25 and 3.125 μ g/mL, using gallic acid as the standard. All results are presented as average values calculated from three series of tests.

TFC of *P. eryngii* extracts: The TFC was measured using Han's method^[10]. 1L of distilled water were added to 250 μ L of *P. eryngii* extracts, to which 75 μ L

of 5% NaNO₂ was added; the mixture was then fixed for 5 min for reaction. 150 µL of 10% AlCl₃ was added, the mixture was then fixed for additional 6 min. 500 µL of 1.0 M NaOH were added, the remaining volume was filled with distilled water to establish a total volume of 2 mL. The mixture was fixed for 15 mins and then measured for its absorbance at 510 nm. At the TFC results were presented as mg catechin equivalent (CE)/g extract by drawing a calibration curve with concentration of 100.0, 50.0, 25.0, 12.5, 6.25 and 3.125 µg/mL, using catechin as the standard. The results are presented as average values calculated from three series of tests.

Measurement of DPPH: The Blois method was used to measure the DPPH activity as the evaluation of antioxidant activity of *P. eryngii* extracts^[11]. 970 µL of 0.1 mM DPPH solution were added to 30 µL of the extracts. The mixture was fixed for 30 min in the darkroom and then measured for its absorbance at 517 nm. The results were presented as the mean value calculated from 3 independent experiments tests. 1 mM ascorbic acid was used as the positive control. The DPPH activity was calculated as follows:

$$\text{DPPH (\%)} = \left(1 - \frac{\text{Absorbance of solution added with reagent}}{\text{Absorbance of solution without reagent}} \right) \dots(1)$$

Measurement of ABTS: This method of Re et al. was used after partial revision to measure the ABTS activity after partial modification^[12]. After mixing 7.4 mM ABTS diammonium salt with 2.6 mM potassium persulfate in a 1:1 ratio, the mixture was fixed for 24 hr in the darkroom to prepare the ABTS cation solution. The absorbance was then adjusted to 0.7 at 734 nm using a spectrophotometer. 30 µL of *P. eryngii* extracts was mixed with 970 µL of ABTS solution. The mixture was fixed for 30 min in the darkroom to facilitate their reaction, and its absorbance was measured at 734 nm. The results were presented as the mean value calculated from 3 independent experiments. 1 mM ascorbic acid was used as the positive control. The ABTS activity was calculated as follows:

$$\text{ABTS (\%)} = \left(1 - \frac{\text{Absorbance of solution added with reagent}}{\text{Absorbance of solution without reagent}} \right) \times 100 \dots(2)$$

Measurement of antibacterial activity: The antimicrobial activity of *P. eryngii* extracts was measured using disc diffusion method^[13]. Lysogeny Broth (LB) culture liquid medium was used for the 6 species of bacteria to be used in the study, in which the bacteria were aerobically cultured for 24 hr at 37°C. Its absorbance was diluted to 0.1 at 600 nm and then the bacteria were smeared to the petri dish. 30 µL (1.5 mg/disc) of *P. eryngii* extracts were sprayed to the paper disc (6 mm diameter, Whatman International, MO, USA) and then the disc was cultured aerobically for 12 hr in a 37°C incubator. The diameter of the clear zone was measured using Vernier caliper (0~150 mm, color world, China), which was used to compare their antimicrobial activities. The results are presented as average values calculated from 3 independent experiments.

STATISTICAL ANALYSIS

All the results were presented as mean ± standard deviation. SPSS 24.0 (SPSS 24.0, IL, USA) was used for statistical analysis. And Duncan's test was used for ANOVA (p <0.05). Pearson's correlation analysis was conducted to analyze the correlation among the DPPH/ABTS activity, TPC, and TFC.

RESULTS AND DISCUSSION

Extraction yield, TPC, and TFC: The extraction efficiency is affected by the chemical qualities of the biologically active substance, method of extraction, temperature, time of extraction and size of reagent molecules, as well as the solvent used for the extraction, resulting in different yield of extraction. In this study, solvents including acetone, EtOH, and EtAC were used to select efficient solvents for extraction of biologically active substances from *P. eryngii*. The yield of extracts obtained from extraction of powdered form of naturally dried *P. eryngii* using acetone, EtOH and EtAC are presented in **Table 1**. *P. eryngii* extracted using EtOH resulted in an extraction yield of 3 times and greater than that of other solvents. As it is reported that the yield of extraction generally increases in a polar solvent^[14]. It was also clear that the extracts in this study increase as the solvent polarity used for extraction increases. Similar to the study of Lin et al. that reported the yield of extraction of *P. eryngii* using EtOH^[15], this study also demonstrated a yield of 3.04 ~ 3.16%.

Table 1: Yield (%) of different solvent extracts from *P. eryngii*

	Solvent for Extraction		
	Acetone	EtOH	EtAC
Yield (%)	0.98	3.14	0.60

Polyphenol is a representative component of food-derived functional substance and is an aromatic compound with more than 2 phenolic hydroxyl, easily dissolved in water or alcohol. It is not only recognized for its antioxidant activity, but also for its anti-inflammatory, anti-thrombotic and anti-neoplastic effect^[16, 17]. Here, gallic acid was used as the standard to obtain the TPC of each *P. eryngii* extract, and its results are presented in **Table 2**. Acetone, EtAC and EtOH were used to measure the TPC of *P. eryngii* extract according to each solvent. The TPC of *P. eryngii* extracts, in the order of greatest to least, were as follows: extracts using acetone ≈EtAC>EtOH, demonstrating 1.31 ~ 1.67 mg GAE/g extract. This revealed a significant difference between acetone, EtAC extract and EtOH extract. Such results were similar to the TPC of *Lentinus edodes* reported by Han et al.^[1, 2], while the contents were less than that of *Auricularia auricula-judae* reported by Yu et al^[18]. It has been reported by Oh et al.^[16] that the order of polyphenol contents extracted from *P. eryngii* according to each solvent was in the order of water > 50% EtOH> 99% EtOH, and that the amount of polyphenol, an antioxidant substance, differs depending on the polarity of the solvent. However, in contrast to such results, this study has revealed the lowest amount of polyphenol in EtOH extract and has demonstrated that acetone and EtAC are the most appropriate solvents for polyphenol extraction. The amount of polyphenol in *L. edodes* from the order of greatest to the least has been reported as acetone extract >EtOH extract >EtAC extract by Yu et al.^[18], while the amount in *A. auricula-judae* has been reported as EtOH extract > acetone extract >EtAC extract by Han et al^[1, 2]. The solubility of polyphenol differs according to the location of hydroxyl group, the size of the molecule and the length of the hydrocarbon chain, and is also greatly affected by the type of solvent used in the extraction, the time of extraction and temperature; it is generally known that polyphenol is well dissolved in diverse solvents such as acetone, EtAC, EtOH, and methanol^[19]. The components of phenolic compounds contained in *P. eryngii* are reported to be phenolic acids such as p-hydroxybenzoic acid, procatechuic acid, vanillic

acid, syringic acid, cinnamic acid and caffeic acid, and flavonoids such as catechin, rutin, and naringin^[20, 21]. Therefore, as demonstrated in the results of this study, the reason that the amount of polyphenol was greater in acetone and EtAC solvents than in EtOH is that the amount of polyphenol does not increase with increasing polarity of the solvent, and that the phenolic compounds of *P. eryngii* differ in the type of compound, the degree and the quality of dissolution according to the type of extraction solvent.

Table 2: TPC&TFC of *P.eryngii* extracts

Solvent	TPC (mg GAE/g extract) ¹⁾	TFC (mg CE/g extract) ²⁾
Acetone	1.67 ± 0.05 ^{a3)}	5.34 ± 0.12 ^b
EtAC	1.63 ± 0.03 ^a	7.77 ± 0.18 ^a
EtOH	1.31 ± 0.02 ^b	0.61 ± 0.02 ^c

Results present the mean and ± SD of values obtained from 3 independent experiments.

¹⁾The value is indicated in mg of gallic acid equivalent per gram of extract

²⁾The value is indicated as catechin equivalent per gram of extract.

^{3)a,b,c}Means with different letters within a column are significantly different at $p < 0.05$ using Duncan's test.

Flavonoid, which belongs to yellow polyphenol that have C6-C3-C6 as its backbone, is abundantly found in all parts of plants as well as in grains and fruits^[22]. Additionally, it is a representative food-derived functional substance with antioxidant activity as found in procyanidin and tannin^[17]. The TFC was 7.77 ± 0.18 mg CE/g extract in EtAC extract, demonstrating a significant difference with that of acetone extract and EtOH extract; similar to the TPC, the amount was the lowest in the EtOH extract. The TPC and TFC were also the highest in EtAC extract than in acetone and EtOH extract in *L. edodes* as reported by Lee et al^[23] Flavonoids can generally be classified according to their chemical structure into phenolic acids that have benzoic acid and cinnamic acid as its basic structure and into C6-C3-C6 structure with 2 phenyl rings. Examples of flavonoids include flavones, flavanones, flavonols, isoflavones, anthocyanins, and flavan-3-ols. Flavonoids of low polarity such as isoflavones, flavanones, and flavonols

are generally well dissolved in solvents of low polarity such as chloroform, EtAc, dichloromethane, and diethyl ether, while flavonoids of high polarity such as flavonoid glycoside and aglycon are extracted to alcohol or alcohol-water mixtures. Consequently, the reason that the TFC of *P. eryngii* were highest in EtAc extract is considered to be that the amount of flavonoids of low polarity such as isoflavones, flavanones, and flavonols was greater than other flavonoids.

DPPH radical scavenging activity: DPPH activity is generally used to measure the antioxidant activity in the food and plants. Such method uses the mechanism in which DPPH, a violet soluble substance with stabilized free radical, reacts with the electron or hydrogen of the antioxidant and is reduced, resulting in a change from the violet color to a vague yellow color, as well as a decrease in the maximum absorbance at 515 ~ 520 nm^[11]. The results of measurement of DPPH activity in *P. eryngii* extracts are presented in **Figure 1**. The activity was the highest in EtAc extract as of $81.0 \pm 0.95\%$, and the activity of acetone extract and EtOH extract was each found to be $79.1 \pm 0.56\%$ and $77.4 \pm 0.33\%$, respectively. Such results demonstrated a significantly increased radical scavenging activity in comparison to the activity of $76.8 \pm 1.33\%$ in ascorbic acid used as the positive control ($p < 0.05$). Yoon et al.^[24] has reported a DPPH radical scavenging activity of 37.9% in *P. eryngii* used as the positive control in 80% EtOH extract of *P. eryngii* cultured in culture medium with sodium glutamate; in comparison with such results, the radical scavenging activity was found to be greater than 2 times in this study. Cho et al.^[25] has reported that the radical scavenging activity increases with increasing concentration in methanol and water extract, and that the DPPH activity increases in methanol, which has lower polarity than that of water. Han has reported that in the case of *Ramaria botrytis*, the DPPH activity was in the order of methanol > EtOH > acetone > EtAc, and in the case of *L. edodes*, the order was EtAc > acetone > EtOH^[10, 2]. Additionally, Han et al. has reported that the EtOH extract demonstrated a relatively highest radical scavenging activity in *A. auricula-judae*^[18]. Therefore, the order of solvents appropriate for measurement of DPPH activity of *P. eryngii* was identical to that of *L. edodes*, and the radical scavenging activity was the highest in EtAc in comparison to that of other solvents, suggesting that biologically active substances with low polarity commonly affect the antioxidant activity.

Generally, phenolic compounds greatly affect the antioxidant activity; however, the TPC or the TFC do not show a direct correlation with antioxidant activity. This may be because each phenolic compound has different antioxidant activity, and because the phenolic compound itself may have low antioxidant activity despite having the highest amount of polyphenol or flavonoids. Nevertheless, a positive correlation was found between the TPC and the DPPH activity in this study.

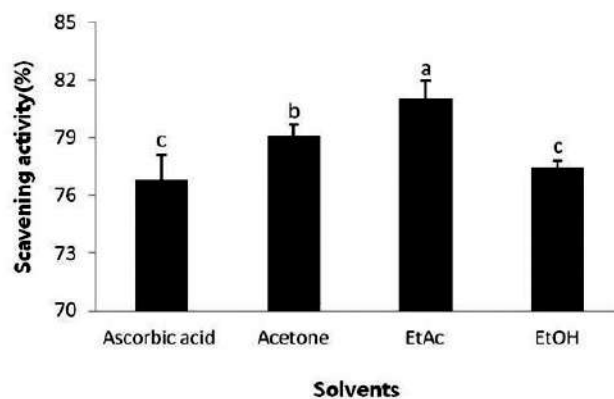


Figure 1: DPPH activity using extracts from *P. eryngii*

1 mM ascorbic acid was used as a positive control.^{a,b,c} Means with different letters are significantly different at $p < 0.05$ using Duncan's test.

ABTS radical scavenging activity: ABTS activity, which enables rapid confirmation of antioxidant substance from natural product, can be measured by observing the change in color from turquoise to colorless appearance as the ABTS free radical formed by reaction with potassium persulfate is removed by the antioxidant contained in the extract^[26, 27]. The results of measurement of ABTS activity in *P. eryngii* extracts are presented in **Figure 2**. The activity was the highest in EtOH extract as of $88.4 \pm 0.22\%$, demonstrating a significantly increased radical scavenging activity in comparison to the activity of $62.3 \pm 0.46\%$ in ascorbic acid used as the positive control ($p < 0.05$). The activity of acetone and EtAc extract was each found to be $57.5 \pm 3.24\%$ and $23.7 \pm 2.41\%$, respectively. Consequently, the ABTS radical scavenging activity in EtOH extract was approximately greater than 3 times than that of EtAc extract. Similar to the scavenging activity of $79.4 \pm 0.5\%$ in 80% methanol extract of *P. eryngii* reported by Hong et al.^[28], it was evident in this study that the radical scavenging activity was higher in EtOH extract of high polarity. Additionally, similar to the reports that DPPH, a stabilized free

radical, generally measures the antioxidant activity of hydrophobic substance, and ABTS, a cation radical, measures the antioxidant activity of both hydrophilic and hydrophobic substance^[29,30], this study demonstrated a higher DPPH activity in EtAc extracts of low polarity, and a higher ABTS activity in EtOH extracts of rather high polarity. Furthermore, the reason that the ABTS was overall higher than DPPH in EtOH extract of *P. eryngii* is considered to be that *P. eryngii* contains more hydrophilic antioxidant substances.

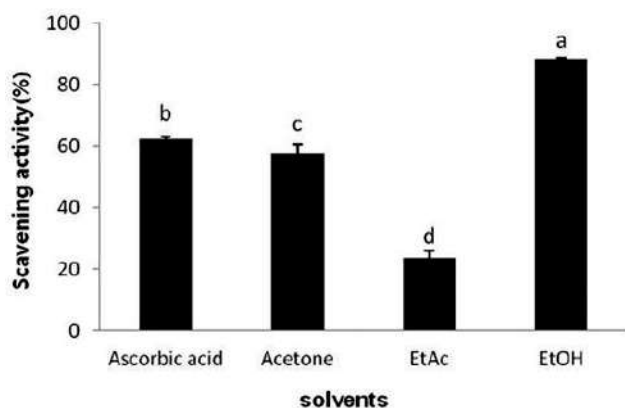


Figure 2: ABTS activity using extracts from *P. eryngii*

1 mM ascorbic acid was used as a positive control.^{a,b,c,d} Means with different letters are significantly different at $p < 0.05$ using Duncan’s test.

Correlation between the TPC/TFC and antioxidant activity: Pearson correlation analysis was conducted to investigate a relationship among antioxidant activity (DPPH and ABTS), TFC, and TPC. And its results are presented in **Table 3**. The correlation coefficient between TPC and TFC was found to be 0.869, demonstrating a strong positive correlation ($p < 0.01$). Although there was a positive correlation between TPC and DPPH as well as between TFC and DPPH (0.694 and 0.905, respectively), there was a negative correlation with ABTS (-0.748 and -0.975, respectively) ($p < 0.05$). It is generally thought that the TPC or the TFC would directly affect the antioxidant activity; however, it appears that the radical scavenging activity may be rather different according to the structural interaction among compounds, for the degree of antioxidant activity may be different in each phenolic compound, and the antioxidant activity may be affected by various biologically active substances other than phenolic compounds, such as organic acid and peptides.

Table 3: Correlation coefficient for TPC, TFC, and antioxidant activity (ABTS and DPPH) of *P. eryngii* extracts

	TPC	TFC	DPPH	ABTS
TPC	1.000	-	-	-
TFC	0.869**	1.000	-	-
DPPH	0.694*	0.905**	1.000	-
ABTS	-0.748*	-0.975**	-0.932**	1.000

* $p < 0.05$, ** $p < 0.01$.

Antibacterial activity of *P. eryngii* extracts: Paper disc diffusion, a method generally used for the measurement of antibacterial activity of plants, was used to search out the antibacterial activity of *P. eryngii* extracts against multi-drug resistant bacteria. The measurement of growth inhibition activity of *P. eryngii* extract against 6 bacteria are presented in **Table 4**. The antimicrobial activity of EtOH extract was found to be in the order of *E. cloacae* > *M. luteus* > *S. aureus* > *B. subtilis* > *P. aeruginosa*. EtAc extract did not demonstrate antimicrobial activity against *E. coli*, but demonstrated a similar antimicrobial activity against other species. On the other hand, acetone extract demonstrated the highest antibacterial activity against *E. coli*. Acetone, EtOH, and EtAc extract all showed a similar growth inhibition activity against *P. aeruginosa*. The extract showed a rather higher antimicrobial activity against *M. luteus* than in *P. aeruginosa*, among which 8.09 mm of clear zone was formed in EtOH extract. EtOH extract also demonstrated the highest antibacterial activity against *E. cloacae*. While EtOH extract and EtAc extract demonstrated no or rather weak antibacterial activity against *E. coli*, acetone extract demonstrated a high activity of 9.72 mm. The antibacterial activity against *B. subtilis* and *S. aureus* was rather high in EtOH extract than in other extracts. Consequently, excluding the fact that acetone extract was the highest in antimicrobial activity against *E. coli*, EtOH extract demonstrated the highest antibacterial activity against the remaining 5 bacteria. Although Kalyoncu et al.^[31] have reported that EtOH extract of *P. eryngii* shows antibacterial activity against *E. coli* and *S. aureus*, and none against *B. subtilis* and *E. cloacae*, this study has demonstrated antibacterial activity of EtOH extract against all 6 oral bacteria species.

Table 4: Antibacterial activities of several solvent extracts in *P. eryngii*

	Acetone	EtOH	EtAC
<i>M. luteus</i>	+	++	+
<i>S. aureus</i>	+	+	+
<i>B. subtilis</i>	+	+	+
<i>P. aeruginosa</i>	+	+	+
<i>E. cloacae</i>	+	++	+
<i>E. coli</i>	++	+	-

-, no inhibition (≤ 6 mm); +, slight inhibition ($- 8$ mm); ++, moderate inhibition ($- 10$ mm).

CONCLUSIONS

After natural air drying and powder preparation of *P. eryngii*, its extraction using solvents including acetone, EtOH and EtAC were measured for its antioxidant and antimicrobial activity. TPC, TFC, and DPPH/ABTS activities were examined for antioxidant activity, and paper disc method was used to observe growth inhibition for antimicrobial activity. The TPC of *P. eryngii* was significantly higher in acetone and in EtAC than in EtOH. The TFC was the highest in EtAc, followed by acetone and EtOH. The DPPH and ABTS activity was each found to be 81.0 ~ 77.4%, 88.4 ~ 23.7%, respectively. In the case of DPPH activity, all 3 extracts demonstrated a higher radical scavenging activity than in ascorbic acid, while in the case of ABTS activity, EtOH extract demonstrated a higher activity than in ascorbic acid. There was a positive correlation between the TPC and the TFC; although both contents showed a positive correlation with DPPH, the contents showed a negative correlation with ABTS. Upon measurement of antibacterial activity of *P. eryngii*, acetone extract and EtOH extract demonstrated antibacterial activity against all 6 bacteria, including *B. subtilis*, *P. aeruginosa*, *S. aureus*, *E. coli*, *M. luteus*, and *E. cloacae*, and EtAC extract demonstrated antibacterial activity against the remaining 5 bacteria excluding *E. coli*. Based on such results demonstrating antibacterial and antioxidant activity of *P. eryngii*, it is expected that *P. eryngii* may be used as ingredients in various natural antioxidants, antimicrobials and health functional foods in the future.

Ethical Clearance: Not required

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Conflict of Interest: Antibacterial and Antioxidant Activity

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Work Commitment and Servant Leadership among Teacher Education faculty of State Colleges and Universities (SUCs) in Region III

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ABSTRACT

Educators, especially teachers, have crucial commitment and leadership roles in the classroom to achieve success in developing empowered and productive students. These two attributes contribute to authentic and altruistic teaching necessary in bringing about transformation of students' lives. This study was conducted in order to determine and analyze the work commitment and servant leadership levels of 160 teachers, chairpersons and deans of TEIs in SUCs of Region III using a descriptive -correlational study design. The educational attainment of the teachers was obtained and related to the work commitment and servant leadership of the respondents. Likewise, the work commitment level was related to the respondents' servant leadership level. Mean and Pearson r were used to facilitate the analysis and interpretation of data. Findings revealed that 24% of the respondents possess doctorate degrees, 44% are master's degree holders, and 32% are still working towards the completion of their master's degree. On the level of work commitment, teachers generally displayed high level of commitment to towards their students (3.76); towards the community (3.71); and towards their profession (4.08). As to their level of servant leadership, findings show positive outcomes for observing ethics (4.58), conceptual skill (4.29), helping subordinates grow and succeed (4.18), empowering (4.15), emotional healing (4.12) and putting subordinates first (4.01). However, teachers need to improve more on creating value for community (3.49). Further findings show that educational attainment of the respondents was positively related to their commitment to students (.686), community (0.765) but not related to their commitment to their profession (0.451). Likewise, educational attainment was positively related to their servant leadership skills on conceptual skills (0.767), creating value for the community (0.776), emotional healing (0.687), helping subordinates grow (0.721), putting subordinates first (0.721) but not positively related to ethics (0.379). Moreover, the work commitment level and the servant leadership of the respondents are positively related (0.822). A model for work commitment and servant leadership for teachers is proposed in this study.

Keywords: *Work commitment, servant leadership, authentic teacher, altruistic teacher*

INTRODUCTION

Educators are leaders. They lead students towards successful acquisition of knowledge, skills and attitude necessary to become productive members of the community. Educators are crucial in honing students' potentials, which are their tools in adapting to the changing society world and cope with its complexities. Likewise, they have a vital role in ushering students to contribute to global peace, harmony and development^{1,2,3}.

What does it take to be a leader in school? Experts in education offer variety of factors that make school leaders effective. According to Morrison⁴, effective

school leaders have high expectations and are very ambitious for the success of their students; demonstrate that distractions or disadvantages are not barriers to success; focus relentlessly on improving the quality of teaching through continuous professional development; expert in assessing and monitoring students' academic progress; develop students individually through internal and external exposures; have high regard for student progress and personal development; they relate well with school stakeholders; and possess rigor for evaluation of student learning with clear strategies.

In addition, effective school leaders according to Sutcliffe⁵ are visionaries; courageous and willing to take

risks; passionate and committed; emotionally intelligent; possess great judgment, make the right calls and wise; optimistic and resilient; persuasive; and curious. Successful school leaders are excellent networkers and make the most out of every opportunity that comes along.

Moreover, Crippen⁶ asserted that effective school leadership entails service and commitment. Teacher-leaders must reflect on authentic attitude in the classroom. The school administrators must display genuine leadership through example and dedication towards work. School leadership is “doing and becoming” together with their circle of influences. It is less of telling people what and how to do things but in accomplishing things as a team.

Aside from commitment, teachers as educators must be a servant leader. They play special role of being servant leaders in the classroom, with the stakeholders, such as the parents and the community. According to Heather Keleghan⁷, to be servant leaders, teachers strive to dedicate and devote themselves to the well-being of whom they serve-teachers, parents and other stakeholders, not seeking for their own personal gains but in looking after the gains of others that come under their tutelage. This is an altruistic and authentic approach in teaching. Weimer⁸ stated that authentic teachers act in the interest of their students, being sincere and candid and concerned about the development of their students.

To be servant leaders, Keleghan believes that teachers have to be humble to the point of putting others’ concern over their ego and pride. Servant leaders need to nurture and heal. They develop students to create their best future. Make students realize the importance of building relationship with people. Servant leaders empower their students and dream great things for them. This means that servant leaders are visionaries. They direct students towards the attainment of their dreams.

This paper then focused on ascertaining the servant leadership and commitment of faculty in Teacher Education Institutions (TEIs) of SUCs in Region III and relating both variables. Model of work commitment and servant leadership for teachers was developed based on the findings of the study.

LITERATURE REVIEW

To achieve success in teaching, teachers need to possess key characteristics that will bring about

substantial transformation of students under their care. Ideally, to become a model teacher entails all the positive adjectives one can mention such as to be loving, caring, understanding, kind, warm, enthusiastic, approachable, just, open-minded, empathic and others. However, above these desirable characteristics, teachers must be authentic and altruistic to impact on the lives of their students^{9, 10, 11}

Commitment and servant leadership are two authentic and altruistic attributes of a teacher. Teachers must stay committed to their special role in the classroom, regardless of their circumstances. They have to be servant leaders-seeking not of their own but putting the needs of those they serve above theirs. To possess these attributes, seem insurmountable in an extremely complex society but are essential in bringing about change and impact to the students.

According to Cox¹², committed teachers are put their students first in the teaching profession, devoted to their school, lifelong learners, contributors to their profession, and 21st Century learners. Committed teachers seek to address students’ needs and wants by providing a wide-variety of teaching strategies and approaches that will respond and appeal to the students. They are devoted to the school activities by their involvement in school organizations and volunteer their time outside class hours to train and involve in student activities. They do not stop learning. They attend to trainings and seminars that will further enhance their teaching competence. Committed teachers are involved in finding ways of improving their school. They are also dedicated towards adapting to change in the 21st Century. They strive to become technological and innovative to stay relevant in today’s fast changing world.

In the study of Hussen, W/Tgegn and Teshome¹³, work commitment of teachers was categorized into three. These are commitment towards students, community and profession. Commitment towards students include interaction with students, using active learning techniques, engaging students in learning, using continuous assessment of instruction, demonstrating flexibility and responsiveness, demonstrating knowledge of students, creating an environment of respect and managing student behavior. On commitment to community, these are establishing a culture of learning, creating a symbolic relationship between the school and community, orienting the community

towards the importance of education as a lifelong process, commitment to basic values and preserving and transferring cultural heritage. On the other hand, commitment to profession includes reflection of teaching, maintaining accurate records, communicating with families, participating in a professional community, growing and developing with the professionally, showing professionalism, demonstrating knowledge of content and pedagogy, setting instructional outcomes and managing classroom procedures.

Moreover, experts believe that teachers must be servant leaders. According to Vanderbilt¹⁴, servant leadership starts when teachers recognize student needs and prioritize addressing these needs first before attending to their personal concerns. She said that servant leaders value people; develop people; build community; display authenticity; provide leadership and share leadership. Spears¹⁵ also underscored ten characteristics of servant leaders which are the ability to listen to intently to the voice of others, not just his own in planning and decision-making; empathy, which means the ability to understand the feeling of others; healing- the gift of reconciliation rather than spreading hate and instigating breaking up relationships; awareness- seeking to know and be updated; persuasion and influence; conceptualization and foresight; stewardship; commitment to the growth of people; and contributes to community building.

In the study of Noland and Richards¹⁶, servant leaders have the ability for emotional healing- which means the sensitivity of teachers towards student problems, mending or patching broken relationships; creating value for community-involvement in community development and in finding ways on how they can actively engage in community activities; conceptual skills- teachers are competent; empowering; helping subordinates grow and succeed; putting subordinates first; and having ethics.

Work commitment and servant leadership are important attributes that need to work together towards attainment of success in developing the students. The study of Muthia and Krishnan¹⁷ found a link between commitment and servant leadership. Servant leadership enhances work commitment, especially when transformational leadership is low. Moreover, Gedifew and Bitew¹⁸ examined the relationship of servant leadership to student learning engagement and academic achievement in the Ethiopian Higher Educational System. The authors found that teachers'

servant leadership positively impacted on students' learning engagement and academic achievement. The researchers recommended that activities to enhance teachers' servant leadership must be implemented. The findings of Gedifew and Bitew¹⁸ was confirmed in the study of Crabtree¹⁹ which yielded a significant positive relationship between the characteristics of servant leadership and the students in their reading achievement scores in South Virginia Schools.

More importantly, work commitment and servant leadership enable teachers to be authentic and altruistic. According to Fernandez²⁰, authentic and altruistic teachers make a long-lasting impact on the lives of the students. Authentic teachers are more passionate, approachable, attentive, capable and knowledgeable.

This study then was conducted in order to assess the work commitment and servant leadership of the TEI faculty of SUCs in Region III. The goal is to develop a model of work commitment and servant leadership for teachers towards a more authentic and altruistic teaching.

RESEARCH PROBLEMS

1. What are the respondents' highest educational attainment?
2. What is the work commitment level of the respondents towards their:
 - 2.1 students,
 - 2.2 community and
 - 2.3 profession?
3. What is the servant leadership of the respondents along:
 - 3.1 emotional healing,
 - 3.2 creating value for community,
 - 3.3 conceptual skills,
 - 3.4 empowering,
 - 3.5 helping subordinates grow and succeed,
 - 3.6 putting subordinates first, and
 - 3.7 ethics?
4. Are the work commitment and servant leadership of the respondents significantly related to their educational attainment?
5. Is the work commitment of the respondents related to their servant leadership?

6. What model of leadership and work commitment could be proposed to attain authentic and altruistic leadership of among teachers in TEIs based on the findings of the study?

HYPOTHESES

1. There is no significant relationship between the educational attainment of the respondents and their work commitment and servant leadership.
2. There is no significant relationship between the work commitment of the respondents and their servant leadership.

METHOD

Research Design: The descriptive-correlational design was employed in the research execution, analyzing and interpreting data on the commitment and servant leadership of faculty in TEIs of SUCs in Region III. The work commitment level and the servant leadership of the respondents were correlated. Likewise, the educational attainment of the respondents was related to their work commitment and servant leadership.

Research Respondents: The respondents of the study were 150 teachers selected randomly 10 deans from the 10 TEIs of Region III SUCs, a total of 160. The sample size for the teachers was set at 50% of the total 300 teacher population of the 10 SUCs in Region III. For the deans, the sample size was based on complete enumeration technique.

Research Instruments: The questionnaire to determine the commitment of the respondents was adopted from the study of Hussen, W/Tgegn and Teshome¹³. On the other hand, the servant leadership questionnaire was adopted from the study of Noland and Richards¹⁶.

Ethical Considerations: To ensure the rights of the respondents, their identity was kept confidential throughout the paper. Data gathered from them were reported in summary. Informed consents were executed by the respondents to signify their voluntary participation in the study.

Statistical Treatment: Frequency, percentage and mean were used as descriptive statistical treatments. Pearson r was used for the correlation.

RESULTS AND DISCUSSIONS

Highest Educational Attainment of the Respondents:

The respondents' highest educational attainment and their type of work were determined and the data are shown in Table 1.

Table 1: Highest Educational Attainment of the Respondents

Educational Attainment	f	%
Doctorate Degree	38	24
Master's Degree	71	44
Bachelor's Degree	51	32
Total	160	100

Table 1 shows the highest educational attainment of the respondents comprising the deans and faculty members. As reflected, the respondents were dominated by those with master's degree (44%) followed by faculty with BS Degree (32%) and doctorate degree (24%). Most of the faculty members with BS degree are currently enrolled in the graduate program and hope to finish in the soonest possible time. To be qualified for a permanent status, teachers are required to possess at least the necessary master's degree to teach in the College of Education. Respondents with doctorate degrees majored in educational management and mostly comprised the deans and chairpersons. Respondents with master's degree majored in their specialization, except for some who majored in educational management. Under the current vertical articulation policy, it is recommended that teachers must align their graduate degree to their field of specialization as provided in Memorandum Circular ²¹.

Based on the findings, some teachers in TEIs in SUCs of Region III still need to complete their master's degree and pursue doctorate degree since studies showed that teachers who possess graduate degrees are more likely to have good decisions and avoid risky behaviors. They become valuable members of the educational institutions and contribute to student high achievement ^{22, 23, 24, 25}.

Level of Work Commitment of the Respondents: To determine the work commitment of the respondents, they were given commitment survey questionnaires based from the study of Hussen, W/Tgegn and Teshome¹³. Table 2 shows the data.

Table 2: Work Commitment of the respondents towards their students

Indicators	Mean	Verbal Description	Level of Commitment
Teachers create a relaxed and supportive environment where the students trust their teachers to help them to be successful.	4.10	Often	High
Teachers encourage students to formulate and work for high individual goals in the development of physical, intellectual and creative aspects.	4.09	Often	High
Teachers respect students and their rights showing a sympathetic and positive attitude towards them.	4.07	Often	High
Teachers recognize individual differences among students and seek to meet their individual needs.	3.58	Often	High
Teachers refrain from commenting unprofessionally about their students.	3.54	Often	High
Teachers inform appropriate individuals and agencies about the students' educational needs.	3.49	Sometimes	Medium
Teachers never punish or blame a student if the student did not understand the teacher in the class.	3.48	Sometimes	Medium
Overall Mean Score	3.76	Often	High

Table 2 reflects the work commitment of the teachers towards their students. As seen, the highest level of commitment displayed by the teachers was on creating a relaxed and supportive environment where the students trust their teachers to be successful (4.10). Teachers tell them to aim high and reach the pinnacle of success. Teachers claimed that they are able to communicate to students about the importance of setting goals and having the passion to achieve them (4.09). Teachers encourage students to work diligently and responsibly in class in order to reach their goals. Teachers open the communication with students and make themselves available for any academic or personal concern. Teachers try to be optimistic in class, modeling sympathy and interest to students' cares and activities (4.07). Teachers impress upon the students the power of positivity and taking deterrents and obstacles as challenges to achieve and become somebody in the future.

Moreover, teachers are able to recognize individual differences in class (3.58). They knew that each student is unique and have their own intelligences and learning styles. Teachers try hard to meet students' unique learning needs through setting schedules for academic consultations and talking privately to students needing special academic guidance. In the process, teachers try to be professional at all times and avoid remarks that tarnish students' respect and trust (3.54). Teachers are aware of their professional ethics and are mindful of

the need to maintain desirable and stress-free learning environment.

However, teachers need to work more on their relationship with stakeholders who must take interest on the academic progress of their students like the parents and guidance office staff. Data obtained showed mean of 3.49, equivalent to *sometimes*, on the teachers' efforts to inform agencies and institutions on the learning needs of the students. Likewise, teachers need to improve how they handle students' low performance in class as the mean generated for the response was 3.47, having a verbal description of *sometimes*. Sometimes teachers tend to lose control over their emotions when students repeatedly fail to cope with lessons especially for students who were always late or absent in class.

Over-all, teachers' work commitment towards students are high as attested by a grand mean of 3.76, with a verbal description of *often*. However, there are areas that teachers need to improve which is seeking support from interested parties regarding student academic progress and on modifying approach in communicating more hard work for students who consistently fail to cope with class. According to Mahuro, Hungi and Lamb²⁶, teachers must work hand-in-hand with parents or guardians for the development of the students. In addition, teachers must focus on looking for ways to engage students in class rather than putting much effort on fixing unproductive behavior²⁷.

Table 3: Work Commitment of the respondents towards the community

Indicators	Mean	Verbal Description	Interpretation
Teachers respect the community and to be loyal to the school system and the community.	4.08	Often	High
Teachers work to improve the quality of education in the community and to strengthen the community’s moral, spiritual and intellectual life.	4.04	Often	High
Teachers are actively involved in community development efforts.	3.49	Sometimes	Medium
Teachers keep parents informed about the progress of their children.	3.48	Sometimes	Medium
Teachers seek to establish friendly and cooperative relationship with parents.	3.47	Sometimes	Medium
Overall Mean Score	3.71	Often	High

On the commitment of the respondents towards community, their respect and loyalty gained the highest mean at 4.08, with a verbal description of *often*, interpreted as *high*. Teachers claimed that they high respect and regard of the community since they are aware that the community looks up to the vital role of education in attaining development. Likewise, teachers claimed they often work to improve the quality of education they provide to the students and the community as a whole (4.04). They expressed their concern over the intellectual and spiritual transformation of the students in order to attain community transformation. It is saying that what the community becomes, depends on what the individual’s quality of life is.

However, teachers’ beliefs must translate to concrete efforts. Results of computation of teachers’ response on active community involvement was only 3.49, *sometimes* and level of commitment is *medium* and relationship to parents was also *sometimes* (3.47), including informing parents about the academic progress of their children (3.48). Consistent to the data in Table 2, teachers must improve on strengthening parent/community- teacher/school relationship.

Over-all, the grand mean generated was 3.71, indicating high commitment of teachers to community. However, teachers must make extra effort in active engagement with parents and community. As Abraham and Ememe²⁸ put it, effective school-community relation is a key performance indicator for the administrators.

Table 4: Work Commitment of the respondents towards their profession

Indicators	Mean	Verbal Interpretation	Interpretation
Teachers regard the profession as a life career and consider membership in the profession as permanent.	4.58	Always	Very High
Teachers adhere to a code of ethics regarding membership, conduct and practice.	4.56	Always	Very High
Teachers refrain from assigning professional duties to non-professional personnel when such assignment is not in the best interests of the students.	4.53	Always	Very High
Teachers commit to the ideal of service to humankind rather than to personal gain.	4.08	Often	High
Teachers exert every effort to raise the educational standard and to improve one’s services to promote a climate in which the exercise of professional judgment is encouraged.	4.07	Often	High
Teachers demand a high order of intellectual skills.	4.01	Often	High
Teachers appropriately use of time granted for professional purposes.	3.45	Sometimes	Medium
Teachers use the writing or research findings of others with intellectual honesty for their professional development.	3.41	Sometimes	Medium
Overall Mean Score	4.08	Often	High

On the respondents' commitment towards their profession, teachers claimed they always regarded their profession as lifetime career and they are permanent members of their professional organization (4.58) and they have very high adherence to the code of ethics (4.56). Teachers are very much aware of the ethics they have to maintain and try hard not to dishonor their organization. They know the standard personal and professional attributes of ideal teachers and are determined to live up to the community expectations.

Likewise, teachers do not delegate professional work to non-professional ones no matter how busy they are (4.53). They know what work to assign to non-teachers in order to lighten up their complex job responsibilities. For instance, assessment and evaluating academic progress of students are theirs while maintaining classroom cleanliness can be delegated to parents, students or housekeeping staff. Attending trainings and seminars are their personal commitment while registration work in seminars can be done by clerks.

Moreover, teachers commit to discharge their jobs, putting students interests on top of their personal gains (4.08). Teachers show this commitment when they have to postpone or skip family gatherings because they have to escort students in a competition or to any school activity; when they have to report to school on non-school days for special gatherings, such as trainings or when they have to undertake remedial classes for slow performers.

Teachers make an effort to improve their competence, decisiveness and make wise choices (4.07). They realize that they need to reflect on daily classroom activities and use their reflections to improve student learning. They need to continue learning to be relevant and effective, considering

how technology is fastly changing educational landscape. They continue to strive for higher quality of teaching and understanding (4.01) and attain high standard of thinking and knowing. They are aware that they have to cope with explosion of information brought about by the internet. They need to prepare to face students who are empowered with knowledge and skills outside the classroom, while dealing with the changing attitude of students because of the influence of technology.

However, teachers need to manage their time wisely, giving a room for continuous education despite the gargantuan job responsibilities they have to face every day. Results of the mean of response on appropriate use of time for professional development were low at 3.45, *sometimes*. This means that teachers need to develop work schedule which will allow them to attend professional development activities. Similarly, teachers also need to improve on how they regard research findings and integrate these in their lessons. The mean rating was 3.41, which means teachers' use of research in their class is not consistent.

Over-all, teachers' level of commitment towards their profession was generally high as attested by a grand mean of 4.08, except for the two variables on time for professional development and in integrating research findings in the teaching-learning process. According to Dynarksy²⁹, teachers must understand the value of research in teaching. According to him, often times, teachers do not see the importance of using research findings. If only teachers open their perspectives, research results help teachers on what does not work in the teaching-learning process. Evidence teaching provides interventions to support student, teacher and school improvement.

Table 5: Summary of Work Commitment of the respondents

Work Aspect	Mean	Verbal Interpretation	Interpretation
Commitment towards Students	3.76	Often	High
Commitment towards community	3.71	Often	High
Commitment towards Profession	4.08	Often	High
Grand Mean	3.85	Often	High

Table 5 shows the summary of the level of work commitment of teachers towards their students (3.76), community (3.71) and profession (4.08). The results appear to be good, however, they have to improve on enhancing their commitment to the community.

According to Grover³⁰ community is important stakeholders in the teaching-learning process. They can provide resources; participate in school affairs; and provide security for the teachers and school.

Servant Leadership of the Respondents: The servant leadership ability of the respondents was determined using an adopted questionnaire from Noland and Richards¹⁶. Data are shown in Tables 6.

Table 6: Servant Leadership of the respondents on based on Emotional Healing

Indicators	Mean	Verbal Interpretation
Emotional Healing		
Teacher helps students when they have personal problems.	4.23	Often
Teacher cares about student’s personal well-being.	4.09	Often
Teacher takes time to talk to a student on a personal level.	4.08	Often
Teacher can recognize if a student is feeling down.	4.06	Often
Grand Mean	4.12	often
Creating Value for Community		
Teacher encourages students to get involved in community activities.	3.56	Often
Teacher is always interested in helping the community.	3.49	Occasionally
Teacher emphasize giving back to the community to the students.	3.48	Occasionally
Teacher is involved with community activities.	3.44	Occasionally
Grand Mean	3.49	Occasionally
Conceptual Skills		
Teacher can tell if there is something wrong going on in class.	4.56	Very Often
Teacher is able to think through complex problems.	4.37	Often
Teacher can solved academic problems in new and creative ways.	4.12	Often
Teacher has a thorough understanding of the class and its goals.	4.09	Often
Grand Mean	4.29	Often
Empowering		
Teacher gives students the freedom to handle difficult situations in the way they feel is best.	4.23	Often
Teacher encourages students to handle important academic decisions on their own.	4.16	Often
Teacher trained students to make decisions.	4.12	Often
Teacher gives students the responsibility to make important decisions about their own academic work.	4.08	Often
Grand Mean	4.15	Often
Helping students grow and succeed		
Teacher is interested in making sure students reach their academicgoals.	4.23	Often
Teacher provides students with academic experiences that enable them to develop new skills	4.21	Often
Teacher makes student development a priority.	4.17	Often
Teacher is interested to know students’ academic goals.	4.12	Often
Grand Mean	4.18	Often
Putting subordinates First		
Teacher cares more about students’ success than his or her own.	4.12	Often
Teachers puts students’ interest above his or her own.	4.01	Often
Teacher sacrifices his or her own interests to meet students’ needs.	4.00	Often
Teacher does what he or she can to make students’ jobs easier.	3.89	Often
Grand Mean	4.01	Often

Conted...

Ethics		
Teacher maintains healthy relations with his or her colleagues.	4.67	Very Often
Teacher would not sacrifice ethical principles in order to meet success.	4.58	Very Often
Teacher has high ethical standards.	4.56	Very Often
Teacher is always honest.	4.52	Very Often
Grand Mean	4.58	Very Often
Overall Mean Score	4.12	Often

Generally, teachers have manifested positive servant leadership in all aspects except for creating value for community. This is indicated by a low mean score generated, which is 3.49. This is equivalent to a verbal description of *occasionally*. According to Peterson³¹, servant leaders are civic-minded; empower others to serve for a cause; and believe that when they serve collectively, the impact is significant.

Table 7: Summary of the Servant Leadership of the Respondents

Indicators	Grand Mean	Verbal Interpretation	Rank
Ethics	4.58	Very Often	1
Conceptual Skills	4.29	Often	2
Helping Subordinates grow and succeed	4.18	Often	3
Empowering	4.15	often	4
Emotional Healing	4.12	Often	5
Putting Subordinates first	4.01	Often	6
Creating Value for the Community	3.49	Occasionally	7
Over-all Mean	4.12	Often	

It can be gleaned in Table 7 that teachers' ethics got the highest mean of 4.58 while creating value for community got the lowest mean of 3.49. Findings indicate that teachers need to improve their community involvement in order to enhance their servant leadership skills. According to Wilson³², servant leaders foster a sense of community support and outreach. They feel the urge to help people surrounding them grow and actively participate in events that will build the community.

Relationship of Educational Attainment and Work Commitment and Servant Leadership

The educational attainment of the respondents was related to their work commitment and servant leadership. Data are shown in Table 8 and 9.

Table 8: Relationship of Educational Attainment and Work Commitment

Work Commitment Aspect	R Value	Decision	Interpretation
Commitment towards Students	0.686	Reject Ho	Significant
Commitment towards community	0.765	Reject Ho	Significant
Commitment towards profession	0.451	Accept Ho	Not Significant

*level of significance=0.05

Table 8 shows that the educational attainment of the respondents is positively related to their commitment to students (0.686) and community (0.765) but not

with commitment towards profession (.451). Values indicate that as the educational attainment advances, the level of commitment also increases toward students

and the community but not towards profession. The researchers attribute this to the fact that when teachers pass their licensure examination, they already feel a part of the teacher force with a responsibility of educating individuals to reach their goals.

The findings on the positive relationship of educational attainment to the commitment of the respondents towards their students and community is consistent to the result of the study conducted by

Bakan, Ersahan and Buykbese³³ that the organizational commitment of teachers in Turkey was positively related to their educational attainment.

Relationship of Educational Attainment and Servant Leadership of the Respondents

Educational attainment of the respondents was likewise related to their servant leadership. Data are reflected in Table 9.

Table 9: Relationship of Educational Attainment and Servant Leadership

Servant Leadership Aspect	R Value	Decision	Interpretation
Conceptual Skills	0.767	Reject Ho	Significant
Creating Value for the Community	0.776	Reject Ho	Significant
Emotional Healing	0.685	Reject Ho	Significant
Empowering	0.687	Reject Ho	Significant
Ethics	0.379	Accept Ho	Not Significant
Helping Subordinates grow and succeed	0.721	Reject Ho	Significant
Putting Subordinates first	0.746	Reject Ho	Significant

*level of significance=0.05

Table 9 shows the relationship between the educational attainment of the respondents and their and servant leadership skills. As shown, educational attainment shows positive relationship with conceptual skills (0.767), creating value for the community (0.776), emotional healing (0.685), empowering (0.687), helping subordinates grow (.0721) and putting subordinates first (0.746). Findings indicate that the higher the educational attainment, the better is the respondents' servant leadership skills. The findings are consistent with the conclusion of Fischer and De Jong³⁴ that servant leadership perception of respondents was positively related to educational attainment and school achievement.

However, educational attainment is not positively related to ethics (0.379) of the respondents. This indicates that the educational attainment of the respondents is not positively related to their ethics skills. The researcher

attributes this to the fact that all respondents, regardless of their educational attainment are very much aware of the code of ethics of their teaching profession and are also oriented on the need to respect school stakeholders, which includes students and parents, not only their superiors and colleagues. Findings that educational attainment is not related to servant leadership skills is consistent with the results of the study conducted by Salame³⁵ in Jordan and Cunningham³⁶ in Michigan, that teachers' educational attainment is not related to the servant leadership of the teachers.

Relationship of Work Commitment and Servant Leadership of the Respondents

The work commitment and the servant leadership were related using the Pearson r. Data are shown in Table 10.

Table 10: Relationship of Work Commitment and Servant Leadership

Area	Mean	Pearson r Value	Decision	Interpretation
Work Commitment Level	4.01	0.822	Reject Ho	Significant
Servant Leadership	4.11			

*level of significance=0.05

Table 10 shows the relationship between the work commitment and servant leadership of the respondents. As reflected in Table 10, the Pearson r value computed is 0.822, which indicates the rejection of the null hypothesis. It means that the work commitment of the respondents is positively correlated to their servant leadership skills. Findings are consistent with the conclusions of Setyaningrum³⁷, Krog&Govender³⁸ and Sokoll (2014) that servant leadership is significantly

related to the commitment of the respondents in various organizations.

Proposed Model of Work Commitment and Servant Leadership for Teachers

Based on the findings of the study, the researchers developed a model of work commitment and servant leadership for teachers. The researchers call this the San Andres and Lagasca Model of Work Commitment and Servant Leadership for teachers (SL Model).

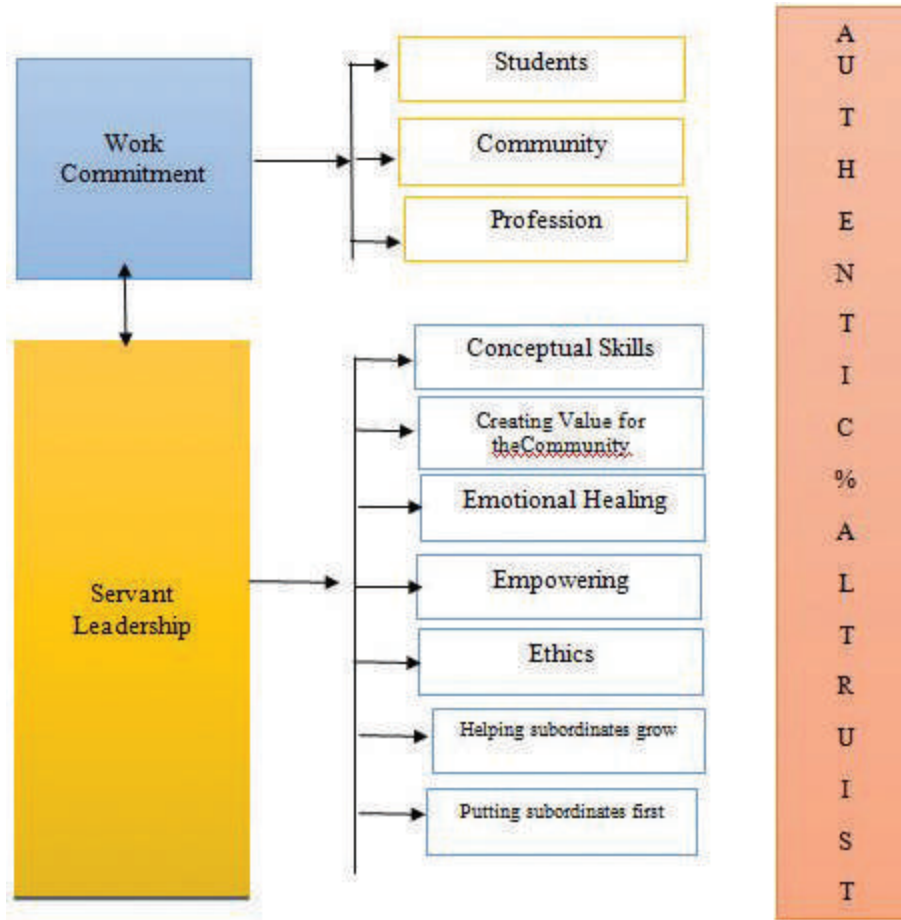


Figure 1: San Andres and Lagasca (SL) Model of Work Commitment and Servant Leadership for Teachers

Figure 1 shows a model of work commitment and servant leadership for teachers. The authors call this the San Andres and Lagasca (SL) model of work commitment and servant leadership for teachers. For the work commitment, teachers must be committed to their students. Teachers must be concerned with the individual development of their students. It includes 5 Cs- (1) creating a learning environment favorable to learning; (2) concern for individual differences; (3) competent teaching; (4) catering for learning needs; and (5) caring attitude.

Commitment towards the community includes 5 Cs also – (1) concern for community development; (2) cooperate and participate with community activities; (3) communicate openly with the parents and community leaders; (4) care for community harmony (5) cater to the family needs.

Commitment to the profession likewise involves 5 Cs – (1) continue education; (2) collaborate with colleagues; (3) create innovative ways or engage in research; (4) care to respect other colleagues; and (5) concern for the integrity of the teaching profession.

For the servant leadership, teachers are expected to have conceptual skills. This is the teacher's abilities in class, which includes 3 Cs (1) creative or innovative way of solving problems in class; (2) critical thinking; and (3) cascade knowledge, skills and desirable attitude to students. In addition, servant leaders create value for community. They have to (1) collaborate, (2) cooperate, (3) communicate with the community. Moreover, servant leaders are emotional healers. They (1) can discern students with problems; (2) care for students who are feeling down; and (3) contribute options to address student problems. Furthermore, servant leaders empower students. They train students not to (1) consult teachers every time they have problems but learn to solve on their own; (2) challenge students to be responsible in making their own decisions; and (3) capacitate students to reach their goals. Servant leaders also observe their ethics. They (1) care to maintain the dignity of their profession; (2) concern to respect others in the profession; and (3) carries high ethical standards. Servant leaders help subordinates grow and develop. They (1) care for the welfare of the students; (2) concerned with the attainment of students' goals; and (3) challenge students to pursue excellence. Lastly, servant leaders put subordinates first. They (1) cater to the students' needs above their own; (2) carry a burden of making lessons easily understandable to students; and (3) care about students' success rather than their own.

CONCLUSIONS

1. Deans and Teachers of TEIs in Region III SUCs are mostly graduates of master's and doctorate degrees but a considerable number are still yet to finish their graduate courses.
2. Deans and teachers of TEIs in Region III SUCs have high work commitment towards their students, community and profession but they have low participation in community activities.
3. Deans and teachers of TEIs in Region SUCs have manifested positive servant leadership skills in the aspect of ethics, conceptual skill, helping subordinates grow and succeed, empowering, emotional healing and putting subordinates first but they need to improve more on creating value for community.

4. Educational attainment of the respondents is positively related to their work commitment towards students and community but not towards their profession.
5. Educational attainment of the respondents is positively related to the servant leadership, except for ethics. Regardless of educational attainment, teachers and deans have similar servant leadership skills.
6. The work commitment levels of deans and teachers are positively related to their servant leadership skills. Generally, the higher the educational level of the deans and teachers, the better is their servant leadership skills.

RECOMMENDATIONS

1. Teachers should finish their graduate degree courses to increase their level of work commitment and servant leadership.
2. Teachers must increase their level of community involvement. Work commitment and servant leadership are not confined only in school but must extend to the community in order to inspire the community members to be responsible, cooperative and unified in their goal of becoming productive and functional towards family and community development.
3. Teachers must also improve their relationship with parents in order to motivate them to get actively involved in the academic endeavors of their children. For teachers thorough understanding of the behavior of students in class and their culture, they need to get to know the parents well.
4. The model developed in the study maybe adopted by teachers in order to improve their work commitment level and their servant leadership skills.
5. Future research may repeat the study and include determining whether the work commitment level and servant leadership of the teachers are positively related to the student and school achievement.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Public Data-Centered Crime Prevention Through Environmental Design (CPTED)

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Dose Assessment for Modeling Medical Phantom of X-Ray Phase Contrast in Web Measurement Convergence-based

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ABSTRACT

Conventional X-ray medical imaging technology used information of x-ray absorption difference due to tissue density difference in the subject. On the other hand, X-ray phase contrast imaging technology is a technology that uses phase contrast information to dramatically increase boundary information between homogeneous materials or similar materials with little difference in density. In order to model the medical phantom that is capable of acquiring and evaluating X-ray phase contrast images, the spatial dose distribution and the absorbed dose were evaluated and analyzed to present the data to the medical phantom optimal design. As a result of the absorbed dose measurement before and after penetration around fixed scattering grid using glass dosimeter, the average absorbed dose before penetration was measured to be $110.8 \pm 1.41 \mu\text{Gy}$ and the absorbed dose after penetration was measured to be $9.18 \pm 1.08 \mu\text{Gy}$. When the scattering and phase contrast images of the graphite material with almost no difference in contrast between the absorbed images were obtained and analyzed, images with relatively large image information were acquired. This result is expected to be used as an important basic data for determining the position of the subject and decreasing the medical exposure dose when acquiring the phase contrast images.

Keywords: *Wireless computing, Exposure dose, phase contrast imaging, phantom, glass dosimeter, X-ray*

INTRODUCTION

X-rays are invisible and are a unique energy source that can ionize and penetrate matter in waves. Because of these characteristics, it is used in many fields such as life science field, logistics distribution field, security search field, defense field, and medical field^[1].

Especially, in the medical field, many applications and contributions have been made to examine and diagnose fracture of the human body, vascular diseases, brain diseases, cancer diseases, osteoporosis diseases, and the like. Due to these utilization, medical exposures account for the largest portion of the human radiation exposure except natural radiation among these contributions^[2, 3].

Medical radiation is used in the medical field by securing legitimacy because it has a lot of benefits on the diagnostic information received by the patient rather than by radiation damage. Besides, in order to optimize the patient's radiation protection, efforts are being made to minimize the patient's dose while obtaining optimal images to agree with ALARA (As Low As Reasonably Achievable) concept^[2-5].

Since medical radiation using X-rays occupies most of the average annual exposure dose of man-made radiation source, research and technology development are continuing to institutionalize exposure dose management, minimize exposure dose, and obtain optimal image^[1, 6].

Conventional X-ray medical imaging technology used information of x-ray absorption difference due to tissue density difference in the subject. On the other hand, X-ray phase contrast imaging technology is a technology that uses phase contrast information to dramatically increase boundary information between homogeneous materials or similar materials with little difference in density^[7-15].

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For this reason, X-ray phase contrast imaging technology is an imaging technology that is well suited for material inspection when the density is low and the imaging effect due to X-ray absorption does not appear^[16].

To detect small phase changes due to x-ray refraction in a subject, a grid-based x-ray interferometer system and phase contrast image acquisition technique are required^[17].

The x-ray phase contrast imaging images the x-ray velocity difference at two adjacent points when the x-ray passes through the material. Since the real number of the refractive index that determines this velocity is about one thousand times larger than the absorption coefficient, it is more efficient than images that use absorption difference of conventional X-ray and has the feature to reduce radiation dose^[16, 18].

Active research is being carried out on X-ray phase contrast imaging technology from 2D plane image to three-dimensional 3D image in the field of computer tomography^[2,3,18]. Various attempts are also being made to develop techniques for obtaining phase contrast images^[10,11,15]. However, these studies have been devoted to dose assessment based on irradiation dosimeter, and not much research has been conducted on the exposure dose using a glass dosimeter despite its multi-faceted usefulness: It is a human tissue equivalence dose meter, repeated readings of radiation dose and cumulative dose measurement are possible, the range of measurable dose is wide, it has less fading effects, but it has better direction and energy dependence. And we have not been able to use specialized medical phantoms to evaluate image quality and exposure dose.

For these reasons, in this study, we analyzed the spatial dose distribution and the absorbed dose in order to model the medical phantom that is capable of acquiring and evaluating the X-ray phase contrast image by presenting data for optimal design of a medical phantom^{19,20,21}.

RESEARCH SUBJECTS AND METHOD

Measurement of Spatial Dose and Half Value Layer: For radiation generator FPD (Flat Panel Detector), we have used CXD-R185 System of JW Medical Equipment. For Detector, we have used a mobile detector of DR TECH.

In the measurement of the spatial dose distribution, the distance between the X-ray tube and the grid was fixed

at 100 cm and evaluated using a Unfors-Xi measuring apparatus at a distance of 89 cm. Exposure conditions were 40kVp 20mA 2mAs, and 10 measurements were made for each condition to obtain the mean value, as in Figure 1.



Figure 1: Half value layer measurement and irradiation dosimeter in computer awareness analysis

Absorbed Dose Measurement Using Glass Dosimeter: In the measurement of absorbed dose, the distance between the X-ray tube and the grid was fixed at 100 cm and evaluation was made at distances of 89 cm and 111 cm with the grid in the middle. Exposure conditions were 40kVp 20mA 2mAs, and 10 measurements were made for each condition to obtain the mean value.

For measurement of absorbed dose, a glass dosimeter Dose Ace (Model GD-352M, FGD-1000) was used, as in Figure 2. Annealing process was performed at 400° C for 1 hour before cooling in consideration of the characteristics of the device, and 5-15 µGy of background was measured. After the panoramic scan, the pre-heating was performed at 70° C for 1 hour before cooling. The dose values irradiated to the device were read through the reader 10 times repeatedly, and the mean and standard deviation were calculated. The background dose was subtracted from the calculated value to derive the dose value^[5].



Figure 2: Glass dosimeter reader

Medical Phantom Manufacturing and Image Evaluation for Phase Contrast Only: In order to acquire and evaluate the absorbed dose phase contrast image, a phantom made of polyethylene material is inserted into a circular rod having a diameter of 10.5 cm, drilling five holes with a diameter of 1 cm and filled with graphite, bismuth, tungsten, barium sulfate and aluminum powder, manufacturing a medical phantom. Absorption, scattering, and phase contrast images were acquired using a self-produced phantom. The focal length was 600 mm, the fixed grid was 700 mm, and the distance between the focus and detector was 1,448mm. Exposure conditions were 22kVp 20mA 630msec for acquiring images and analysis, as in Figure 3.



Figure 3: Phantom for phase contrast only

RESULTS AND DISCUSSION

Spatial Dose and Half Value Layer Measurement Results

For spatial dose distribution and half value layer measurement, the distance between the X-ray tube and the grid was fixed at 100 cm and evaluated using a Unfors-Xi measuring device at a distance of 89 cm. Exposure conditions were 40kVp 20mA 2mAs, and 10 measurements were made for each condition to obtain the mean value.

At a distance of 90cm from the focal point, the spatial dose distribution was 12.09mR at the central part, 9.98mR at the anode side, and 12.51mR at the cathode side, showing dose disparity according to the angle of the target. The measured dose was 10.84mR in the upward direction of focus and 11.84mR in the downward direction, and the irradiation dose showed different spatial dose distribution according to the direction with respect to the focus.

In addition, the half value layer, which measures the quality of the x-ray according to the direction of the

focus, was measured to be 1.29 mmAl in the center, 1.28 mm Al in the cathode, 1.32 mm Al in the anode, and 1.31 mm Al in the upper and lower parts identically. This phenomenon is caused by the inclination of the anode. The overall x-ray dose is increased on the cathode side, but the X-ray dose with the shortest energy is relatively less and the X-ray dose is relatively decreased with respect to the anode. And the shortest wavelength x-rays tend to increase relatively, as in Table 1.

Table 1: Measurement Results of Spatial Scattering and Half Value Layer

Direction	Exposure dose	Half value layer
Cathode	12.51 mR	1.28 mmAl
Anode	9.98 mR	1.32 mmAl
Center	12.09 mR	1.29 mmAl
Up	10.84 mR	1.31 mmAl
Down	11.94 mR	1.31 mmAl

Measurement Result of Absorbed Dose of Glass Dosimeter:

To obtain the phase contrast image, two methods are used, one is to place the subject in front of the grid and the other is to place the subject behind the grid. For this reason, in the measurement of absorbed dose, the distance between the X-ray tube and the grid was fixed at 100 cm and evaluation was made at distances of 89 cm and 111 cm with the grid in the middle. Exposure conditions were 40kVp 20mA 2mAs, and 10 measurements were made for each condition to obtain the mean value.

As a result of the measurement of the absorbed dose before and after penetration around fixed scattering grid using glass dosimeter, the average absorbed dose before penetration was measured to be $110.8 \pm 1.41 \mu\text{Gy}$ and the absorbed dose after penetration was measured to be $9.18 \pm 1.08 \mu\text{Gy}$, as in Table 2.

To obtain the phase contrast image, two methods are used, one is to place the subject in front of the fixed scattering grid and the other is to place the subject behind the fixed scattering grid. Judging from the results, it seems to be better to acquire images by placing the subject behind the fixed scattering grid in terms of dose management.

Table 2: Results of Dose Measurement Based on Grid Position

Direction	Pre-grid penetration	After grid penetration
Cathode	111.3 ± 1.51µGy	9.4 ± 1.07µGy
Anode	107.7 ± 1.45µGy	8.6 ± 1.03µGy
Center	109.7 ± 1.51µGy	9.3 ± 1.46µGy
Up	112.2 ± 1.07µGy	9.3 ± 0.88µGy
Down	113.3 ± 1.52µGy	9.3 ± 0.95µGy
Mean	110.8 ± 1.41µGy	9.18 ± 1.08µGy

Absorption, Scattering, Phase Contrast Image Acquisition: The X-ray absorptive image acquires the images by the difference of absorption coefficient of the substance. As the density difference of the tissue becomes bigger, the contrast of the image becomes bigger and it becomes more convenient to diagnose the disease or to confirm the foreign substance. On the other hand, the x-ray scattering and phase contrast imaging images the x-ray velocity difference at two adjacent points when the

x-ray passes through the material. Since the real number of the refractive index for determining the velocity is about one thousand times larger than the absorption coefficient, it is more efficient and has features that can reduce radiation dose [15].

Especially, phase contrast imaging is a technology that dramatically increases boundary information between homogeneous materials or similar materials with little difference in density, and is used for clinical breast imaging or low dose computed tomography.

The X-ray absorption difference imaging is distorted due to the geometric position because the image is generated by the x-ray attenuation coefficient of the tissue. Overcoming these drawbacks is scattering and phase contrast imaging. The scattering image and the phase contrast image provide a high discriminative power to identify the material by correcting the scattering degree by correcting the geometric distortion through a mathematical algorithm, as in Figure 4.

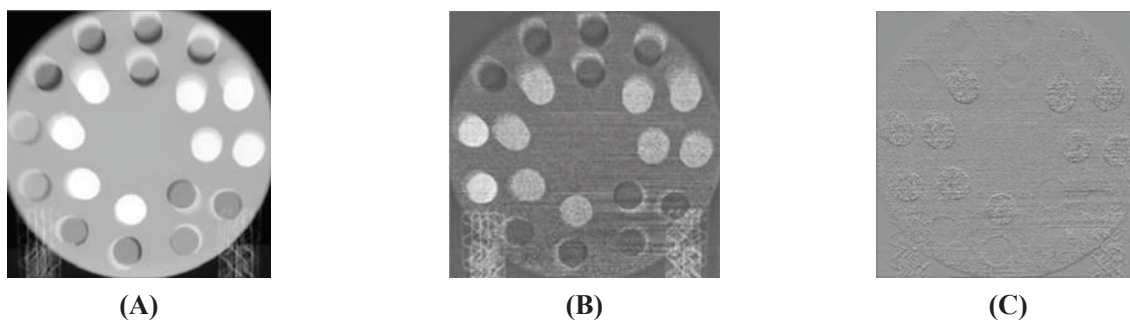


Figure 4: Absorption [A], scattering [B], phase contrast [C] imaging

These results show the usefulness of scattered image and phase contrast image when describing soft tissues, which are regions where the X-ray absorption difference in human organs and tissues is small.

When the absorption difference of X-rays in adjacent tissues is small in the absorptive image, the discrimination ability is degraded in the image, but the scattered image and the phase contrast image can show the distinguishing ability in this case.

In other words, organ or tissue composed of a substance with a low effective atomic number has a poor contrast or resolution of the image in the absorption difference image. In this case, the scattered image and the phase contrast image can improve the contrast and resolution of the image and can help diagnosis of the disease from the image.

These technologies show many applications in the medical field to diagnose and treat human diseases in the future and it will contribute to the reduction of radiation dose. With the development of X-ray scattering and phase contrast imaging technology, many researches and developments on medical phantom that can quantitatively acquire and evaluate images should be carried out.

CONCLUSION

In this study, the spatial dose and the half value layer were measured in order to model the medical phantom that is capable of acquiring and evaluating the X-ray phase contrast, and the medical phantom was manufactured for acquisition and analysis of images. As a result of measuring the half value layer according to the

direction of the focus in the low-energy medical X-ray region, the center portion was 1.29 mm Al, the cathode was 1.28 mm Al, the anode was 1.32 mm Al, and the upper and lower portions were 1.31 mm Al identically. As a result of the absorbed dose measurement before and after penetration around fixed scattering grid using glass dosimeter, the average absorbed dose before penetration was measured to be $110.8 \pm 1.41 \mu\text{Gy}$ and the absorbed dose after penetration was measured to be $9.18 \pm 1.08 \mu\text{Gy}$. When the scattering and phase contrast images of the graphite material with almost no difference in contrast between the absorbed images were obtained and analyzed. images with relatively large image information were acquired. This result is expected to be used as an important basic data for determining the position of the subject and decreasing the medical exposure dose when acquiring the phase contrast images.

Ethical Clearance: Not required

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Physical and Psychological Factors Affecting Smartphone Addiction in Adolescents According to Depression

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ABSTRACT

This study was conducted to identify factors influencing smartphone addiction depending on the presence of depression, a significant influential factor. This study was conducted on 54,603 individuals with depression from among the participants of the 2017 Youth Health Behavior Online Survey (13th edition). The general, physical, and psychological characteristics were weighted and analyzed using IBM SPSS 23.0 after creating a complex sample survey file, with the significance level set at .05. This study indicated that there were differences in general, physical, and psychological characteristics according to depression, as well as differences in factors influencing smartphone addiction. Intervention programs should be implemented using the results of this survey on factors influencing smartphone addiction in adolescents.

Keywords: Smartphone addiction, Depression, Adolescent

INTRODUCTION

According to a Ministry of Science, ICT, and Future Planning study on smartphone overuse among 29,712 individuals aged between 13 and 69, 18.6% (7,860 individuals) were deemed to be at risk of smartphone dependency, and adolescents were the largest group, representing 30.3% (1,523 individuals)¹.

The primary content utilized by adolescents aged between 10 and 19 in the group at risk of smartphone dependency was messengers and games; the utilization rate of instant messengers such as KakaoTalk or Facebook that allow for peer-to-peer real-time transfers of data such as images or photos online was 97.4% for middle school students and 98% for high school students².

Among adolescents, the smartphone is a tool that forms and transmits peer culture, and can, therefore, be regarded as a key factor in understanding their culture³.

Despite the convenience and efficiency of smartphones, overuse is associated with problems such

as dependency and addiction. Particularly, adolescents are more prone to addictive behavior compared to adults as they have not yet developed full control over themselves⁴.

Typically, addictive behavior associated with smartphone overuse is related to individual characteristics such as depression or loneliness; interpersonal relationships, such as conflict with peers and family, social delinquency, and lack of sociability; as well as health issues at the physical and psychological level, such as stress, strained eyes, insomnia, lack of focus, or aggressiveness⁵.

Depression is an influential factor in adolescent smartphone addiction; as the depressed state becomes more intense, individuals tend to be more engaged with the virtual world, and such engagement reemphasizes the dissatisfaction and loneliness in interpersonal relationships, in turn, intensifying depression⁶⁻⁷.

Existing studies show that the factors influencing internet addiction in adolescents can be largely divided into individual characteristics, such as physical and psychological, and environmental factors.

Gender was one of the factors considered, and female students had higher tendencies of smartphone addiction. In addition, lower academic performance and financial

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status led to higher levels of smartphone addiction⁸⁻¹⁰. Moreover, perceptions, attitudes and frequency of family meals were strong predictors of smartphone addiction in adolescents¹¹. Emotional factors such as self-control, stress, and suicidal ideation also influenced smartphone addiction in adolescents¹²⁻¹⁴.

Physical activity for adolescents is effective in reducing or preventing smartphone addiction, reducing the anxiety from smartphone addiction, and increasing satisfaction with life¹⁵⁻¹⁶. Smoking is an influential factor in smartphone addiction; however, some studies have asserted that it does not influence smartphone addiction, and thus verification is needed on this front¹⁷⁻¹⁸.

While the smartphone can be a convenient tool that allows for real-time search and communication if used effectively, overdependence on it leads to negative influences on various aspects of life. Compared to adults, adolescents lack the ability to exercise appropriate control, which is why education and management regarding the effective use of smartphones is required. For effective education and management, it is necessary to identify the factors influencing smartphone addiction and create the appropriate contents for interventions. This study was conducted to identify factors influencing smartphone addiction in adolescents according to the presence of depression, a significant influential factor, and to provide basic data for education and management in the context of effective smartphone use.

RESEARCH METHODOLOGY

Research Design: This is a descriptive study that conducted a secondary analysis of the 2017 Youth Health Behavior Online Survey (13th edition) to identify factors influencing internet addiction in adolescents according to the presence of depression.

Research Subjects: The subjects of this study were 54,603 individuals from among the 622,766 participants aged 12-18 of the 2017 Youth Health Behavior Online Survey (13th edition) who indicated the presence of depression (sadness and despair) in the last 12 months with “yes” or “no” answers. The Youth Health Behavior Online Survey is a confidential, self-administered survey carried out by the Ministry of Education, Ministry of Health and Welfare, and Korea Centers for Disease Control and Prevention for the purposes of identifying the status of health in Korean adolescents, calculating health indicators for planning and evaluating

health promoting projects for adolescents, and identifying adolescent health indicators that are comparable between countries. The survey included 800 sample schools nationwide and was administered after training the teachers in charge of research support and oversight. Gifts were provided after the survey administration.

Research Method: The survey was carried out by assigning an internet-connected computer per participant for the students of sample classes in the computer rooms of the participating schools. The students’ seats were assigned randomly, and the survey was confidential and self-administered.

Research Variables: General characteristics: Gender, age, academic performance, financial status, residence type, frequency of high-caffeine beverage consumption per week in recent days, number of breakfasts per week, frequency of fast food consumption per week, and experience of having a part-time job.

Psychological factors: Stress, subjective body image, subjective health, smartphone addiction, suicidal thoughts, suicidal plans, and attempts at suicide.

Data analysis Methodology: IBM SPSS 23.0 was utilized with weighted average values to create a complex sample planning file to be analyzed, with the significance level set at .05.

The levels of general, physical, and psychological factors of the subjects were estimated using constants and the weighted percentages.

Comparisons between groups were made using chi-square or t-tests.

- Logistic analysis was used to analyze factors influencing internet addiction.

RESEARCH RESULTS

Comparison of General Characteristics: Given the presence of depression, there were differences between the 2 groups depending on gender, age, academic performance, financial status, frequency of high-caffeine beverage consumption, frequency of breakfast, frequency of fast food consumption, residence type, and experience of having part-time jobs ($p < .001$). Depression was more prevalent in those who were female, aged, had lower academic performance, lower financial status, consumed more caffeine, were less likely to have breakfast, had more fast food, did not reside with family, and with part-time job experience.

Comparison of Physical and Psychological Characteristics: Depending on the presence of depression, there were differences between the 2 groups in terms of the level of fatigue recovered from through sleep over 7 days, weight control efforts, BMI, drinking, smoking, experience with sexual intercourse, subjective body image, subjective health, suicidal thoughts, suicidal plans, suicide attempts, and smartphone addiction ($p < .001$). There were no differences in the number of days of 60 minutes or more physical activity over the past week.

Individuals indicated higher depression in the group that demonstrated insufficient fatigue recovery from sleep, weight loss attempts, and normal BMI, and those who drank and smoked, engaged in sexual intercourse, experienced high stress, considered themselves obese, perceived themselves to be unhealthy, engaged in suicidal thoughts and plans and attempted suicide, and those with higher scores of smartphone addiction.

Factors Affecting Smartphone Addiction: In individuals not experiencing depression, the level of smartphone addiction was 1.076 times higher in those aged 12-15 years compared to those aged 16-18 years. Smartphone addiction was lower for individuals with higher academic performance. In terms of fast food consumption frequency, those consuming it twice a week or less had a 0.721 times lower level of smartphone addiction than those consuming at least once a day, and in terms of residence type, the level among those living with family was 1.422 times higher than those not residing with their family. Those with part-time experience had 1.105 times higher levels of smartphone addiction compared to those who did not, and smartphone addiction was lower for those engaging in low levels of physical activity. Individuals who recovered from fatigue sufficiently through sleep had low levels of smartphone addiction. In terms of weight control efforts, individuals engaging in no weight control effort had 1.158 times higher smartphone addiction levels, 1.206 times higher if they attempted to lose weight, and 1.215

times higher if they attempted to gain weight. In terms of BMI, smartphone addiction was higher when individuals had 25 or higher BMI, and those who did not engage in smoking or drinking had lower levels compared to those who did. Smartphone addiction was lower for those without sexual intercourse experience by 0.818 times compared to those with experience. It was high for those with high stress, and 0.858 times less for those perceiving themselves to be of average build compared to those perceiving themselves to be very obese.

In subjects with depression, men had 0.874 times lower smartphone addiction levels compared to women, and in terms of age, those aged 12-15 years had 1.319 times higher levels of smartphone addiction, similar to the findings with subjects with no depression. Smartphone addiction was lower for those with good academic performance, and in terms of financial status, all groups showed higher levels compared to those indicating low financial status, which differed from individuals without depression. Individuals consuming fewer high-caffeine beverages had higher levels of smartphone addiction, and those eating breakfast at least 3 times a week had 0.909 times less smartphone addiction compared to those eating 4 times a week. Those with part-time experience had 1.233 times higher levels of smartphone addiction compared to those who did not, and individuals with low levels of physical activity had higher levels of smartphone addiction. Individuals with insufficient recovery from fatigue through sleep showed higher addiction, and those not engaging in weight maintenance efforts showed 1.144 times higher addiction compared to those who did. In terms of BMI, smartphone addiction was higher when individuals had 25 or higher BMI, and those who did not engage in smoking or drinking had lower levels compared to those who did. Smartphone addiction was 0.786 times lower for those with no sexual intercourse experience, and higher levels of stress indicated higher levels of smartphone addiction (Table 1).

Table 1: Factors Influencing Smart Phone Addiction

Characteristics		Not depressed (n=40,753)			Depressed (n=13,850)		
		OR	95% CI	p	OR	95% CI	p
Gender	Male	1.001	0.945-1.061	.963	0.874	0.795-0.961	.005
	Female	1.0			1.0		
Age(yr)	12-15	1.076	1.018-1.137	.010	1.319	1.209-1.438	<.001
	16-18	1.0			1.0		

Conted...

Academic grade	High	0.678	0.607-0.757	<.001	0.574	0.483-0.682	<.001
	Medium-high	0.866	0.783-0.957	.005	0.792	0.691-0.908	.001
	Medium	0.888	0.806-0.977	.015	0.892	0.775-1.026	.110
	Medium-low	1.0	0.905-1.106	.993	0.960	0.837-1.101	.556
	Low	1.0			1.0		
Economic level	High	0.941	0.776-1.142	.538	1.486	1.164-1.897	.002
	Medium-high	1.194	0.989-1.441	.064	1.837	1.481-2.278	<.001
	Medium	1.186	0.989-1.421	.065	1.627	1.337-1.980	<.001
	Medium-low	1.129	0.940-1.357	.194	1.526	1.229-1.895	<.001
	Low	1.0			1.0		
Frequency of high calorie drink consumption(day/week)	0	1.023	0.822-1.273	.838	1.311	1.025-1.675	.031
	1-3	1.195	0.949-1.505	.130	1.685	1.287-2.205	<.001
	≥4	1.0			1.0		
Frequency of breakfast(day/week)	≤3	0.952	0.901-1.006	.078	0.909	0.839-0.984	.019
	≥4	1.0			1.0		
Frequency of fast food consumption	≤2/week	0.721	0.557-0.933	.013	0.841	0.631-1.122	.239
	3-6/week	0.995	0.766-1.291	.968	1.131	0.835-1.532	.427
	≥1/day	1.0			1.0		
Living arrangement	With family	1.422	1.239-1.633	<.001	1.130	0.927-1.377	.225
	Others	1.0			1.0		
Part-time job experience	Yes	1.105	1.018-1.199	.017	1.233	1.102-1.380	<.001
	No	1.0			1.0		
Physical activities performed 60 minutes or more(day/week)	0	1.154	1.073-1.242	<.001	1.114	0.995-1.248	.061
	1-3	1.198	1.118-1.283	<.001	1.162	1.041-1.298	.008
	4-7	1.0			1.0		
The level of fatigue recovery by sleep during the past seven days	Highly sufficient	0.688	0.607-0.780	<.001	0.815	0.647-1.026	.081
	Sufficient	0.881	0.802-0.969	.009	1.177	1.005-1.378	.044
	Neutral	0.981	0.903-1.066	.645	1.161	1.034-1.302	.011
	Insufficient	1.093	1.007-1.186	.034	1.214	1.089-1.352	<.001
	Highly insufficient	1.0			1.0		
Weight control efforts	No effort	1.158	1.072-1.252	<.001	1.144	1.001-1.307	.049
	Reduction effort	1.206	1.111-1.309	<.001	1.142	0.997-1.308	.056
	Increase effort	1.215	1.075-1.374	.002	1.115	0.913-1.360	.285
	Maintenance effort	1.0			1.0		
Body Mass Index(BMI) (kg/m ²)	<18.5	1.132	1.005-1.275	.041	1.228	1.012-1.489	.037
	18.5-24.9	1.271	1.162-1.386	<.001	1.256	1.092-1.445	.001
	≥25	1.0			1.0		
Alcohol drinking	Yes	1.0			1.0		
	No	0.839	0.794-0.887	<.001	0.831	0.766-0.902	<.001
Smoking	Yes	1.0			1.0		
	No	0.818	0.751-0.890	<.001	0.786	0.702-0.881	<.001
Sexual experience	Yes	1.0			1.0		
	No	0.859	0.747-0.989	.035	0.942	0.808-1.099	.449

Conted...

Stress	Profound stress	2.603	2.171-3.121	<.001	2.257	1.359-3.750	.002
	Feeling a lot	2.440	2.088-2.851	<.001	2.490	1.501-4.132	<.001
	Average stress	2.145	1.850-2.487	<.001	2.125	1.279-3.531	.004
	A little feeling	1.416	1.213-1.653	<.001	0.779	0.779-2.271	.295
	No stress	1.0			1.0		
Subjective body awareness	Very thin	1.083	0.893-1.315	.416	0.957	0.717-1.277	.766
	Thin	0.962	0.826-1.121	.623	.0933	0.744-1.170	.548
	Normal	0.858	0.744-0.988	.033	0.908	0.738-1.117	.360
	overweight	0.9	0.795-1.018	.094	0.906	0.749-1.095	.306
	Very overweight	1.0			1.0		
Suicidal thoughts	Yes	1.0			1.0		
	No	0.661	0.589-0.741	<.001	0.805	0.736-0.880	<.001

DISCUSSION

The purpose of this study was to provide basic data for programs for effective smartphone use in adolescents by identifying influential factors according to the presence of depression.

The results of this study indicated that smartphone addiction was higher in female adolescents and adolescents who drank. Choi et al.¹⁸ also indicated that factors negatively influencing smartphone addiction were being female, drinking, and internet overuse. As such, it is necessary to develop a smartphone addiction intervention program that considers individual characteristics such as gender, drinking, and smoking.

This study also showed that higher academic performance was associated with a lower probability of smartphone addiction, and higher financial status was associated with a higher probability of smartphone addiction. Chung et al.¹⁹ indicated that factors influencing smartphone addiction in Korean adolescents were female gender, drinking, low academic performance and low levels of subjective health; Suk and Ku⁸ showed that the level of smartphone addiction was higher for those with low academic performance and financial status.

According to previous studies, the characteristics of adolescents that influence smartphone addiction vary depending on type and intensity. It is necessary for attempts at smartphone addiction intervention for adolescents to diversely review and reflect sociocultural backgrounds and individual characteristics. Furthermore, repeated studies are needed to establish theoretical foundations.

The results of this study indicated that individuals with insufficient fatigue recovery from sleep had a higher likelihood of smartphone addiction compared to those responding that they had adequate recovery. These results are different from existing studies; according to Boumosleh and Jaalouk⁶, 35.9% of smartphone addicts with depression, a strong influential factor of smartphone addiction, reported fatigue from sleeping late, with 38.1% reporting lower quality of sleep and 35.8% indicating sleeping less than 4 hours owing to smartphone use. As such, further research appears necessary.

This study indicated that individuals with low levels of physical activity and high stress had higher smartphone addiction; this is in line with Haug et al.'s study²⁰. Kim²¹ asserted that stress is closely related to smartphone use, as the world accessed through smartphones is used as a method to access pleasure inaccessible in the real world and to reduce pain. As such, it is important to conduct interventions to reduce stress to reduce the level of smartphone addiction.

The results of this study showed that adolescents who did not have suicidal thoughts had lower levels of smartphone addiction compared to those who did. Kawabe et al.²² found that the mental health, including suicidal thoughts, of adolescents who are addicted to smartphones, was poorer than those who did not have smartphone addiction. Sohn et al.²³ also found that suicidal ideation was high in adolescents showing addiction to cyberspace, and that it was closely related to depression. Emotional disorders including depression immerse the individuals in cyberspace, which is relatively stable and gives them a feeling of superiority; this immersion

then exacerbates emotional issues, resulting in a vicious cycle. A diverse range of interventions is required to bring the adolescents out from the virtual space accessed through smartphones and back to the real world. Various studies on the factors influencing smartphone addiction should be conducted to confirm these factors, and actual intervention programs reflecting these factors should be carried out.

CONCLUSIONS

For adolescents in Korea, the smartphone goes beyond being a daily necessity; it is critical for maintaining interpersonal relationships. The effective use of smartphones can lead to a higher quality of life because of their convenience; however, overdependence can lead to the pursuit of a virtual image while ignoring reality, devastating the actual life. Factors influencing smartphone addiction in adolescents are diverse; they can be divided into individual characteristics, including physical and emotional factors, and environmental factors. Depression is a key factor influencing smartphone addiction. Those with depression tend to be focused on the ideal, virtual world and its interpersonal relationships, instead of the real one where they feel anxious and depressed. Moreover, factors such as gender, academic performance, financial status, type and form of diet, physical activity, drinking, smoking, stress, and suicidal ideation significantly influence smartphone addiction. Therefore, interventions for easing and preventing smartphone addiction in adolescents should consider these influential factors. Additionally, further research is needed to identify more influential factors.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Study on Learning Satisfaction's Relations to Career Adaptation and Psychological Independence in College Students

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ABSTRACT

Background/Objectives: This study is designed to investigate the effects a college student's learning satisfaction has on his or her career adaptation and psychological independence from their parents

Method/Statistical analysis: The subjects of this study consist of 183 students of D University located in Seoul. The analysis tools used here are as following: a frequency analysis and descriptive statistics as demographic features; a one-way layout analysis of variance to examine the effects of learning satisfaction on career adaptation and psychological independence; a correlation analysis to understand the relationships among the variables.

Findings: This research result shows that learning satisfaction had a significant effect on career adaptation. Also, learning satisfaction and Career adaptation had a significant effect on psychological independence from fathers, while it did not on psychological independence from mothers. and learning satisfaction and career adaptation and psychological independence from father proved closely correlated to each other while there are apparently no correlation between psychological independence from mother.

Improvements/Applications: Through this study, it becomes necessary to deliberate on how to improve learning satisfaction among students and on how to give strong support to universities and instructional media to have positive effects on students

Keywords: *College Student, Learning satisfaction, Career adaptation, psychological independence, Positive effect.*

THE NECESSITY AND PURPOSE OF THE STUDY

Students may enter a college usually after deciding what to major in—unlike when they were in secondary school. If they are satisfied with their major, it will raise the levels of self-esteem, give them self-confidence and enable them to lead a very desirable college life. On the other hand, if they find their major subjects too unsuitable or too difficult for them, many of them may feel conflicted and lose interest in college life itself.

In reality, college is a preparatory institution where one can equip oneself with competencies and qualifications

to live as a member of society. For this reason, a college student's satisfaction with his or her major, namely, learning satisfaction is expectedly very closely related to his or her career decision and development. But considering that Korean students, in general, have been extremely accustomed to the routine of studying since secondary school days, it may be necessary to examine if college students are excellent in studies because they have developed longtime study habits since childhood or because, owing to their suitability to their major subjects, their learning satisfaction helps them have various purpose and competence.

Therefore, this study intends to research into the relationship of a college student's high level of learning satisfaction with his or her later adult psychological independence and career adaptation. Regarding this, Jongho Shin et al(2006)¹ report that academic activities at school have positive effects on mastery goal orientation

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helpful to future jobs or studies, and also on learning satisfaction by the medium of mastery goal orientation.

Klein, Noe and Wang(2006)², on the other hand, argue that students with lower levels of mastery goal orientation tend to have higher levels of learning satisfaction. This shows that academic goal orientation and learning satisfaction have little to do with each other (qtd. in YoungjuJoo, et al. 2012)³. Therefore, this study too has been initiated by questioning how learning satisfaction and career adaptation are related. levels of learning satisfaction.

Also, this study intends to look into how relevantly independent from their parents are those students with high learning satisfaction who make efforts with keen awareness of their future career. It is no exaggeration to say that college students may cope with a big task of psychological independence from their parents as they are put in their late adolescence and early adulthood. Therefore, by preparing to enter the society, they may have to achieve independence from parents whom they have until now relied on. It is revealed that psychological independence is significantly related to adaptation to college and social life, interpersonal relations, career development, career maturity, career decision. However, the research into correlations among learning satisfaction, career adaptation and psychological independence from parents have so far been quite insufficient, and thus this study is to examine carefully the effects of college students' learning satisfaction on career adaptation and on psychological independence and the correlations among those factors. It is thus expected that this study will help a university promote systematic educational courses and support in order for their students to have a clear sense of career goals and to enhance their qualities and competences as societal members psychologically independent from their parents.

This study will discuss the following points. First, college students' learning satisfaction is likely to have significant effects on career adaptation. Second, learning satisfaction would have significant effects on psychological independence. Third, learning satisfaction, career adaptation and psychological independence will be co-related to one another.

enrolment percentages in the university. Dropout in residential university is caused by academic, family and personal reasons, campus environment

and infrastructure of university and varies depending on the educational structure agreed by the university. Thus, this work aims to effectively formulate education program and institutional infrastructure through which the student's enrollment rate at the university will get increased significantly. The main aim of this paper is to develop a improved decision tree model and to derive a classification rules to predict whether student will graduate or not using the historic dataset. In this paper, improved decision tree model is used to generate the model. Information like age, parent's qualification, parent's occupation, academic record, attitude towards university was collected from the students to forecast the group of students needs the periodical monitoring.

BACKGROUND

Learning satisfaction can be defined as a state of mind gained when the aim of learning is accomplished or when an individual learner's expectation is fulfilled(Wolman, 1989)⁴. In other words, learning satisfaction refers to a sense or an attitude that a person has in regard to learning. In fact, learning satisfaction in itself does not represent educational quality and efficacy in objective ways although it can be utilized as an indicator that helps us estimate the quality and efficacy of efficacy to some degree. Despite the drawbacks, however, the result of measuring the level of satisfaction in an academic situation would be put to good use in forecasting effective education(qtd. in DongwookHan, 2014)⁵

In order to raise the level of learning satisfaction, according to the argument by Chul Kim and Daesung Ma(2005)⁶, one should recognize individual variations based on various capabilities, interests and concerns among students and thus devise proper teaching methods in accordance with the variations. To make a student learn genuinely, the teacher should try to lead a student to become a self-initiated, active participant(Wooshim Chang, 2016)⁷.

Then, how is the relations between learning satisfaction and career preparation. Usually, a student devoted to his or her studies is expected to make intense preparations to find a job or to develop a career.

Career adaptation, in particular, refers to the degree of readiness to deal with changing jobs and working conditions(Super &Knasel, 1981)⁸. In other words, it means one's competences or attitudes to cope with current

situation in positive and active manner while keeping in mind future situations yet to come. Various variables regarding career adaptation are offered and introduced as causes of work values, communication competencies, interpersonal relations, social support, career decision and immersion, openness and autonomy(Eunyoung Son, Soonhee, Lee 2012)⁹.

Also, psychological independence as a variable regarding learning satisfaction indicates an acquisition of freedom of thought and action by breaking away from dependent relations and bondage to one’s parents. As one plans and decides one’s specific career especially while in college, one comes to show more and more attachment patterns as they grow to be an independent subject with a strong desire to know about their new environment. At

the same time, they display a low level of attachment to their parents, their early attachment figures. It is true that the level of vocational maturity is determined according to the degree of psychological independence in the college years when students make specific career plans and preparations(Allen, 2008)¹⁰. Therefore, psychological independence as well as learning satisfaction is assumably related to career adaptation, helping an individual’s growth with such variables.

RESEARCH METHOD

Research Subjects: This study has surveyed 201 students at D University located in Seoul, and selected, as subjects, 183 students who gave earnest answers.

Table 1: Socio-demographic characteristics

N	Gender		Year in university				Major Fileds				
	Male	Female	1	2	3	4	Humanities	Social Science	Business	Engineering	Physical
183	85	98	32	58	48	45	34	70	34	29	16
(%)	(46.4)	(53.6)	(17.5)	(31.7)	(26.2)	(24.6)	(18.6)	(38.3)	(18.6)	(15.8)	(8.7)

As shown in Table 1, The total number of students participating in this study was 183 (male: 85, female: 98). The distribution of grade is 32 in the first grade and 58 in the second grade. In addition, the third grade is 48 and the fourth grade is 45 students. The major fields are Humanities (34), Social Science (70), Business (34), Engineering (29), Physical (16).

Measurement Tools

Learning Satisfaction: To measure the level of learning satisfaction, this study makes use of the tools developed by Lent et al.(2013)¹¹ and adapted and applied by Jinkwan Kim(2014)¹². This survey consists of 6 items on a Likert-type scale of one to five.

Career Adaptation: To measure career adaptation of each student, this study utilizes validation criteria revised and adapted by Okhyon Choi and Bongwhan Kim(2006)¹³ and applied by Hakyung Kim (2016)¹⁴. This survey consists of 6 items on a Likert-type scale of one to five.

Psychological Independence: This study makes use of Psychological Separation Inventory (PSI) created by Hoffman(1984)¹⁵ and utilized by Hanik Jo and Sanghee Won(2013)¹⁶. From PSI, conflictual psychological separation inventory’s 20 questions were used in this study. In case of questions as to psychological independence from parents, this study distinguish between father and mother.

RESULTS OF ANALYSIS

The results of various analyses are presented as in the following.

The Mean and standard deviation of the variables: Table 2 exhibits the statistical data under discussion for the variables of psychological independence from mothers, fathers, learningsatisfaction, degree of career adaptation, psychological independence from fathers.

Table 2: Statistical data for main variables

Categorization	N	Minimum	Maximum	Mean	Standard deviation
Psychological independence (mothers)	183	1.50	4.00	2.7172	.57864
Learning Satisfaction	183	1.67	4.67	3.0392	.55124
Career adaptation	183	2.33	4.83	3.5264	.50973
Psychological independence (Fathers)	183	1.77	4.34	2.9780	.37841
Total	183				

As shown in Table 2, the mean and standard deviation for the variables of psychological independence from mothers, learning satisfaction, degree of career adaptation, psychological independence from fathers were obtained at 2.7172(SD=.57864), 3.0392(SD=.55124), 3.5264(SD=.50973), 2.9780(SD=.55124), respectively.

The effect of the mean variables: A regression analysis was conducted among the four main variables of psychological independence from mothers, learning satisfaction, degree of career adaptation, psychological independence from mothers and fathers. The results were found in Tables 3-7.

Table 3: Regression analysis of learning satisfaction and career adaptation

Model	Sum of Squares	df	Mean Square	F	Sig. p
Regression	16.522	1	16.522	97.195	.000***
Residual	30.767	181	.170		
Total	47.289	182			

* P<.05, **. P<.01, *** p<.001

As shown in Table 3, Regression analysis of learning satisfaction and career adaptation found the following Result, F= 97.195, P<.01, which also exhibits that the model is significant enough.

Table 4: Regression analysis of learning satisfaction and Psychological independence

	Model	Sum of Squares	df	Mean Square	F	Sig. p
2	Regression	.001	1	.001	.003	.955
	Residual	56.559	173	.327		
	Total	56.560	174			

As shown in Table 4, Regression analysis of learning satisfaction and Psychological independence from mothers found the following Result, F= 0.003, P>.01 which also exhibits that the model is not significant.

Table 5 : Regression analysis of Career adaptation and Psychological independence

	Model	Sum of Squares	df	Mean Square	F	Sig. p
3	Regression	.221	1	.221	.659	.418
	Residual	60.717	181	.335		
	Total	60.938	182			

As shown in Table 5, Regression analysis of Career adaptation and Psychological independence from mothers found the following Result, F= 0.659, P>.01 which also exhibits that the model is not significant

Table 6: Regression analysis of learning satisfaction and Psychological independence(fathers)

	Model	Sum of Squares	df	Mean Square	F	Sig. p
4	Regression	10.378	1	10.378	119.776	.000***
	Residual	15.683	181	.087		
	Total	26.061	182			

* P<.05, **. P<.01, *** p<.001

As shown in Table 6, Regression analysis of learning satisfaction and Psychological independence from fathers found the following Result, F=119.776, P<.01 which also exhibits that the model is significant enough.

Table 7 : Regression analysis of career adaptation and Psychological independence (fathers)

	Model	Sum of Squares	df	Mean Square	F	Sig. p
5	Regression	9.677	1	9.677	106.896	.000***
	Residual	16.385	181	.091		
	Total	26.061	182			

* P<.05, **. P<.01, *** p<.001

As shown in Table 7, Regression analysis of career adaptation and Psychological independence from father found the following Result, F=106.896, P<.01 which also exhibits that the model is significant enough.

As shown in Tables 3-7, learning satisfaction had a significant effect on career adaptation and psychological independence from fathers, while it did not on psychological independence from mothers. Career adaptation also had a significant influence on psychological independence from fathers, but not on psychological independence from mothers. What it means might be that higher learning satisfaction would lead to higher career adaptation and eventually affects psychological independence from fathers, However, it is interesting that higher learning satisfaction would not affect psychological independence from fathers, It might indicate that even college students are psychologically dependent on mothers and that high career adaptation would not easily lead to psychological independence from mothers.

Correlation The effect of the mean variables

Table 8: Correlation coefficients for the main variables

Main Variables		[1]	[2]	[3]	[4]
Psychological independence (mothers)	[1]	1			
Learning satisfaction	[2]	.004	1		
Career adaptation	[3]	-.060	.591**	1	
Psychological independence (Fathers)	[[4]	-.022	.631**	.609**	1

** . P<.01

As shown in Table 8, a significant correlation was found between learning satisfaction on one hand and career adaptation and psychological independence from fathers on the other hand. Career adaptation, in turn, showed

a significant correlation with learning satisfaction and psychological independence from fathers. However, the variable of independence from mothers was not closely correlated with learning satisfaction and career adaptation.

CONCLUSION

There are a diversity of surprisingly useful and convenient benefits in the modern information age. What seems unchanged, however, is that one's studies are nothing less than one's own shares that nobody else can substitute even with so much information and so many convenient facilities provided. As a result of this research, it is conceivable that through the effects of learning satisfaction on career adaptation psychological independence and the results of their correlation, far more efforts should be made to prepare for measures and supports to enhance learning satisfaction.

Also, preparing the educational grounds would be urgent so that, while completing their college courses, students may grow as mature and competent adults to adapt to and cope with their careers. For this, it is important to support and encourage every individual student to acquire clear their self-knowledge and to clarify their interests, concerns, capabilities and aims. In doing so, it is as much necessary to support and urge universities to promote genuine learning and create desirable environment.

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The Effects of Career Barriers and Career Efficacy on Job Seeking Stress: A Comparative Perspective of Nursing and Social Welfare University Students

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ABSTRACT

Background/Objectives: The purpose of this study was to compare the perception of employment among university students majoring in nursing and social welfare, which are representative professions in the field of human services.

Method/Statistical analysis: A purposive sample of 135 students was recruited for the cross-sectional survey design. The data collected from the survey were analyzed by using SPSS 18.0. Descriptive statistics, T-test, and hierarchical regression analysis were conducted in regular order.

Findings: The hierarchical regression analysis confirmed the effect of career barriers on job seeking stress and career efficacy. Model 1 included personal characteristics of students. Model 2 added major satisfaction to Model 1. Model 3 added career barriers to Model 2. The results of this study showed that the higher the perceived career barriers, the higher the job seeking stress ($\Delta R^2 = .328$, $p > .001$), and that the lower the perceived career barriers, the higher the career efficacy ($\Delta R^2 = .477$, $p > .001$).

Improvements/Applications: Based on the results of empirical analysis, this study proposed the need for systematic guidance to promote the career efficacy of nursing and social welfare students.

Keywords: Major satisfaction, Career barrier, Job seeking stress, Career efficacy, Social work student, Nursing student.

INTRODUCTION

In the context of high youth unemployment rate in the Republic of Korea as a severe social problem, this study compares the major satisfaction, job seeking stress, and career barriers of nursing students and social welfare students who are commonly majoring in human services. In addition, this study examines the effects of career barriers on job seeking stress and career efficacy, and seeks to draw practical implications for their career preparation. In Korea, some departments of humanities and social sciences that are not preferred in the industrial

field are subject to the restructuring of university, and the number of students is reduced or the departments are merged. In the case of the preferred departments, there is a mismatch between the supply of graduates and the demand of practice field. In some cases, it takes a long time to find a job¹. In fact, the issue of social advancement of young people into labor market is now becoming a serious social problem, and the government is examining various ways to improve the employment rate of young people at the national level, but it is not easy to solve the problem². The fields of nursing and social welfare are the major human service areas and women predominate. Since the 2000s, there has been a similar trend in that the number of departments and students has been steadily increasing due to the strengthened health and welfare policies and the increased social demands³. In addition, both departments are similar in that they are supervised by the same Ministry of Health and Welfare regarding the

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qualification of departments and students. However, the two majors differ in the management of the educational curriculum and the supply and demand of professional workers. In the case of nursing, the qualifications of students are strictly controlled by detailed standards through a university accreditation⁴, but in the case of social welfare, the standards and accreditation are flexible to a degree⁵.

The educational requirement to become a social worker is available not only in universities but also in a wide variety of courses of study. This reality differs from the field of health, including nursing, in that it provides detailed standards for raising professionalism, manages educational curriculum in universities, and controls the supply and demand of professional workers. The ease of acquiring social worker qualifications ultimately can lead to an excessive supply of professional social workers and bring about problems of entry barriers in labor market and unstable employment as well as controversy over the special expertise of social workers⁶.

Constantly high youth unemployment rate is emerging as a social problem. Getting a job at the same time as graduation became a story of the past. In this situation, universities are fully committed to curriculum management and student guidance in order to cultivate students as talented people fitted in the practice field and to activate their social participation. In particular, the human service field, which provides services to people, requires ethical responsibility that universities must cultivate by internalizing the professional value of human dignity as well as raise professionalism⁷.

However, even if students are well prepared, they are experiencing various career barriers and job seeking stress before entering society⁸. The average employment rate of university graduates is 64% in 2016, which is different depending on the major⁹. In the case of health-related workers whose demand is continually increasing recently, employment rate after graduation is high, compared to other majors, since the government manages the number of university students. But, in the field of social welfare, the barriers to entry into the labor market are high due to the excessive supply of social workers, compared to the demand. Therefore, it is reported that university students majoring social welfare experience high career barriers and job seeking stress ahead of their graduation¹⁰. To this end, more studies should be made to promote career efficacy and mature career attitude.

Career barrier is defined as individuals' perceptions of situations that negatively influence career choice and career goals in the course of career-related processes. Career barrier is a complex concept that includes the lack of job-related information or career directions, and the external difficulties such as various conditions and academic backgrounds¹¹. Most of the studies related to career barriers have set career barriers as an independent variable and examined the effects of career barriers on the resultant variables. According to previous studies, career barriers can lead to unsettled career decision, job seeking stress, and even depression¹². Entry into the labor market after graduation is one of the major developmental tasks in adolescence¹³. However, the recent increase in the number of NEETs has made it difficult to apply job and marriage as universal developmental tasks in adolescence. Many studies report that university students are already experiencing job seeking stress before graduation.

Stress is not a problem in itself, but it can cause problems in mental health, depending on how one copes with the stress, so there must be a mechanism to respond appropriately¹⁴. In particular, in the case of job seeking stress, it is a very important task to improve the capacity to buffer job seeking stress, since personal efforts to cope with are very limited in the social environment of long-term stagnation and low economic growth. In this regard, the sense of efficacy, which means self-confidence in solving problems¹⁵, can be a very important variable in coping with job related stress. According to previous studies, career efficacy has a significant role in solving a variety of career-related problems, alleviating job-seeking stress, and motivating to decide concrete career direction. In addition, it has been reported that major satisfaction has a positive effect on career decision and career efficacy^{16,17}.

In this context, the purpose of this study is to compare the differences in major satisfaction, career barriers, job-seeking stress, and career efficacy, which are perceived by nursing and social welfare undergraduate students in the field of human services. In addition, this study examines the effect of career barriers on job seeking stress and career efficacy. In this context, this study focuses on students majoring in nursing and social welfare, which are the representative field of human services continually expanded in accordance with changes in the demographic and social environment. The purpose of this study is to

compare the major satisfaction, job seeking stress, career barriers, and career efficacy of nursing and social welfare students, and examine the effects of career barriers on job seeking stress and career efficacy.

This study differs from previous studies in that this study empirically analyzes the effects of career barriers on job seeking stress and career efficacy in a comparative perspective of different majors. Finally, this study suggests policy implications to improve students' career decision-making capacity and minimize career barriers¹⁹.

MATERIALS AND METHOD

Research problems: The research problems of this study are as follows.

First, what is the level of major satisfaction, career barriers, job seeking stress, and career efficacy perceived by nursing and social welfare students?

Second, are there differences in major satisfaction, career barriers, job seeking stress, and career efficacy between nursing and social welfare students?

Third, do career barriers perceived by nursing and social welfare students affect job seeking stress?

Fourth, do career barriers perceived by nursing and social welfare students affect career efficacy?

Sampling: In order to minimize the effect of external variables, this study aimed at nursing and social welfare students belonging to the same university. The subjects of this survey were the third and fourth grade students who took some major courses and considered more directly about job and career. The survey was conducted in September 2016, and the questionnaires available for data analysis were collected from 119 students in social welfare department and 46 students in nursing department.

Measurements: The measures used in this study were those whose reliability was reported in domestic studies. The measure of career barriers used in An's study (2013) were composed of six sub-concepts of 22 items (lack of job information, external barrier, lack of self-clarity, lack of awareness of need, discrimination, indecisiveness). Major satisfaction was measured by the measure of five-item scale used in the same study¹⁸.

Job seeking stress was measured by a scale consisting of five sub-concepts of 21 items (personality, family environment, schoolwork, school environment, job seeking uncertainty)¹⁹. Career efficacy is a measure of efficacy associated with career decision, consisting of five sub-concepts (planning, problem solving, self-evaluation, goal setting, and collection of job-related information)²⁰.

Statistics: The data collected from the survey were analyzed by using SPSS 18.0. Descriptive statistics, T-test, and hierarchical regression analysis were conducted in regular order.

RESULTS AND DISCUSSION

The respondents consisted of 46 nursing students and 118 social welfare students as shown in table 1. The third grade students were 53% and the fourth grade students were 47%. Female students predominated and the average age was 22.3 years. The students who participated in group activities during university life was 47% of the total respondents.

As the result of t-test, this study found that social welfare students were more aware of career barriers and experienced more job-seeking stress than nursing students were. Nursing students showed more confidence in their major satisfaction and career direction than social welfare students did.

Table 1: General Characteristics

Characteristics	Category	N (%)
Age	Mean ± SD	22.3 ± 1.68
Gender	Male	45(28.8)
	Female	116(71.2)
Major	Nursing	46(28)
	Social Welfare	118(72)
Group activity	Participated	77(47.2)
	Not involved	86(52.8)
Grade	3	87(53.4)
	4	76(46.6)

The mean of major variables was shown in Table 2: major satisfaction 3.6, career barriers 2.41, job-seeking stress 2.45, and career efficacy 3.28. The correlations between the main variables are shown in Table 3.

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Major satisfaction	165	1.20	5.00	3.623	.586
Job-seeking stress	157	1.00	4.43	2.470	.646
Career barriers	161	1.00	4.21	2.406	.697
Career efficacy	158	1.00	5.00	3.284	.652

Table 3: Correlations

	Career barriers	Job-seeking stress	Career efficacy
Major satisfaction	-.261**	-.274**	.298***
Career barriers		.579***	-.659***
Job-seeking stress			-.426***

The t-test confirmed whether there is a difference in the mean of major variables between nursing and social welfare students and whether the difference is statistically significant. As shown in Table 4, career barriers and job seeking stress were higher in social welfare students than in nursing students. Conversely, major satisfaction and career efficacy were higher in nursing students than in social welfare students.

Independent sample T-test examined the statistical significance on the difference of the mean. The results of

Levine’s Test for Equality of Variance showed that the difference between nursing students and social welfare students was statistically significant in terms of major satisfaction, career barriers, job seeking stress, and career efficacy²¹.

In other words, social welfare students thought that they had higher career barriers and experienced more job seeking stress than nursing students did. In addition, the nursing students showed more confidence in major satisfaction and career direction than social welfare students did.

Table 4: Comparison of Mean between Nursing and Social Welfare Students

	Major	N	Mean	Std. Deviation	t	p
Major satisfaction	Social Welfare	114	3.539	.54944	-3.340	.001
	Nursing	46	3.865	.59338		
Career barriers	Social Welfare	114	2.5665	.62544	5.001	.000
	Nursing	46	1.9982	.70978		
Job-seeking stress	Social Welfare	111	2.5794	.60477	3.59	.000
	Nursing	45	2.1843	.66551		
Career efficacy	Social Welfare	113	3.1133	.59814	-5.59	.000
	Nursing	45	3.7022	.59842		

The hierarchical regression analysis was used to control the effects of personal characteristics and major satisfaction and analyze the effects of career barriers on job seeking stress and career efficacy. Model 1 included gender and group activity. Model 2 added major satisfaction to Model 1, and Model 3 added career barriers to Model 2. Multi-collinearity was found to be acceptable through tolerances and VIF.

Table 5 shows the effect of career barriers on job seeking stress. Both Model 2 with major satisfaction

and Model 3 with career barriers showed statistically significant results. Model 1 was not statistically significant, but it was found that students who participated in group activities had comparatively lower job-seeking stress.

In Model 2, the higher the major satisfaction, the lower the job seeking stress. In model 3, the higher the career barriers, the higher the job seeking stress. The effect of Model 3 was $\Delta R^2 = .328$ ($p > .001$), which was increased by .261, compared to Model 2.

The effects of carrier barriers on carrier efficacy are shown in Table 6. Model 1 was not statistically significant, but students who participated in group activities showed higher career efficacy, contrary to the influence of career barriers on jobseeking stress.

Model 2 shows that the higher the group activity and major satisfaction, the higher the career efficacy. In model 3, the lower the career barriers, the higher the career efficacy. The effect of Model 3 was $\Delta R^2=.477$ ($p>.001$), which was increased by .323, compared to Model 2.

Table 5: Job Seeking Stress

	Model 1		Model 2		Model 3	
	β	t	β	t	β	T
Gender (Female=0)	-.03	-.46	-.05	-.64	-.05	-.73
Group activity (participation=0)	.18	2.21*	.13	1.57	.06	.83
Major satisfaction			-.24	-2.89**	-.09	-1.28
Career barriers					.50	7.62***
R ² (ΔR^2)	.033(.020)		.085(.066)		.364(.328)	
Constant	2.341		3.386		1.648	
F(F Sig.)	2.485(.087)		4.515(.005)		19.208(.00)	

$p>.05$, ** $p>.01$ *** $p>.001$

Table 6: Career Efficacy

	Model 1		Model 2		Model 3	
	β	t	β	t	β	t
Gender (Female=0)	.096	1.19	.11	1.46	.10	1.76
Group activity (participation=0)	-.22	-2.81**	-.15	-1.96*	-.06	-.92
Major satisfaction			.34	4.46***	.20	3.20***
Career barriers					-.60	-9.66***
R ² (ΔR^2)	.057(.044)		.168(.152)		.491(.477)	
Constant	3.403		1.842		3.740	
F (F Sig.)	4.484(.013)		9.993(.000)		35.482(.000)	

* $p>.05$, ** $p>.01$ *** $p>.001$

CONCLUSION

This paper proposed an improved decision tree algorithm for prediction of dropout student. This study analyzed the effects of career barriers perceived by university students on job seeking stress and career efficacy in Korea, where youth employment rate is about 60% after graduation. In particular, this study examined the difference in career barriers and job seeking stress between nursing students and social welfare students, and analyzed empirically the effects of preceding variables on job seeking stress and career efficacy.

The results of this study are as follows:

First, in the case of nursing where the accreditation of curriculum and the management of manpower are strict, career barriers and job seeking stress are low and major satisfaction and career efficacy are high, compared to social welfare where the accreditation and manpower management are not strict.

Second, participation in group activities has a negative effect on job seeking stress and a positive effect on career efficacy. Third, job seeking stress is high as students perceive that career barriers are high, and career efficacy is high as students perceive that career barriers are low.

Based on the results of this study, the following suggestions can be made. First, strict management of

curriculum in majors related to human services is necessary. In the field of humanities that guide human life in a better way, the curriculum should be strictly managed based on the value of human dignity as well as professionalism. Even though the criteria for obtaining a qualification are provided, it is easy to acquire a qualification for social worker from various courses of study as well as universities. This reality not only hinders the entry of university graduates into the labor market, but also causes the problem of lowering the quality of overall social work. As a result, it becomes an important factor that affects job seeking stress of social welfare students. Because this barrier to entry into the labor market is a part that young people cannot solve voluntarily, the problem needs to be solved from the social and structural dimensions. In the case of social welfare, as in nursing, there should be a new approach to minimize career barriers of university graduates, such as rigorous management of curriculum, strict evaluation of demand and supply of social workers, and university accreditation.

Second, given that career barrier is a complex concept, customized guidance needs to be provided to students to minimize career barriers. Because there are diverse career barriers such as personal indecisiveness, lack of information, and lack of external support, there will be differences in the circumstances that students perceive as barriers. In this study, the analysis was based on the overall average. However, in order to be able to concretely address the various barrier problems, the university will need to take decisive measures to revitalize career support center and provide customized supports.

Third, it will be necessary to promote career efficacy through increased participation in various group activities. In the case of the nursing and social welfare, which are practical studies, it is necessary to support group activities as an informal mechanism for enhancing professional expertise in addition to the regular curriculum of the university. Finally, strategies to cushion job seeking stress and strengthen career efficacy are needed. Since efficacy is the confidence of oneself to solve the problem, it can be linked to the efficacy of the major. During the course of study, students should be equipped with skills and expertise needed to solve problems themselves after graduation through diverse teamwork and teaching methods.

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Conflict of Interest: Nil

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Promoting of Healthy Cities through Social Ecological Paradigm

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ABSTRACT

Background/Objectives: The approach of new healthy cities is a concept based on the social, economic, and psychological aspects of city dwellers. This study has made some suggestions for building healthy cities as a new paradigm, which emphasizes social and ecological factors.

Method/Statistical analysis: As a primary data, this study developed a questionnaire designed as ecological and systematic factors about the health and healthy city factors, and analyzed 283 cases out of 300 cases, excluding 17 cases that were lacking. For the secondary data, this study used the information already available, such as the website of Gijang-gun, statistical reports, and Busan statistical portals.

Findings: The population of Gijang is gradually increasing due to the influx of population in Jeonggwan New Town. Gijang is a city of festivals utilizing natural resources. It is one of the most successful festivals in Korea that attract tourists from all over the country every year. Abundant local resources can be a beneficial resource to inspire residents to participate in the region. However, in this study, residents and healthy city experts of Gijang showed lukewarm attitudes toward local participation and cooperation. They showed positive attitudes toward Gijang's food supply, housing supply, and anxiety about crime, which are the foundation of the healthy city. Compared to the abundant food and housing supply, Gijang has difficulty in public transportation. As seen in this survey, residents have a strong desire for health care. It was found that the anxiety about crime was comparatively low while the anxiety about natural disasters seemed to be very high. Also, the high willingness of residents to continue to reside in the region means that there is abundant social capital available for future regional development.

Improvements/Applications: Gijang has a combined form of a city urban and agricultural. Gijang's public transport bases are relatively poor compared to those of other local governments. However, the maximization of the local resources they have can be used for health promotion and health education of Gijang dwellers.

Keywords: urbanization, healthy cities, social and ecological paradigm, environment, dwellers

INTRODUCTION

Urbanization has brought about changes to city dwellers' lifestyle and their living environment. The Healthy city Project aims to cope with health issues that have emerged with urbanization. The approach to healthy cities scopes with social and economic aspects, and is a concept based on the socio-economic and psychological aspects of city dwellers. Efforts to improve urban health through quantitative and qualitative improvements in the urban environment surrounding human beings were further triggered by the conceptualization of healthy cities by Hancock and Duhl (1988) ^[1]. They presented the characteristics of healthy cities as shown in Table 1.

Table 1: Parameters for Healthy cities

1	A clean, safe, high quality physical environment (including housing quality)
2	An ecosystem which is stable now and sustainable in the long term
3	A strong, mutually-supportive and non-exploitative community
4	A high degree of public participation in and control over the decisions affecting one's life, health and well-being
5	The meeting of basic needs (food, water, shelter, income, safety, work) for all the city's people
6	Access to a wide variety of experiences and resources with the possibility of multiple contacts, interaction and communication

Conted...

7	A diverse, vital and innovative city economy
8	Encouragement of connectedness with the past, with the cultural and biological heritage and with other groups and individuals
9	A city form that is compatible with and enhances the above parameters and behaviours
10	An optimum level of appropriate public health and sick care services accessible to all
11	High health status (both high positive health status and low disease status)

Hancock argued that local governments should take the lead and implement ‘health for all mankind’ strategy to promote the health of the urban population. Currently, 93 local governments in Korea have joined and are active in the Alliance for Healthy cities and are active [2]. In recent years, as national and local government efforts to revitalize the city have been actively carried out, the urban regeneration and understanding of the health of residents have to be in place [3]. Because urban regeneration and healthy cities have a common goal of enhancing urban environment and quality of life through environmental, social and physical improvements [4]. Studies in foreign countries have already discussed the effects of regeneration of residential areas and improvement of the surrounding environment on the physical and psychological health of residents [5]. The ideas are shown in Figure 1 [7].

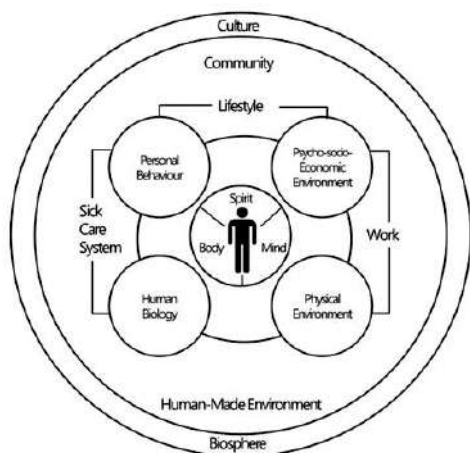


Figure 1: The Mandala of Health, a Model of the Human Ecosystem

This study employs the social ecosystem theory to identify healthy cities. The social ecosystem theory is

a theory of the relationship between the system and the environment, in which the community is composed of various sub systems, and each system is understood as an organism that interacts with each other, but maintains balance and seeks change as an independent entity [8, 9]. In other words, successful healthy cities require the cooperation of the public and the government to induce residents to participate through the interaction between the subsystems and existing resources in the local community. This study presents some suggestions for building healthy cities as a new paradigm, which emphasizes social and ecological factors. To achieve the purpose of the study, a regional survey of residents was conducted and some suggestions were made based on the results.

MATERIALS AND METHOD

Characteristics of Research Sites

Geographical Features: In Figure 2, Gijang-gun is located at the eastern end of Busan Metropolitan City, on the southern tip of the Korean peninsula. The Daeun Mountains in the northwest area of Gijang lie on the border of Yangsan City. The three towns including Gijang-gun, Jangan-eup, and Ilgwang-myeon in the eastern region are adjacent to the East Sea. The northeast area is on the border of Ulju-gun, and the southwest faces Haeundae-gu and Geumjeong-gu of Busan.

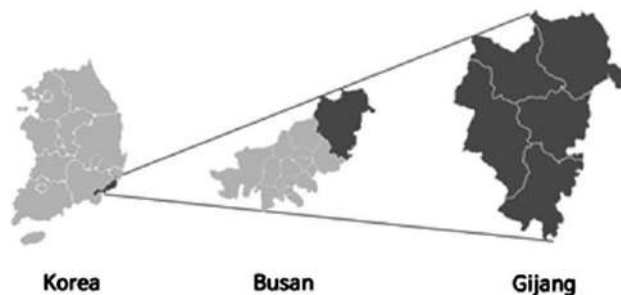


Figure 2: Location of Gijang-gun

Population Trend: Gijang-gun’s population has grown by 10.1% in 2009 due to the influx of population in Jeonggwang New Town. The net number of migration is the second most prominent population movement in the country. It is in stark contrast to the declining population of Busan as a whole as shown in Table 2 [10].

Table 2: Population Trend of Gijang

Year	Total	Men	Women	The Number of Households	Increase and Decrease
2009	89,159	44,713	44,671	35,334	10.1
2010	102,557	51,211	51,346	40,664	14.7
2011	108,095	53,840	54,255	42,806	5.4
2012	114,566	56,941	57,625	45,186	6.0
2013	132,507	71,581	66,888	51,846	15.6
2014	144,748	71,581	73,167	56,606	9.2
2015	153,093	75,755	77,338	60,024	6.0
2016	158,527	78,373	80,154	62,810	3.5
2017	161,651	80,067	81,584	65,738	

Local Resources: Gijang is a city full of festivals utilizing natural resources. It is so great that it can be the most successful festival example in Korea, and it is visited by many tourists from all over the country every year. There are festivals such as tidal flat mud village festival, anchovy festival, seaweeds kelp festival, conger eel festival, Chaseong culture festival, Cheolma Hanwoo Bulgogi festival, and Good fishing ritual festival. Excavation of various local festivals and successful local festival events are important factors that can lead to mutual interest and cooperation among local residents, and these characteristics of Gijang-gun may establish social capital in the future and will be local assets with high availability.

Survey: Korea Healthy Cities Partnership (KHCP) explains the 11 healthy cities requirements, including the following social and ecological factors; Active participation of city dwellers and control of any problems having an influence on individual life, health, and welfare; All city dwellers satisfied with factors in everyday life (including food, water supply, housing conditions, income, safety, and working conditions); Establishing interaction and communication among city dwellers, and gaining access to resources; Promoting history culture and biological heritage or the linkage between all groups within the community and individuals. The study drew up a healthy city questionnaire based on 11 factors presented by the KHCP.

A survey was conducted for 220 residents and 80 healthy city experts on healthy city Gijang between July 1, 2016 and October 30, 2016. A total of 283 cases were analyzed, with the exception of 17 poor returns. The questions were ‘food supply’, ‘housing supply’, ‘medical supply’, ‘security of crime’, and overall satisfaction with life in Gijang. In addition, the Busan Metropolitan Government social survey data was used in part.

RESULTS AND DISCUSSION

The questionnaire items are about Gijang’s food supply. In terms of the questionnaire item, ‘rich in food’, 53.1% of the residents and 71.3% of the experts answered that Gijang was ‘rich in food’, demonstrating that residents and experts commonly answered very positively about the food of Gijang as in **Figure 3**. When asked about housing issues, 53.7% of residents and 57.6% of experts answered positively that ‘housing supply is smooth’ in the item about housing.

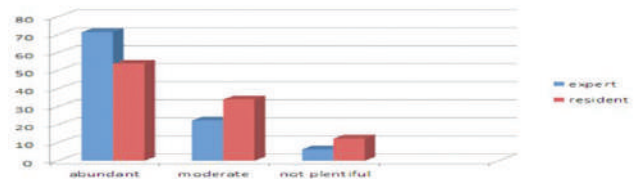


Figure 3: Degree of Food Supply

On the other hand, in the item that Gijang’s medical level (number of medical facilities, number of medical staff) was sufficient, 44.7% of the residents and 60% of the experts answered that it was not enough, revealing the vulnerability of Gijang as a healthy city as in **Figure 4**. There was a difference between the two groups. Experts, rather than residents, responded negatively to the adequacy of medical care. The vulnerability in Gijang’s health has been uncovered. With both urban and rural characteristics, Gijang has a unique lifestyle. While there is abundant food supply and housing supply, there still are difficulties in public transportation. As shown in this survey, residents have a strong desire for health care. The full use of existing nuclear hospitals should be considered.

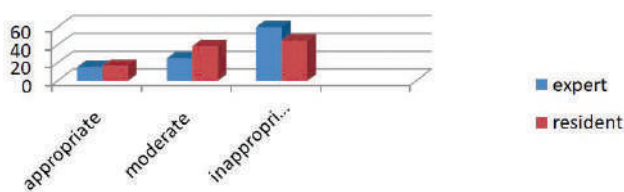


Figure 4: Adequacy of Medical Supply

In the item on the safety of Gijang such as crime and security, etc., 41.3% of experts and 39.4% of residents answered that they were safe, showing that it was a

little more favorable response than not safe. However, the Busan Metropolitan City Survey^[10] (biennial survey, data from 2015 is the most up-to-date data) shows the characteristics of Gijang worthy of looking closely as in **Table 3**. Compared with the basic local self-governing bodies of Busan Metropolitan City on ‘feelings of local uneasiness factors’, there was nothing unusual about crime and/or violence, but compared to other basic local self-governing bodies, the anxiety about natural disasters can be seen to be remarkably high in Gijang.

Table 3: Anxiety about Natural Disasters

	Feel Very Much	Feel A Little	Moderat	Not Feel Much	No Feeling At All
Total	12.6	38.5	29.7	15.2	2.8
Jung-gu	11.1	34.5	28.1	19.4	6.1
Seo-gu	12.6	36	32.8	13.7	4
Dong-gu	6.3	31.5	29.2	25.9	5.4
Yeongdo	12.3	32.6	29.9	15.3	5.6
Jin-gu	10.2	38.8	30.7	16.7	2.4
Dongnae	14	38.6	28.4	15	3.2
Nam-gu	9.6	34.6	30.2	20.5	3.2
Buk-gu	18.6	41.4	27.1	10.2	1.9
Haeundaeu	11.7	39.4	30.6	15.3	2.9
Saha-gu	12.1	41	30.5	14	1.6
Geumjeong	13.6	46.3	28.3	9.6	1.5
Gangseo-gu	15.9	41.9	28.8	11	2
Yeonje-gu	10.9	33.1	29.6	19.7	4.1
Suyeong-gu	12.4	38.9	27.7	15.8	3.6
Sasang-gu	10.1	37.9	33.3	15.9	1.9
Gijan-gun	25.7	38.8	25.2	8.5	1.3

In the opinion of residents and experts on local resources, the respondents who answered “Gijang is a local community that make good use of local resources (local festivals, local products)” were 48.5% of residents and 55% of experts, showing a very positive attitude, while 13.8% and 2.5% respectively of the respondents who answered “they do not use them well”. The use of local resources can have a huge influence on the social welfare of residents.

On the other hand, 50.2% of the respondents answered ‘normal’ and 34.5% answered ‘active’ to the item, ‘Do you think that there are various encounters, exchanges, contacts and interaction among the residents of Gijang?’, and in case of experts, 46.3% of them answered ‘normal’, and 35.0% answered ‘active’. While they answered that they are very positive about using local resources, they showed lukewarm attitudes towards the exchange and

interaction among the residents. With regard to the item, ‘Is Gijang a healthy city?’, they showed neutral attitudes. 44.8% of the residents and 47.5% of the experts answered that it was normal as in Figure 5.

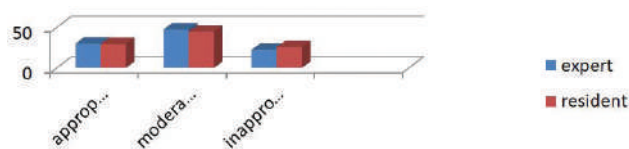


Figure 5: Is Gijang a Healthy City?

As shown in **Figure 6**, for the item, “I have a willingness to continue to live or work in Gijang”, 74.9% of the residents and 55.0% of the experts answered that they were highly willing to live or work in Gijang. This item shows the loyalty to the region. The high willingness of residents to continue to reside in the area means a wealth of social capital that can be used for future regional development.



Figure 6: Willing to Stay or Work

CONCLUSION

In the results of the survey, the opinions of residents living in Gijang and experts related to healthy city of Gijang can be summarized as follows.

First, the opinions on health related food, housing supply, and safety for crime in general had positive attitudes. Given that the appetite for food, housing, and safety to lead a healthy life are very basic needs, Gijang can be a well-being community as a residential area. However, there is a need to improve the regional image of healthy city Gijang as they showed a neutral attitude toward the issue of whether Gijang to be as a comprehensively healthy city.

Second, while they were positive for the safety of crime, in contrast, their attitude toward safety for natural disasters was very negative. Considering the geographical features of Gijang, it is a very natural outcome and the usual safety education and training to prepare for this should be provided to the community. Since the premise of health is safety, the identification of Gijang as a safe city is necessary for future healthy city planning.

Third, there was a very positive assessment of the local festivals and its use of regional specialties, which can be regarded as local resources of Gijang. The regional festivals that utilize the characteristics of Gijang are a very important resource that can enhance residents' cohesiveness and community spirit. As both residents and experts showed a positive attitude toward the use of these resources, in practice, these have proven to be a social capital that can enrich their lives and further enhance the value of Gijang. These positive assessments are to be the potential that new residents and existing ones of Gijang will continue to interact with each other. However, their views on exchanges and interactions among residents turned out to be different. They showed lukewarm responses to various meetings, exchanges and interactions among local residents.

Lastly, they showed very positive attitudes about the willingness of staying in or working in Gijang. In particular, 74.9% of the respondents said they would continue to live in the region, indicating that the residents are highly satisfied with the region. This positive attitude can be an important step in understanding the possibility of active participation of residents when policies are implemented to build a healthy city through cooperation between the public and the government.

Based on these results, suggestions for the healthy city Gijang are as follows.

First, the basic principle of a healthy city is to provide the residents with the safety in their daily life. Gijang has geographical characteristics of being adjacent to the mountain and the coast, and urban and rural and fishery complexes, and there are elements of various disasters (large typhoon, forest fire, earthquake, tsunami, drought) as compared with those of other basic self-governing bodies in Busan. The image of healthy city Gijang and safe city Gijang should be strengthened. A safety education manual is required to strengthen the sense of disaster preparedness of residents and to be shared by the people and the government. To achieve this, safety education manuals should be distributed and promoted centered on schools and industries. It is necessary to develop visiting education by taking advantage of the characteristics of Gijang where the public transportation is not well organized. Also, the high desire for medical services requires the development of visiting services through public health centers.

Second, by using the local festivals of Gijang, which are already active and considered to be a successful case, it is necessary to strengthen the community consciousness of residents. By arranging a system for local residents to participate in various local festivals, it is necessary to raise the social capital that leads to the development of local community with the effect of increasing local participation awareness of residents. Participation in volunteer activities through festivals promotes harmony between existing residents and newly arriving residents, and increases residents' local participation and interest in the region. This can lead to community change.

Third, Gijang has many other unique characteristics compared to other basic self-governing bodies in Busan. As seen from this survey, they showed very high satisfaction with food, housing and the safety from crime.

Also, they hope to continue living and working in Gijang. This fact means that Gijang has important resources that a healthy city needs. On the other hand, the lack of medical care and the anxiety of natural disasters are factors that harm healthy city Gijang. The government should be the center, and it should complement these shortcomings based on the cooperation of residents.

The definition of a healthy city is changing from a medical model to a social model. That is, it means not only physical health but also social, emotional, and cultural health of the community and should be developed into a comprehensive concept of healthy city through participation of residents. Korea continues to undergo changes such as urbanization, urban development, and urban redevelopment. Above all, the concept of healthy cities cannot be overlooked for cities where residents can live a long life. This study suggested the construction of a healthy city based on a new paradigm centered on social and environmental factors.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Review on Privacy Preserving of Medical Data in Cloud Computing System

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ABSTRACT

In current scenario, tele-medicine system is the emerging health-care service, where health professionals can treat, evaluate and diagnosis a patient using tele-communication technology. Data in health-care system denotes a set of medical health data (X-ray, fMRI data, scans of lung, brain, etc.), which are complex and larger in number. It is infeasible to handle the medical-datasets using traditional hardware and software. So, it is essential to develop a practical approach to balance the privacy protection and health-care data sharing. In order to deal these concerns, several methodologies are developed, most of the researches focused only on a small scope of issue with single concept. This review paper analysis the researches done on privacy preserving of medical-data in cloud computingsystem and also examines the major issues faced by the conventional techniques. This procedure helps the researchers to give better solution for the current concerns faced in the privacy preserving of medical-data in cloud system.

Keywords: *Cloud computing, cloud data storage, cloud service provider, medical data, and privacy preserving.*

INTRODUCTION

Big data analytics is the process of collecting and assessing the enormous amount of data for obtaining new knowledge, which is applied in the fields of medical, weather forecasting ^[1], purchase history analysis, etc. Nowadays, tele-medicine is one of the emerging research fields for e-health research ^[2]. The health-care industry includes patient data in the form of social media posts (blogs, and twitter feeds), clinical decision support system (laboratory, prescriptions, medical imaging, pharmacy, physicians written notes and other administrative data) ^[3], ^[4], machine generated sensor data, medical journal articles, etc. These multimedia medical data are infeasible to manage by using traditional software and hardware. Cloud computing is the finest system to overcome the issues of big-data, because it delivers computation for analyzing and organizing the data, and also provides enough storage space ^[5], ^[6]. Cloud architectures pave the way for improvement and cost trade-off with availability and reliability enhancement. In cloud storage, the user can access their personal data at anytime and anywhere without storing the data at local.

Though, the cloud service provider does not completely trust the cloud storage due to the verification of data integrity, which happens at non-trusted cloud

servers. Similar to cloud computing, the health-care cloud computing is also have different problems associated to its security. The most important issues are cyber-security concerns, absence of security standards, policy and legal problems, data protection, lack of transparency, privacy protection and software licensing ^[7], ^[8]. To resolve these issues, several methodologies were developed for balancing the privacy protection and health care data sharing. For instance, multi-key privacy-preserving deep learning methodology ^[9] and triangular data privacy preserving protocol ^[10] was employed for cloud data security. However, these approaches showed better data storage security, but the encryption and decryption time was too high. In this paper, review on the privacy preserving of medical data in cloud system has been done in order to analysis the performance and concerns of conventional methodologies. This process motivates the researcher's for further research work in preserving of health-care data.

This review paper is composed as follows, Section II presents the overview of privacy preserving of medical data in cloud system. Section III reviews several recent papers on privacy prese ving in cloud computing system. Section IV represents the research gap. In section V, objective of the research is presented. The conclusion is made in the section VI.

Over-view of privacy preserving of health-care data in clouds: Generally, privacy preserving of medical data in cloud system consists of three major steps such as, acquisition of medical data, data encryption and decryption, and system model for cloud data storage.

Types of medical data: The data acquisition is the initially stage of privacy preserving of medical data in cloud system. In this scenario, two types of medical data are acquired such as, text and image data. It is necessary to select appropriate data; if the data is not acquired satisfactorily then the intended operations may not be achievable. A few example of text and image data are detailed below.

Image type: The image type medical data are acquired from the standard benchmark datasets: T1-WCEMRI, Mammographic Image Analysis Society (MIAS), OASIS dataset, etc. All these datasets are related to medical field. A brief description about the acquired datasets are determined below.

- **T1-WCEMRI dataset:** The original T1-WCEMRI dataset contains 3064 medical images form

233 patients with three types of brain tumor's: glioma-1426 slices, pituitary tumour-930 slices and meningioma-708 slices.

- **MIAS dataset:** MIAS is an organization of UK research groups, which generates a database of digital mammograms. The original dataset digitized at 50 micro pixel edge, then the database is reduced to 200 micro pixel edge of 1024×1024 pixels ^[11]. The dataset consists of 322 digitized images that are available on 2.3 GB 8mm (Exabyte) tape.
- **OASIS dataset:** The original OASIS dataset contains 1500 raw image scans, which is captured from 609 normal adults and 489 persons at different stages of cognitive decline ranging in age from 42-95 years. This database consists of 2000 MR Sessions that comprises of susceptibility weighted imaging, arterial spin labelling, diffusion tensor imaging sequences, time of flight, etc. ^[12]. Figure 1 shows the sample images of T1-WCEMRI, MIAS and OASIS datasets.

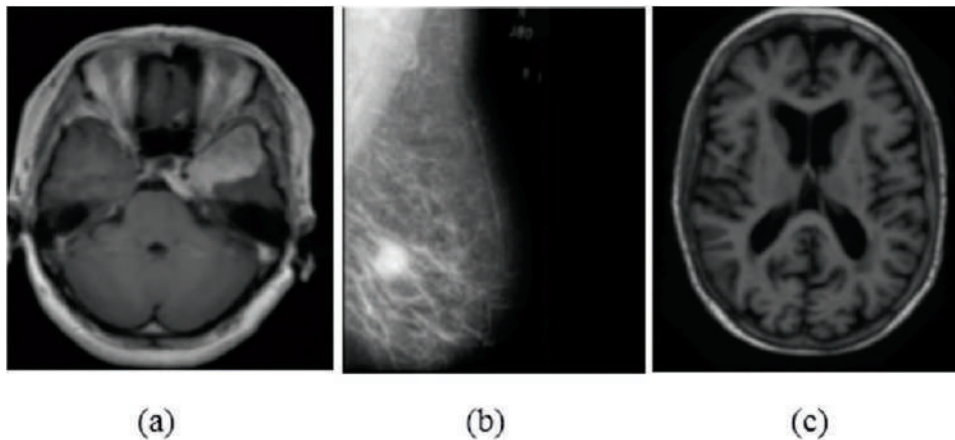


Figure 1: a) Sample T1-WCEMRI dataset image, b) MIAS dataset image, c) OASIS dataset image

Text type: The text type medical data are acquired from the standard benchmark datasets: Cleveland, Hungarian, star-plus, Switzerland datasets, etc. The description about the acquired databases are detailed below.

- **Cleveland dataset:** The Cleveland database consists of 76 characteristics under 14 categories. Many machine learning researchers have used the Cleveland database. The field named “goal” refers to the patients with the heart disease^[13]. It represents the value from 0 to 4, which separates from the absence of heart disease to the presence. Six of the 76 characteristics are removed due to incomplete data. Some of the patient's name and

their social security number are eliminated from the dataset that are replaced with the dummy values for the privacy purpose.

- **Hungarian dataset:** The format of Hungarian database is similar to Cleveland database. The Hungarian database comprises of 261 examples. Three or four examples are neglected due to incompleteness of the data. The class distribution of Hungarian database demonstrates 62.5% absence of heart disease and 37.5% have heart disease.
- **Star-plus dataset:** The star-plus dataset comprises of six subjects, and above forty trails of functional

magnetic resonance imaging data are collected for each subject [14]. An individual trail contains averagely 5000 voxels for one snap-shot, which is collected for every 0.5 seconds.

- **Switzerland dataset:** Switzerland dataset is collected from University Hospital Zurich, Switzerland by William Steinbrunn, M.D and from University Hospital Basel, Switzerland by Mattias Pfisterer, M.D. It includes 123 data instances and 14 attributes. The class distribution of Switzerland dataset shows 93.5% presence of heart disease and 6.5% absence of heart disease. After the acquisition of medical data, data encryption and decryption is carried out for preserving the privacy of medical data in cloud system.

Medical data encryption and decryption: Homomorphic encryption is the form of encryption, which performs computation on cipher-texts and generates the encrypted result. In decryption phase, the matching operation is performed on the plain-text. The homomorphic encryption is divided into two types such as, fully homomorphic and semi homomorphic schemes. Some of the common homomorphic methods used in medical data encryption and decryption are discussed below.

Enhanced homomorphic crypto-system: The Enhanced Homomorphic Crypto-system (EHC) is used for homomorphic decryption and encryption to with-stand the problem of indistinguish ability under chosen plain-text attack. In homomorphic encryption, the system performs computation on the encrypted data without knowing the knowledge of real value. At last, the encrypted data or message is send to decryption phase for decrypting the encrypted data^{33,34,35,36}. While performing on real value, the decrypted outcome must be equal to the intended computed value. To overcome this concern, a specific structure is presented by EHC [15]. The encryption and decryption of EHC is determined below,

Select large prime numbers "p" and "q".

Calculate $m = p * q$.

Generate a random number "r".

Where, "r", "m" and "q" values should be kept secret.

Shared key is "p".

Encryption:

Encryption (X, m, p, q, r) .

Assume $X \in Z_p$.

Calculate $Y = (X + r * p^q) \pmod m$.

Output $Y \in Z_c$.

Decryption:

Decrypt (Y, p) .

Input $Y \in Z_c$.

Calculate $X = Y \pmod "p"$ output $X \in Z_p$.

Benaloh crypto-system: Benaloh crypto-system is a homomorphic encryption approach with an improvement of expansion factor [16]. Though, the private and public keys are generated as follows,

Consider two large parameters "p" and "q", with a block size "R".

- "R" divides $(p - 1)$.
- "R" and $(p - 1)/R$ are reasonably prime.
- "R" and $q - 1$ are reasonably prime.
- $n = pq$.

Select $y \in (Z_n)^* = \{x \in Z_n : \gcd(x, n) = 1\}$,

$$y^{\frac{\phi}{R}} \neq 1 \pmod n \tag{1}$$

Where, ϕ represented as $(p - 1)(q - 1)$, (y, R, n) are considered as public key and the two prime numbers "p" and "q" are denoted as private key.

Encryption:

In case, if m is an element in Z_R and u is a random umber in $(Z_n)^*$, then calculate the randomized encryption of m using the equation (2).

$$E_R(m) = \{y^m u^r \pmod n : u \in (Z_n)^*\} \tag{2}$$

For easy verification, equation (2) is re-written as follows,

$$E_R(m_1) \times E_R(m_2) = E_R(m_1 + m_2) \tag{3}$$

Decryption:

The decryption function of m and u is denoted in the equation (3).

$$(y^m u^R)^{(p-1)(q-1)/R} = y^{m(p-1)(q-1)/R} u^{(p-1)(q-1)} = y^{m(p-1)(q-1)/R} \pmod n \tag{4}$$

Since, $m < R$ and $y^{(p-1)(q-1)/R} = y^{m(p-1)(q-1)/R} \neq 1 \pmod n$, Benaloh cryptosystem concludes that $m = 0 \pmod R$

if $(y^m u^R)^{(p-1)(q-1)/R} = 1 \pmod n$. In case, if $z = y^m u^R \pmod n$ is an encryption of m by using secret key (p, q) determine whether $m = 0 \pmod R$. If R is small, decrypt z by employing a non-negative integer ms such that $(y^{-mz} \pmod n) \in E_R(0)$.

Brakerski-Gentry-Vaikuntanathan crypto-system: Brakerski, Gentry and Vaikuntanathan developed a first fully homomorphic encryption scheme, which does not need bootstrapping [17]. The developed methodology delivers better performance on base security with learning errors. This encryption method is implemented in the open source library along with several optimizations approaches. The developed encryption scheme is an asymmetric encryption methodology, which is utilized for the encryption by means of bits.

Encryption: (Plain-text m , public-key Pub): Ciphertext c .

Decryption: (Cipher-text c , private-key Priv): Plain-text m .

Level shifting operation:

Rescale (Cipher-text c): Cipher-text c' .

Switch-key (Augmented Cipher-text c): Cipher-text c' .

Homomorphic operation:

Add (Cipher-text c_1 , Cipher-text c_2): Cipher-text c_{sum} .

Mul (Cipher-text c_1 , Cipher-text c_2): Cipher-text c_{mul} .

System model for cloud medical data storage: This sub-section describes about the system model for cloud medical data storage, as shown in the figure 2. Generally, the cloud data integrity architecture contains following parties [18],[19]. The general function of each individual party is described below.

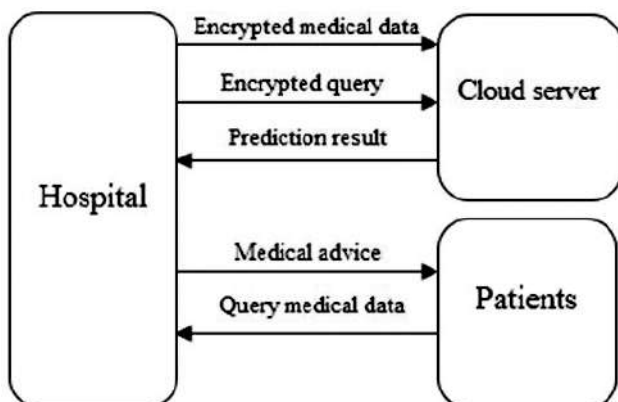


Figure 2: Cloud medical data storage system

Data owner: At first, the data owner needs to register with cloud service provider server. After registration, cloud service provider generates private and public key and send the keys to data owner. Once the data owner register with cloud server, the data owner allowed to download and upload the resource/data in the cloud server. The respective data are encrypted and upload in the cloud server. Usually, key generation is an important step in data storage, which includes two keys such as private and public key. The sender encrypts the data using public key, and only the holder have private key to decrypt the respective data.

User: In order to access the network, initially the user needs to create an account. After creating the account, user want to login the account and request the work from cloud service provider. Based on the user request, cloud service provider will process the user requested work. The network coding use the programming languages like .net or java for communicating with the cloud server. The user can access the requested data by sending the request to cloud server provider.

Cloud service provider: Cloud service provider has a combination of hardware and software resources and also delivers flexible online data storage and computing. In data storage, the cloud service provider comprises of huge amount of data and also handles the data owner and user information for authentication. The cloud service provider stored the data owner and user information in the database. In order to process the user requested job, the cloud server redirects the user requested job to any of the queue. In queue, virtual machines are utilized to process the user requests.

Third party auditor: Based on the data owner request, the third party auditor audits the data, which are uploaded by the data-owner. The TPA need to register with the cloud server for auditing the user requested data. The TPA updates the auditing information at certain time period, so the security of data is ensured. Also, the auditor update to the data-owner, if there is any change occurred while auditing the data.

Key generation: Generally, the key generation techniques includes two stages set up stage, and challenge-prove stage. The brief description about each stage is detailed below.

Set-up stage: The set-up stage is a series of operation at the client end for initializing the system. This stage includes three functions,

- Key generation (1^{key}): This section includes probabilistic key generation methodology $\{skey, pkey\}$, which considers security parameter key as an input. The inputs are considered as a private key $skey$ and the outputs are denoted as a public key $pkey$. The data-owner publishes public $pkey$, and keeps private key $skey$ as a secret key for decrypting the respective data.
- Tag generation ($skey, pkey, m \rightarrow$ meta data): The meta-data considers the client document $skey, pkey$ as an input and the outputs (meta-data tags δ) are stored locally by the client. At the server end, the corresponding documents m and tag δ are remotely stored by the client.
- Block-sig-generation: After generating the tag document δ , the data-owner creates signatures for each data block using cryptographic hash function.
- Gen-challenge ($c \rightarrow \{chal\}$): This operation considers the client's private parameter c as an input and the output challenge $chal$ for the future query.
- Gen-proof ($p_s, m, \delta, chal \rightarrow \{G\}$): It takes user public parameters p_s , meta-data δ , document m and challenge $chal$ as an input and the output G is given to the user for verifying the server, whether it outsourced the document correctly or not.
- Check-proof ($pkey, chal, meta\ data, G \rightarrow \{"reject", "accept"\}$): This operation is used to check the server possession of the target documents. It considers the user public key $pkey$, challenge $chal$ made by the client, evidence G and meta-data δ as an input. By analysing the evidence G , the function results as either "accept" or "reject".

Challenge-prove stage: The challenge-prove stage is an interaction process between the server and client. The client determines the issues and sends the challenges to the server. The server evaluates the corresponding challenges and replies output to the client. The challenge-prove stage contains three operations, which are listed below.

LITERATURE REVIEW

Several techniques are suggested by researchers in privacy preserving of medical-data in cloud systems. In this scenario, brief evaluations of some important contributions to the existing literatures are presented.

Author	Methodology employed	Advantage	Limitation	Performance measure
X. Liu, R.H. Deng, Y. Yang, H.N. Tran, and S. Zhong, [20]	A Hybrid Privacy preserving Clinical decision support System (HPCS) with light-weighted data mining approach was proposed for monitoring the patient's health condition in real-time.	Compared to the existing approaches, the developed methodology effectively solves the computational overflow problem by analysing the experimental result.	While performing with more users, the developed approach leads to two major issues: inadequate data backups and data loss.	Computational and communication cost
J. Li, J. Li, X. Chen, Z.Liu, and C. Jia, [21]	In this research, a hybrid architecture (combination of fuzzy keyword search and AttributeBased Encryption (ABE) algorithm) was proposed to tackle the problems of privacy preserving in cloud computing.	The experimental outcome confirmed that the proposed methodology was more significant than the existing approaches in terms of time cost	The developed cloud computing system was an open-ness cloud computing system, so social engineering and phishing attacks were common here.	Time cost
J.J. Yang, J.Q. Li, and Y. Niu, [22]	To secure the medical data in cloud environment, an effective methodology was proposed. The developed methodology contains four major steps (vertical data partition, data merging, integrity checking and hybrid search across cipher and plain text.	In multi-cloud paradigms, the proposed methodology provides better balance between the privacy protection and medical data utilization.	The developed methodology provides insecure data sharing in the condition of one to one solution.	Time cost

Conted...

H. Zhang, Z.Zhou, L.Ye, and D.U. Xiaojiang, [23]	In this study, a new data partition methodology: extended quasi identifier technique was proposed in cloud computing for reducing the data privacy concerns.	The developed data privacy preserving methodology was applicable in several real scenes, because it could incur low information loss.	The developed cloud computing system still consists of vulnerabilities, specifically in the networks that have several data-owners and complex infrastructures.	Time cost, and average relative error
C. Zhang, L. Zhu, C.Xu, and R. Lu, [24]	APrivacy Preserving Disease Prediction (PPDP) system was proposed to improve the level of privacy protection.	The developed methodology effectively encrypts and outsourced the medical data to the cloud server.	The PPD approach have several positive benefits, but there were numerous security problems and ensuring privacy was extremely difficult.	Computational time
H.A. Al Hamid, S.M.M. Rahman, M.S. Hossain, A.Almogren, and A. Alamri, [25]	A bi-linear pairing cryptography with tri-party one round authentication key protocol was proposed in order to store and access the medical data securely.	The developed authentication key protocol security analysis shows that the proposed approach was robust against all security attacks.	In most of the cases, the developed methodology does not supports the direct-order operation in cloud server.	Memory requirement, decryption time, encryption time and key generation time.
X. Liu, R. Lu, J. Ma, L.Chen, and B. Qin,[26]	Developed a new privacy preserving patient centric Clinical Decision Support System (CDSS)with naïveBayesian classifier for securing the patient's information privately.	Naïve Bayesian classifier excavates the useful information from large clinical data for improving the CDSSs.	Sometimes, the developed classifier leads to collusion problem between the cloud platform and processing unit.	Running time
A. Alabdulatif, H. Kumaraage, I.Khalil, and X. Yi, [27]	In this study, a light-weighted homomorphic encryption methodology was utilized for ensuring the data security	Qualitative and quantitative analysis shows that the developed approach performs consistently with less over-heads and high detection accuracy in cloud-based anomaly systems.	The developed methodology need efficient processing facility and large volume of data, otherwise it leads to critical issues of security, data-ownership and privacy.	Execution and encryption time
A.Alabdulatif, and M. Kaosar, [28]	A homomorphic encryption system based on DomingoFerrer approach was proposed forsecuring the analytic services and cloud based storage.	The proposed methodology: Extended DomingoFerrer determines both positive and negative ranges in cloud computing system. This action helps to improve the security of cloud based storage system.	Still, an effective computing methodology was required to further improve the cloud storage system.	Encryption, decryption, multiplicationand addition time
L. Lyu, J.C. Bezdek, Y.W. Law, X.He, and M. Palaniswami, [29]	To address the challenges in cloud service, a two stage method (Repeated Gompertz (RG) and Random Projection (RP) matrix) was proposed.	The two stage algorithm (RG+RP) preserves the privacy of both anomalous and normal data.Also, it delivers better recovery rates in several benchmark medical datasets.	The computational time cost was bit high, while performing with two stage process.	Recovery rate

Conted...

H.H. Nguyen, [30]	In this research, Lloyd based methodologies were developed to address the problem of privacy preserving k-modes.	The developed methodology provides secured private key for the data-owner, which prevents the stored data from the attackers.	Only, a few attacks were utilized to withstand the capacity of developed methodology.	Friedman test and runtime
K. Xing, C.Hu, J. Yu, X.Cheng, and F. Zhang, [31]	This paper considered the issue of mutual privacy protection in social participatory sensing, which was decreased by using k-means clustering algorithm.	In experimental analysis, the k-means clustering methodology shows better solutions to the collusion attacks.	In multi-clouds, the k-means clustering partition the data vertically, so it was difficult to protect the entities of clusters.	Accuracy and recall
H. Kaur, N.Kumar, and S. Batra, [32]	In order to enhance the health care recommendation system efficiency, a new algorithm: Privacy Preserving Collaborative Filtering (PPCF) with Arbitrary Distributed Data (ADD) approach was proposed.	Compared to other recommendation systems, the developed system shows better on-line prediction generation time and off-line model generation computation time.	The developed approach was only applicable for structural medical database by means of vertical splitting. It does not supports unstructured medical data.	Coverage and mean absolute error

CHALLENGES

In current scenario, a few challenges need to be resolved in the field of privacy preserving of medical data in cloud computing system. In this cloud system, it is essential to reduce the storage in private cloud on the off chance, where the entire sensitive information is stored. An efficient service is required to attain proper incoming data storage, indexing maintenance, and accessing capacity. In addition, finding an appropriate set of attributes for sanitization would minimize the side effects, especially when sensitive information overlaps with non-sensitive information. These procedures are achieved by following the below mentioned objectives.

CONCLUSION

The e-health care system is the most emerging and developing system for preserving the personal health data. The cloud based health care system makes the personal health record more flexible and efficient. In order to evaluate and diagnose a patient, the health-professionals need to access patients medical records (brain scans, fMRI data, X-ray, etc.), which consists of enormous multi-media data. For supporting mobility and efficient access for both the patients and health-professionals, the medical records need to be stored in big data storage in the health-care cloud. This review paper gives an overview of privacy preserving of

health care-data in cloud computing system and also evaluates the existing methodologies by means of advantage, limitation and performance measure, which is detailed in the table 1. Still, there is much work to be done on privacy preserving of health care-data in cloud computing system for delivering better data security. This review paper will help the readers to understand the state-of-the-art in privacy preserving of medical-data in clouds and also motivates more meaningful works.

FUTURE WORK

The researchers follow some of the major objectives in privacy preserving of medical data in cloud system, which are discussed below.

- Develop a clustering methodology for preserving the medical records in hybrid clouds.
- Develop a hybrid query based secure methodology for data storing, retrieving and ensuring the safe usage of medical resources/records and also to provide better solutions to the problems like data privacy protection and lack of transparency.
- Develop a privacy-preserving outsourcing framework under the hybrid cloud mode.
- Develop a secure system to overcome the drawback of Computational time and cost while encrypting and decrypting data.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nill

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Grandchildren Parenting Experiences of Grandparents

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ABSTRACT

Background/Objectives: This study was to explore the meaning of life found in the life story of grandparents who are parenting their grandchildren.

Method/Statistical analysis: This study employed the phenomenological analysis method proposed by Colaizzi. The study was conducted through face-to-face in-depth interviews based on a semistructured interview guide. In-depth interview is a process of communication with purpose and it is where the researcher engages in purposeful conversation with the participant to create knowledge related to the subject to utilize the content provided by the research participant as research data.

Findings: The study results are grandparents taking care of grandchildren showed 3 categories Worth, Relations with adult children, and Difficulties of parenting. Grandparents taking care of grandchildren showed 3 categories 'Worth', 'Relations with adult children', and 'Difficulties of parenting'. The above study results show that grandparents taking care of grandchildren were participating in parenting through their own parenting experiences and parenting literature although they were not largely influenced by their own grandparents in the past.

Improvements/Applications: This study can be provided as basic data for education of grandparents participating in parenting grandchildren and young couples trying to find a balance between work and family.

Keywords: *Grandchildren, Grandparents, Experience, Qualitative, nurture.*

INTRODUCTION

Data The biggest characteristic of modern society is the equal social life among men and women due to education level increase, changes in values regarding employment, and self-realization desires in women.

The high rate of employment of married women due to the increase of social participation of women is acting as a core factor in bringing social changes and family changes¹.

Important changes that appeared especially after the 1960s include deterioration of extended families, decrease of traditional families, as well as the phenomenon of multiculturalism along with increase of international immigration.

This rapid changes in family and society created a sense of crisis in young women responsible for childbirth and parenting leading to an increase of households without children and this led to the low birthrate phenomenon² with the birth rate of 1.24.

This phenomenon is expanding into a crisis for each household as well as a national crisis. As the participation in economic activities of married women increase, the biggest difficulty that inhibit the coexistence of work and family for women is the problem of parenting after childbirth².

Looking at the fact that while more than 70% of working mothers with preschool age children utilize early childhood education institutions and still entrust their children³ to the children's grandparents in other times, parenting support from grandparents is an alternative plan of preschool age children parenting and can be an important resource as the role of supporting economic activities of the married adult children⁴.

Especially the reason why parenting by grandparents are preferred with younger age of children is because grandparents are trustworthy and take care of the children with affection⁵.

Therefore the purpose of this study was to explore the meaning of life found in the life story of grandparents who are parenting their grandchildren.

After setting their children on their feet, they felt “emptiness, loneliness and dreariness as if one corner of the heart were with a hole” while the feeling of relief of having achieved the assigned duty was accompanied by the feeling of emptiness and depression by becoming needless people.

The results of study show that they have much time to spare in general, so they enjoy leisure time; however, they also suffer from depression by the loss of meaning of life and sense of purpose by feeling confused in the meaning of life due to changes and loss of family relationship through marriage of their children and death of spouse.

However, most of them led their usual life, enjoyed their hobbies they wanted to have for a long time and were fully occupied with volunteer activities, thinking that the volunteer works were equivalent to the act of gaining virtue for their children.

In particular, one of the reasons why they take care of their grandchildren is that they are proud to see their daughter or daughter-in-law working in the field of their expertise.

This is one of the characteristics of people belonging to baby boomer generation of which working women and participation in society were started to be considered absolutely positive.

Due to the changes in perception of women in the sense that their daughter and daughter-in-law must work, they were willing to actively help in taking care of their grandchildren.

For this reason, the study coincided with the research results⁶, in the sense that they felt responsible for rearing their grandchildren and they want to play a role as primary fosterers in accordance with blood-tied tradition of our country's culture.

This has the same context as the result of research⁷ in the sense that the main motive of taking care of their grandchildren resides in the fact that there are no other proper options or the situation is inevitable.

This means that the elderly in the old stage of life use their time and ability for the benefit of others and society, and it is considered the same context as the result of survey done by Kelly in the sense that this experience gives them an opportunity to actively participate in the society to which they belong, serving as an indispensable factor for social integration of the elderly into the society.

In sum, after making their children independent from them, grandparents think that the act of rearing their grandchildren is rewarding in life and lead an enjoyable life through the activity⁸.

The following results show what influenced the current role as grandparents, view on childrearing, relationship with their adult children, difficulties while rearing their grandchildren, advantages in rearing their grandchildren and desirable childrearing.

MATERIALS AND METHOD

The study was conducted through face-to-face in-depth interviews based on a semistructured interview guide. In-depth interview is a process of communication with purpose and it is where the researcher engages in purposeful conversation with the participant to create knowledge related to the subject to utilize the content provided by the research participant as research data.

Here, the researcher does not only unilaterally accept the content of the interview but as the role of intervening in the experience composition of the participant in the interview process.⁹

Preliminary research participants were 3 grandparents who were not participants in the study. The interview time for the preliminary study was around one hour to one hour and a half per session and it was determined after the interview if there were difficult questions that the preliminary study participants could not understand, if there were additional questions that should have been asked, and if the interview time was appropriate.

Also, recordings were made with the agreement about the recording of the interview and after the interview, the recorded contents were all transferred and analyzed.

To obtain validity and reliability of the study, the study strived to minimize prejudice by researchers against research participants in the process of data collection and analysis.

Methods: This research conducted analysis according to the method described by Colaizzi, out of phenomenological data analysis methods.

To achieve this, analysis was conducted through listening to recorded in-depth interview of participants, reading the transcription of it, and composing the

meaning by making general, abstract topics from extracted sentences to categorize a broader level. To distinctively describe what research participants express during categorizing process, their interview responses were repetitively read and categorized into topics before receiving counsels from nursing professors with many experience in qualitative research.

This researcher read many times the manuscript written based on the recording of the in-depth interviews with study subjects, made general and abstract themes with the sentences extracted from the manuscript to built a semantic structure, and categorized them in a larger level.

In the categorization process, this researcher repeatedly read study participants' interviews to accurately describe their expressions and categorized themes, and then took advice from three professors in nursing department, who have a lot of experience of qualitative research.

This study used the phenomenological analysis method proposed by Colaizzi.

This researcher read many times the manuscript written based on the recording of the in-depth interviews with study subjects, made general and abstract themes with the sentences extracted from the manuscript to build a semantic structure, and categorized them in a larger level.

In the categorization process, this researcher repeatedly read study participants' interviews to accurately describe their expressions and categorized themes, and then took advice from three professors in nursing department, who have a lot of experience of qualitative research. According to the flow of themes in the analyzed data, this researcher integrated and comprehensively explained material experience.

Ethical Considerations for research Performance:

Since qualitative research is performed by a direct relationship with research participants, privacy can be exposed, which is very difficult to control it in an appropriate manner.

Therefore, a prerequisite is consent and cooperation of the family and relevant supervisors as well as prior consent. Before conducting interview, research purposes were explained to the participants and a written consent was obtained from them.

The following things are promised with participants.

- (1) the interview content will not be used except for the research purposes
- (2) transcribed data and recorded files will be discarded immediately after the research is completed
- (3) a report was processed anonymously, and
- (4) private personal information will not be disclosed.

Furthermore, the participants had the full right to refuse participating in the research at any time during the interview.

RESULTS AND DISCUSSION

The study results are as follows.

Table 1 Grandparents taking care of grandparents showed 3 categories Worth, Relations with adult children, and Difficulties of parenting.

The above study results show that grandparents taking care of grandchildren were participating in parenting through their own parenting experiences and parenting literature although they were not largely influenced by their own grandparents in the past.

While grandparents are involved in raising grandchildren to expect adult children's success, it is difficult because of differences in educational perceptions among adult children.

Nevertheless, grandparents for finding the meaning of life such as happiness, worth, and mission through the parenting of grandchildren

Table 1: Grandchildren Parenting Experiences of Grandparents

Upper category	Lower category
Worth	Meaning in life
	Economic assistance
	Appreciation
Relations with adult children	Regret
	Conflict
	Trust
Difficulties of parenting	Physical and emotional difficulties

Grandparents taking care of grandchildren showed 3 categories 'Worth', 'Relations with adult children', and 'Difficulties of parenting'.

The above study results show that grandparents taking care of grandchildren were participating in parenting through their own parenting experiences and parenting literature although they were not largely influenced by their own grandparents in the past.

While grandparents participate in the parenting of their grandchildren expecting the success of their adult children, due to the differences in the perception of education between their adult children, it also acted as a factor that made it difficult for grandparents.

Nevertheless, grandparents look for meaning of life such as happiness, worth, and mission through the parenting of grandchildren.

Firstly, the result shows that the execution of a role as grandparents is mainly influenced by the method of childrearing of their parents, books on childcare and childrearing experience.

This coincides with preceding research in the sense that a positive childrearing behavior of a grandmother gives significant influences on positive childrearing behavior of a mother, while a positive childrearing behavior of a mother exerts an impact on the self-conception of a child¹⁰.

Moreover, research participants, who had already finished the childrearing duty, recalled the memory of childrearing of the past by reading books on childcare in preparation for being inadequate to childrearing. As research participants wish to be helpful in rearing grandchildren by receiving proper education in tune with the times, it is estimated that education oriented to grandparents relevant to childrearing in accordance with today's trends will be urgently needed.

Secondly, as for view on childrearing of grandparents, they wanted their grandchildren to be recognized by people by having all-round balance of health, love and character and fulfilling the duty with autonomy.

This manifests the same context as the survey result in the sense that grandparents taking care of their grandchildren are expected to play roles accomplishing socioemotional support, active parental role and educational function, emphasizing the dual roles as fosterers and educators.

At the same time, this coincides with the research result in the sense that grandparents can play a role as powerful supporters for their grandchildren, while as critics and advisers for their children regarding the attitude of childrearing.

Moreover, when necessary, the parental role can be also supported by grandparents.¹¹

First, the past experience of grandparents raising grandchildren felt was 'strictness and warmth' and 'losing one's temper and differences'. The goal of their adult child dependence period was earning time on their side and getting well-prepared ending for their later years. The motivation of raising grandchildren was the expectation of children's success and absence of caring children.

Second, the significant impact on role performance of grandparents was education for children occurred while living with their grandparents, baby books and experience of child rearing.

The view of grand childbearing was 'health, love, the good morale of grandchildren', 'grand children who are self-regulating and established everywhere.

The relationship between grandparents and adult child was proved as the 'proudness and pitifulness' and trusting son-in-law and daughter-in-law.

The difficultness of raising grandchildren is 'playfulness and education', 'emotion control and guidance of life'.

The conflict between grandparent and adult child was the different view of education.

Although raising the grandchildren was being exhausted, there were also some advantages that occurred such as 'the harmony of family' and 'worthwhile'.

Third, the meaning of grandparent raising grandchildren's life was happiness, responsibility, worthwhile, emotional support, respect and recognition.

Those results of research showed that though there was no such a huge effect from the parents of grandparent, the grandparent could participate in raising the grandchildren through the experience of raising their child and information from baby book.

Actually, the grandparent usually participated in raising grandchildren since they have expected the

success of their adult child and wants to support them with 'proudness and pitifulness', the different view between grandparent and adult child was one of the factors that made grandparent tired. Even though those happenings occurred sometimes, grandparents have figured out the true meaning of life like happiness, worth while and responsibility through raising their grand children.

CONCLUSION

It can be concluded that the study found that in the parenting reality where the number of grandparents participating in parenting gradually increase, participation in parenting by grandparents led to successful senescence through an achievement of sense of productivity apart from the meaning of life and the significance of the study is in that it gives positivity in the participation by grandparents in the parenting of grandchildren which is being activated due to social changes and that it can provide basic data on education of grandparents.

The results of the study can be provided as basic data for education of grandparents participating in parenting grandchildren and young couples trying to find a balance between work and family, and the significance of the study is in providing positive perspective of parenting of grandchildren and the lives of many grandparents.

Besides the meaning of life, we can see as this study showed that raising the grand children leads the grandparent to successful aging with their achievement in the infant care reality that the number of grandparent raising grand children started increasing.

It also granted the affirmation of the participating in the raising of grand children which is being revitalized by the changes of the society as well as it can provide the basic of grandparents' education.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Smoking Prevention School Projects Perceived by Health Teachers

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ABSTRACT

Background/Objectives: The purpose of this study was to investigate the perception of smoking prevention programs in schools by the teachers.

Method/Statistical analysis: The survey was conducted from December 30, 2015 to October 31, 2016 by web survey in Gyeonggi-do in Korea. The subjects of the study were 95 health teachers working in 95 elementary, middle and high schools in Gyeonggi Province. The analysis of the study was conducted using the SPSS 23.0 Windows version program, and the analysis was performed using frequency analysis and chi-square test.

Findings: The perceptions of health teachers on school smoking prevention programs differ according to the type of school, which is the structural environmental characteristic of the school where the health teacher works, and the designation of smoking cessation in the school.

Improvements/Applications: As a result of this study, it is considered that it is necessary to establish an in - school smoking cessation environment such as designation of smoking cessation in school, smoking counseling, and smoking prevention program that affects the level of perception of smoking cessation by school teachers.

Keywords: *Health Teacher, Smoking Prevention School Projects, School Environment*

INTRODUCTION

Korean male smokers are 50% who start to smoke in adolescents under 19 years of age¹. Therefore, the burden of the death of Korean men due to smoking is very large¹. The health risk is higher when the age at which smoking is started is younger, as the amount of smoking and the frequency of smoking increases. Therefore, it is necessary to implement a smoking cessation policy as a priority target for adolescents². Youth smoking in Korea is showing a decline in 2016. As a result of the experience of smoking prevention and smoking cessation education in middle and high schools in 2016, 63.8% of boys and 66.9% of girls were increased compared to the previous year and the price of tobacco was also increased³. The smoking rate of adolescents increased due to the environmental characteristics like the retail store where easy to buy cigarettes around the school⁴. The results of the survey on youth smoking cessation showed that they were exposed to various media that received smoking cessation education or promoted smoking cessation at school⁵. As mentioned above, smoking cessation requires various

forms of smoking cessation education in the education field along with the policy efforts of the nation.

In a school that has major activities in adolescence, a health teacher is a medical nurse who is the primary health care worker in the school and plays an important role in health education and health care so that students can form healthy lifestyles and resolve their own problems⁶. Health teachers are aware of their roles as school health professionals and participate in school health programs⁷. In addition, the higher the awareness of health teachers about the school health promotion project, the higher the teacher's work practice and the higher the perceived job performance⁸. Smoking prevention programs targeting individual students and the whole school are needed at school⁹.

The purpose of this study was to investigate the general characteristics of health teachers in charge of primary health care in schools and to investigate the differences in awareness of school smoking prevention programs.

MATERIALS AND METHOD

Purpose of Study: The specific objectives of this study are as follows;

First, this study examined the general characteristics of health teachers and environmental characteristics related to smoking cessation in working schools.

Second, this study investigates the awareness of health teachers on smoking prevention programs in school.

Study Design: The purpose of this study is to investigate the perception of smoking prevention centered school project in health teachers.

Selection Process of the Subject: The subjects of this study were 118 health teachers working at 118 elementary, middle and high schools in Gyeonggi - do attending health teacher training. The survey period was from October 31, 2015 to December 30, 2015. The survey method was firstly explained to the subjects of the study by explaining the purpose of the research, and after receiving the consent form, the structured questionnaire of the self - filling method was used. The data were collected from 95 questionnaires except 23 questionnaires which had many missing values.

Data Analysis: The analysis of the study was conducted using the SPSS 23.0 Windows version program, and the analysis was performed using frequency analysis and chi-square test. The questionnaires used in the research were revised and supplemented based on national and international references and expert validity¹⁰. The general characteristics were composed of age, gender, career of nurse, career of smoking prevention and smoking cessation. The environmental characteristics were composed of 5 types of school type, total number of students, smoking cessation area, smoking counseling program, and smoking counseling experience. Teachers' awareness of smoking prevention programs consisted of two items; The Cronbach's α value of the research tool used in this study was 0.717.

RESULTS AND DISCUSSION

General characteristics of the subjects and the environmental characteristics of the school: Table 1 shows the general characteristics of the subject and the environmental characteristics of the school. The results of the study showed that the age of the health teachers were 43 (45.3%), 40 (35.8%) and 18 (18.9%). The

teachers' career was 40 (42.1%) for less than 5 years, 31 (32.6%) for more than 10 years and 24 (25.3%) for less than 5 years. The teachers' smoking cessation experience was less than one year (53.7%), less than 5 years (22.2%), and more than 5 years (22.2%). The types of schools where health teachers work were 55 (57.9%) in elementary school, 24 (25.3%) in middle school and 16 (16.8%) in high school. Health teachers answered that 91 (98.5%) of the environmental characteristics related to smoking cessation were designated as smoking areas in the school. There were 64 (67.4%), no less than 5, 24 (25.3%) and seven or more (7.3%) questions on the counseling experience of health teachers.

Table 1: General characteristics of the subjects and the environmental characteristics of the school

Variables	Categories	Frequency	Ratio (%)
Gender	Female	95	100
Age(year)	<40	34	35.8
	$\geq 40 \sim < 50$	43	45.3
	≥ 50	18	18.9
Health teacher career	<5year	40	42.1
	$\geq 5 \text{ year} \sim < 10 \text{ year}$	24	25.3
	$\geq 10 \text{ year}$	31	32.6
Smoking prevention work experience	<1year	51	53.7
	$\geq 1 \text{ year} \sim < 5 \text{ year}$	22	23.2
	$\geq 5 \text{ year}$	22	23.2
Total student (Persons)	<500	29	30.5
	$\geq 500 \sim < 1000$	39	41.1
	≥ 1000	27	28.4
School type	Elementary school	55	57.9
	Middle school	24	25.3
	High school	16	16.8
School non-smoking area	Be	91	98.5
	None	4	4.2
Smoking counseling Program	Be	32	33.7
	None	63	66.3
Smoking counseling experience (number)	None	64	67.4
	<5	24	25.3
	≥ 5	7	7.3

Experience of health teachers’ success after smoking prevention project: According to Table 2, teachers’ smoking career experience, school smoking cessation designation, and smoking program counseling were found to be related ($p < .05$).

Table 2: Experience of health teachers’ success after smoking prevention project

Variables	Categories	Smoking prevention success experience		X ² /p
		Yes	No	
		N(%)	N(%)	
Age(year)	<40	22(64.7)	12(35.3)	2.224 (.329)
	≥40 ~<50	32(74.4)	11(25.6)	
	≥50	10(55.6)	8(44.4)	
Career	<5year	31(77.5)	9(22.5)	3.885 (.143)
	≥5year ~< 10year	13(54.2)	11(45.8)	
	≥10year	20(64.5)	11(35.5)	
Total student (Persons)	<500	18(62.1)	11(37.9)	.931 (.628)
	≥500 ~<1000	26(66.7)	13(33.3)	
	≥1000	20(74.1)	7(25.9)	
Smoking prevention work experience	<1year	20(39.2)	31(60.8)	7.237* (.027)*
	≥1year ~< 5year	13(59.1)	9(40.9)	
	≥5year	20(90.9)	2(9.1)	
School type	Elementary school	34(61.8)	21(38.2)	3.726* (.155)
	Middle school	16(66.7)	8(33.3)	
	High school	14(87.5)	2(12.5)	
School non-smoking area	Be	64(70.3)	27(29.7)	8.621* (.010)*
	None	0	4(100.0)	
Smoking counseling Program	Be	28(87.5)	4(12.5)	8.896 (.003)*
	None	36(57.1)	27(42.9)	
Smoking counseling experience (number)	None	38(59.4)	26(40.6)	5.714* (.057)
	<5	20(83.3)	4(16.7)	
	≥5	6(85.7)	1(14.3)	

* :Fisher’s exact test

Perceptions of the need for health teachers to prevent smoking: In Table 3, the necessity of smoking cessation program at school, the smoking cessation career of teachers, type of school, school counseling program, and experience of cigarette counseling were shown to be significantly related to the difference of distribution ($p < .05$).

Table 3: Perceptions of the need for health teachers to prevent smoking

Variables	Categories	Necessity of School Smoking Prevention Project		X ² /p
		Necessity	Unnecessary	
		N(%)	N(%)	
Age (year)	<40	15(44.1)	19(55.9)	3.572 (.168)
	≥40 ~ <50	27(62.8)	16(37.2)	
	≥50	12(66.7)	6(33.3)	
Career	<5year	23(57.5)	17(42.5)	.666 (.717)
	≥5year ~ < 10year	15(62.5)	9(37.5)	
	≥10year	16(51.6)	15(48.4)	

Conted...

Total student (Persons)	<500	17(58.6)	12(41.4)	.941 (.625)
	≥500 ~ <1000	20(51.3)	19(48.7)	
	≥1000	17(63.0)	10(37.0)	
Smoking prevention work experience	<1year	22(43.1)	29(56.9)	17.694* (.000)*
	≥1year ~ < 5year	11(50.0)	11(50.0)	
	≥5year	21(95.5)	1(4.5)	
School type	Elementary school	27(49.1)	28(50.9)	5.254* (.072)
	Middle school	14(58.3)	10(41.7)	
	High school	13(81.3)	3(18.8)	
School non-smoking area	Be	54(59.3)	37(40.7)	5.500* (.032)*
	None	0	4(100.0)	
Smoking counseling Program	Be	30(93.8)	2(4.9)	26.794 (.000)*
	None	24(38.1)	39(61.9)	
Smoking counseling experience (number)	None	30(46.9)	34(53.1)	8.196* (.017)*
	<5	18(75.0)	6(25.0)	
	≥5	6(85.7)	1(14.3)	

* :Fisher's exact test

CONCLUSION

The results of this study showed that there was no difference in the perception of school smokers' prevention programs among the general characteristics such as age, career, number of students and kind of school. However, there was a difference in the perception of smoking prevention programs according to the environmental characteristics related to smoking cessation at school, such as the career guidance of health teachers, the designation of smoking cessation at school, the smoking counseling program, and the number of cigarette counseling.

Therefore, for the success of the youth smoking cessation project, it is required to develop the smoking cessation environment of the school and to develop the training program to strengthen the professional capacity of the health teachers as school health professionals.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Proposal Study on Public Data-Centered Crime Prevention Through Environmental Design (CPTED) in Seoul City Utilizing Classical Music

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ABSTRACT

Violent crimes have increased continuously due to the development of urban society and have become a threatening factor against the residential safety of citizens. The prevention of these crimes is always a major topic in human society and one of the fundamental elements of the quality of life and safety of citizens. In recent years, much attention has been paid to environmental design through the Crime Prevention Through Environmental Design (CPTED) as a preventive measure. Currently, South Korea is promoting the openness and utilization of public data, and crime prevention is one of the fields that can utilize public data actively. This approach to crime prevention utilizing public data will be helpful for the proposal of policies from new viewpoints departing from the general utilization measures of CPTED that improve streetlights and closed-circuit television (CCTV) installations, whose limitations have been pointed out as they are only mechanical surveillance. Thus, this study sets the research scope based on the statistics of the status of five criminal offenses by administrative district in recent years provided by the data portal in Seoul City, the capital of South Korea, as the utilization data and concentrates on the analysis. Based on the analysis results, this study proposes a method to utilize classical music as a new policy for regions where the improvements are most needed. The open-source Python analysis program was employed as the main data analysis and visualization method.

Keywords: CPTED, Public Data, Data Analysis, Classical music, Python

INTRODUCTION

A number of studies have been conducted on crime prevention for the safety of citizens from violent crimes that occur in cities along with the development of modern society. These studies have found that crime occurrences were closely related to the environments and crimes can be deterred or reduced through environmental changes and improvements ^[1]. Among them, some effective improvement measures were proposed focusing on closed-circuit television (CCTV) around the roads, including alleys, night lighting, the reorganization of a typical street to ensure a line of sight and increase

maintenance images, the installation of signposts, and the removal of blind spots ^[2].

However, such policies have revealed some limitations in areas where general Crime Prevention Through Environmental Design (CPTED) is used. As a result, if only the hardware and physical aspects of the CPTED are considered to place stress on security in communities, those communities are regarded as falling into exclusive and hardline images. Thus, a study suggested that a software approach based on daily living environments is also needed ^[3]. As a software approach, western countries have utilized classical music in specific areas as a crime prevention policy.

The promotion of the openness and utilization of public data in Korea will be helpful for providing a new alternative in this context. Thus, this study aims to identify the crime status by administrative district by analyzing the public data of Seoul from the portal and proposes a preventive measure utilizing classical music

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in administrative districts that are vulnerable to crime. In Section 2, recent studies related to crime prevention using CPTED and classical music are presented. In Section 3, the study methodology is defined. In Section 4, current statistics on and characteristics of crime in crime-prone regions in Seoul are analyzed. In Section 5, limitations and constructive study directions to overcome the limitations are proposed, and in Section 6, the analysis results are summarized and discussed. Finally, in Section 7, the conclusions are given and further studies are briefly described.

Current Practice and Research: In this section, the basic concepts of the CPTED, which is significant deterrent to crime, are investigated through the effects and limitations of currently utilized CPTEDs. After this, the effect of utilizing classical music, which is a newly proposed measure, and cases of other nations are studied.

Basic CPTED concepts: Research on the alternatives to crime prevention and reduction has been conducted for a long time, and a number of studies have been conducted in various fields, including perception of crimes, crime psychology, creation of crime prevention environments, and police activities [4]. Among these studies, the concept of CPTED has been proposed and utilized for a long time through environmental design to combine physical environments and social factors. CPTED was proposed by Jeffery as a strategy to reduce crime and fears by manipulating factors related to environments [5].

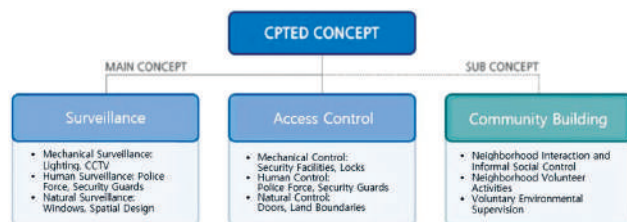


Figure 1: CPTED concept

As shown in Figure 1, the central concept of CPTED is surveillance and access control. As related policies, ensuring the visibility and openness of streetlights improves crime prevention and a non-intrusive surveillance function through CCTV installation is also known to be effective for crime prevention, particularly against the five criminal offenses [6].

The strategies for this basic concept have been divided into “strengthening surveillance, access control, territorial reinforcement, legibility, activity support, and management and maintenance as a developed guideline”

[7]. Newman defined territoriality as a combination of mental, psychological, physical, and cultural dimensions that should be maintained as a physical environment with regard to territorial reinforcement that can be conveniently accessed by the software approach [8].

Studies on currently utilized CPTED: The installation of CCTV and security lighting is the most typical current utilization method of CPTED. Studies on the policies for utilizing CPTED acknowledge the effect of existing methods but express their clear limitations.

A study on the effect of CCTV for crime prevention in Seoul reported the reduction effect on murder, rape, and theft in administrative districts whose population was larger than others. However, crimes of assaults and aggravated robbery, the main crimes discussed in this study, were not significantly reduced statistically. In particular, no crime reduction effect was found in the case of assaults, which are often regarded as an opportunistic crime. In addition, although CCTV installation had a reduction effect on theft crimes, particularly in the early days of the installation, the marginal effect gradually dropped even if the number of CCTV installations was increased, which revealed the need for other public security alternatives [9].

As another typical method, security lights can be used, and there has been a study on the regression analysis of the effect of the number of security lights on crime prevention. The study determined that the number of security lights itself has some effects on crime prevention, but no significant correlation with actual prevention was found [4].

Study on the effect of classical music on crime prevention: The proposed alternative to existing policies is listening to classical music, which can be effective and contribute to crime prevention. It is a more humanistic policy as a soft crime prevention policy, and there have been studies on the proven effect of using classical music for restraining impulsiveness with various groups for crime prevention.

A study on restraining the impulsiveness of middle school students at the development stage indicated that classical music was effective because the melodies of classical music are easy to listen to and widely liked. In addition, this study emphasized the effect of listening to classical music more than popular songs, which increased impulsiveness [10]. Another study also proved

that individual music therapy, including listening to music, had a positive impact on the impulsiveness and self-control of children from low-income families [11]. A study on the effect of music therapy on patients with schizophrenia verified that music therapy reduced anxiety and impulsiveness and improved self-control significantly [12]. A study on listening to music by military groups also revealed that music listening reduced stress and promote emotional stability and vitality through the expansion of the music environments used in the military base [13].

Case study on crime prevention utilizing classical music: There have been successful cases of crime prevention utilizing classical music.

A loitering problem of teenagers in the car park of a 7-Eleven store in Canada was resolved by using classical music [14], and aggravated robberies, assaults, and vandalism were reduced by 33%, 25%, and 37%, respectively, by utilizing music in the London Underground [15]. The crime rate was reduced by 40% when classical music was played through the speakers in West Palm Beach [16], and the loud sound of opera music or carol songs were played in the entrance of the subway in Copenhagen Denmark to prevent drug dealers and homeless people from gathering around the subway [17].

Research Approach: The data that were quantitative bases of regional and crime information were relatively recent data in 2016 provided by the public data portal in Seoul City. The data were collected and summarized according to the purpose of this study. The crime occurrences and arrest statuses in the administrative districts in Seoul were visualized using the Python analysis program based on the above data, and the administrative district that needed the new alternative policy the most was selected. After this, the results were compared and analyzed with existing crime occurrence studies based on the features of the administrative district selected as the final crime region out of all the features of Seoul City provided by the portal.

Study on Crime Region in Seoul: The data were classified into three types to investigate the crime region. First, the number of crime occurrences, the number of arrests of offenders, and the number of residents by district were used and visualized as data to select a region. Second, data about crime occurrence places and the crime motives of offenders were analyzed to determine the characteristics

of crime in the entire region of Seoul. Finally, the data were classified as population movement rate, visitors at major tourist attractions, and market status to analyze the characteristics of the crime region.

Selection of major crime regions in Seoul: Python was used as the main tool in the analysis to select a region. For the crime rate, the number of crime occurrences in each district was divided by the number of residents, and for the arrest rate of offenders, the number of crime occurrences by district was divided by the number of arrests of offenders by district to calculate the crime occurrence and arrest rates by administrative district in Seoul. The above results are shown in Figure 2, in which the number of crime occurrences with a higher rate is depicted with a darker color and the number of arrests with a lower rate is marked with smaller circles on the Google map.

```

tmp_criminal = crime16_t['crime'] / crime16_t['population'] * 1000000
map = folium.Map(location=[37.5502, 126.982], zoom_start=11)
map.choropleth(geo_data=geo_str, data=tmp_criminal, columns=[crime16_t.index, tmp_criminal],
              fill_color='YlOrRd', key_on='feature.id')

for n in crime16_t.index:
    folium.CircleMarker([crime16_t['lat']][n], crime16_t['lng']][n],
                      radius=crime16_t['arrest_rate'][n]*0.08, line_color='#3186cc',
                      fill_color='#3186cc', fill=True).add_to(map)

map

```

Figure 2: Crime and arrest rates in Seoul with main visualization code

The code execution results showed that Jongno-gu had the highest crime rate followed by Jung-gu and Yeongdeungpo-gu, as marked in Figure 3. In the three districts, the lowest arrest rate was that of Jung-gu, followed by those of Yeongdeungpo-gu and Jongno-gu, indicating that Jung-gu needed the crime prevention policy the most.

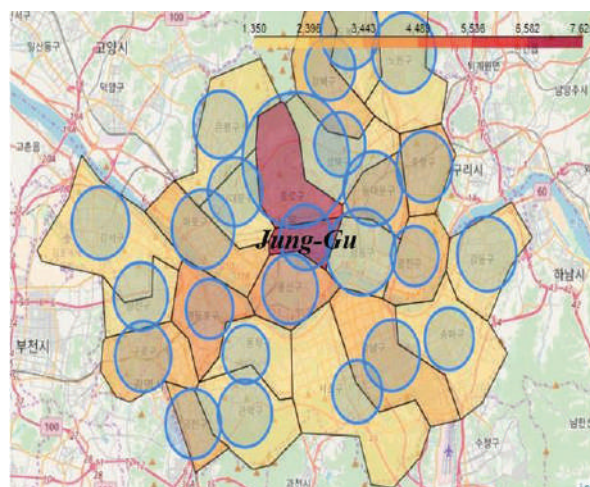


Figure 3: Visualization of crime and arrest rates in Seoul

Characteristics of crime in Seoul: The data analysis results on the crime occurrences exhibited that aggravated robberies (9,329 cases), assaults (24,535 cases), and rape (986 cases) occurred in the street, which had the most crimes in common, followed by entertainment places (2,000 cases or more), and in the case of aggravated robberies, shops were the second-most common places (4,400 cases). These data results are consistent with existing study results that the number of entertainment places is significantly correlated with the number of aggravated robberies, thefts, and assaults ^[1].

In addition, a major motive of offenders who committed serious crimes was impulsiveness, as shown in the data regarding the crime motive. The characteristics of crimes due to impulsiveness can be found in existing studies. The crimes that are committed impulsively without controlling anger properly are defined as anger/impulsive crimes ^[18], and chronicle anger (46%) was pointed out as the main motive of offenders in random street assaults that occurred in 2012 ^[19]. In addition, one of the reasons why Koreans experienced anger-related crimes was the outcome-oriented thinking and behavior of Koreans, which increased stress further ^[20]. Thus, this study proposes a preventive measure as the crimes with an impulsive motive analyzed in the above data are viewed as anger/impulsive crimes.

Regional characteristics of the major crime occurrence place: The regional characteristics of the final selected district of Jung-gu are as follows: First, it has a high floating population (around 17-18%). This is higher than any other region whose floating population was around 15% to 16%. This result is consistent with an existing study that found that the most influential factor on the five criminal offenses in Seoul was the floating population. ^[1]

Second, Jung-gu is a district that has the second-largest tourist population (3,913,660 visitors) in Seoul. This figure is larger than the number of residents (121,151 persons) by 32 times as well as the daytime moving population (442,225 persons). A previous study reported a steady increase in sexual and violent offenses, the characteristics of crimes committed by Chinese people living in Korea ^[21]. Jung-gu is one of the most-visited places by foreigners in Seoul as a tourist attraction, which could be an influencing factor of the increase in crime.

Third, the number of markets by district was analyzed, and Jung-gu had the most shops (21,876 shops) in Seoul. It had more shops than the second highest district of Jongno-gu (10,738 shops) nearly by double. This figure verifies that a place with many shops is vulnerable to crimes, as described in Section 4.2, as shops and entertainment places are crime-prone places. The high crime rate in Jung-gu is also supported by the previous study result that restaurants and accommodations in tourist cities had a high rate of crime ^[22].

Development Practices: This study provided the most recent crime status by analyzing recent one-year data in Seoul. However, it did not determine the previous status and change. In addition, this study lacked numerical accuracy due to the use of comparative analysis with general existing studies rather than technical and detailed analysis techniques to analyze the characteristics of crime. Thus, to overcome these limitations, analysis techniques that can provide more detailed figures are required and persuasive power needs to be increased through long-term studies in the future.

DISCUSSION

Jung-gu was selected as the district that required a new change after the serious crime and arrest rates were marked on the map based on the public data of Seoul. The crime motive of most crimes found in the public data was impulsivity, and, regarding the data about crime occurrence places, most thefts occurred in the streets and shops. The most common crime occurrence places for assaults and rapes were streets and entertainment places. Previous studies on CPTED in Korea have not proposed a preventive policy with regard to the detailed characteristics above. Furthermore, existing studies on CPTED have proposed measures focusing on CCTV and security right installation, as suggested in existing physical measures. However, these measures were limited as their crime prevention effects were insignificant. Thus, this study proposed playing classical music in specific areas to overcome the limitations of existing preventive measures.

CONCLUSIONS AND FUTURE WORK

This study concludes that playing classical music was appropriate as a measure to restrain impulsiveness and took various environmental variables into consideration

for crime prevention in Seoul. This study result contributes to preventive policies to overcome the limitations of existing physical policies for the prevention of various crimes, and employs the crime motive of impulsiveness, which had not been studied before in Korea. In addition, if the proposal with the new suggestion of playing classical music in Jung-gu, which is characterized by the most diverse crime occurrence in Seoul, is proven to be effective, this policy will be expanded to other districts in the future. To increase the reliability of the new proposal in this study, another analysis study is needed to continue the use of a numerically significant analysis technique, and a long-term range rather than the short-term range used in this study will be adopted to study the change in crimes in Seoul.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Effect of Action Observation of Meaningful Tasks on Upper Extremity Motor Function in Patients with Stroke

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ABSTRACT

Background/Objectives: The purpose of this study was to survey the influence on action observation of meaningful tasks on upper extremity function in patients with stroke. Thirty stroke patients were prospectively randomized to an action observation of meaningful tasks (AOMT) group or action observation of simple joint movement (AOJM) group.

Method/Statistical analysis: All patients performed traditional occupational therapy and physical therapy. Both groups additionally performed action observation for 20 minute/day, 5 days/week, for 4 weeks. The AOMT group executed an action observation of meaningful tasks, AOJM group executed action observation of simple joint movement. To evaluate the effects of intervention, a Wilcoxon signed-rank test was used to contrast before- and after-intervention results in each group. The Mann-Whitney *U* test was used to contrast changes in outcome measures between the groups.

Findings: The Fugl-Meyer Assessment (FMA) before-test score in the AOMT group was 24.33±10.27 and the after-test score was 27.27±10.61. The Wolf Motor Function Test (WMFT) before-test score was 18.60±11.66 and the after-test score was 22.13±12.35. Significant changes in the FMA and WMFT were observed in the AOMT group. The mean change in FMA score was 2.93±2.63 in the AOMT group and 0.93±2.40 in the AOJM group, showing a statistically significant difference. The mean change in WMFT score was 3.53±2.90 in the AOMT group and 0.80±1.78 in the AOJM group, showing a statistically significant difference. The AOMT group showed a significant increase in upper extremity function after the intervention.

Improvements/Applications: This study demonstrated that action observation of meaningful tasks significantly improves upper limb movement in patients with stroke. We present evidence that action observation of meaningful tasks has a beneficial effect in occupational therapy for movement disorders after stroke.

Keywords: stroke, action observation, upper extremity motor function, meaningful tasks, mirror neuron system

INTRODUCTION

After stroke, patients can have severely impaired upper extremity motor function. Stroke causes upper extremity hemiplegia, especially loss of grasping ability, because of the complex modes of hand function. Furthermore, pain, muscle contracture, spasticity, and uncomfortable upper limb movement result in limb disuse, interfering with long-term functional recovery^[1,2]. Therefore, many patients develop upper extremity disorders and their ability to perform everyday life is severely limited^[3]. Therapeutic approaches to rehabilitation include a variety of physical interventions

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to induce voluntary movement and more use of the affected upper extremity [4]. Neuroplasticity occurs through repetitive, voluntary movement of paralyzed upper limbs. Intervention methods after stroke are considered necessary to avoid disuse of the upper limb[5].

Action observation is an effective tool to promote motor learning. Some authors suggest that action observation and actual practice have similar motor learning effects, as they share activation of the cerebral cortex sensory-motor systems associated with motor performance[2]. Action observation of others or of a model appearing in images automatically activates the same components of the nervous system as are involved in the practical motor functions[6].

Use of the mirror neuron system (MNS) is a new recovery strategy for the upper limb of in patients withcortex infarction. When a patient observes or imitates another person’s movements, the same components of the nervous system may be activated to some extent, resulting in self-movement. The MNS has been used in research on motion and understanding of behavioral intent, speech, empathy, and social interaction since its discovery[7,8]. Neurons with mirror-like characteristics are found in both cerebral cortex areas and constitute the MNS. A system alike to that observed in monkeys has been discovered in persons. According to many neurophysiology studies, observations of object manipulation as well as direct manipulation of objects control the activity of the exercise area involved in actual practice[9].Thus, action observation training can contribute to the formation of definitive movement by providing clear and specific information about the standard operations required to perform a function [10].

In other study, patients were asked to achieve reaching tasks in a new space and achieved better after seeing a video portraying people studying to reach in the similar new space compared with those who observed the similar action in different space[11]. In a crucial study of the role of the cerebral cortex in human imitation,areas associated with the actual implementation of simple finger movements were conclusively identified during observations of the same movements made by different individuals, compared to the results with giving of space or representative signals[12]. Indeed, action observation improves motor function [13] and appears to be a dependable intervention for enhancing upper extremity movement after stroke [14]. However, action observation

tasks differ among various studies, ranging from simple joint movements to basic daily activities[3,15]. Therefore, the effect of intervention on the type of operational observation task is uncertain. This study researched the effects of action observation of meaningful tasks in stroke patients to determine their effect on upper motor function.

MATERIALS AND METHOD

Subjects: The study involved 30 participants diagnosed with cerebro vascular accident at K hospital, Seoul, Korea. These participants met the selection criteria and gave voluntary knowledgeable consent to take part in the study. The incorporation criteria were as follows: (1) age ≥19 years, (2) diagnosed with brain damage, (3) brain injury within 6 months,(4) a score of ≥24 in the Korean version of the Mini-Mental State Examination (MMSE-K) and no communication problems, and (5) absence of pain and edema in the affected hands.

The exclusion criteria were as follows: (1) cognitive impairment with MMSE score of <24, (2)serious upper extremity spasticity,(3) serious bone and joint deformity or muscle a trophy. Detailed participants individual information are described in Table 1.

Table 1: Individual information of patients

Characteristics	AOMT group (n=15)	AOJM group (n=15)
Age (y), mean ± SD	63.00 ± 10.55	63.40 ± 6.65
Sex (male/female)	7/8	6/9
Type of stroke (Hemorrhage/ Infarction)	6/9	7/8
Sideofhemiplegia (Right/Left)	5/10	7/8
Onset of stroke months, mean ± SD	3.00 ± 1.18	3.90 ± 1.28

SD: standard deviation.

AOMT: action observation of meaningful tasks, AOJM: action observation of simple joint movements.

Materials: The Fugl-Meyer Assessment-Upper Extremity(FMA)scale was used to evaluate behavior, including reflection; shoulder, elbow, wrist, and finger cooperative movements; detachment movements; and consist of 33 units. The maximum score is 66.FMA has excellent reliability and validity and is greatly suggested for post-stroke assessment of movement[16].

The Wolf Motor Function Test (WMFT) was used to assess limb movement while supplying insight into body joint and upper extremity action. This includes 15 tasks, 6 joint segment moves, and 9 integrated feature moves. The completion time was recorded and the quality of work was rated. The highest score is 5 and the total score is 75^[17].

To evaluate the effects of intervention, a Wilcoxon signed-rank test was used to contrast before- and after-intervention results in each group. The Mann-Whitney *U* test was used to contrast changes in outcome measures between the groups. Data were analyzed using SPSS Version 18.0 for Windows. Results were considered significant at *p* values <0.05.

Methods: The subjects were arbitrary separated into AOMT group (n=15) and AOJM group (n=15). Both groups accepted traditional physical therapy and occupational therapy for 30 minutes/day, 5 days/week,

for 4 weeks. In addition, the AOMT group achieved action observation of meaningful tasks and the AOJM group achieved action observation of simple joint movements for 20 minutes a day. The action observation tasks for each of the two groups were selected based on prior studies^[3]. In the action observation intervention, a video showed specific motion of upper limb movement and a whole of 10 movement videos were used for tasks by each group. All action was recorded by the same model and every action was filmed from 2 different angles (frontal plane and sagittal plane). The effect of showing behavior from different points of view is supported by recent monkey studies. The visual response of the monkey mirror neurons was recorded while presenting a film of action from different visual standpoints^[18]. Each video was approximately 2 minutes in duration. Patients in both groups were trained by the occupational therapist to pay attention and observe each task on the TV.

Table 2: Action observation tasks for each group

Action observation of meaningful tasks in the AOMT group	Action observation of simple joint movements in the AOJM group
1. Using chopsticks	1. Scapula protraction and retraction
2. Using a pencil	2. Shoulder flexion and extension
3. Using a computer mouse	3. Shoulder adduction and abduction
4. Hand washing	4. Elbow flexion and extension
5. Using a mobile phone	5. Forearm supination and pronation
6. Dressing	6. Wrist flexion and extension
7. Drinking with a water bottle	7. Wrist ulnar deviation and radial deviation
8. Grasping and release of tennis ball	8. Wrist circumduction
9. Handling of a credit card	9. Finger adduction and abduction
10. Combing hair	10. Hand grasping and release

RESULTS AND DISCUSSION

Clinical parameters before and after treatment: Upper extremity motor function in both groups before and after treatment is shown in Table 3.

The FMA before-test score in the AOMT group was 24.33±10.27 and the after-test score was 27.27±10.61. The before-test WMFT score was 18.60±11.66 and the after-test score was 22.13±12.35. Significant changes in the FMA and WMFT were observed in the AOMT group. The FMA before-test score in the AOJM group was 23.40±11.59 and the after-test score was 24.33±10.18. The before-test WMFT score was 17.20±12.17 and the after-test score was 18.00±12.02. There was no significant difference between FMA and WMFT scores in the AOJM group.

Table 3: Clinical parameters before and after treatment

	AOMT group			AOJM Group		
	Before-test	After-test	p-value	Before-test	After-test	p-value
FMA	24.33(10.27)	27.27(10.61)	<.001*	23.40(11.59)	24.33(10.18)	<.155
WMFT	18.60(11.66)	22.13(12.35)	<.000*	17.20(12.17)	18.00(12.02)	<.104

The values are means (standard deviation).

FMA: Fugl-Meyer Assessment, WMFT: Wolf Motor Function Test, *p<0.05 by Wilcoxon signed-rank test

AOMT: action observation of meaningful tasks, AOJM: action observation of simple joint movements.

Comparison of results between the AOMT and AOJM groups: The mean changes in upper extremity motor function scores in the 2 groups are compared in Table 4.

The mean change in FMA was 2.93±2.63 in the AOMT group and 0.93±2.40 in the AOJM group, showing a statistically significant difference. The mean change in WMFT was 3.53±2.90 in the AOMT group and 0.80±1.78 in the AOJM group, showing a statistically significant difference. Mean changes in the FMA and WMFT were significantly greater in the AOMT group.

Table 4: Comparison of results between the AOMT and AOJM groups

	Mean change		p-value
	AOMT group	AOJM group	
FMA	2.93(2.63)	0.93(2.40)	<.038†
WMFT	3.53(2.90)	0.80(1.78)	<.004†

The values are means (standard deviation).

FMA: Fugl-Meyer Assessment, WMFT: Wolf Motor Function Test, †p<0.05 by Mann-Whitney U test.

AOMT: action observation of meaningful tasks, AOJM: action observation of simple joint movements.

DISCUSSION

The present study demonstrated that action observation of meaningful tasks resulted in significant improvement of upper limb movement in stroke patients with established disability. This improvement was quantified using standard motor function scales. These improvements were similar to those observed when actually performing an action, but were observed in the AOJM group. Thus, action observation with previous training has an impact on neural rehabilitation exercise.

Previous studies have steadily shown that action observation is a beneficial way to study or promote movement of a particular action skill^[19]. However, the

tasks applied in action observation varied. One studies applied simple manipulation of small balls^[20], while another study targeted simple joint movements^[21]. In this research, we compared simple joint movement tasks with meaningful functional tasks using action observation. Greater improvement of upper extremity function was noted when meaningful tasks were observed. Fogassi et al. reported that the cerebral cortex is facilitated with observation of meaningful movements related to a goal rather than to simple actions^[22].

In another study, classic ballet dancers have shown greater activation of the same area while observing ballet movement rather than Capoeira movement^[23]. Similarly, the MNS was more strongly activated in professional pianists while observing a piano performance rather than musically innocuous exercises. Complementing this finding is the demonstration of the task of action observation and the MNS in learning new athletic abilities^[24]. Prior results support the findings of this study. Thus, observation of meaningful tasks, an important intervention in occupational therapy, will contribute to the promotion of upper extremity movement in stroke patients through individual motivation and activation of the motor cortex.

The limitations of this research are a little participant size and variable functional status of the brain. It is necessary to study not only the effect on motor function in stroke patients but also the effect on the motor cortex. This method occurred to be superior to that of ordinary neuro rehabilitation therapy and the effect is sustained for at least 4 weeks after intervention. The beneficial effect of treatment is performed through observation of routine meaningful tasks.

We suggest that the therapeutic effect should be improved by applying observation of everyday life to recent stroke rehabilitation treatment.

CONCLUSION

The aim of this research was to investigate the effect of upper extremity movement in response to action observation of meaningful tasks in stroke patients. This research investigated the effects in patients with early-stage stroke. Action observation of meaningful tasks is a useful way to enhance motor and sensory function in stroke patients with severe impairment of actual upper extremity movement. In conclusion, we present

proof that action observation of meaningful tasks has a beneficial effect on treatment of movement disorders after stroke.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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The Case Study and Analysis of Technology through Sports and ICT Convergence in Korea

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ABSTRACT

Background/Objectives: This study attempted to examine the examples of the convergence of information and communication technology and sports.

Method/Statistical analysis: This study mainly focuses on secondary data such as literature review and various research reports. Research results, technology, and products through sports and ICT convergence are classified into 6 categories. Three subjects with a Ph.D. degree in related fields were verified and classified according to the criteria.

Findings: In future, taking a cue from traditional sports, esports will adopt similar revenue-generating models; smart traditional sports will adopt esports innovations, particularly in fan engagement, live streaming and the event experience; creative content will be key for successful esports sponsorships and the value of esports streaming rights will increase as Twitch and its rivals seek exclusive content.

Improvements/Applications: The next phase of the quality, volume and variety of content will increase, it will be harder and harder to cut through; to stay relevant, sports, brands and media.

Keywords: *ICT, Sports, Convergence, Esports, Big Data*

INTRODUCTION

It has been reported that the sports industry of Korea is growing due to increased leisure time from five-day work week and five-day school week, rapid growth of the leisure industry from family camping and outdoor activities, and nationwide pursuit of happiness and health in the aging society^[1]. Accordingly, with increasing interest in the sports industry, relevant industries have been combined into a single market centered on consumers. The new sports market was formed by convergence with other industries like IT. New additional services were created by combining sportswear and service, facility and service, and sports and health using IT^[2].

Especially, simulation sports based on virtual reality (VR) and augmented reality (AR) are receiving the attention^[3]. Sports and IT have converged and organically combined with the simulation industry, constantly expanding the scope. VR technology has shown rapid development, and hobbies of people are changing with the vitalization of 'screen sports'^[4]. Screen sports allow people to enjoy sports without restraints such as space, equipment, season and weather.

Looking at the pace of technology development, what would sports look like after 10 years? Paradigms of the past will definitely become useless. Would sports authorities and fans be able to adapt to such changes? The purpose of this study is to conduct a case study on technologies that are being implemented through convergence of ICT and sports and tendencies that will appear in the near future, and to provide insight for many unspecified individuals who are related to the sports industry.

Accordingly, this study aimed to examine convergence of ICT and sports. Especially, cases and trends were analyzed by classifying convergent sports

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ICT into six areas: 1) VR and AR screen sports; 2) ICT and Olympic Games; 3) ICT and smart stadium; 4) big data and sports; 5) e-sports evolution; and 6) sports business models based on convergent technologies.

METHOD

This study mainly focuses on secondary data such as literature review and various research reports. Research results, technology, and products through sports and ICT convergence are classified into 6 categories. Three subjects with a Ph.D. degree in related fields were verified and classified according to the criteria.

Reviews (Sports ICT and Policy Trend in Korea)

Status of Sports ICT Industry in Korea: The global sports industry has grown by 5.27% per year from 2006 to 2017 and is predicted to show annual growth of 4% until 2020. As such, the sports industry is showing consistent growth despite the worldwide economic recession.

Gross sales of the Korean sports industry were 36.5 trillion won in 2015, which was 2.95% of GDP. The sports Industry also contributes to job creation. The job creation effect of the sports industry was found to be 14.4 (persons / billion won), even higher than the culture industry (12.4) known as a representative job-creating industry.

Also, the sports industry plays the role of a global business, which can lead to creation of jobs by pioneering new markets through convergence with other industries. Screen golf that converges sports and science created a new market of 1.7 trillion won (2015).

Nike attracted new consumers by launching Nike Plus with Apple. Nike increased its sales volume by 30% through products related to IT^[5]. Sports ICT is a scientific technology that converges sports science with other fields of study to analyze physical activities, enhance health, improve athletic performance of professional athletes and prepare the grounds for vitalization of leisure activities. Convergence of sports and ICT provides equipment that can accurately measure records of athletes, increase trust of the audience in fair judgment, and expand participation in leisure and sports activities.

In particular, the sports industry is changing with the expansion of living sports due to increase of income and interest in health. The wellness market of Korea that converges sports, ICT and medical service has size of

76 trillion won (2014), which is about 7% of GDP. This market is predicted to grow at an annual rate of 10% until 2020. Especially, the development of wearable computer, which provides body information to consumers who participate in sports activities to maintain and enhance their health, is accelerating.

The sports ICT industry is creating a new market with the expansion of leisure sports such as mountain climbing. It is especially expanding in the field of virtual sports. There are diverse areas of convergence for sports and ICT, including athletic performance measuring devices, devices helping improvement of athletic performance, devices for fair judgment and recording, and virtual sports experiences. Also, as the number of sports competitions and participants is increasing, new ICT will be developed to reduce emission of pollutants and operating expenses during construction and operation of sports facilities. In addition, smart app trainers display exercise information and path of users on a map so that users can design their own exercise courses based on desired exercise intensity and time. Indoor leisure devices based on VR (ski simulator, tennis, etc.) are also under development. The number of Korean ICT companies that can develop convergent sports ICT was 19,553 in 2015, increased by 3.7% compared to 2014 (18,854). This is only 0.54% of companies in all industries.

Policy Trend of Sports ICT in Korea: The Ministry of Science, ICT and Future Planning established the K-ICT strategy so that ICT can take a leading role in growing national economy and bring forward the core government task of 'creative economy'^[6]. By investing 9 trillion won starting in 2016, the strategy aims to accomplish 17 tasks in 4 major areas such as 8% growth of ICT, ICT production of 240 trillion won in 2020, export of 210 billion dollars, improved constitution of the ICT industry, large-scale investment in the ICT industry, finding of packaged sales channels including China and developing nations, and fostering of 9 strategic industries including the new SW industry.

In relation to sports and ICT, the Ministry of Science, ICT and Future Planning plans to invest 600 billion won until 2020 to demonstrate 5G technologies for the first time in the world at the 2018 PyeongChang Olympic Winter Games and to commercialize 5G in 2020. The reason for selecting sports as the primary sector of the K-ICT strategy is because the ICT industry of Korea is highly competent at about 90% level

compared to the United States, a nation with the world's best technologies, but Korea lacks ICT associated with sports [7]. The new industry based on wearable computer is expected to dominate new future markets.

The Ministry of Culture, Sports and Tourism announced a mid to long-term plan (2015~2019) for the promotion of the game industry, which is related to sports ICT. The plan is to foster global companies and increase size of the market by 10% a year from 10 trillion won in 2015 to 13 trillion won in 2019, increase export volume by 10% a year from 2.8 billion won in 2015 to 4 billion won in 2019, and increase the employment effect by 3% a year from 100,000 jobs in 2015 to 120,000 jobs in 2019.

Particularly, the Ministry of Culture, Sports and Tourism will create a new market by supporting R&D on sports, secure world class technologies through research on sports and scientific technologies, and foster the sports industry as a new national growth engine. The Ministry of Trade, Industry and Energy announced the regional industrial promotion plan in 2015 to invest 190.7 billion won into central businesses that can contribute to the vitalization of regional economy by creating added values and jobs. The capital area and Gangwon Province selected the sports ICT industry (sports knowledge service industry) as the primary industry^{7,8,9,10}.

To improve capability for industrial and academic innovation and increase competitiveness of regional industries by creating a groundwork for R&D through convergence of sports and ICT and supporting companies, the government invested 35 billion won into Creative Economy Innovation Center and programs connected with regional industries. Creative and convergent R&D were promoted through demand survey and Creative Economy Innovation Center.

RESULTS

Simulation sports market of Korea: The simulation sports market of Korea is estimated to be 5 trillion won in 2018. Screen golf marked the beginning of simulation sports. Screen golf was started with a machine that was imported from the United States in 1990s¹⁸. Size of the screen golf market was about 1.7 trillion won in 2015. There are about 8,000 screen golf clubs in Korea. The screen golf business of Korea is not only popular within the nation but also in various vacation sports in the world and houses of wealthy families in the Middle East. Size of the screen sports industry increased with the addition

of baseball in 2014, and the scope of screen sports is expanding. 'Football Pantage I' at Seoul World Cup Stadium is a popular online theme park that combines soccer and VR / AR technologies. VR technology was applied to the fitness area.

In addition, realistic experience VR has become an alternative for outdoor sports that are disappearing due to air pollution and irregular weather. The project on the development of sports and education convergence platform supervised by the Ministry of Culture, Sports and Tourism and Korea Sports Promotion Foundation until July 2019 is a representative example of support on indoor sports. This platform is intended to provide experience in sports and correct postures using ICT and VR technologies.

ICT and PyeongChang Olympic: The 2018 PyeongChang Olympic Winter Games embodied five ICT services. First is the world's first 5G (5th generation telecommunication). A 5G demonstration network was constructed for the first time in the world, which enabled advanced imaging service with excellent two-way, high-definition and 3D images. Realistic media were presented by developing exclusive terminal devices and using a demonstration network.

Second are convenient IoT services. Indoor spatial information, AR guide, kiosk making cheer messages by recognizing user motions, and mobile app providing information about tour courses, accommodations, restaurants and transportation were provided. Third is UHD (ultra high-definition) broadcasting, which is 4 times clearer than HD TV.

Important events such as figure 1 skating were successfully broadcasted in 4K UHD. Fourth is smart AI. An automatic interpretation and translation service was provided between Korean language and 8 other languages (English, Chinese, Japanese, French, Spanish, German, Russian and Arabic) at Olympic Stadium (guide robots) and on a mobile app (Genie Talk).

Autonomous driving vehicles were operated near Pyeongchang, and a 24-hour AI call center was operated during the Olympics period to provide information about events and traffic. Last are exciting VR services. VR experiences for ski jump, snowboard and bobsleigh simulating actual sites of the PyeongChang Olympic Games and VR roller coaster and shooting game were provided. VR game attraction and K-pop concert were also available.

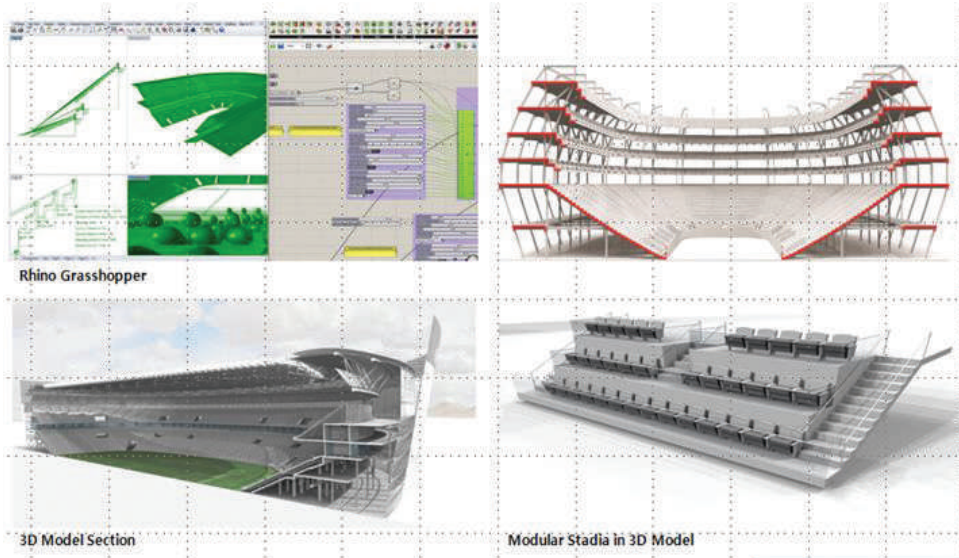


5G realistic image

5G connected car

Augmented reality(AR)guide

Figure 1: ICT used during PyeongChang Olympic Winter Games



ICT and Smart Stadium

Figure 2: KT wiz and SK used Smart Stadium System

Figure 2 shows the technology applied to KT and SK Ballpark. In the SK baseball field, IOT-based parking guidance system, food and souvenir ordering and billing system are installed to enhance user convenience. IOT-based energy saving air-conditioning system has been constructed, and toilets and kiosks also provide congestion information. We also built Big Data based player motion analysis system. VR mobile live streaming service and GIGA VR baseball relay have serviced in real time.

KT Wiz is a professional baseball team with the home stadium in Suwon. KT Wiz Park started a mobile live baseball streaming service using GIGA VR in 2016. Images taken by VR cameras installed at the first base, third base and catcher’s box are combined in real time to generate videos. The audience can connect to GIGA Wi-Fi in the stadium and watch the live VR streaming on

their smartphone. Figure 2 shows the technology applied to KT and SK Ballpark.



Figure 3: MLB and iBeacon Service[9]

Figure 3 shows how the iBeacon app is implemented on the smartphone in MLB. iBeacon is providing a variety of game information and fan services to fans looking for a baseball field through Apple’s ‘Micro-location’ technology on smartphones in MLB. Visitors who

have an iPhone have access to stadium maps, barcode-stained tickets and seat location information services through smart phones. You can get virtual points on your smartphone and download coupons that are available on the team store in the arena. Figure 4 shows how the wireless system actually works in MLB. Wireless service is available in all MLB venues since 2016.

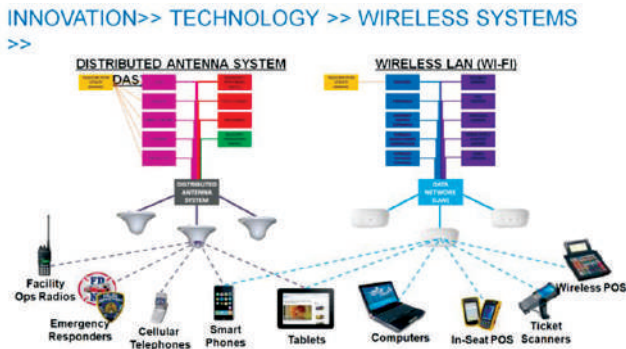


Figure 4: MLB and Wireless System[10]

Big Data and Sport

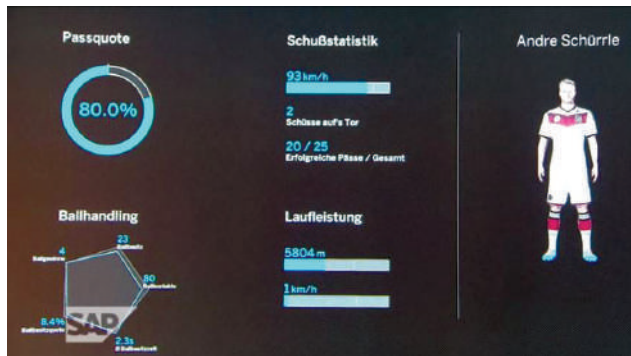


Figure 5: SAP ‘Match Insight’[11]

Figure 5 shows the actual operation of ‘Matchinsight’, which was used by the German national team who won the 2014 World Cup. ‘Matchinsight’ of SAP had an influence on winning of the 2014 World Cup by the German national soccer team. This is a representative example of big data used in sports. The German national soccer team collected and analyzed biometric information of athletes and game information in real time to make decisions on tactics and substitutions. Before this, soccer did not rely as heavily on big data as other sports. The German national soccer team used big data to collect and analyze unstructured data. In the case of baseball, the scope of analysis was limited to simple records such as batting average, earned run average and win rate in the past. Nowadays, baseball teams can measure conditions of athletes such as exercise intensity, efficiency of posture, joint angle, spin rate, speed and

heart rate, which can be applied to training. Baseball is greatly increasing the usage of big data.

Esports Evolution: Growth of e-sports in Korea was affected by the large-scale construction of high-speed internet networks after the financial crisis of Asia in 1997. There is an opinion that high unemployment rate at the time caused many people to find something to do [12]. Widespread supply of LAN gaming centers played an important role in helping growth of e-sports in Korea. Korea e-Sports Association under the Ministry of Culture, Sports and Tourism was founded in 2000 for the purpose of encouraging and regulating e-sports.

The e-sports industry showed a tremendous growth in 2010s, both in terms of the audience and prize money. Although large-scale tournaments were established prior to the 21st century, the number and size of tournaments was increased from about 106 in 2000 to about 260 in 2010.

Efforts to commercialize esports and harness its audience engagement power are intensifying, and the sector is primed for further strong growth, states the report. Games publishers are playing a more active role in building businesses around the esports scenes related to their titles. Activision Blizzard’s Overwatch League is perhaps the most prominent example of the changing approach. Blizzard has adopted familiar elements from traditional sports to create the global league: franchise teams, multiple league-wide partner brands, an exclusive media rights deal. It’s a bellwether project: many eyes are on it to see if Blizzard can build the large, global audience it is aiming for.

Sport Business Model: In future, sponsorships will become more flexible and tailored, and will include more value-in-kind; brands will seek rights holders that understand their business strategies and can align sponsorships with them; rights holders will invest more in digital content and activation capabilities, in order to engage fans, collect data and service sponsors; and, rights holders that can prove their value using data will take larger shares of the sponsorship revenue pie. The researchers examined and modeled the degree of sports and ICT convergence in various aspects, and the following conclusions were drawn. Figure 6 shows the final result of this study.

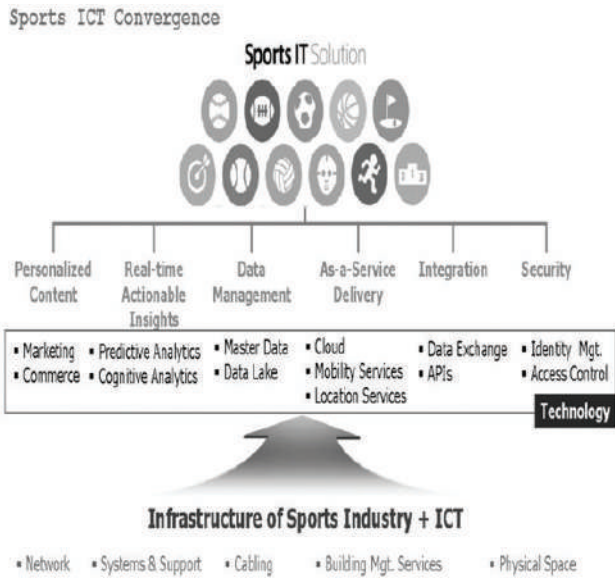


Figure 6: The results of Sports and ICT Modeling

CONCLUSION

The next phase of the quality, volume and variety of content will increase, it will be harder and harder to cut through; to stay relevant, sports, brands and media will have to experiment with new technologies such as voice activation, VR, AR and chatbots; digital media will continually give birth to new influencers and publishers, appealing to different generations and segments of the audience; and, rights holders will explore ways of monetizing the new types of content, through sponsorship and subscription products.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Antibacterial and Antioxidant Activity of *Pleurotuseryngii* Extracts

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ABSTRACT

Background/Objectives: To evaluate antibacterial and antioxidant activities using *Pleurotuseryngii* extracts.

Method/Statistical analysis: TPC, TFC, DPPH, and ABTS activities were examined for antioxidant effects. In order to determine the antimicrobial activity, we also studied these extracts using six multi-resistant bacteria through paper disc diffusion.

Findings: The content of total polyphenols ranged from 1.67 mg GAE/g extract in acetone extract to 1.31 mg GAE/g extract in EtOH extract. The content of total flavonoid varied from 7.77 mg CE/g extract in EtAC extract to 0.61 mg CE/g extract in EtOH extract. At the result of DPPH activities of all extracts were higher than the ascorbic acid solution. DPPH activity of EtAC extract was the highest value at 81.0%. In addition, the highest ABTS activity was observed in EtOH extract at 88.4%. DPPH activity showed a stronger correlation with TPC and TFC. EtOH extract and acetone extract showed antimicrobial activity against six microorganisms. The EtOH extracts were the most effective against *Enterobacter cloacae*, and the most significant acetone extracts were the most effective for *Escherichia coli*.

Improvements/Applications: Based on this study, *Pleurotuseryngii* can be a good candidate for natural antioxidants and antimicrobials.

Keywords: antimicrobial, antioxidant, flavonoid, *Pleurotuseryngii*, polyphenol

INTRODUCTION

Various diseases such as brain diseases, heart diseases, atherosclerosis and autoimmune diseases are increasing in humans of the modern society due to changes in diet as well as excessive stress. Additionally, the incidence rate of various cancers is increasing due to incremented use of environmental chemicals. Because there are many natural plants with intrinsic biological activities that may prevent various

oxidation reactions, studies are continuously conducted to discover natural products with antioxidant effects that maintain health and delay aging, as well as natural products with antineoplastic effects that prevent cancer; most importantly however, studies are more actively developed to especially discover biologically active substances derived from natural products^[1,2].

Plants have various antimicrobial substances including secondary metabolites or their derivatives such as alkaloids, terpenoids, quinolones, flavonoids, phenolic compounds and volatile oil^[3]. Mushrooms are generally recognized to be effective in Chinese medicine and traditional medicine, and are known to be effective in the treatment of chronic diseases by increasing the defensive system of the human body through diseases such as phagocytosis^[4]. Among the various natural products, mushrooms especially have

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their characteristic scent and taste, and are recognized as a low-calorie food with abundant nutrients. Additionally, mushrooms contain β -glucan and are reported for their effects of preventing various diseases through their anti-neoplastic and immunostimulatory actions as well as effects of lowering cholesterol; for this reason, they are used as ingredients in functional health foods as well as in medical products, thereby increasing the annual mushroom production rate by 3~4%^[1,2,5].

The scientific name of Saesongi mushroom is *Pleurotuseryngii*. Its general name and the name of species is registered as King Oyster Mushroom, while its product name is registered as Saesongimushroom^[5]. Dried *P. eryngii* not only offer approximately 37.7% of protein content with abundant amino acids, but also contain β -glucan, polysaccharopeptides and polysaccharides such as polysaccharide-protein conjugates, Vitamin C, minerals and Vitamin B12 (treatment factor to pernicious anemia), substance not commonly seen in other mushrooms^[5,6]. *P. eryngii* have solid and excellent flesh due to the compact plectenchyma in their fruiting body and have less water content than other mushrooms, offering their value as a functional edible mushroom^[5,7]. *Pleurotostreatatus*, which belongs to the same *Pleurotus* family as *P. eryngii*, contains lovastatin and therefore lowers cholesterol, and is additionally reported to be effective in breast cancer as well as in colon cancer^[8].

This study was compared and analyze the antioxidant as well as the antimicrobial activity of *P. eryngii*, a mushroom with characteristics of a functional food product, extracted to solvents such as acetone, ethanol (EtOH) and ethyl acetate (EtAC); this was achieved by measuring not only the antioxidant activity such as the antioxidant (DPPH, 1,1-diphenyl-2-picrylhydrazyl; and ABTS, 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) radical scavenging activity, total polyphenol contents (TPC), and total flavonoid contents (TFC) but also the antimicrobial activity against 6 multi-drug resistant bacteria.

MATERIAL AND METHOD

Materials: *P. eryngii* used in this study were purchased in a sliced form from Duriban farm (Gwangju, Korea), and were used in a powdered form after natural air drying. Aluminium(III) chloride hexahydrate, ascorbic acid, catechin, 2,2-diphenyl-1-picrylhydrazyl, 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) diammonium salt, Folin-Ciocalteu reagent, and gallic acid used in the

antioxidant activity test were purchased from Sigma-Aldrich Co. (St. Louis, MO, USA), and extra pure reagents were used for acetone, EtOH, and EtAC. The 6 species of bacteria used for the antimicrobial assay using *P. eryngii* extracts were 3 species of Gram-positive bacteria containing *Micrococcus luteus* (KCTC1915), *Staphylococcus aureus* (KCTC1928), and *Bacillus subtilis* (KCTC1918) and 3 kinds of Gram-negative bacteria including *Pseudomonas aeruginosa* (KCTC1637), *Enterobacter cloacae* (KCTC1685), and *Escherichia coli* (KCTC2441). All bacteria were harvested from Korean Collection for Type Cultures (KCTC, Daejeon, Korea), and activated from subculture in according to each of their culture conditions.

Preparation of *P. eryngii* extracts: 400 mL of solvent were added to 50 g of powdered *P. eryngii*, which was then extracted and filtered (Advantec MFS, Tokyo, Japan) for 48 hr in room temperature. Rotary evaporator (EYELA A-1000S, Tokyo, Japan) was used to remove the solvents of the filtrate, and the concentration was set to 50 mg/mL by diluting in dimethyl sulfoxide (DMSO, Sigma-Aldrich Co., St. Louis, MO, USA). After such process, the extracts were used in the test with storage at -20°C. Solvents used for *P. eryngii* were EtAC, acetone and EtOH, which each have different polarities but allow easy removal.

TPC of *P. eryngii* extracts: The TPC was measured via chromogenic assay revealing blue color obtained from reaction between Folin-Ciocalteu reagent and phenolic compounds contained in the *P. eryngii* extracts^[9]. 45 μ L of 1 N Folin-Ciocalteu reagent (Sigma-Aldrich Co., MO, USA) were mixed to 45 μ L of *P. eryngii* extracts, and the mixture reacted at normal room temperature for 3 minutes to promote the reaction. After mixing 910 μ L of 2% Na₂CO₃, the mixture was fixed for 30 min. And then the absorbance was measured at 760 nm using a spectrophotometer (MECASYS, Daejeon, Korea). At the TPC results were presented as mg gallic acid equivalent (GAE)/g extract by drawing a calibration curve with concentration of 100.0, 50.0, 25.0, 12.5, 6.25 and 3.125 μ g/mL, using gallic acid as the standard. All results are presented as average values calculated from three series of tests.

TFC of *P. eryngii* extracts: The TFC was measured using Han's method^[10]. 1L of distilled water were added to 250 μ L of *P. eryngii* extracts, to which 75 μ L of 5% NaNO₂ was added; the mixture was then fixed for 5 min for reaction. 150 μ L of 10% AlCl₃ was added, the mixture was then fixed for additional 6 min. 500 μ L of 1.0 M NaOH were added, the remaining volume was filled

with distilled water to establish a total volume of 2 mL. The mixture was fixed for 15 mins and then measured for its absorbance at 510 nm. At the TFC results were presented as mg catechin equivalent (CE)/g extract by drawing a calibration curve with concentration of 100.0, 50.0, 25.0, 12.5, 6.25 and 3.125 µg/mL, using catechin as the standard. The results are presented as average values calculated from three series of tests.

Measurement of DPPH: The Blois method was used to measure the DPPH activity as the evaluation of antioxidant activity of *P. eryngii* extracts^[11]. 970 µL of 0.1 mM DPPH solution were added to 30 µL of the extracts. The mixture was fixed for 30 min in the darkroom and then measured for its absorbance at 517 nm. The results were presented as the mean value calculated from 3 independent experiments tests. 1 mM ascorbic acid was used as the positive control. The DPPH activity was calculated as follows:

$$\text{DPPH (\%)} = \left(1 - \frac{\text{Absorbance of solution added with reagent}}{\text{Absorbance of solution without reagent}} \right) \times 100 \dots(1)$$

Measurement of ABTS: This method of Re et al. was used after partial revision to measure the ABTS activity after partial modification^[12]. After mixing 7.4 mM ABTS diammonium salt with 2.6 mM potassium persulfate in a 1:1 ratio, the mixture was fixed for 24 hr in the darkroom to prepare the ABTS cation solution. The absorbance was then adjusted to 0.7 at 734 nm using a spectrophotometer. 30 µL of *P. eryngii* extracts was mixed with 970 µL of ABTS solution. The mixture was fixed for 30 min in the darkroom to facilitate their reaction, and its absorbance was measured at 734 nm. The results were presented as the mean value calculated from 3 independent experiments. 1 mM ascorbic acid was used as the positive control. The ABTS activity was calculated as follows:

$$\text{ABTS (\%)} = \left(1 - \frac{\text{Absorbance of solution added with reagent}}{\text{Absorbance of solution without reagent}} \right) \times 100 \dots(2)$$

Measurement of antibacterial activity: The antimicrobial activity of *P. eryngii* extracts was measured using disc diffusion method^[13]. Lysogeny Broth (LB) culture liquid medium was used for the 6 species of bacteria to be used in the study, in which the

bacteria were aerobically cultured for 24 hr at 37°C. Its absorbance was diluted to 0.1 at 600 nm and then the bacteria were smeared to the petri dish. 30 µL (1.5 mg/disc) of *P. eryngii* extracts were sprayed to the paper disc (6 mm diameter, Whatman International, MO, USA) and then the disc was cultured aerobically for 12 hr in a 37°C incubator. The diameter of the clear zone was measured using Vernier caliper (0~150 mm, color world, China), which was used to compare their antimicrobial activities. The results are presented as average values calculated from 3 independent experiments.

Statistical analysis: All the results were presented as mean ± standard deviation. SPSS 24.0 (SPSS 24.0, IL, USA) was used for statistical analysis. And Duncan's test was used for ANOVA (p <0.05). Pearson's correlation analysis was conducted to analyze the correlation among the DPPH/ABTS activity, TPC, and TFC.

RESULTS AND DISCUSSION

Extraction yield, TPC, and TFC: The extraction efficiency is affected by the chemical qualities of the biologically active substance, method of extraction, temperature, time of extraction and size of reagent molecules, as well as the solvent used for the extraction, resulting in different yield of extraction. In this study, solvents including acetone, EtOH, and EtAC were used to select efficient solvents for extraction of biologically active substances from *P. eryngii*. The yield of extracts obtained from extraction of powdered form of naturally dried *P. eryngii* using acetone, EtOH and EtAC are presented in **Table 1**. *P. eryngii* extracted using EtOH resulted in an extraction yield of 3 times and greater than that of other solvents. As it is reported that the yield of extraction generally increases in a polar solvent^[14]. It was also clear that the extracts in this study increase as the solvent polarity used for extraction increases. Similar to the study of Lin et al. that reported the yield of extraction of *P. eryngii* using EtOH^[15], this study also demonstrated a yield of 3.04 ~ 3.16%.

Table 1: Yield (%) of different solvent extracts from *P. eryngii*

	Solvent for Extraction		
	Acetone	EtOH	EtAC
Yield (%)	0.98	3.14	0.60

Polyphenol is a representative component of food-derived functional substance and is an aromatic compound with more than 2 phenolic hydroxyl, easily dissolved in water or alcohol. It is not only recognized for its antioxidant activity, but also for its anti-inflammatory, anti-thrombotic and anti-neoplastic effect^[16, 17]. Here, gallic acid was used as the standard to obtain the TPC of each *P. eryngii* extract, and its results are presented in **Table 2**. Acetone, EtAC and EtOH were used to measure the TPC of *P. eryngii* extract according to each solvent. The TPC of *P. eryngii* extracts, in the order of greatest to least, were as follows: extracts using acetone \approx EtAC > EtOH, demonstrating 1.31 ~ 1.67 mg GAE/g extract. This revealed a significant difference between acetone, EtAC extract and EtOH extract. Such results were similar to the TPC of *Lentinusedodes* reported by Han et al.^[1, 2], while the contents were less than that of *Auricularia auricula-judae* reported by Yu et al.^[18]. It has been reported by Oh et al.^[16] that the order of polyphenol contents extracted from *P. eryngii* according to each solvent was in the order of water > 50% EtOH > 99% EtOH, and that the amount of polyphenol, an antioxidant substance, differs depending on the polarity of the solvent. However, in contrast to such results, this study has revealed the lowest amount of polyphenol in EtOH extract and has demonstrated that acetone and EtAC are the most appropriate solvents for polyphenol extraction. The amount of polyphenol in *L. edodes* from the order of greatest to the least has been reported as acetone extract > EtOH extract > EtAC extract by Yu et al.^[18], while the amount in *A. auricula-judae* has been reported as EtOH extract > acetone extract > EtAC extract by Han et al.^[1, 2]. The solubility of polyphenol differs according to the location of hydroxyl group, the size of the molecule and the length of the hydrocarbon chain, and is also greatly affected by the type of solvent used in the extraction, the time of extraction and temperature; it is generally known that polyphenol is well dissolved in diverse solvents such as acetone, EtAC, EtOH, and methanol^[19]. The components of phenolic compounds contained in *P. eryngii* are reported to be phenolic acids such as p-hydroxybenzoic acid, procatechuic acid, vanillic acid, syringic acid, cinnamic acid and caffeic acid, and flavonoids such as catechin, rutin, and naringin^[20, 21]. Therefore, as demonstrated in the results of this study, the reason that the amount of polyphenol was greater in acetone and EtAC solvents than in EtOH is that the amount of polyphenol does not increase with increasing polarity of the solvent, and that the phenolic compounds

of *P. eryngii* differ in the type of compound, the degree and the quality of dissolution according to the type of extraction solvent.

Table 2: TPC & TFC of *P.eryngii* extracts

Solvent	TPC (mg GAE/g extract) ¹⁾	TFC (mg CE/g extract) ²⁾
Acetone	1.67 \pm 0.05 ^{a3)}	5.34 \pm 0.12 ^b
EtAC	1.63 \pm 0.03 ^a	7.77 \pm 0.18 ^a
EtOH	1.31 \pm 0.02 ^b	0.61 \pm 0.02 ^c

Results present the mean and \pm SD of values obtained from 3 independent experiments.

¹⁾The value is indicated in mg of gallic acid equivalent per gram of extract

²⁾The value is indicated as catechin equivalent per gram of extract.

^{3)a,b,c}Means with different letters within a column are significantly different at $p < 0.05$ using Duncan's test.

Flavonoid, which belongs to yellow polyphenol that have C6-C3-C6 as its backbone, is abundantly found in all parts of plants as well as in grains and fruits^[22]. Additionally, it is a representative food-derived functional substance with antioxidant activity as found in procyanidin and tannin^[17]. The TFC was 7.77 \pm 0.18 mg CE/g extract in EtAC extract, demonstrating a significant difference with that of acetone extract and EtOH extract; similar to the TPC, the amount was the lowest in the EtOH extract. The TPC and TFC were also the highest in EtAC extract than in acetone and EtOH extract in *L. edodes* as reported by Lee et al.^[23] Flavonoids can generally be classified according to their chemical structure into phenolic acids that have benzoic acid and cinnamic acid as its basic structure and into C6-C3-C6 structure with 2 phenyl rings. Examples of flavonoids include flavones, flavanones, flavonols, isoflavones, anthocyanins, and flavan-3-ols. Flavonoids of low polarity such as isoflavones, flavanones, and flavonols are generally well dissolved in solvents of low polarity such as chloroform, EtAC, dichloromethane, and diethyl ether, while flavonoids of high polarity such as flavonoid glycoside and aglycon are extracted to alcohol or alcohol-water mixtures. Consequently, the reason that the TFC of *P. eryngii* were highest in EtAC extract is considered to be that the amount of flavonoids of low polarity such as isoflavones, flavanones, and flavonols was greater than other flavonoids.

DPPH radical scavenging activity: DPPH activity is generally used to measure the antioxidant activity in the food and plants. Such method uses the mechanism in which DPPH, a violet soluble substance with stabilized free radical, reacts with the electron or hydrogen of the antioxidant and is reduced, resulting in a change from the violet color to a vague yellow color, as well as a decrease in the maximum absorbance at 515 ~ 520 nm^[11]. The results of measurement of DPPH activity in *P. eryngii* extracts are presented in **Figure 1**. The activity was the highest in EtAC extract as of $81.0 \pm 0.95\%$, and the activity of acetone extract and EtOH extract was each found to be $79.1 \pm 0.56\%$ and $77.4 \pm 0.33\%$, respectively. Such results demonstrated a significantly increased radical scavenging activity in comparison to the activity of $76.8 \pm 1.33\%$ in ascorbic acid used as the positive control ($p < 0.05$). Yoon et al.^[24] has reported a DPPH radical scavenging activity of 37.9% in *P. eryngii* used as the positive control in 80% EtOH extract of *P. eryngii* cultured in culture medium with sodium glutamate; in comparison with such results, the radical scavenging activity was found to be greater than 2 times in this study. Cho et al.^[25] has reported that the radical scavenging activity increases with increasing concentration in methanol and water extract, and that the DPPH activity increases in methanol, which has lower polarity than that of water. Han has reported that in the case of *Ramaria botrytis*, the DPPH activity was in the order of methanol > EtOH > acetone > EtAC, and in the case of *L. edodes*, the order was EtAC > acetone > EtOH^[10, 2]. Additionally, Han et al. has reported that the EtOH extract demonstrated a relatively highest radical scavenging activity in *A. auricula-judae*^[18]. Therefore, the order of solvents appropriate for measurement of DPPH activity of *P. eryngii* was identical to that of *L. edodes*, and the radical scavenging activity was the highest in EtAC in comparison to that of other solvents, suggesting that biologically active substances with low polarity commonly affect the antioxidant activity. Generally, phenolic compounds greatly affect the antioxidant activity; however, the TPC or the TFC do not show a direct correlation with antioxidant activity. This may be because each phenolic compound has different antioxidant activity, and because the phenolic compound itself may have low antioxidant activity despite having the highest amount of polyphenol or flavonoids. Nevertheless, a positive correlation was found between the TPC and the DPPH activity in this study.

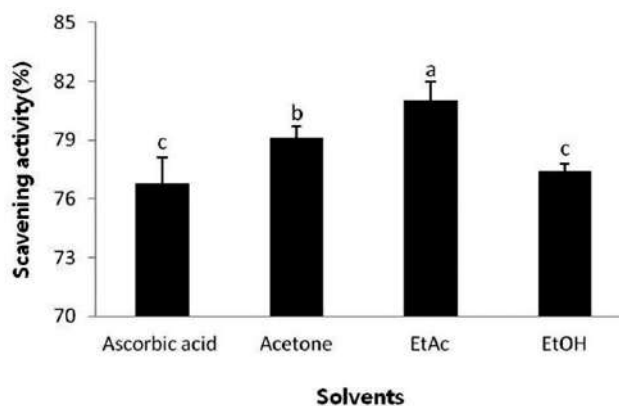


Figure 1: DPPH activity using extracts from *P. eryngii*

1 mM ascorbic acid was used as a positive control.^{a,b,c}Means with different letters are significantly different at $p < 0.05$ using Duncan's test.

ABTS radical scavenging activity: ABTS activity, which enables rapid confirmation of antioxidant substance from natural product, can be measured by observing the change in color from turquoise to colorless appearance as the ABTS free radical formed by reaction with potassium persulfate is removed by the antioxidant contained in the extract^[26, 27]. The results of measurement of ABTS activity in *P. eryngii* extracts are presented in **Figure 2**. The activity was the highest in EtOH extract as of $88.4 \pm 0.22\%$, demonstrating a significantly increased radical scavenging activity in comparison to the activity of $62.3 \pm 0.46\%$ in ascorbic acid used as the positive control ($p < 0.05$). The activity of acetone and EtAc extract was each found to be $57.5 \pm 3.24\%$ and $23.7 \pm 2.41\%$, respectively. Consequently, the ABTS radical scavenging activity in EtOH extract was approximately greater than 3 times than that of EtAC extract. Similar to the scavenging activity of $79.4 \pm 0.5\%$ in 80% methanol extract of *P. eryngii* reported by Hong et al.^[28], it was evident in this study that the radical scavenging activity was higher in EtOH extract of high polarity. Additionally, similar to the reports that DPPH, a stabilized free radical, generally measures the antioxidant activity of hydrophobic substance, and ABTS, a cation radical, measures the antioxidant activity of both hydrophilic and hydrophobic substance^[29, 30], this study demonstrated a higher DPPH activity in EtAC extracts of low polarity, and a higher ABTS activity in EtOH extracts of rather high polarity. Furthermore, the reason that the ABTS was overall higher than DPPH in EtOH extract of *P. eryngii* is considered to be that *P. eryngii* contains more hydrophilic antioxidant substances.

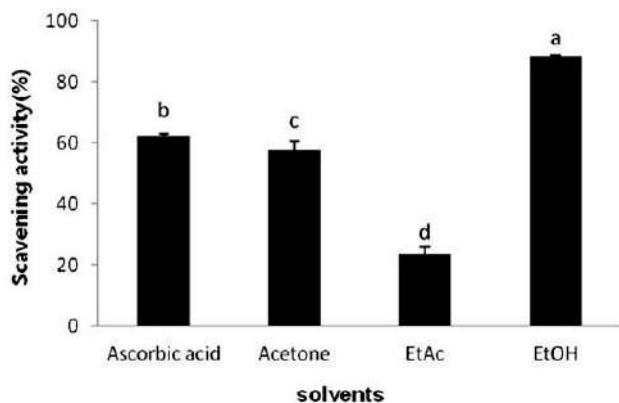


Figure 2: ABTS activity using extracts from *P.eryngii*

1 mM ascorbic acid was used as a positive control. ^{a,b,c,d}Means with different letters are significantly different at $p < 0.05$ using Duncan’s test.

Correlation between the TPC/TFC and antioxidant activity: Pearson correlation analysis was conducted to investigate a relationship among antioxidant activity (DPPH and ABTS), TFC, and TPC. And its results are presented in **Table 3**. The correlation coefficient between TPC and TFC was found to be 0.869, demonstrating a strong positive correlation ($p < 0.01$). Although there was a positive correlation between TPC and DPPH as well as between TFC and DPPH (0.694 and 0.905, respectively), there was a negative correlation with ABTS (-0.748 and -0.975, respectively) ($p < 0.05$). It is generally thought that the TPC or the TFC would directly affect the antioxidant activity; however, it appears that the radical scavenging activity may be rather different according to the structural interaction among compounds, for the degree of antioxidant activity may be different in each phenolic compound, and the antioxidant activity may be affected by various biologically active substances other than phenolic compounds, such as organic acid and peptides.

Table 3: Correlation coefficient for TPC, TFC, and antioxidant activity (ABTS and DPPH) of *P.eryngii* extracts

	TPC	TFC	DPPH	ABTS
TPC	1.000	-	-	-
TFC	0.869**	1.000	-	-
DPPH	0.694*	0.905**	1.000	-
ABTS	-0.748*	-0.975**	-0.932**	1.000

* $p < 0.05$, ** $p < 0.01$.

Antibacterial activity of *P. eryngii* extracts: Paper disc diffusion, a method generally used for the measurement of antibacterial activity of plants, was used to search out the antibacterial activity of *P. eryngii* extracts against multi-drug resistant bacteria. The measurement of growth inhibition activity of *P. eryngii* extract against 6 bacteria are presented in **Table 4**. The antimicrobial activity of EtOH extract was found to be in the order of *E. cloacae* > *M. luteus* > *S. aureus* > *B. subtilis* > *P. aeruginosa*. EtAc extract did not demonstrate antimicrobial activity against *E. coli*, but demonstrated a similar antimicrobial activity against other species. On the other hand, acetone extract demonstrated the highest antibacterial activity against *E. coli*. Acetone, EtOH, and EtAc extract all showed a similar growth inhibition activity against *P. aeruginosa*. The extract showed a rather higher antimicrobial activity against *M. luteus* than in *P. aeruginosa*, among which 8.09 mm of clear zone was formed in EtOH extract. EtOH extract also demonstrated the highest antibacterial activity against *E. cloacae*. While EtOH extract and EtAc extract demonstrated no or rather weak antibacterial activity against *E. coli*, acetone extract demonstrated a high activity of 9.72 mm. The antibacterial activity against *B. subtilis* and *S. aureus* was rather high in EtOH extract than in other extracts. Consequently, excluding the fact that acetone extract was the highest in antimicrobial activity against *E. coli*, EtOH extract demonstrated the highest antibacterial activity against the remaining 5 bacteria. Although Kalyoncu et al.^[31] have reported that EtOH extract of *P. eryngii* shows antibacterial activity against *E. coli* and *S. aureus*, and none against *B. subtilis* and *E. cloacae*, this study has demonstrated antibacterial activity of EtOH extract against all 6 oral bacteria species.

Table 4: Antibacterial activities of several solvent extracts in *P.eryngii*

	Acetone	EtOH	EtAC
<i>M. luteus</i>	+	++	+
<i>S. aureus</i>	+	+	+
<i>B. subtilis</i>	+	+	+
<i>P. aeruginosa</i>	+	+	+
<i>E. cloacae</i>	+	++	+
<i>E. coli</i>	++	+	-

-, no inhibition (≤ 6 mm); +, slight inhibition (~ 8 mm); ++, moderate inhibition (~ 10 mm).

CONCLUSIONS

After natural air drying and powder preparation of *P. eryngii*, its extraction using solvents including acetone, EtOH and EtAC were measured for its antioxidant and antimicrobial activity. TPC, TFC, and DPPH/ABTS activities were examined for antioxidant activity, and paper disc method was used to observe growth inhibition for antimicrobial activity. The TPC of *P. eryngii* was significantly higher in acetone and in EtAC than in EtOH. The TFC was the highest in EtAc, followed by acetone and EtOH. The DPPH and ABTS activity was each found to be 81.0 ~ 77.4%, 88.4 ~ 23.7%, respectively. In the case of DPPH activity, all 3 extracts demonstrated a higher radical scavenging activity than in ascorbic acid, while in the case of ABTS activity, EtOH extract demonstrated a higher activity than in ascorbic acid. There was a positive correlation between the TPC and the TFC; although both contents showed a positive correlation with DPPH, the contents showed a negative correlation with ABTS. Upon measurement of antibacterial activity of *P. eryngii*, acetone extract and EtOH extract demonstrated antibacterial activity against all 6 bacteria, including *B. subtilis*, *P. aeruginosa*, *S. aureus*, *E. coli*, *M. luteus*, and *E. cloacae*, and EtAC extract demonstrated antibacterial activity against the remaining 5 bacteria excluding *E. coli*. Based on such results demonstrating antibacterial and antioxidant activity of *P. eryngii*, it is expected that *P. eryngii* may be used as ingredients in various natural antioxidants, antimicrobials and health functional foods in the future.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Effect of Horse Riding and Horse Riding Simulator Exercises on the Balance of the Elderly

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ABSTRACT

Background/Objectives: This study aims to determine the effect of horse riding and horse riding simulator exercises on the balance of the elderly.

Method/Statistical analysis: The subjects of this study were 12 male elderly who performed horse riding group 6 elderly and horse riding simulator group 6 elderly. The horse riding and horse riding simulator exercises were conducted for 30 min. twice a week for 12 weeks

Findings: The study results showed that each of the groups had a significant improvement in limit of stability, functional reach test, and time up & go test before and after the intervention. In addition, the comparison results between the groups showed that there was a significant difference in limit of stability whereas no significant difference was found in functional reach test, and time up & go test.

Improvements/Applications: Horse riding and horse riding simulator were effective in the balance of the elderly and there was a significant difference between each of the groups. However, the horse riding simulator can be done in the indoor, reduce a fall risk possibility and less economic burden. Thus horse riding simulation is accepted as more effective method as an intervention method to improve the elder balance ability.

Keywords: Horse riding, Horse riding simulator, Elderly, Balance, Simulator Exercises.

INTRODUCTION

The muscle strengthening and posture control training are very important to the prevention of fall since muscle weakening due to aging-related physical changes degrade the balance ability of the elderly, which causes a frequent fall of elderly^[1]. Simple repetitive motions that require concentration are suitable for muscle strengthening and posture control of the elderly. Based on this principle, horse riding can be one of the exercises that are suitable for the elderly^[2]. The rehabilitation through horse riding can overcome

physical and psychological disabilities and horse riding has been applied to rehabilitation treatments for various diseases such as musculoskeletal disorders, neurological disorders, and mental disorders clinically^[3]. Therapeutic riding refers to a treatment using a horse, which can be applied as a tool for various therapeutic purposes. The therapeutic horse riding has physical, emotional, social, cognitive, behavioral and educational purposes. The movements of horse can activate muscles of arms and legs as well as trunk muscles of horse riders thereby having an effect of muscle strengthening, and can help patients with cerebral palsy to develop normal motor abilities and patients with problems in the central nervous system to learn functional movements due to the normal sensorimotor stimulation. Among the sensorimotor stimuli, a vestibular input can increase balance ability by the control of the righting and equilibrium responses. In addition, the effect of the improvements on balance abilities is applied to individual patients^[4]. In therapeutic riding, trunk forward riding and backward riding

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movements as well as upper extremity arms outstretched to the sides and reaching down to touch stirrups in the lower extremity are repeated. These movements can improve balance control abilities due to the activation of trunk extensor and strengthen muscle strength in the upper and lower extremities^[5]. The horse movements can generate the similar effect of normal walking exercise for horse riders as three-dimensional movements and it can input sensorimotor stimulation in the gravity direction. The characteristic of horse riding is a rehabilitation training method suitable for patients with mobility disorder^[6]. The degradation in balance abilities due to changes in physical functions in the elderly can cause a fall or mobility disorder during daily activities. As an exercise method to improve balance abilities of the elderly, horse riding can help improvements on static balance abilities for the elderly^[7]. Furthermore, horse riding can improve abilities of physical functions for the elderly whose physical functions are degraded thereby giving vitality during daily activities and preventing a fall. In this way, the therapeutic riding for improving the balance for elderly people has been training with Horse riding simulator recently. Indoor horse riding simulator can be more interesting than general equilibrium training and has the advantage of improving balance through various movements of the trunk. Balance training using an indoor horse riding simulator is more common than outdoor horse riding^[8]. The purpose of this study is to determine the effect of horse riding and horse riding simulator exercises on balance control of the elderly. This study aims to help the application of horse riding clinically by comparing the effects between the outdoor horse riding and the indoor horse riding simulator on balance abilities.

MATERIALS AND METHOD

Study Subjects Ethical Consideration: The subjects in this study were the elderly aged over 65 years. There were chosen at the Horse Riding Education Center located in Hyunnae-myunGosung-gun in Gangwon-do. A total of 12 subjects were divided into six horse riding group(HR) and six horse riding simulation group(HRS). The subjects participated in this study with voluntary consent after being fully informed about the purpose and method in this study. The selection criteria of the study subjects were those who had no orthopedic, neurological,

or medical abnormalities. Among study subjects, mean age, height, and weight of subjects in Horse riding (HR, n=6) group were 76.7±4.9 years old, 160.2±5 cm, and 68.3±8.6 kg while those of horse riding simulator (HRS, n=6) group were 75.6±3.2 years old, 162.1±4.5 cm, and 70.2±4.2 kg. All subjects were male.

Measurement Method: The subjects in the HR group rode horses bred in Jeju and trained in the Horse Riding Education Center. The subjects wore protective helmets and vests. An assistant held the reins and subjects performed a total of 30 min. exercise consisting of five min. of warm-up exercise, 20 min. of horse riding, and five min. of cool down exercise twice a week for 12 weeks. To prevent a fall, only horse walking was used. HR group program is shown in Table 1

And The HRS group used a horse simulator (S-rider, Shinwha Electron Co. Ltd, Korea) and horse riding programs of walking, slow trot, and fast trot were selected. A total of 30 min. HRS exercise was conducted as follows: five min. of warm-up exercise, 20 min. of horse riding simulator, and five min. of cool-down exercise twice a week for 12 weeks. For the assessment of balance ability of the study subjects, limit of stability (LOS) was measured using Biorescue (RM Ingenierie, France) and visual instruction was provided by the laptop screen, and the foot plate of the equipment was connected. LOS was measured by recording the maximum range at each direction in the manner of transferring the center of gravity toward the arrow on the screen. At that moment, the center of gravity was indicated by a red point. The balance ability before and after the HR and HRS exercise was assessed using functional reach test (FRT) and time up & go test (TUG). FRT was used to assess dynamic balance in standing. The subjects stood barefoot, placed their feet shoulder width apart, and held both arms parallel to the ground with the palms facing down. The subjects extended both arms to the maximum, then stretched forward as far as possible with their arms parallel to the ground and the distance moved was measured. TUG test sat in an armchair. At the start of the test, they stood up and walked 3 meters, then walked back to and sat in the armchair[Figure 1].

Table 1: HR group program

Program	Time	Horse riding contents
warm-up	10 minute	sitting on horse, using proper posture, take horse by the reins, standing in the stirrups
Horse riding	20 minute	riding forwards, riding without stirrups, riding independently, maneuvering the horse in a figure eight pattern on flat ground
warm-down	10 minute	stretching exercises

**Figure 1: HR group program**

Data Analysis: The study data were processed statistically using SPSS version 18. The normal distribution was proven by the Kolmogorov-Smirnov test. To compare changes in measured variables before and after the upper extremity training in both groups, the Wilcoxon test was conducted. The Mann-Whitney U Test was also conducted to compare differences in measured values in each group. The statistical significance level of all tests was set to $\alpha=.05$.

FINDINGS

The study results showed that HR had a significant difference in LOS, FRT, and TUG before and after the intervention, and HRS had also a significant difference in LOS, FRT, and TUG before and after the intervention. The comparison between HR and HRS groups showed that LOS had a significant difference whereas FRT and TUG had no significant difference between them [Table2].

Table 2: Comparison of LOS, FRT and TUG between groups

	Group	Pre	Post
LOS (mm2)	HR*	216.9 ± 79.0	266.2 ± 77.1†
	HRS*	218.9 ± 74.8	231.7 ± 75.1
FRT (cm)	HR*	18.8 ± 2.7	26.5 ± 2.2
	HRS*	18.5 ± 3.4	24.0 ± 5.9
TUG (secs)	HR*	13.1 ± 1.7	8.3 ± 1.2
	HRS*	13.1 ± 1.4	9.3 ± 1.9

HR: Horse riding, HRS: Horse riding simulator, LOS: Limits of stability, FRT: Functional reach test, TUG: Time up and go test, * $p<0.05$ by pair t-test, † $p<0.05$ by independent sample t-test

DISCUSSION

Therapeutic riding influences a posture control significantly due to sensorimotor stimulation through physical movements during horseback riding in the front, rear, left and right directions. In particular, the coordination of head and trunk during horseback riding can increase posture stability^[9]. In addition, it can increase muscle activity and dynamic stability of trunk thereby reducing a risk factor of fall of the elderly^[10]. Horse riding helps communication between living animal and human due to its characteristics. The movement of a horse is similar to a gait of human, which can facilitate the movement of the center of gravity in the human body and effective in improvements on balance by activating muscles around the pelvis^[11]. The horse riding simulation has an advantage of doing exercise consistently as it can attract the elderly' interest although it is a relatively low strength of exercise task. It can also be effective for the elderly to have a similar exercise amount as much as that of healthy adults^[13]. The comparison results of trunk stability exercise using balls and HRS showed that the gait capability was more improved by HRS, and FRT and TUG were also significantly different by performing HRS. The HRS was also effective in dynamic as well as static balance as it can generate an input to the motor,

visual, somatosensory, and vestibular systems. It is highly desirable for the elderly who have experienced a fall as an indoor exercise and it can improve balance ability, which is highly beneficial as a preventive exercise against falls^[13].

The center of gravity in human body is moved in various directions while performing a HRS exercise and proximal muscles are activated when a posture is controlled in the gravity direction so that the righting reflex occurs due to the central nervous system regulation. In addition, muscles around the pelvis are also activated thereby increasing the trunk stability as well as increasing the LOS^[10].

The present study had a significant difference in LOS, FRT, and TUG before and after the exercise of HRS, which indicated the effect on improvements of balance abilities for the elderly. The elderly subjects in the previous study were consistent with the HRS training parameters. These results implied that the HRS exercise which was performed in the indoor had an effect on trunk muscle activation of the elderly as it increased posture control ability by various sensorimotor stimuli. HR is suitable as one of the various intervention methods for gait and balance of those who have physically functional disabilities^[14] and it can increase coordination, range of motion of joints, balance, gross and fine motor skill, and muscle strength thereby improving increases in self-esteem, reduction in stress, psychological stability, and quality of life^[5].

It can also get a positive effect on psychological stability and increase in physical body functions, resulting in improvements on daily activity capabilities. However, HR can be a burden economically and time limitation, which can be drawbacks^[15]. However, the HRS group had a significant difference in LOS, FRT, and TUG before and after the exercise. The comparison results between the HRS and HR groups showed that there was a significant difference only in LOS. The HR exercise performed in the outdoor for the elder had more fall risk and higher economic burden. In contrast, the HRS exercise is a method of exercise intervention that can be done in the indoor and can reduce a fall risk possibility. In this regard, the HRS exercise can be more helpful as an exercise method to improve the elder balance ability.

The dementia elderly and the normal old man were improved by using the indoor horse riding machine in the

level of balance, and the balance ability was improved. Continuous exercise was helpful for the improvement of the elderly balance and also for emotional stability even with low intensity horses rehabilitation riding exercise^[16]. The elderly are more likely to engage in sport activities than younger people, but they are less likely to participate in horses rehabilitation riding activities, but they can cause interest. It also has effects on aerobic exercise and psychological stability^[17].

In addition, communication between humans and horses can reduce stress if a person is unable to maintain normal social relationships due to dysfunction. Increased postural stability and reduced stress increase the quality of life in the elderly.

The horses rehabilitation riding of the elderly has been carried out a lot in the previous studies using the indoor riding machine, but there is not enough research on the horse rehabilitation riding training in the outdoors. The horse rehabilitation riding exercise becomes an active weight-bearing exercise while maintaining posture on the horse, and the trunk muscles related to posture maintenance are activated by various sensory stimuli.

Therefore, it is effective to improve the balance ability for the fall prevention of the elderly, and it is judged that the improvement of the balance ability affects the quality of life. In this study, we did not study the quality of life after elderly riding rehabilitation training. However, improvement of equilibrium ability after riding rehabilitation training improves the quality of life by improving functional mobility.

CONCLUSION

Decreases in strength and balance due to aging cause falls. There are generally a lot of exercises to strengthen strength and balance to prevent falls. However, the general exercise is lost interest and does not exercise constantly. And the elderly prefer to exercise through hobby activities. Riding rehabilitation has many merits as an exercise method for the prevention of falls in the elderly.

The equilibrium motion and the horse riding simulation on the unstable support surface improved the static and dynamic balance ability of the horse riding simulation before and after the exercise. These results suggest that rhythmic movements on the horse are more effective in improving balance ability than balanced training in the static posture^[18].

As the elderly population increases, there is a growing interest in quality of life and the need for exercise to prevent falls is emphasized. Strengthening and balancing exercise for fall prevention are more static than dynamic exercise. Exercise using horse riding simulation is very effective for the elderly as exercise method for dynamic posture control.

In the present study, the balance improvement after HR training for the elderly was consistent with the previous studies, but the variables of improvement in physical function excluding balance were not measured in this study. In the future, it will be necessary to study various variables after HR training. The limitations of this study are a small number of subjects and more studies are needed in relation to elderly walking and psychological factors of therapeutic riding.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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A Collaborative Outlier Detection Method for High Dimensional Data sets

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ABSTRACT

In the popularization of data mining techniques there is increasing demand among the researchers and academicians to detect the ramified database of different kinds that deals with areas such as healthcare sector, insurance, banking etc. Many researchers proposed different methods which were distance based approaches, density based approaches, depth based approaches etc. but these approaches were not able to deal properly with high dimensional datasets. This paper proposes a collaborative outlier detection approach for high dimensional dataset with four phases say Normalization phase, Reduction phase, Clustering phase, and lastly Feature bagging phase. The experiment was conducted on lung Cancer dataset obtained from UCI repository and the outcomes are recorded, moreover the outcome shows that detection accuracy improves considerably and simultaneously there is decrease in the execution time by five percent.

Keywords: DBSCAN, Feature Bagging, Median MAD Normalization, Outlier, Principal Component.

INTRODUCTION

Observations which are inconsistent with the rest of the data present in the data set are known as Outliers^[1]. The outliers are the observations which have a higher integrated squared error than a threshold. The detection of this type of inconsistent data is required for many applications in real life, which includes detection of crimes, fraudulent transaction detection, intrusion detection in the network, in stock market, data analysis in hospitals, etc. The types of outliers can be classified into various classes namely: Outliers as points consisting of multidimensional data, outliers which are contextual consisting of sequence of data which are discrete and are dependency oriented, time-series etc. Attributes which are contextual and behavioral are used for defining each instance to a particular context. Outliers which are collective which does not consider individual data but a collection of data. In general any outlier detection

method^[2] creates a normal pattern and after that assigns an outlier score to the data points which is based on how much it is deviated from the pattern which is normal. Some of the models are, models based on extreme values, models based on probability, models which are linear, models based on proximity, models based on information theory, models based on high dimensional data etc. Both uni-variate and multivariate data can be checked for outlier on the basis of whether they are categorical or continuous. In data which are uni-variate, features like shape, center, distribution of data and relative position are considered. In bi-variate data use of prediction can be done by using correlation and regression, also multiple regressions can be done using multivariate data. Estimations used in statistics such as standard deviation and also the mean are highly affected due to the points which lie away from the center of the data set. Poisson and Gaussian distribution are statistical methods when applied to large data set. In this paper a collaborative method is proposed. The organization of the rest of the paper is in section 2 the review of literature is done, in section 3 the methodology is discussed, in section 4 the proposed algorithm is presented followed by experimental analysis in section 5 and finally the conclusion and future work in section 6.

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REVIEW OF LITERATURE

The categorization of outlier detection methods in general can be grouped as supervised and unsupervised methodologies. The methods based on distance, density, statistical and high dimensional datasets are grouped into unsupervised outlier detection.

S. Ramaswamy, R. Rastogi, and K. Shim, proposed a method in year 2000^[3] which is based on the distance calculation function which is the most popular method. In this technique the outlierness of a data point was specified depending on its distance from k-nearest neighbour based on distance.

Similar methods were proposed in year 2002 by ^{[4],[5]}and ^[6]. The approach based on density involves the data points with varying densities as compared to the densities of data points present in the surrounding. The method of computing density was different from one another.

W. Jin, A. Tung and J. Han, proposed such type of method in the year 2006^[7] which is known as Local Outlier Factor. The degree of LOF for each data point is calculated which determines the degree of outlierness. Further he proposed a method^[8] which was similar to LOF with additional feature of taking epsilon-neighbourhood as reference. In this method MDEF known as Multi Granularity Deviation Factor was determined.

C. Aggarwal and P. S. Yu proposed ABOD in the year 2008^[9] which is very effective and stated that angles are not affected by the distance.

Zhang, M. Hutter and H. Jin proposed a method in year 2009^[10] which were based on extracting the local outlier. In this method for each data point the neighbour's in reverse order were also found.

P. Kriegel, P. Kröger, E. Schubert, A. Zimek, proposed a method LoOP in the year 2009^[11] which considered the outlierness metric as the relative distance from its neighbors. This method calculated the top-n outliers. The next category of algorithms which were independent of the distance functions were used for high Dimensional datasets.

C. Aggarwal and P. S. Yu proposed a method^[12] of outlier detection which is grid based. The dataset in this method is first divided into grids the outliers are found in these grids first.

P. Kriegel, P. Kröger, E. Schubert, A. Zimek, and proposed SOD in the year 2009^[13] in this method the outlier determined first in the subspaces. In this paper collaborative method for enhancing the outlier detection for high dimensional dataset is proposed.

A Collaborative Outlier Detection Algorithm

The proposed algorithm consists of four phases:

- i. Normalisation Phase
- ii. Dimensionality Reduction Phase
- iii. Clustering Phase
- iv. Feature Bagging Phase

Normalization Phase: In Normalization phase the dataset is normalized. The dataset used may consist of number of attributes and each attribute requires a different unit for measurement and due to this reason it is required that the dataset be normalized. For the processes such as clustering and classification it plays a significant role. The most popular method of normalization is z-score, min-max and median-MAD methods. Some of the methods studied by ^[14] Median is an estimator of location which has a highest breakdown point of 0.5. The Median Absolute Deviation has the same definition i.e. it is an estimator of scale. It is immune to sample size. Huber (1981) described MAD as the only useful ancillary estimate of scale. It is more robust than the traditional interquartile range in which the breakdown point was only 0.25. The steps of calculations of median involve at first arranging the observations in ascending order, then determine the mean rank of the statistical series and also finally determining the value which is associated with that rank. Considering a statistical series 1, 2, 2, 7, 9, 10, 10 and 1005. The formula for the average rank is $(n+1)/2$ i.e. 4.5. Therefore median is between 4th and 5th values i.e. in our example between seven and nine (i.e. eight). The MAD calculation is straight forward as median as it is nothing but median absolute deviation from median. In statistics it is considered as a variability measure of a quantitative data which is univariate. Let us consider a dataset X_1, X_2, \dots, X_n the absolute deviations of the median from the median of the data given.

The formula is: $MAD = \text{median} (|X_i - \text{median}(X)|)$

The method starts with the deviation from the median of the data, then the absolute values of the median is calculated. This measure is unaffected by the

outliers in a particular dataset than that of the standard deviation. In case of standard deviation the mean square distance is calculated this results in weighing heavily of the large deviations and thus influence of the outliers is high. On the other hand in MAD, this type of deviation is not there and acts robustly in estimating the scale than other methods like sample variance or standard deviation. This phase is the step 1 of proposed algorithm described in the subsection 3.5.

Dimensionality Reduction Phase: In Dimensionality Reduction phase the dimensions of dataset is reduced by the application of Principal Component Analysis(PCA)^[15]. In this method statistics of the data set is taken and orthogonal method of transformation is used which transforms an observation into a variable set which are then mapped with set of variables known as principal components. The number of unique observation is equal to the original number of variables or original number minus one. Out of the number of principal components obtained after applying the method the component having highest variance is the first component and each of the components followed by it has the variance with the restriction that they are orthogonal to the feature those precede the result comprising of vectors which are uncorrelated to one another on the basis of orthogonally. This method is generally a tool to explore predictive modelling. Mostly it can be used for visualizing distances which are genetically related and how the population are related. The process consists of decomposition of eigen value of correlation based matrix or decomposing of the matrix after normalization for each of the attribute in the matrix. The result is obtained generally by getting the value of weight associated with each of the original variable which is standardized and it should be multiplied with the value of the component. Also this method is used in reduction of dimension of the data-set. Dimensionality reduction of the data-set is also done using this method. Taking an instance if we keep the first two principal components it finds the components in the two dimensional plane where the distribution of high dimensional data set is the most, where as if two different directions in the data set are chosen at random, then the clusters may spread apart and most likely to overlap with one another and cannot be distinguished. Linearity is the most powerful assumption in PCA.

Considering $m \times n$ matrices, let the original recorded dataset be X and the re-represented dataset, If P is a linear transformation is represented by equation 1:

$$PX = Y(1)$$

X is transformed into Y by the help of the matrix P , which is represented as follows:

$$\begin{aligned}
 PX &= \begin{bmatrix} p_1 \\ \vdots \\ p_m \end{bmatrix} [x_1 \cdots x_n] \\
 Y &= \begin{bmatrix} p_1 \cdot x_1 & \cdots & p_1 \cdot x_n \\ \vdots & \ddots & \vdots \\ p_m \cdot x_1 & \cdots & p_m \cdot x_n \end{bmatrix} \\
 y_i &= \begin{bmatrix} p_1 \cdot x_i \\ \vdots \\ p_m \cdot x_i \end{bmatrix}
 \end{aligned}$$

Dot product of row in p and the corresponding values of X represents each coefficient of Y_i . Hence, the rows of P is a new basis vectors which represents the columns of X .

Effect of PCA on Data with Outliers: When the data set is noisy PCA is most advantageous as it is more easier if the variance spreads over the few components rather than over the whole set of components, so comparatively the noise effect becomes less as the signal-to-noise-ratio of the first few components is higher. This effect of concentrating much of the signal on the first few components can be achieved by PCA's dimensionality reduction feature the latter principal components may be dominated by noise, and so they can be discarded without great loss. This phase is the step 2 of the proposed algorithm in subsection 3.5.

Clustering Phase: In Clustering phase the clustering is applied to the preprocessed dataset. It is a density based algorithm. It forms clusters by grouping the data points which are having dense neighboring data points^[16]. Sensitivity to noise is less for DBSCAN and it can also handle datasets which are high dimensional. Core point is one which has number of surrounding points greater than the $MinPts$ in the range of points of Eps -neighbourhood. A point which is in the Eps -neighborhood of the other point and which is itself not a core point, and the third type of point as shown in fig1 is a noise point which is outside the boundary of Eps . If the count of the points present in each points Eps -neighborhood is greater than $Minpts$ then a cluster is created. This phase is the step 3 and 4 of the proposed algorithm in sub section 3.5.

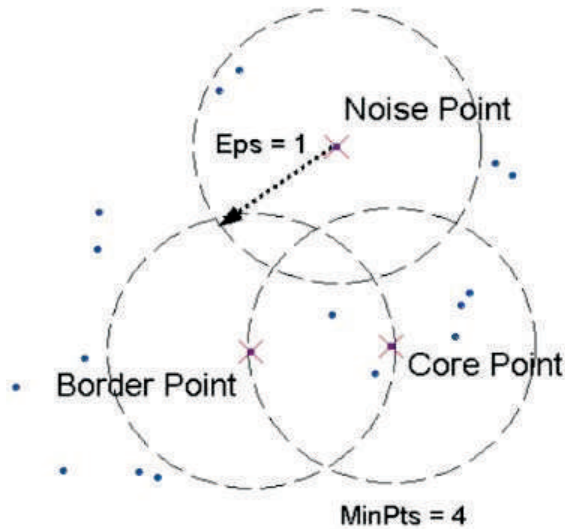


Fig. I

The Feature Bagging Phase: In feature bagging phase it consists of calculation of feature bagging based outlier factor (FBBOF). It is an ensemble based method^[17,18,19]. The results depends on the Local Outlier Factor(LOF). With each iteration a randomly selected variable set with a randomly selected variable set with a randomly chosen size which is in the range of $d/2$ to d (representing the dimensionality of the input data)is taken. The scores of LOF are calculated for each of the selected data subset and FBBOF is the score which is the cumulative sum of each iteration.

Local Outlier Factor: A complex process is followed in this method to determine the value of the outlier of a datapoint.It is a density based method. It determines the value of the outlier of a datapoint. It is a density-based method. it determines the local densities of a point along with its neighboring point. The outlier degree is calculated to be the ratio of a point’s density and the average of densities of points present in nearest neighbor proposed the first method based on density, it is more advantageous, than distance based method. If a point p is there the LOF is defined for a parameter K as:

$$LOF_K(p) = \frac{\sum_{o \in K(p)} \frac{lrd_{K(o)}}{lrd_{K(p)}}}{|N_K(p)|}$$

For a point p the distance of reachability is denoted as:

$$reach_{distK}(p, o) = \max(K_{distance(o)}, dist(p, o))$$

The density of local reachability is expressed as:

$$lrdK(p) = 1 / \frac{\sum_{o \in K(p)} reach_{distK}(p, o)}{|N_K(p)|}$$

The distance of reachability for a point is represented as:

$$reach_{distK}(p, o) = \max(K_{distance(o)}, dist(p, o))$$

The difference between density of the data point and density of neighbour of data point is reflected by LOF. The distance to the nearest neighbour is considered as the neighbourhood. Higher the value of LOF means that the degree of being an outlier is higher. This phase is the step 5 and 6 of the proposed algorithm in subsection 3.5.

Proposed Algorithm

Input: Data set D.

Output: Outlier points.

Step1: The Median MAD Normalization method is applied to the dataset D

Step2: PCA is applied to the Normalizeddataset D, and low dimensional dataset l is obtained.

Step3: DBSCAN is applied to the low dimensional dataset to get the noise point’s n1.

Step4: Let the noise points be taken as cluster0 and each of the other points are taken ascluster1.

Step5: For each point in the noise set n1 calculateFBBOF.

Step6: The points having high FBBOF are added to the noise set n1and removed from cluster1.

Output: The set n1.

FINDINGS

The analysis of the experiment performed and efficiency of the algorithm which is proposed. on Lung Cancer data set was used for analysis which is obtained from the UCI repository; it has in total 32 instances and 56 attributes. The efficiency of proposed algorithm when applied to the Lung cancer dataset can be judged by the result as shown below in Table1:

Table I: Comparison of Accuracy

Algorithm	Eps	Minimum points	Accuracy
FBOD	.4	.4	0.7500
ABOD	.4	.4	0.7778
SOD	.4	.4	0.8750
Proposed Algorithm	.4	.4	0.9848

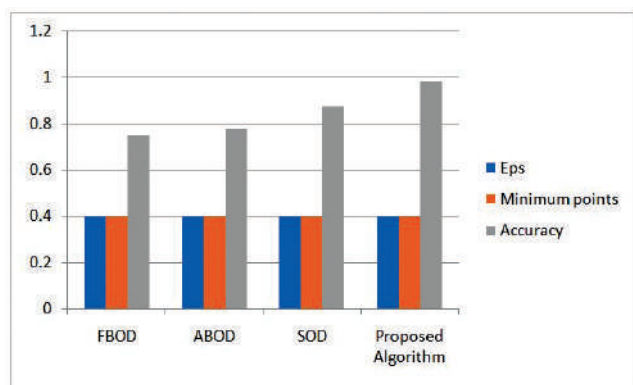


Fig. II: Graphical representation of accuracy comparison

The following table gives the comparison of execution time of the proposed algorithm with the existing algorithms:

Table II

Algorithm	Execution Time
FBOD	26.44
ABOD	23.48
SOD	36.773
Proposed Algorithm	25.05

The precision, recall and F1 score for the algorithms is obtained. We can use precision as a measure for evaluating the correctness of the algorithm, more the precision lesser is the false positive and also lesser accuracy means higher the false positive. On the other hand the recall will measure the integrity or sensitivity of the algorithm, with the increase in recall the false negative becomes lesser and as the recall decreases latter increases. The F1 score is calculated by the combination of recall and precision, more the F1 score means better is the model used.

The following metrics are used for measuring the efficiency:

$$P = \frac{TP}{TP + FP}$$

$$R = \frac{TP}{TP + FN}$$

The F1 Score is defined as:

$$F1 \text{ Score} = \frac{2 * P * R}{P + R}$$

Where P represents = Precision

R represents = Recall

TP = True Positive

FP = False Positive

FN = False Negative

The three measures for the proposed algorithm is presented in the following table. From the analysis it is clear that our proposed algorithm have higher value of F-measure which proves that it is a more efficient method.

Table II

Algorithm	P	R	F-measure
FBOD	0.5	0.5	0.5
ABOD	0.33	0.67	0.4422
SOD	1	0.66	0.7951
Proposed Algorithm	0.833	1	0.9088

The graphical representation if given in Fig-III

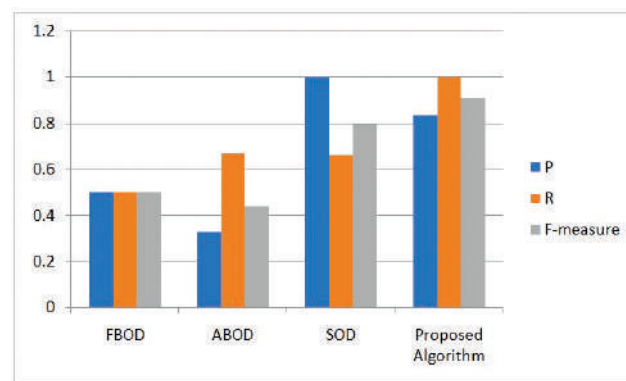


Fig. III: Comparison of Precision, Recall and F1 measure

The Fig-IV below represents the receiver operating curve for SOD and the Fig V which follows it represent the ROC curve of the proposed algorithm.

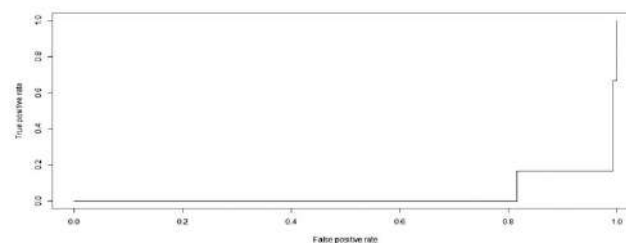


Fig. IV: Roc curve with SOD

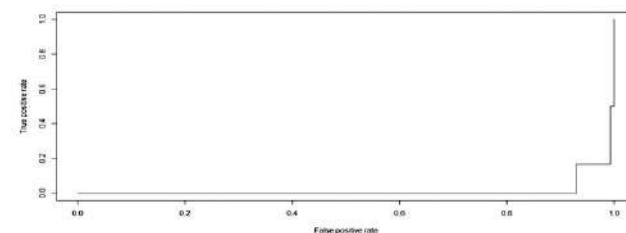


Fig. V: Roc curve with Proposed Algorithm

CONCLUSION

The proposed method which uses feature bagging based outlier factor which proves to be better than the existing algorithms as the accuracy increases considerably. The median MAD technique of normalization is very much effective in obtaining accurate result as this method is robust to outliers. From the experimental analysis it is concluded that higher accuracy is obtained. The techniques such as random forest can be introduced to further improve the results which is our future work.

Conflict of Interest: Nil

Source of Funding: self

Ethical Clearance: Not required

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Knowledge Management for Youth: Skill India for Global Knowledge Economy

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ABSTRACT

The competitive edge of developed economies in the last few decades has been driven by novel technologies starting from personal computers to internet and telecommunication. These technologies are based on knowledge and information creation and dissemination and hence the new socio-economic developments stemming from the same are referred to as knowledge revolution and have changed the nature and organisation of work and economy. In this new trend in global knowledge economy how prepared is India? Despite a demographic dividend can India compete? The focus of the paper is to throw light on the key knowledge area where Indian youth needs to be skilled for India's competitive edge in global knowledge economy.

Keywords: *Knowledge economy, Skills and Competencies, Indian Youth, Workforce preparation.*

INTRODUCTION

Global knowledge economy is defined in terms of production based on knowledge intensive activities that contribute to an accelerated pace of technological and specific advance as well as equally rapid obsolescence¹. The key resource in knowledge economy includes intellectual capabilities than physical or natural resources. The role that steel and cotton (and coal and petroleum in later phase) played in the industrial economy is now replaced by information and communication technology in the knowledge era². Hence research and development for innovation is the pivotal structure on which knowledge economy is dependent on. Consequently, the traditional linear mode of innovation is replaced by multitude fold of lateral flows of innovation in a knowledge economy³. Innovation in technology features as the most important feature of this new knowledge economy as all sectors of the economy rely on the knowledge creation, dissemination and application accelerating the contribution of service sector to the economy⁴. Daniel Bell, Friedrich Hayek, Fritz Machulp, Gary Becker and Peter Drucker are the proponents of knowledge economy and found the role of knowledge (especially theoretical) as the axial principles of society and investigated its role in human capital development, in organisations, in national economic development etc⁵⁻⁶⁻⁷⁻⁸. The rethinking of knowledge as pivotal in the rationale for KBE is based on efforts of Organisation for

Economic Cooperation and Development (OECD) and World Bank (WB) to popularise the concept in the advent of globalisation as well as percolation of information and communication technology to all aspects of economic activities^{9,10,11}.

MATERIALS AND METHOD

Promoting education and facilitating skills training for all will benefit the nations in the smooth transition to a knowledge economy. This happens in two ways. First, the nations which have high number of educated youth are fertile grounds for development of science and technology particularly knowledge-based technology¹². Secondly, an increase in education and skills level of a nation ensures a correspondent increase in economic growth¹³. Once the significance of education is established, it poses two different challenges in policy agenda for educationists. First challenge is to increase the quantity and quality of human capital in order to meet the demands of a knowledge economy. Second challenge lies in narrowing down the income disparities. The jobs today are radically different than they were few decades back. In the new knowledge based economy farm and factory jobs have been replaced greatly by white collar skilled jobs both in manufacturing and services sector the later having witnessed a large boom in the current decades. And this is true for India as well as elsewhere including the USA¹⁴. New jobs created since the

beginning of this millennium have been skewed towards white collar office employment and in knowledge jobs comparing to production or extraction jobs like farming and mining.

This paper uses an analytical structure to comprehend the World Bank rhetoric as well as that of Organisation of Economic Cooperation and Development. With a comparative framework of existing framework the paper attempts at finding the required skills for developing youth for a knowledge economy.

The World Bank in its Report on Lifelong Learning and Knowledge Economy in Developing Countries (2003) reported three reasons of skills gap for knowledge economy¹⁵. First, knowledge is being developed and applied in novel ways creating demands for novel methods for creating and disseminating information. Second, product cycles have shortened and thus need for innovation is greater than ever. Third, trades being increasingly worldwide create pressure on the producers to innovate, thus intensifying the need for skills development and up-gradation. A detailed structured analysis of existing literature, primary data from interviews with policy makers as well as secondary data of policy documents are used to reach at conclusion.

The last few decades have witnessed creation of jobs which require professional skills that might not be honed through four years college course or might require special training. Rapid growth of information and communication technology and the skills related to these require special training that need to be refreshed every now and then due to rapid obsolescence of the same technology and the replacement of new technology. There has been a debate on the skills possible remedies for the same through national policy agendas^{16,17,18&19}. The focal point of these debates reached a niche in the economic crisis after 2008.

The Knowledge Economy and India: India has an extraordinary potential to be a knowledge superpower in near future. It is endowed by a “demographic dividend” as the age structural transition is dominated by youth population. It also has pool of human capital. India also strong and substantial educated Diaspora abroad. It was in 2005 that the World Bank report on India as a knowledge economy declared that India has reached an optimum level to transit to knowledge economy since the ample work force in subsistence and non productive

sectors can be shifted and used in knowledge intensive productive sectors or even in converting non-productive sectors to knowledge intensive productive sector. The advantages that India has in knowledge sector that will help in its transition to knowledge economy are many:

First India has a huge pool of talent, an English speaking skilled workforce, especially in the sciences. It may well facilitate the international exchange of ideas, knowledge, goods and services, and capital to a greater extent^{19,20}. **Secondly** India is a democratic country with the largest democratic market in the world. **Third** India also has a large (skilled and educated) Diaspora that creates knowledge linkages and networks with a wide network of Indian doctors, engineers and scientists abroad. **Fourth**, all the institutions of a free market economy such as well developed financial sector and a dynamic private sector are present in almost all economic activities. **Fifth**, the infrastructure in science and technology is also well developed and is diversified. **Finally** in recent years there has been huge development in information and communication technology in which India has truly become a world leader in software services.

With these advantages India can become a knowledge based economy thereby improving its economic growth and social development while enhancing its competitiveness in the global market. The Planning Commission’s report on ‘India as Knowledge Superpower: Strategy for Transformation’ (2001) and ‘India Vision 2020’ seek ways to address the knowledge economy issue within India, specifically focusing on building up a guided approach for smooth transition to knowledge economy^{21,22}. However, till now in the year 2014 this transition to knowledge economy has not been achieved completely.

There are four pillars on which knowledge economy stands: a strong economic and institutional regime, a skilled and educated work force, an efficient innovation system, and a dynamic information infrastructure. To strengthen its position as a knowledge economy, India has to strengthen each of these pillars through strong reforms in these sectors. However, in this paper the second pillar has been dealt with, i.e., a skilled and educated workforce.

India has the world’s youngest work force with a median age way below that of China and OECD countries. The Registrar General and Census Commissioner of

India (RGCCI) projection of population of India show an increase of population from one billion in 2011 to 1.400 billion in 2026. In the first quarter of 21st Century the share of workers in the age group of 15 to 59 in total increase would be 83 %. India is endowed with the ‘demographic dividend’ which means that India has a higher group of working population as a portion of larger population which leads to low dependency ratio and a higher benefit to competitiveness and growth. This is in a huge advantage that India has especially considering the fact that the Western developed nations are suffering from aging population which is affecting their economic growth and productivity reversely. Half the population of India was younger than 25 in 2010. It will change to half the population being under 28 in 2030, making India a very young country for the next 20 years. By 2020 it is expected that average Indian will be 29 years old as compared to average of 37 years in China and the USA, 45 years in Europe and 48 years in Japan.

This demographic dividend that we are so proud of is expected to contribute to growth and prosperity in several ways. Principally, it will ensure adequate labour supply for carrying out growth agenda. But this is possible only with the support of a skilled and trained work force that can cater to the demands of new set of industries that are technology based especially in knowledge intensive industries. Though India will have enough manpower to fulfil its domestic needs as well as export to fill the gap created in the global market due to aging, it remains a challenge for India to impart proper training for skills development. Government of India among many proactive steps has also demarcated a few significant sectors in which skills training mechanism are to be developed at a regular basis.

The surplus of trained work force can lower the dependency ratio thereby increasing the economic output of the country only given that they are skilled enough to contribute to the knowledge intensive industries in global demands for labour force in knowledge intensive jobs²⁴. However, for reaping the benefits of demographic dividend the development processes in India must ensure workforce of a desired quality to get employment opportunity as they enter the labour force²⁵. The NSSO data for the first decade of this millennium showed a sharp decline in labour force participation among rural youth and a dormant increase in urban youth showing a delayed entry into workforce (National Sample Survey Office, 2010), However, a simultaneous

report also showed that the unemployment ratio among youth is shooting up with more open unemployment among youth than before. There is utter irony in rampant unemployment at one hand and lack of skilled personnel to serve a knowledge economy at the other, a gap that can be filled only with a conscious effort made as a part of development process to upgrade skills level of the youth. For creating a knowledge economy, it is essential to have a skilled work force to develop, generate, transfer, disseminate and apply knowledge effectively.



Figure 1: Percentage of Workers Receiving Skill Training (Country Wise)

According to a report by FICCI on skills development and training of workforce, out of twelve million workforces entering into labour market each year in India, majority are unskilled and the skill capacity is merely only four million. This means India needs to develop its skills development capacity through education to produce trained human capital. Without planned efforts towards increasing the skills training capacity, there is a threat of demographic dividend turning out to be demographic burden (Ashish Bose, 2007). For any government at the centre or in the states, it is a real challenge to absorb the vast masses of unemployed and poor- quality employable youth. This is going to affect productivity of labour and also threaten law and order. Hence there is a dire need for increasing the employability of the youth as well as create and enhance skills level for the youth through skills training. Ironically India faces the coexistence of huge unemployment along with huge skills shortage at the same time. NASSCOM-Mc Kinsey Report (2013) also is apprehensive of a huge skills shortage in future lest the training capacity is increased in both IT related and BPO related skills in India. The World Bank while projecting prospective high economic growth in countries maintains that India’s Total Factor Productivity is at a stage where it can be harnessed to give effective results for its human capital by applying its knowledge resource

(World Bank, 2003). The current century demands a current set of skills competencies which were hitherto non-existent. Fostering such skills in the institutions of higher education as well as vocational training centres is important for all countries including India. However, such an effort demands an open, flexible and creative education from basic to tertiary level. Additionally to help the citizenry continuously upgrade their existing skills level it is essential to have a strong lifelong learning system in place. India still has large dropout rates at all levels of education, about 104 million children out of school. Female participation in secondary and tertiary level is much lower. Powerful missions in the forms of total literacy campaign and girl child education have made deep impacts, however efforts need to be further made to enhance educational attainment a reality.



Figure 2: Growth in Manpower Requirement in India by 2022

Findings: What Competencies for Knowledge Economy?

In the eighties and nineties, the first wave of globalisation created demands for borderless value chains for low-skilled, low-value work while all highly skilled value activities remained within country that

the companies belonged to. For instance, companies in the USA had all high skilled and high valued jobs in USA where as low-skilled ones were outsources. Now on the contrary in the second phase of globalisation in the beginning of 21st century transnational companies operate the human resource from across the globe to retain talents especially in high valued and high skilled jobs. Territory remains redundant although the home locations of companies are used for strategy formation and coordination.

In the earlier job market training on the 3Rs (Reading, Writing and Arithmetic) along with on-the-job training was enough for a stable career for a lifetime. However in the current global economy, the additional skills required are centered on communication, creativity, divergent thinking, socializing etc. the skills gap is not so much the traditional skills as it is of training on disposition towards work, productive and responsible habits etc (along with basic knowledge of the 3Rs).

In short the skills required from youth in knowledge economy would be thinking skills (critical thinking, problem solving, creativity and innovation), communication skills (the ability to communicate easily using technology), team work and leadership skills (the interpersonal skills to work effectively and provide effective leadership to collaborative work modules, leveraging strengths of others as well as own to complete task), lifelong learning and self direction (learning continually to upgrade skills level), technology adoption and application (effective application of technology to solve problem and develop further) and finally professionalism and work ethics. Skills and human resource issues have become more important to corporate competitive advantage than ever with a focus on innovation and intellectual capital across all business sectors.

Table 1: Critical Skills for Knowledge Economy

Thinking Skills	Critical thinking, problem solving, creativity, and innovation
Communication	The ability to communicate effectively using the variety of methods and tools available in today’s environment
Teamwork and Leadership	The interpersonal skills to work effectively in a team and to provide leadership through collaboration, motivation, and leveraging the strengths of others
Lifelong Learning and Self-Direction	Continually improving one’s capabilities by taking responsibility to set goals, improve skills, and show initiative
Technology Adoption and Application	A firm foundation of technology skills including concepts and operations, selecting appropriate tools, and solving problems with appropriate technology
Professionalism and Ethics	Demonstrate personal accountability and effective work habits: punctuality, working productively with others, and time and workload management

Source: Cochran and Lekies, 2008²⁷

Tough the traditional technological knowledge along with 3Rs and on-job training is equally or even more important now than ever, it has also been supplemented with other soft skills such as social skills, interpersonal relations and divergent and creative thinking. Therefore to succeed in the workplace at an individual level these skills are the pre-requisite. However, at a national level to empower the youth the skills also need to be focused in the policy agenda to produce a skilled and talented workforce. To do so, the measurements that Indian government needs to focus on are the following:

Workforce preparation of youth: Considering these set of skills, it is easy to predict that to train these skills requires exposure to work environment. Youth programmes must include work force participation of the youth in different segment of the economy instead of youth joining workforce. There is a difference in planned youth programme providing youth with work force preparation and the youth joining the work force leaving higher studies or professional course. Yet in India, planned exposure of the youth to the workplace preparation is non-existent or extremely low. A planned work force preparation programmes across the country giving not only abstract knowledge of work but also practical hands n experience on the same can be extremely helpful in learning through contact with adults doing the job. Youth participation in work force on a leisure time basis (such as summer camp or industry attachments) is a big force in closing the skills gap as well as opportunity gap. However these programmes instead of being one-shot activity should rather be a complex web of variety of activities catering to different jobs for different development stage or aptitude.

Lifelong learning: In the knowledge economy where routine tasks are simplified to give way to more complicated tasks for completion of projects, Social skills and critical thinking are crucial. To acquire them one needs to continuously upgrade skills; one of the reasons behind lifelong learning.

Tertiary Education: Universities are the ground in which research and development is carried out for the development and dissemination of knowledge. Research and innovation are the basic foundation on which country's profile on knowledge economy stands. Hence, a modernist makeover is to be given to higher education through national policy agenda if a smooth transition to knowledge economy is to be achieved. Of particular

importance here is to be attached to mobility of students, teachers and research scholars across boundaries to facilitate smooth transfer, sharing and acquisition of knowledge among nations. Hence it is essential to showcase Indian Universities for international students. Youth in India should be encouraged to engage in research and development and perceive research as a lucrative career option.

Youth in Networked economy: Knowledge economy is based on networked economy, an economy of increased communication networks. Youth must be encouraged towards greater knowledge sharing and collaboration, partnering each other towards increased prosperity. Vocational Education and Training (VET) can work as an agenda of youth transition in a networked society. VET in schools policies are an attempt to provide pathways between schooling, training and employment.

Benchmarking for skills profiles: There must be a standardised skills benchmarking or profile of the youth in the country to regulate the skills level as well as provide support for the development for filling the gap if any. This is not just to keep track of the number of people going for skills training but also for making it easier for the youth to choose the right job in future.

Importance of Tacit Knowledge: Knowledge intensive work depend on the use of 'tacit' knowledge that resides in people's minds in the form of expertise and/ or experience, rather than being written down (or codified) in manuals, guides, lists and procedures. Hence codification of tacit knowledge into explicit readable and learnable paradigms becomes essential to the economy. Previous economy in the twentieth century saw the growth of Taylorism which was based on Fordist kind production management where the knowledge of the workers was captured in the shape of assembly line. In the knowledge economy since the reliance has increased more on the tacit knowledge, therefore codification or digitization becomes important to the economy. This encompasses translating knowledge work into working knowledge through the extraction codification and digitisation of knowledge into software prescripts and packages that can be transmitted and manipulated by others regardless of location. Youth in India therefore be trained as apprentice as part of their work force preparation.

R&D and Innovation: If India is to sustain this phase of economic development and lead the global knowledge

economy then there has to be a systematic plan to inculcate spirit of innovation in the youth. Introducing the importance of research at a young age will go a long way in bridging the gap in R&D and develop an attraction for research and innovation. At school the curriculum has to be remodelled to impart more research aptitude and innovative capability. Similar to the science experiments done in the laboratory to prove or disprove cause and effect, many different experiments and hands on experiences on other subjects can also be carried out along with positive reinforcement for students for divergent thinking on those subjects.

The paper analysed several aspects of education and skills required to excel in a knowledge economy. A highly specialized skills set based on these areas of importance for knowledge economy are prerequisites when it comes to success and competitiveness in global market. They are essentially based on areas of expertise on which Indian youth in the formal education system are not trained. It is found that preparing Indian youth for edge in global competitiveness, a new set of skills based on digitized network may be initiated. Especially effective in this rung is the importance of codification of tacit knowledge. Knowledge, that is difficult to transmit by virtue of being tacit and therefore in need of codification, needs to be focused on. This entails translation of knowledge work into working knowledge. The process through which this is done is called codification and digitization of information into software prescripts and packages. Youth in India therefore can be trained as apprentice as part of their work force preparation so that they can transmit and manipulate these codified data regardless of location.

Secondly, it is found that the need for emphasizing research and development for initiating innovation goes a long way in empowering a nation in the global competition in knowledge. Youth in India have to be aware of importance of research at an young age to be successful in this trail. School curriculums have to impart training on developing research capabilities.

It is found that there is a much lackadaisical approach in the education governing bodies when it comes to the importance of life-long-learning and importance of adapting to new challenges thrown by knowledge economy. Though in India adult education has been a part of the total literacy campaign, we have

to understand that lifelong learning goes beyond this. Work force must be prepared for any new challenge and change in the production system, through continuous learning and skills training. Therefore work place skills imparting for the unskilled and semiskilled must be part of the lifelong learning.

CONCLUSION

Knowledge codification and commodification is a norm in global economy based on competition. Hence research and development for innovation is the pivotal structure on which knowledge economy is dependent on. For innovation through research and development the youth is the main vessel through which realisation of knowledge economy is possible. However, the youth in India are yet to be exposed to any kind of workforce preparation skills development. Entrepreneurship and innovations which are stressed at the national level is yet to become a reality. Consequently the irony of unemployment and unskilled labour exists side by side to skilled unemployment. There is a huge gap between the skills level and the jobs in the market. The labour market's demand for skills remains unsatiated as the education system and skilling programmes do not cater to the existing demand in the market. The global skills web explains the discrepancy of existing skills gap and rate of unemployment among youth to be large. Matching the two to create a balance for economic development to cater to the knowledge economy would be a challenge but not an impossible one to achieve.

The youth development programmes in the country attempting to bridge the gap between skills and training are restricted to certain areas leaving large chunk of urban youth and rural unemployed behind. If India is to emerge as a global knowledge economy then it has to make way for innovation through building youth for future knowledge jobs. Increasing Knowledge workers would also increase the national potential for further development in research boosting national economy.

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Surveillance of Microorganisms and Their Drug Sensitivity Patterns in Diabetic UTI Patient at a Tertiary Care Teaching Hospital

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ABSTRACT

Background: Urinary Tract Infection (UTI) is one of the common infections affecting people, both from the community and hospital. The causative pathogens for UTI and their drug sensitivity patterns vary from region to region. Changes in their genetic constituents with time might be the reason.

Aim: In this study, we aimed investigate the profile of common uropathogens and assess their antibiotic sensitivity patterns with commonly used drugs for UTI patients.

Materials and Method: In this study, 153 urine samples were analyzed with routine microscopy, culture and sensitivity for a period of six months at Institute of Medical Science and SUM Hospital, Bhubaneswar, Odisha. Both bacteria and fungi were used for drug sensitivity test.

Result: A total no. of 54 Gram positive bacteria and 40 Gram Negative bacteria were isolated. *S. aureus* was the most common GPC isolated and *P. aeruginosa* was the most common GNB. *E. coli* was the second most GNB which showed resistance to Cephalosporins and Aminicoumarin group. 4 *Candida* species were isolated, to which Clotrimazole was the most susceptible antifungal agent. *Staphylococcus* sp showed resistance to β -lactams and Macrolids group of antibiotics. *Shigella* sp showed resistance to β -lactams. *C. albicans* was found to be the common Fungi isolated, followed by *C. krusei*.

Conclusion: Since the drug sensitivity pattern changes from place to place and varies from time to time. The culture sensitivity therapy should be practiced before empirical administration of antibiotics.

Keywords: Diabetes, Drug resistance, *Candida*, Oxacillin, Bacteria

INTRODUCTION

The occurrence of diabetes mellitus is at an alarmingly increasing rate all around the world and has almost become a serious health issue especially in developing countries¹. At least one diabetic patient will be found at every door.

Urinary tract infections and diabetes share an immense relationship. Urinary tract infections are one of the most common microbial disease that has been encountered in medical practice and affects people of all ages. Urinary tract infection's prevalence has been estimated, all around the world to be 150 million persons per year. Diabetic patients has higher risk of getting an UTI than non-diabetic ones².

This is because diabetes mellitus is a heterogeneous group of disorders that has been characterized by variable degrees of insulin resistance, impaired insulin secretion and increase in production of urine³. Diabetic patients encounter urinary urgency, incontinence during night, painful urination and retention of urine in the bladder, making the urinary tract most frequent infection site.

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Explanation to increased UTI in diabetic patients might be the nerve damage, caused due to high blood glucose levels, which affects the ability of the bladder to sense the presence of urine and hence allowing the urine to stay in the bladder for longer time, increasing the probability of infection. Another possible reason can be, high glucose level in urine adds to the environment for bacterial growth².

Besides, diabetic patients suffer various impairments in the immune system and poor metabolic control. This causes long term complications like Diabetic Neuropathy and Cystopathy³. In most cases microorganisms causing UTIs are multi drug resistant and are difficult to be treated. Lots and lots of money is spent each year for the treatment of such patients. But it is of no use if the antibiotics are administered empirically. Such pathogens are needed to be identified and the susceptibility is needed to be tested and then the antibiotic must be administered. Hence our aim of the study is to identify the causative organism and pattern of sensitivity to different antibiotics so that there would be specific antibiotic administered for specific organism.

MATERIALS AND METHOD

This study was carried out among outpatient department, in patient department of Diabetes and Neuro science ICU. Samples included urine and high vaginal swabs. Both male and female from 20 years of age were taken into consideration for study. Samples were taken from patients suspected to have fungal infections attending the outpatient department and obtained from in-house hospitalized patients, from both, who had no prior history of UTI as well as who were administered antibiotics (in order to study the multidrug resistance).

Bacterial isolation and identification procedures:

Isolation of uropathogens was performed by surface streak procedure on both Blood Agar and Cystine lactose electrolyte deficient agar medium and vaginal swab was streaked on Blood Agar and MacConkey Agar. The plates were studied after over night aerobic incubation at 37 degree C (BOD incubator, REMI, Mumbai, Maharashtra, India). After growth of bacteria, they are identified with culture morphology and biochemical tests of conventional methods.

Susceptibility testing: Antimicrobial susceptibility of isolates was tested for all 18 bacterial and fungal pathogens by disc diffusion method. The plates that showed growth of another colony within the inhibition zone were again isolated and identified and antimicrobial susceptibility was checked. The antibiotic discs and their concentrations were: Amikacin (AK, 30mcg), Amoxycycline (AMC, 30mcg), Azithromycin (AZM, 15mcg), Cefoperazone (CPZ, 75mcg), Cefotaxime (CTX, 30mcg), Cefuroxime (CXM, 30mcg), chloramphenicol (C, 30mcg), Ciprofloxacin (CIP, 5mcg), Clarithromycin (CLR, 15mcg), Colistin (CL, 10mcg), CoTrimoxazole (COT, 25mcg), Gentamycin (GEN, 10mcg), Levofloxacin (LE, 5mcg), Linezolid (Lz, 30mcg), moxifloxacin (MO, 5mcg), Nalidixic acid (Na, 30mcg), Norfloxacin (Nx, 10mcg), ofloxacin (Of, 5mcg), Oxacillin (OX, 1mcg), Penicillin-G (P, 10units), Novobiocin (NV, 5mcg), Tetracycline (Te, 30mcg), Tigecycline (TGC, 15mcg). All the antimicrobials used for study were obtained from Himedia. A standard inoculum was made by inoculation single colony in 2ml nutrient broth, after 3 hrs of incubation, spreaded on Muller-Hinton agar (Himedia); antibiotic discs were dispensed after drying the plate for 3-5 minutes and incubated at 37 degree C overnight. Antifungal susceptibility was also tested. The antifungal discs and their concentrations were – Clotrimazole (CC, 10 mcg), Miconazole (MIC, 30 mcg), Ketoconazole (KT, 10 mcg), Itraconazole (IT 10 mcg), Nystatin (NS 50 mg), Fluconazole (FLC 10 mcg), Amphotericin-B (AP 20 mcg). All the antimicrobials used for study were obtained from Himedia. A standard inoculum was made by inoculation single colony in 2ml nutrient broth, after 3 hrs of incubation, spreaded on Muller-Hinton agar (Himedia); antibiotic discs were dispensed after drying the plate for 3-5 minutes and incubated at 37 degree C overnight.

RESULTS

A total of 153 samples were received, out of which 137 were urine and 16 were high vaginal swabs. Among which 57.51% showed growth and 42.48% did not show any growth. Out of all 153 samples 56.86% were female patients and 43.13% were male patients (Table 1). The samples received from patients aged – 21 to 88 years. Culture positivity was seen mostly from age 21-70, but higher culture rate was seen in 51-70 (53.33%) (Table 2).

Table 1: Age and sex distribution of patients that showed maximum growth

Sl. No.	Age Group	No of Male Patients	No of Female Patients	Organism
1	21-30	4 (21.05 %)	15(78.94%)	12
2	31-40	8 (32%)	17(68%)	19
3	41-50	13 (46.42%)	15(53.57%)	16
4	51-60	19 (42.22%)	26(57.77%)	24
5	61-70	13 (52%)	12 (48%)	11
6	71-80	5 (71.42%)	2(28.57%)	4
7	81-90	4 (100%)	0	2
Total		66	87	116

Patients from age 21-90 years were taken under consideration, including male and female patients . It was observed that patients of 50-60 years of age showed more growth ,followed by patients aged 31-40 years and 41-50 years aged people. Patients aged 81-90 years showed least growth. Hence , patients between 31-60 years suffered more from infection.

Table 2: Total no of clinical samples cultured for the study

Sl. No.	Sample Type	No. of Sample	Sample Showed Growth	Sample Showed No Growth
1	URINE	137(89.54%)	74(54.01%)	63(45.98%)
2	H.V.SWAB	16(10.45%)	14(87.5%)	2(12.5%)
	TOTAL	153	88(57.51%)	65(42.48%)

The samples received included Urine and High Vaginal Swabs.89.54% of samples were Urine and 10.45% were High Vaginal Swabs. Among 89.54% of urine samples , 54.01% showed growth and 45.98% sowed no growth. Among 10.45% of High Vaginal Swabs, 87.5% showed growth and 12.5% showed no growth.

47.71% samples were from IPD, 35.94% were from NSICU and 16.33% were from OPD.15.90% showed multiple infection ie., more than one organism were found(Table 3). Total of 18 isolates were found including Bacteria and Fungus. (table 4).

Table 3: Organism isolated from Urine and High vaginal swab culture

Sl. No.	Types of Organisms	Frequency	%
1.	Candida albicans	12	10.34
2.	Candida glabrata	2	1.72
3.	Candida krusei	4	3.44
4.	Candida tropicalis	2	1.72
5.	Citrobacter sp	1	0.86
6.	CONS	4	3.44
7.	Escherichia coli	8	6.86

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8.	Enterobacter aerogenes	1	0.86
9.	Enterococcus	13	11.2
10.	GPB	7	6.03
11.	Klebsiella pneumoniae	1	0.86
12.	Pseudomonas sp	17	14.65
13.	Staphylococcus aureus	25	21.11
14.	Serratia marcescens	3	2.58
15.	Staphylococcus sp	5	4.31
16.	Shigella sonnei	1	0.86
17.	Shigella sp	9	7.75
18.	Streptococcus sp	1	0.86
	Total	116	

From all the samples 18 different types of organisms were identified.Both Bacteria and Fungus were obtained. *S.aureus* was more common , followed by *Pseudomonas sp* ,*C.albicans* and *Enterococcus*.

Table 4: Occurance of colony from single culture

Sl. No.	No of Colony	Frequency	%
1.	No growth	65	41.13
2.	Single colony	78	49.36
3.	Double colony	11	6.96
4.	Triple colony	3	1.89
5.	More than 3 colonies	1	0.63
	Total	158	

The bacteria were; *Citrobacter sp* (fig1a), CONS (fig 1k), *Escherichia coli* (fig1b), *Enterobacter aerogenes*

(fig1c), *Enterococcus* (fig1d), GPB (fig1l), *Klebsiella pneumoniae*(fig1e), *Pseudomonas aeruginosa* (fig1m), *Staphylococcus aureus* (fig1f), *Serratia marcescens* (fig1g), *Staphylococcus sp* (fig1h), *Shigella sonnei*, *Shigella sp* (fig1i), *Streptococcus sp* (fig1j), *Candida albicans* (fig2b), *Candida glabrata* (fig2c), *Candida krusei* (fig3a), *Candida tropicalis* (fig2d). Patients suffering from different diseases were taken into concern . Patients suffering from Diabetes were more in no. 68.63% (48.57% male patients and 51.42% female patients), followed by patients suffering from UTI 25.49% and Hypertention (22.87%).



Fig. 1: a. *Citrobacter* species, Fig. 1: b. *E. coli*, Fig. 1: c. *Enterobacter* species, Fig. 1: d. *Enterococci* species, Fig. 1: e. *Klebsiella pneumoniae*, Fig. 1: f. *Staphylococcus aureus*, Fig. 1: g. *Serratia marcescens*, Fig. 1: h. *Staphylococcus* species, Fig. 1: i. *Shigella* species, Fig. 1: j. *Streptococcus* species, Fig. 1: k. CONS, Fig. 1: l. Gram Positive Bacillus, Fig. 1: m. *Pseudomonas aeruginosa*

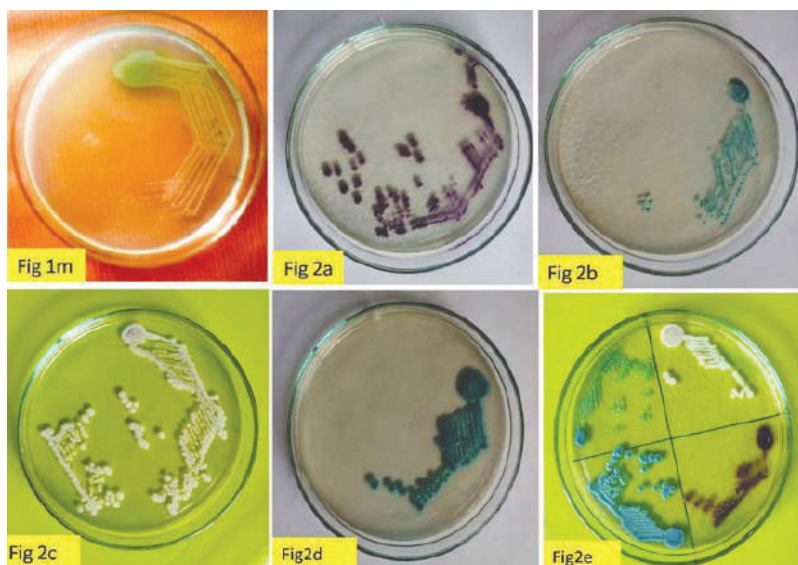


Fig 2: a. *Candida krusei*, Fig 2: b. *Candida albicans*, Fig 2: c. *Candida glabrata*, Fig 2: d. *Candida tropicalis*, Fig 2: e. *Candida sp*

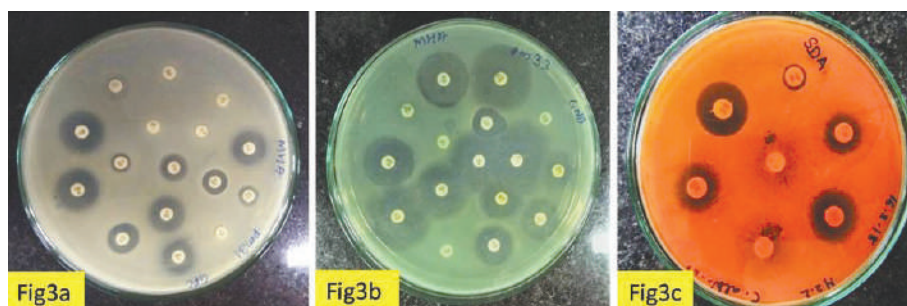


Fig 3 a. Antibiotic Sensitivity Test for Gram Positive Cocci On Muller-Hinton Agar; Fig 3 b. Antibiotic Sensitivity Test for Gram Negative Bacilli On Muller-Hinton Agar; Fig 3 c. Anti-fungal screening of Candida on Sabouraud Dextrose Agar plate

Anti-fungal Screening Result: *C.albicans* showed 33.33% resistance to Clotrimazole, 50% to Miconazole, 83.33% to Ketozazole, 66.66% to Itraconazole, 66.66% to Nysatatin, 83.33% to Fluconazole, 75% to Amphotericin-B. *C.krusei* showed 50% resistance to Clotrimazole, 75% to Miconazole, 50% to Ketozazole, 75% to Itraconazole, 56% to Nysatatin, 25% to Fluconazole, 25% to Amphotericin-B. *C.glabrata* showed 0% resistance to Clotrimazole, 50% to Miconazole, 0% to Ketozazole, 0% to Itraconazole, 0% to Nysatatin, 0% to Fluconazole, 0% to Amphotericin-B. *C.tropicalis* showed 50% resistance to Clotrimazole, 60% to Miconazole, 100% to Ketozazole, 100% to Itraconazole, 100% to Nysatatin, 100% to Fluconazole, 100% to Amphotericin-B (table 5)(fig3c).

Table 5: Anti-fungal resistance pattern for Candida sp

Sl. No.	Organism	CC 10	MIC 30	KT 10	IT 10	NS 50	FLC 10	AP 20
1.	Candida albicans	33.33%	50%	83.33%	66.66%	66.66%	83.33%	75%
2.	Candida glabrata	0%	50%	0%	0%	0%	0%	0%
3.	Candida krusei	50%	75%	50%	75%	56%	25%	25%
4.	Candida tropicalis	50%	60%	100%	100%	100%	100%	100%

DISCUSSION

In this study 61.43% of samples showed growth. Among which 45.28% were gram positive, 38.67% was gram negative, 18.86% was found to be *candida* and 6.6% was found to be GPB. *Staphylococcus* and *Enterococcus* was found to be predominant, and showing resistance mostly to beta lactams and cephalosporins group of antibiotics. Among gram negative bacteria, *Pseudomonas* sp and *shigella* sp were predominant and showed resistance to carbapenems, macrolids and oxazolidinones group of antibiotics. *C.albicans* was predominant which was resistance to Ketozazole and Amphotericin -B.

Despite the wide spread availability of antibiotics, urinary tract infection (UTI) remains the most common bacterial infection in human population⁴. The risk of developing infection in diabetes is higher due to abnormalities in the host defence and high glucose in urine⁵. *E.coli* was the predominant isolate in significant

bacteriuria. *E.coli* was followed by *Klebsiella pneumoniae*, as a common isolate in our study. Whereas CONS were the majority isolates⁵. *E.coli* were the predominant 10 (31.25%) isolates causing UTI, followed by *Staphylococcus aureus* -8 (25%), *Pseudomonas aeruginosa*-5 (15.62%), *Proteus mirabilis* -5 (15.62%), *Klebsiella pneumoniae* -2 (6.25%) and *Serratia marcescens* - 2 (6.25%)⁶ *E.coli* was chief isolate accounting 56.7% followed by *K. pneumoniae* as 21.62% and others among total isolates in diabetics⁷The isolation rate of *E. coli* from urine culture was higher (64.6 per cent) among diabetic patients followed by *Klebsiella pneumoniae* (12.1 per cent) and *Enterococcus* (9.9 %) ⁸. The bacteria isolates were; Coagulase negative Staphylococci (CNS) (37.5%), *E.coli* (24%), *Klebsiella pneumoniae* (12.5%), *Staphylococcus aureus* (15%) and *Streptococcus* sp (10%) (Joseph Aje et al). *Escherichia coli* was the predominant uropathogen followed by *Klebsiella pneumoniae* and they were together involved in 76.2% of UTI cases² *Escherichia coli*

was the most common isolated bacterial uropathogen followed by *Enterococcus faecalis*, *Staphylococcus saprophyticus* and *Pseudomonas aeruginosa*⁹. *E. coli* is the most common organism. Organism responsible for the hospital acquired infection may have tendency to develop multiple drug resistance¹⁰. The six overall most common isolates were: *Escherichia coli*, accounting for 47% of isolates in both hospitals, followed by *Candida* spp. (10.8%), *Klebsiella pneumoniae* (9.6%), *Streptococcus agalactiae* (GBS; 9.5%), *Enterococcus faecalis* (4.2%) and *Pseudomonas aeruginosa* (4.1%)¹¹. The most common bacterial isolate was found to be *E. coli* (45.7%, 1103/2412), which was followed by Coagulase-negative Staphylococci (18.6%, 449/2412) and *Klebsiella* species (8.3%, 199/2412)¹². The most common organism isolated was *Klebsiella pneumoniae* at 42.4%. Gram-negative bacilli made up about 23 (69.7%) of the isolates¹³. Commonly recovered UTI isolates were *E. coli*, *K. pneumoniae*, *Pseudomonas sp* and *S. aureus*¹⁴. *E. coli* was the commonest isolated uropathogen followed by coagulase-negative *Staphylococci*¹.

CONCLUSION

UTIs are prevalent among diabetic patients due to their weak immune system and excess sugar in urine. Ignorance of risk factors and empirical use of drug leads to antibiotic resistance. The susceptibility patterns as seen in this study tend to suggest that it is absolutely necessary to obtain sensitivity reports before initiation of antibiotic therapy in cases of suspected urinary tract infection (UTI). This paper opines that the ultimate decision to use a particular antimicrobial against UTIs depends on culture susceptibility otherwise it became toxic/resistant. Hence, the empirical therapy should be eliminated and drugs should be administered only after Antibiotic Sensitivity Test.

Conflict of Interest: There is no conflict of interest

Source of Funding: Nil

Ethical Clearance: Approved from Institutional Ethics Committee

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Assessment of Degree of Collaboration to “Airway Foreign Body” Indian Literature through Bibliometric Snapshot

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ABSTRACTS

Background: The foreign body reaction composed of macrophages and foreign body giant cells is the end-stage response of the inflammatory and wound healing responses following implantation of a medical device, prosthesis, or biomaterial. This study is attempted on all papers published on foreign body in Scopus index journals.

Materials and Method: In this retrospective study, the publication trend, citation trends for top articles, distributions of journals and Scopus categories were analyzed. Five bibliometric indicators including total articles, independent articles, collaborative articles, first author articles, and corresponding author articles were applied to compare publications between countries and institutions. All the data and information were retrieved from the SCOPUS data base on 27 October 2017 for a period of 2007 to 2016.

Results: The number of article in first author is very less as compared to the article with multi authorship. With T test, it is revealed that open access articles are less published as compared to the closed access article, which is considered to be very statistically significant at $P=0.0073$. It is observed that the top 10 authors published 17% of total documents and other 150 authors published the rest 83% documents. It is found that 45.5% of total documents were published in top 15 journals and the rest 67 journals published 55% documents.

Conclusions: FBs in the ear and nose were found more frequently in children, and the throat was the most common site of FBs in adults and elderly people. Most of the nasal and aural FBs can be easily removed in the ER or OPD. Parents/caretaker should not allow children to play with coins or other small objects to prevent the risk of FB ingestion or insertion. The research on FB should be carried out in larger amount to solve the problem for intake of FB.

Keywords: Foreign body reaction, bibliometric, Scopus, Foreign body giant cells

INTRODUCTIONS

A foreign body (FB) is any object in a region that is not meant to be, where it can cause harm by its mere presence if immediate medical attention is not sought¹. It can be found in the ear, nose, and throat (ENT) region. FB may be classified as animate (living) and inanimate

(nonliving). The inanimate FBs can further be classified as organic or inorganic and hygroscopic (hydrophilic) or non-hygroscopic (hydrophobic)². The presence of FBs in the ENT region is one of the most common causes of Otolaryngology emergencies. FBs can be introduced spontaneously or accidentally in both adults and children. Generally, FBs are more common in younger children; this may be due to various factors such as curiosity to explore orifices, imitation, boredom, playing, mental retardation, insanity, and attention deficit hyperactivity disorder, along with availability of the objects and absence of watchful caregivers³.

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MATERIALS AND METHODV

Data used in this retrospective study were retrieved from the Scopus database, the online version of the Scopus databases 7th-10th December 2017. The database was searched under the keywords “Foreign Body” in terms of topic (title, abstract, author keywords, and Key Words Plus) within the publication year with a limit of 2007 to 2016. Key Words Plus supplied additional search terms extracted from the titles of articles cited by authors in their bibliographies, database, and substantially augmented title-word and author-keyword indexing⁴. Non-article-type documents such as reviews, meeting abstracts, editorial materials, proceedings papers, letters, book chapters, news items, corrections, and notes were excluded. The final filter was the front page, in which only the articles having the search keywords in their first page including article title, abstract, and author keywords were retained⁵. The impact factor of a journal was based on the Journal Citation Report 2012. The number of citations of an article in a single year, for example 2012, was referred to as the C2012 and the total number of citations since publication to 2012 was referred to as the TC2012^{6,7}. The collaboration type was determined by the addresses of the authors. Collaboration could

be classified as either a single-country article, in which all authors’ addresses were from the same country, or an international collaborative article, which was co-authored by researchers from multiple countries⁸. The records were downloaded and reorganized using Microsoft Excel 2010. In the SCOPUS database, the corresponding author was designated as the “reprint” author; this study instead used the term “corresponding author”. In a single author article where authorship was unspecified, the single author was both first author and corresponding author. Similarly, for a single institution article, the institution was classified as the first author’s institution and the corresponding author’s institution.

RESULTS

All articles published in scopus data base from the year 2007 to 2016 were analyzed and it was revealed that the number of publications increases year to year and in the year 2015 the highest number of publications published (Table 1). With T test, it is revealed that open access articles are less published as compared to the closed access article, which is considered to be very statistically significant at P=0.0073.

Table 1: Year wise distribution of documents with open Access

Year	Number of document	Percentage	Open Access document	Closed Access document	Percentage
2007	4	2.60	1	3	25.00
2008	7	4.55	2	5	28.57
2009	7	4.55	0	7	0.00
2010	16	10.39	6	10	37.50
2011	16	10.39	4	12	25.00
2012	19	12.34	5	14	26.32
2013	14	9.09	5	9	35.71
2014	21	13.64	7	14	33.33
2015	33	21.43	8	25	24.24
2016	17	11.04	7	10	41.18
Total	154	100.00	45	109	29.22

Table 2: Distribution of published documents with Authorship pattern

Year	Single Author	Double Author	Triple Author	Four Author	Five Author	More than Five Author	Grand Total
2007	0	0	0	4	0	0	4
2008	0	1	3	1	1	1	7
2009	0	1	2	2	2	0	7

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2010	3	0	2	6	1	4	16
2011	0	3	5	6	2	0	16
2012	0	1	3	9	2	4	19
2013	3	3	3	3	0	2	14
2014	0	3	5	6	2	5	21
2015	2	6	4	13	6	2	33
2016	3	1	2	6	3	2	17
Total	11	19	29	56	19	20	154

Similarly, the number of author in published article were analyzed and it is found that as compare to single author the multi author papers are more. Among 154 articles 11 articles are published with single author, 19 articles are published with double author, similarly triple author articles are 29 and other articles are also documented (Table 2).

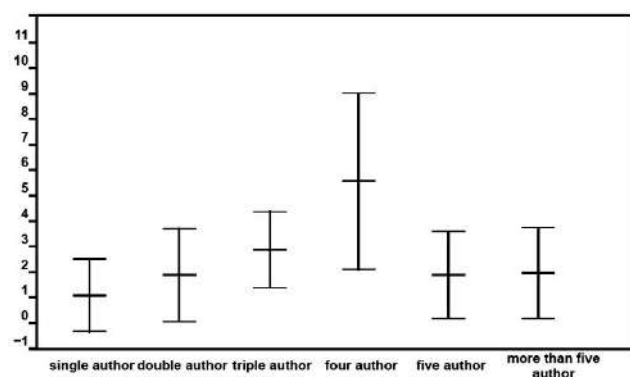


Fig. 1

With Anova results, it is revealed that there is a significant difference in the authors participated for publishing articles at P=0.0003.

It is observed that the top 10 authors published 17% of total documents and other 150 authors published the rest 83% documents (Table 3).

Table 3: Documents published by top 10 authors

Name of the Authors	Documents	Percent	Cumulative Percent
Gregori, D.,	5	2.22	
Sahu, M.C.	5	2.22	2.22
Swain, S.K.	5	2.22	4.44
Foltran, F.	4	1.78	6.67
Passali, D.	4	1.78	8.44
Ballali, S.	3	1.33	10.22
Ghai, A.	3	1.33	11.56
Madan, K.	3	1.33	12.89
Singhi, S.C.	3	1.33	14.22
Wadhwa, R.	3	1.33	15.56
37 authors published two documents each	74	32.89	16.89
113 Authors published one document each	113	50.22	49.78
Total 160 Authors	225	100.00	100.00

Table 4: Author's affiliation into different organizations

Sl. No.	Name of the organization	Document	Percent	Cumulative percent
1.	All India Institute of Medical Sciences	15	6.44	
2.	Postgraduate Institute of Medical Education and Research	13	5.58	6.44
3.	Siksha O Anusandhan University	6	2.58	12.02
4.	Universita degli Studi di Padova	5	2.15	14.59
5.	Maulana Azad Medical College	5	2.15	16.74
6.	Christian Medical College, Vellore	4	1.72	18.88
7.	Universita degli Studi di Siena	4	1.72	20.60

Conted...

8.	Pandit Bhagwat Dayal Sharma Postgraduate Institute of Medical Sciences	4	1.72	22.32
9.	Prochild ONLUS	3	1.29	24.03
10.	BYL Nair Charitable Hospital & TN Medical College	3	1.29	25.32
11.	Lady Hardinge Medical College	3	1.29	26.61
12.	19 organizations published two documents each	38	16.31	27.90
13.	130 organizations published one document each	130	55.79	44.21
Total	160 organizations	233	100.00	100.00

The researchers working on foreign body are more from All India Institute of Medical Sciences, New Delhi and Postgraduate Institute of Medical Education and Research comes in second place and Siksha O Anusandhan University, Odisha is placed in third position (Table 4).

Table 5: Documents published in different journals

Name of The Journal	Document	Percent	Cumulative Percent
Indian Journal Of Pediatrics	8	5.19	
Indian Journal Of Otolaryngology And Head And Neck Surgery	7	4.55	5.19
International Journal Of Pediatric Otorhinolaryngology	7	4.55	9.74
Journal Of Bronchology And Interventional Pulmonology	6	3.90	14.29
Journal Of Clinical And Diagnostic Research	6	3.90	18.18
Lung India	6	3.90	22.08
Journal Of Anaesthesiology Clinical Pharmacology	5	3.25	25.97
BMJ Case Reports	4	2.60	29.22
Indian Journal Of Anaesthesia	4	2.60	31.82
Paediatric Anaesthesia	4	2.60	34.42
Singapore Medical Journal	4	2.60	37.01
Chest	3	1.95	39.61
Egyptian Journal Of Ear Nose Throat And Allied Sciences	3	1.95	41.56
Pan African Medical Journal	3	1.95	43.51
Saudi Journal Of Anaesthesia	3	1.95	45.45
14 journals published two documents each	28	18.18	47.40
53 journals published one document each	53	34.42	65.58
Total number of journals = 82	154	100.00	100.00

It is found that 45.5% of total documents were published in top 15 journals and the rest 67 journals published 55% documents.

Degree of collaboration: Degree of collaboration is a measurement of the prominent area of inquiry in

scientific studies indicating the trend in patterns of single and joint authorship. It is examined in this study of the Indian publications on Airway Foreign Body during this ten year period, as shown in Table-6. The degree of collaboration "C" is 0.93 which means there is less work of single authors in comparison to the multiple authors.

Table 6: Degree of Collaboration

Year	Single Author Paper N _s	Multiple Author Paper N _M	N _M + N _S	Degree of Collaboration (C)
2007	0	4	4	1.00
2008	0	7	7	1.00
2009	0	7	7	1.00
2010	3	13	16	0.81
2011	0	16	16	1.00
2012	0	19	19	1.00
2013	3	11	14	0.79
2014	0	21	21	1.00
2015	2	31	33	0.94
2016	3	14	17	0.82
Grand Total	11	143	154	0.93

The extent of collaboration in research can be measured with the help of the formula:

$$C = \frac{N_M}{N_M + N_S}$$

Where, C= Degree of Collaboration

N_M = Number of multiple authors

N_S = Number of single authors

In ten year study, a total number of 154 papers were published in India and indexed in SCOPUS database. The number of authors was varied from article to article. A comparative study between single author and more than one author was taken and it was found that statistically significant at two tailed p – value where p = 0.000068 in t test (Table 6).

Table 7: Documents published in different subjects

Name of the Subject	Document	Percent
Medicine	148	85.06
Biochemistry, Genetics and Molecular Biology	10	5.75
Pharmacology, Toxicology and Pharmaceutics	9	5.17
Environmental Science, Nursing, Veterinary, Social Science	4	2.30
Dentistry	3	1.72
Total	174	100.00

The total documents published and indexed in Scopus database are distributed in different subjects.

medicine is the macro subject and other four subjects are micro subjects (Table 7).

DISCUSSION

Adults and older children usually give a history of FB lodgment in ENT. But younger children are brought to the clinic by anxious parents or relatives. FBs may vary widely in shape, size, and composition, and the symptoms may range from asymptomatic to acute life threatening condition. In our study, the most common age group affected was age < 10 years, similar to results found in many other studies⁹⁻¹³. This may be due to the tendency of young children to lodge objects into the natural orifices of body, accidentally or intentionally. The ear was the most common site for FBs in young children, who not only insert objects in their ears but also into the ears of their siblings and friends. Common ear FBs include cotton wool, bean, bead, paper/plastic, eraser, insect, paddy seed, and popcorn kernel. Patients usually present with earache, aural fullness, or ear discharge. Occasionally it may be asymptomatic and found incidentally during routine otoscopic examination. A high incidence of living FBs (i.e., ticks) in our study is explained by the fact that the people in the villages of Chitwan go to the jungle to collect fodder and graze cattle. Many people get ticks in the ear when they go for jungle safari, as Chitwan is a famous tourist destination in our country and attracts both domestic and international tourists. Examination under a microscope helps to confirm the presence of FB in the ear and aids in its removal under intravenous sedation/GA to minimize trauma to the tympanic membrane and external auditory canal. It is useful especially in children who are

not cooperative to allow proper otoscopic examination when there is associated otitis externa. Ear syringing led to successful removal of most of the non-hygroscopic FBs. Negative pressure suctioning can be useful especially when there is aural or nasal discharge along with the FB. Our study showed that there is predominance of FBs in the nose in younger children, which was seen in many other studies.^{1,3,12} Unilateral, foul-smelling, purulent nasal discharge in children must be regarded as due to FB until proved otherwise. With growth and cognitive development, the introduction of FB in the nostrils diminishes significantly, which is found only in patients with psychiatric disorders. FB in the nose or ear is usually unilateral, although it can be bilateral, as in one of our patient with FB grams in both nasal cavities and another case of FB erasers in both the external auditory canals. Sometimes there can be multiple ear or nose FBs as well. FB ingestion is a common problem. The most frequently swallowed FBs in children include coins and metallic FBs (parts of playing objects), and meat bones (chicken bone/fish bone/mutton/buffalo meat) are common in adults and elderly patients^{13,14}. Heavy consumption of alcohol and eating meat simultaneously, especially during festivals, along with poor mastication may be the cause for meat bone/bolus impaction in adults. In elderly, edentulous patients, defective peristalsis due to age-related neuromuscular in coordination and poor masticating habits are the predisposing factors for the cause of impaction of meat bone/bolus in the esophagus. Moreover, in elderly people there are commonly other underlying pathologies that cause narrowing of the digestive tract. Coin was the most common FB in the throat in children in our study, which is similar to other studies.^{12,14}

CONCLUSION

FBs in the ear and nose were found more frequently in children, and the throat was the most common site of FBs in adults and elderly people. Most of the nasal and aural FBs can be easily removed in the ER or OPD. Parents/caretaker should not allow children to play with coins or other small objects to prevent the risk of FB ingestion or insertion.

Conflict of Interest: There is no conflict of interest

Source of Funding: Nil

Ethical Clearance: Approved from Institutional Ethics Committee

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Input of Stress Indices towards Intensity of Perceived Stress Among Beginner Nurses at Critical Care Unit

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ABSTRACT

Objectives: The statistics undoubtedly indicates that the nursing staff comprises the majority among the medical professionals. Nurses' workload and their work have been challenged. The aim of the study is to examine the relationship of various stress indices and selected background variables with perceived stress level of beginner CCU nurses.

Method: The investigation was carried out in critical Care Unit (I.C.U) of selected multi-specialty hospitals in Bhubaneswar during the period November 2015. I.C.U nursing stress scale was used to assess stress factors.

Results: The demographic profile of the CCU Nurses showed that the large group of the studied sample (51%) were ≤ 25 years of age, around (61%) of nurses were single. Distribution of nurses according to their exposure to ICU stress factors illustrated that (38% and 27 %) of nurses were suffering from severe stress and moderate stress respectively regarding thinking on direct patient care, and (26 % and 34 %) of nurses were suffering from severe stress and moderate stress respectively regarding inadequate knowledge and skill. Regarding lack of support, it was found that (22 % and 27%) of nurses were suffering from severe stress and moderate stress respectively. The regression model proved that level of stress was more dependent on "management of the unit" and less dependent on "interpersonal conflict".

Conclusion: The present study has been helpful in understanding the contribution of various dimensions of stress and selected professional variables towards perceived stress level of ICU nurses. This study will orient about different components of stressors for which we could check turn over and absenteeism of nurses.

Keywords: Dimensions of stress, professional variables, perceived level of stress, ICU nurses

INTRODUCTION

In modern hospitals the nursing care of critically ill patient in an intensive care unit (ICU) differs from a general hospital ward in many respects: the staff/patient ratio is larger, there is a great deal of multifarious electronic equipment, more vital therapeutic treatments are followed and morbidity and mortality are higher.

However, studies indirectly pointed out that critically ill patient as frustrating to look after. This is relevant because these patients are expensive to take care of and become very taxing to nurses and doctors¹. Elevated stress level occurs from the unvarying anticipation that critically ill patients will deteriorate in connection with the complication of care. This complication is intrinsic in the developed hi-tech application of the ICU². As a result, professionals who are capable to recognize which reasons aggravate stress, they can build up plans to deal with what these reasons and accordingly develop their worth of life and of work³. Nurses are confronted with stressors that come with the pressures of assuming with caring for a large number of patients suffering from

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ailment or sickness. The issue of stress in nursing should be checked comprehensively and accurately⁴.

Nurses with less ICU experience are considered to care for highly dependent patients more challenging than experienced nurses and may perceive that ICU setting is a more strenuous and stressful environment in which to work. In an operational setting where turnover and lack of nursing staff is apparent and forecasted to deteriorate, this is cause for real apprehension about future resourcing for this patient group⁵.

Recognition of work-related stressors and strategies that can be employed for managing occupational stress for the nursing profession have been receiving bigger concern by researchers, nursing institutes, and employers over the last two decades. A study comparing occupational stress among nurses and non-nurses shows that nurses experience significantly more stress factors than their non-nurse colleagues⁶.

Nurses are confronted with severe stress in Indian hospitals because of the scarcity of nurses. A male ICU nurse feels significantly higher stress level as contrasted to females. Second, male ICU nurses from private hospitals proved significantly higher level of stress than the government ICU nurses on different dimensions of Organizational Role Stress Scale⁷.

According to some estimates, job stress is the key factor in 70% of absentee employees and almost wasting of 10% of the country's gross domestic product⁸. Occupational stress may be responsible for many of the organizational outcomes such as decline in performance, job dissatisfaction, lack of motivation and commitment, as well as an increase in absenteeism and turnover⁹. Nurses in hospitals are prone to experience job stressors than those in other backgrounds, which may be appropriate for ICU nurses when compared to indoor nurses¹⁰. A study on Workforce issues and potential solutions reported that globally, intensive care nurses are central part of critical care team. These nurses add to better patient outcomes, decreased morbidity and mortality, diminished complications and errors, and decreased overall costs¹¹.

Now nursing has become a profession in its own right. People have higher expectations from nurses for the medical service they deliver to the society. Therefore, nursing has become more demanding, more challenging and more complicated. Correction of stress

would be possible by recommending an evidence-based set of strategies, which would help in sustaining nurses in the I.C.U setting. Therefore, it is necessary to bring the attention of the administration as well as practicing nurses towards the problem of work-related stress in critical care setting. It is important to highlight the stress indices and demographic factors those trigger the intensity of stress in beginner nurses.

METHOD

The investigation was carried out in critical care unit of selected multi-specialty hospitals in Bhubaneswar, during the period January-June 2016. A purposive sample consisted of 270 nurses, who work in the previously mentioned settings invited to participate in the study. 252 participants returned a completed questionnaire. Therefore, the final participants were 252 CCU nurses.

Selected background variables of the registered nurses of C.C.U were collected by using C.C.U nurse's background information sheet, which included different demographic and professional variables. Critical care nursing stress scale was used to identify stressors (factors of CCU stress) as regards direct patient care, inadequate knowledge & skill, lack of support, interpersonal conflict & management of the unit. The questions used the 4-point Likert scale from not at all stressful to very stressful. The score were calculated for as follows: scores 1 = low level of stress, scores 2 = moderate level of stress and scores 3 = high level of stress.

Inclusion Criteria

- Registered nurses who work more than one week and less than one month of experience in present ICU - Nurses are not independently providing nursing care to the patient.
- Nurses working in CCUs and must have finished their orientation period, were included in this study.

Exclusion Criteria

- Nurses working in pediatric and neonatal CCUs.
- Nursing Supervisors and Nurse Educators of CCUs.

Statistics

The quantitative data were entered and analyzed using the SPSS (Statistical Package for Social Sciences version 20.0), and the level of significance (α) was set at

0.05. Frequencies and percentage distribution tables will be structured to present the demographic characteristics of participants. Mean perceived level of stress of the nurses will be computed for all the five dimensions of stress. Regression analysis will be applied in determining contribution of various dimension of stress towards perceived level of stress. To find out the relationship between perceived stresses of C.C.U nurses with the selected professional variables, One way ANOVA test will be conducted for all variables except marital status as in case of marital status, there are only two samples, hence t test can be conducted.

ETHICAL CONSIDERATIONS

The hospital ethical committee approved this study. Approval from nurses was obtained. Several strategies were utilized to protect the nurse's rights who decided to take part in this study. First, oral verbal consent of the nurses was obtained prior to the administration of the questionnaire. The nurses were informed of the purpose of the study, and that they had the right to refuse to participate. In addition, the voluntary nature of participation was

stressed as well as confidentiality. Moreover, the nurses were informed that they can abstain from answering any questions and they can terminate at any time. Anonymity of the nurses was preserved at all times.

RESULTS

Description of background variables: The background variables of the biggner CCU Nurses (Table 1) showed that the large group age of the studied sample (51%) were ≤ 25 years, around (61%) of nurses were single, and in relation to the educational level, it was found that the majority (64%) of them had nursing diploma. (66 %) of the nurses had an experience of less than one year as registered nurse. In past C.C.U experience of registered nurses, (81 %) of registered nurses were not having past ICU experience and (13 %) of them were having less than 6 Months of experience. In Weekly shift hours of mornings (57%) of nurses were posted for (1- 3) days in CCU, In Weekly shift hours of evenings (77%) of nurses were posted for (1- 3) days in ICU. On Consecutive Days of Working, in week (44%) of nurses were in less than one and (31%) of nurses were within (1-2) consecutive days of working in a week at CCU (Table 1).

Table 1: Frequency and percentage Distribution of the background variables of biggner CCU nurses

Demographic Variables	Frequency	Percentage(%)	
Age in years	≤ 25	129	51
	26-30	108	43
	> 30	15	6
Marital Status	Single	153	61
	Married	99	39
Degree	G.N.M	162	64
	B. Sc Nursing	72	29
	P. B.ScNsg	18	7
Total years as Registered Nurse	< 1	167	66
	1 - 2	57	23
	2 - 3	14	6
	3 - 5	14	6
Past ICU Experience	No Experience	204	81
	< 6 Months	32	13
	6 Months - 1Year	16	6
Weekly shift hours during morning in days	1 -3	145	57
	4-6	103	41
	7	4	2
Weekly shift hours during evening in days	1 -3days	196	77
	4-7days	47	19
	None	9	4
Consecutive Days Working in week	< 1	110	44
	1	65	25
	1 - 2	77	31

Distribution of nurses according to their exposure to CCU stress factors: Table -2, illustrated that (38% and 27 %) of nurses were suffering from severe stress and moderate stress respectively regarding thinking on direct patient care, and (26 % and 34 %) of nurses were suffering from severe stress and moderate stress respectively regarding inadequate knowledge and skill. Regarding lack of support, it was found that (22 % and

27%) of nurses were suffering from severe stress and moderate stress respectively. For Interpersonal conflict with nurses, it was found that (17 % and 24 %) of nurses were suffering from severe stress and moderate stress respectively. Regarding Management of unit, it was found that (39 % and 37 %) of nurses were suffering from severe stress and moderate stress respectively (Table 2).

Table 2: Number and percentage distribution of nurses according to their exposure to ICU stress indices

No.	ICU Stress factors	Severe Stress		Moderate Stress		Mild Stress		Normal stress	
		frequency	%	frequency	%	frequency	%	frequency	%
1.	Thinking on direct patient care	96	38	67	27	70	28	19	7
2.	Inadequate knowledge & skill	65	26	87	34	93	37	7	3
3.	Lack of support	55	22	69	27	98	39	30	12
4.	Interpersonal conflict	44	17	58	24	107	42	43	17
5.	Management of unit	98	39	94	37	50	20	10	4

Contribution of each dimensions of stress towards perceived levels of stress in C.C.U nurses: To find out the relationship between the perceived stress level and the dimensions of stress, regression analysis was performed between them. It is relevant to say that the dependent variable is the perceived stress level and the independent variables are the five dimensions of stress mentioned above.

The descriptive statistics of table - 3, gave the mean stress level and the mean score of various dimensions of stress of 252 nurses who had no experience of handling patients in ICUs along with the standard deviations of the scores (Table 3).

The significant of the model summary table -4 was the value of R². R² is the percentage of variance in the dependent variable explained by the collection of independent variables. R² provided an indication of the explanatory power of the regression model. In this case it was 100 (R²= 1) which was great. This implied that the dependent variable i.e. mean perceived stress level was 100% explained by the interdependent variables i.e. Thinking on direct Patient Care, Inadequate Knowledge & Skill, Lack of Support, Interpersonal Conflict and Management of the Unit (Table 4).

The ANOVA table - 5. tested the significance of the regression model. In this case the p value was 0.000 and hence p<0.05, It concluded that the independent variables not only 100% explained the dependent variable, but this relationship is also significant (Table 5).

The correlation table -6, described that there was highly positive correlation between the mean perceived stress levels of stress with all the dimensions of stress with Pearson Correlation Coefficient value more than 0.7 except the dimension “Lack of Support” where it was 0.281 still positive. Again in each case the p value was 0.000, i.e. less than 0.05; this indicated the relationship between dependent variable and independent variables were highly significant (Table 6).

The coefficient table-7, described the coefficient of independent variables in the regression model as labeled in column three as B. Hence our desired model was: Mean Perceived Level of Stress = -.002 + .231 (Thinking on Direct Patient Care) + .250 (Inadequate Knowledge & Skill) + .096 (Lack of Support) + .077 (Interpersonal Conflict) + .346 (Management of the Unit) (Table 7).

FINDINGS

Simplifying the above model we got:

$$MPLS = -.002 + .231 (DPC) + .250 (IKS) + .096 (LOS) + .077 (IC) + .346 (MOU)$$

The regression model proved that stress level of nurses without having experience of handling patient independently in CCU i.e. perceived level of stress was more dependent on “management of the unit” and less dependent on “interpersonal conflict” .

Table 3: Descriptive Statistics of Perceived Stress Level of Nurses with relation to dimensions of stress
N = 252

Descriptive Statistics Mean \pm S.D	
Mean Perceived Stress Level	3.49 \pm 0.53
Direct Patient Care	3.30 \pm 0.64
Inadequate Knowledge & Skill	3.69 \pm 0.67
Lack of Support	3.34 \pm 0.81
Interpersonal Conflict	3.66 \pm 1.12
Management of the Unit	3.46 \pm 0.65

Table 4: Model summary of perceived stress level of nurses with relation to dimensions of Stress

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 ^a	1.000	1.000	.003

Predictors: (Constant), Management of the Unit, Lack of Support, Inadequate Knowledge & Skill, Direct Patient Care, Interpersonal Conflict

Table 5: ANOVA table of Perceived Stress Level of Nurses with relation to dimensions of Stress

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.71	5	14.142	1225185.574	.000 ^a
	Residual	.003	246	.000		
	Total	70.71	251			

a. Predictors: (Constant), Management of the Unit, Lack of Support, Inadequate Knowledge & Skill, Direct Patient Care, Interpersonal Conflict

b. Dependent Variable: Mean Perceived Stress Level

Table 6: Correlation table of Perceived Stress Level of Nurses with relation to dimensions of Stress

Correlations			
		Mean Perceived Stress Level	Sig. (1-tailed)
Pearson Correlation	Mean Perceived Stress Level	1.000	
	Direct Patient Care	.845	.000
	Inadequate Knowledge & Skill	.771	.000
	Lack of Support	.281	.000
	Interpersonal Conflict	.715	.000
	Management of the Unit	.836	.000

Table 7: Coefficient table of Perceived Stress Level of Nurses with relation to dimensions of Stress

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.002	.002		-1.39	.164
	Direct Patient Care	.231	.001	.281	443.09	.000
	Inadequate Knowledge & Skill	.250	.000	.318	533.73	.000
	Lack of Support	.096	.000	.148	284.83	.000
	Interpersonal Conflict	.077	.000	.164	246.51	.000
	Management of the Unit	.346	.000	.428	723.61	.000

a. Dependent Variable: Mean Perceived Stress Level

Relationship of perceived level of stress of C.C.U nurses with selected demographic variables: It was observed from the above table-8, that there was significant difference in perceived stress level of CCU nurses among professional qualification, income of family, Years of experience as registered Nurse, past CCU experience, Current Area of Practice, experience in Current Position in week ,Weekly Rotation Plan of morning in Days and Consecutive Days Working as $p < 0.05$ (Table 8).

Table 8: One way ANOVA to show the result of significance between perceived level stresses of C.C.U nurses with the selected background variables

$n_1=252$

Dependent Variable	Independent Variables (Demographic Variables)	F Value	Significance (p Value)
Perceived stress levels of C.C.U nurses	Age	.835	.435
	Marital Status	1.032	.311
	Degree	3.157*	.044
	Family Income	5.302*	.001
	Family Member	29.143*	.000
	Years as Registered Nurse	8.411*	.000
	Past CCU Experience	21.437*	.000
	Current Area of Practice	11.308*	.000
	Experience in Current Position in week	22.138*	.000
	Weekly Rotation Plan of Morning in days	7.000*	.000
	Rotation Plan Evening	.095	.984
	Consecutive Days Working	3.290*	.039

* Significant at 0.05 level

DISCUSSION

This study aimed to examine effect of various stress indices and selected background variables towards perceived stress level of novice CCU nurses. CCU nurses stress related factors have been placed in five main categories: direct patient care, inadequate

knowledge & skill, Lack of support, Interpersonal conflict and Management of unit. All categories had several subsets and they were the most important professional stressors for the CCU nurses of this study. The management of the units, thinking on direct patient care and Inadequate knowledge and skill were among the most stressful experiences that the novice ICU nurses faced with. Based on the CCU nurses experiences, the following items were some of the stress factors, which are most stressful for the nurses: “Assigned to nurse 2 to 3 patients in ICU setting”, “Listen or talk to a patient about his/her approaching death” and “Provide support/information and creating positive rapport with critically ill patient’s family members” . The highly rated actual stressful events are “Expose to health & safety hazards.”, “Handle mechanical ventilators or non-invasive ventilation.”, Prioritize your nursing care in ICU setting, Perform ABG analysis independently in ICU setting, Blame for anything that goes wrong in C.C.U”, “Work continuously for eight hours by standing in I.C.U.”, “Prepare patient(s) for specific procedure(s)/ investigation(s)” and “Participate in delivering in-service education.”.

These findings are consistent with the reports of^{10,12} have reported that the nurses faced with multiple occupational risk factors. Some studies, which have been conducted in Iran, mentioned about the sources of stress for nurses such as patient care, inappropriate treatment of the patient’s family, increasing workload, dissatisfaction with the wages, work on holidays, and lack of access to physician in emergencies. Having enough sleep and rest, lack of social acceptance, work environment, contact with contaminated objects, Many studies in other countries as well have reached to similar findings. A significant decline in the amount of nurses over 40 years of age working in CCUs can be related to the fact that these professionals, when they arise to this age, are engaged in other areas, watching for administrative positions, educational positions, or even give up the occupation¹³. The most important factors creating stress which were mentioned by the CCU nurses of the present study have been referred to the management of the unit and interpersonal conflicts. Different stress factors statistics showed that if the senior management people will develop and adopt need based stress management strategies, it would minimize the pressure and stress imposed on nurses. The nurses should also try with the development of good relations between themselves to reduce the occupational stress.

The regression model proves that stress level of nurses having experience of handling patient independently in CCU i.e. actual level of stress is more dependent on “management of the unit” and less dependent on “lack of support”. When compared to studies alike high levels of stress show a relationship between an increase in work demand as well as a poor work environment. These studies in meticulously show that targeting particular individuals or groups will be of limited use without also addressing the general work environment¹⁴. This finding points to the fact that participants who are dissatisfied with the social interaction and support in their work environment experience higher levels of stress. When compared to studies alike Stress in critical care nurses: actual and perceived, there were significant correlations between perceived life stress and the perceived severity of work stressors, as well as between actual and perceived stressful work events¹⁵.

It is observed that there is significant difference in actual perceived level of stress in CCU nurses among various age groups In conjunction a study indicated that younger age correlated with high levels of stress¹⁴. Research indicated that the non-work related causes of stress are found to be statistically highly significant when correlated with the level of stress¹⁶.

CONCLUSION

Study results have shown that the most common type of work-related perceived stress for CCU nurses were due to management of unit and Inadequate knowledge and skill followed by direct patient care. High stress levels often result in burnout and turnover of employees and change of their attitudes to work, and thus they can negatively influence the care for patients. Hence, action and strategies should be targeted for C.C.U working nurses at both individual and organizational level for managing C.C.U nurses stress. Lack of accurate information regarding perceived stressors leads to misconception about the stressors and creates the common challenge for the employees and employers. Therefore, it is essential to have an accurate orientation about different components of stressors for which we could check turn over & absenteeism.

Conflict of Interest: There is no conflict of interest

Source of Funding: Nil

Ethical Clearance: Approved from Institutional Ethics Committee

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Surveillance of *Candida Albicans* and their Antifungal Susceptibility in Oral Candidiasis

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ABSTRACT

Background: *Candida albicans* prevails to be the most common infection among all *Candida* infections. Due to indiscriminate, misuse and over use of antibiotics in case of fungal diseases, ICU patients, immunocompromised patients like AIDS, it reveals multidrug resistant (MDR) strains. Proper antibiograms study should be carried out for proper drug prescription.

Aim: In this study, we aimed to investigate the common isolates *Candida albicans* and their drug susceptibility test and identified the gene responsible for resistance to Fluconazole and Itraconazole antibiotic.

Materials and Method: This study was executed with routine microscopic, identification of organisms and drug sensitivity of isolates from 103 oral swab samples for a period of three months at IDS and Institute of Medical Science and SUM Hospital, Bhubaneswar, Odisha. Bacteria and fungus were identified with universal primer (16S rRNA). Bacteria having Fluconazole and Itraconazole resistant genes were identified using specific primers.

Results: From 103 oral swab samples, 100 showed significant growth. *Candida albicans* was common isolate, followed by *Candida glabrata*, *Candidatropicalis* and *Candida krusei*, In case of bacteria, *Pseudomonas* was common. Bacteria were identified using 16S rRNA primer (8F, 1541R). Drug susceptibility pattern revealed highly resistant to Colistin and Azithromycin in case of Gram negative bacteria. However, amikacin was sensitive to all. In case of Gram positive cocci, penicillin and navobiomycin remained high resistance but chloramphenicol was the most sensitive. For fungal isolates Nystatin and fluconazole remained highly resistant while Miconazole and Itraconazole showed high sensitive. By using specific primers (ERG11, CDR1, MDR1, 18srRNA) for Fluconazole, and (ERG3, NERG3, ERG11) for Itraconazole resistant genes were identified in *Candida albicans*.

Conclusion: Empirical use of antibiotic should not be practiced while prescribing drugs. Proper identification and drug susceptibility pattern of organisms should be conducted before prescribing a drug. PCR method should be implemented for early detection of antibiotic resistance patterns.

Keywords: *Candidiasis*, MDR, 16SrRNA, Fluconazole, Itraconazole and ERG11

INTRODUCTION

The oral cavity is home to many different microorganisms, including bacteria, viruses, fungi, and sometimes protozoa¹. The different, tissues and fluids in the oral cavity, as well as different types of foods that pass through oral cavity, provide a unique environment which allows various microorganisms to survive in the oral cavity¹. Most of times the organisms live in complete harmony with their host, sometimes they can

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cause harm in the form of dental caries, periodontitis, and other infections. The shift from harmless to harmful was described by P.D. Marsh² in the ecological plaque hypothesis.

Candida species, commonly *Candida albicans*^{3,4}, can be present in the mouth of healthy individuals without causing disease to its host body³⁻⁵. Like bacteria, fungi can be part of the natural oral microflora, a change in the balanced microflora can lead to infection and disease. Other names of oral candidiasis are oral thrush and candidal stomatitis. It is also referred to as a biofilm disease⁶. The lesion can vary in size, shape and colour, largely dependent on the predisposing factors behind the disease⁴. *Candida albicans* is the most important human fungal pathogen⁷. This includes those affected with HIV-AIDS, cancer, diabetes, infants, elderly, those who have undergone organ transplant etc are prone to develop *Candida*.

MATERIALS AND METHODE

A total of 103 Oral swab samples were collected from patients admitted to IDS department of IMS & SUM hospital, Bhubaneswar, Odisha, India, during the period 18th December 2017 to 27th January 2018. All the samples were cultured on blood agar MacKonky agar and SDA plates and incubated at 37^o C for 24-48 hours. The colonies so obtained were stained with Gram's staining chemicals and was observed under microscope. Strains were inoculated on CDA plate and again incubated at 37^o C for 24-48 hours.

Antifungal screening was done by disk diffusion method. Colonies were cultured in test tubes containing 2ml of SDB and incubated for 24 hours. Then the cultures were poured on SDA plate and spreaded using sterile cotton swab. After 5 minutes, antifungal (7) disks were placed on the plates, maintaining a distance of 30mm each. 7 antifungal disks were used such as: Amphotericin-B, Clotrimazole, Fluconazole, Itraconazole, Ketoconazole, Miconazole and Nystatin.

RESULTS

A total number of 46 colonies of *Candida spp.* were obtained. Out of which 41 colonies were *C. albicans* (green colour on CDA), 3 colonies were *C. glabrata* (white colour on CDA), 1 colony was *C. kruzei* (purple colour on CDA) and 2 colonies were *C. tropicalis* (blue-purple colour on CDA).

Antifungal screening showed variable results for all four species of *Candida*. *C. albicans*, *C. glabrata* and *C. kruzei* showed 100% resistance to Fluconazole. Again *C. albicans* and *C. glabrata* were 100% resistance to Ketoconazole. *C. glabrata* also showed 100% resistance to Nystatin. Itraconazole showed a high percentage of susceptible for *C. albicans* (87.5%), *C. kruzei* (80%), *C. tropicalis* (100%) and *C. glabrata* (60%). Amphotericin-B showed variable results in all the 4 species i.e. *C. albicans* 62.5% susceptible, *C. glabrata* 60% resistance, *C. kruzei* 80% susceptible, *C. tropicalis* 66.6% resistance. Miconazole showed resistance for *C. albicans* and *C. glabrata* by 75% and 80% respectively. But *C. tropicalis* and *C. kruzei* were 100% and 80% susceptible respectively. Similarly, Clotrimazole showed 50%, 80% and 60% resistance for *C. albicans*, *C. glabrata* and *C. kruzei* respectively. But it was 100% susceptible for *C. tropicalis*.

DISCUSSION

In recent years, *Candida* infections in all over world, hospitalised patients have been on the increase^{8,9}. This increase has been associated with different surgical interventions, intensive care and treatment, extreme of age, metabolic disorders, neutrophil dysfunction, and immunodeficiency states among others^{10,11}. This system calls for accurate identification of *Candida* species to select the most effective therapeutic strategies to control invasive fungal infections^{12,13}. The occurrence of a variety of culturable fungal species obtained from oral swab samples, which were mainly *Candida* species and a few non-*Candida* species. Among the *Candida* species, the predominant isolate was *C. albicans*, followed by *C. glabrata*, *C. tropicalis*, and *C. kruzei*. The non *Candida* species included *S.aureus*, *Enterococcus*, *Streptococcus*, *GPB*, *Pseudmonas*, *P.mirabilis*, *E.aeruginosa*, *P.aerogenes*. An important observation in our study is that the commonly isolated *Candida* species was *C. albicans* from oral swab samples, and this corroborates with findings in studies done in Brazil, China and USA^{14,15,16,17}. The predominance of this species *C. albicans* may be attributed to virulence, conferring upon its enhanced capacity for colonization and pathogenic activity for humans^{18,19}. In fact several studies have shown that *C. albicans* is the predominant species regardless of the immune status of the patient in all over world^{20,21}. Tanzanian and Iranian studies which also showed that *C. albicans* was a dominant species,

while non-albicans *Candida* species were present in lower proportions^{8,22,23}. Though exact species of non candida is undifferentiated correctly. The utilization of the Internal Transcribed Spacer (ITS) region for species identification seems to be gaining popularity, and is considered the gold standard and which is the most reliable strategy for the correct, accurate and rapid molecular method for identification of fungal species, including *Candida* species^{24,25,16}. Consistent with findings in other studies, oral swab samples was found to be the main source of the *Candida* isolates though *C. albicans* mostly occur from urine samples^{25,26,27}. Females are more prone to *Candida* colonisation due to their anatomy and *Candida* is part of the normal flora of the genitourinary tract in women^{28,27}. Wabe 2011 reported that the similar observations were made out of India in Ethiopian, Ghanaian and Nigerian studies where 60% of candida and 80% of oral yeast(fungal) isolated from immunocompromised patients, were mostly *C. albicans* because, *C. albicans* expresses several virulence factors during host infection which is the contribution of pathogenesis of *Candida* infection^{29,30,31}. Blignut 2007 reported that in South African study about 80% of oral yeast isolates from hospitalised patients were *C. albicans*^{32,33}. Kwamin 2013 reported that from sputum and HVS specimens mostly *C. albicans* were isolated and this may be attributed to its virulence^{30,31}. Many studies have also indicated that *C. albicans* is the main cause of candidaemia and sepsis, especially in immunocompromised and debilitated patients with cancer, HIV/ AIDS and diabetes³⁴. However, our findings indicate that *C. albicans* was the main species commonly isolated from oral swab samples as it is known to cause candidiasis in immunocompromised patients and neonates in intensive care units^{35,36}. The probable explanation for this is that *Candida* species appear not to be normally distributed in different parts of the world³⁷. It has been noticed that some *Candida* species are more specific to a particular region than others³⁸. This suggests that more attention should be paid to local distribution of *Candida* species than to continental distribution. For the management of *Candida* infection the antifungal susceptibility testing because it promotes accurate administration of antifungal agents, and as an aid in drug development as well as a means of tracking the development of antifungal resistance in epidemiologic studies^{39,40,17}. In this study, the majority of the *Candida* species were isolated from oral swab samples, and these were mainly associated

with drug resistance. This may be attributed to the fact that in Zambia the majority of HIV patients are given fluconazole tablets for prophylaxis against oral thrush and cryptococcal meningitis, and compliance to therapy in these patients is unknown, resulting in development of drug resistance^{41,37}. This corroborates with other studies in which similar findings were observed^{42,43}. This could be attributed to the antifungal prophylaxis which is considered to be responsible for development of resistant strains to antifungal agents used for prophylaxis^{48,42,43}. The multi-drug resistance (MDR) observed in 46 isolates of *Candida*, with *C. albicans*, being the predominant resistant, mostly to fluconazole and Other species that showed MDR patterns, and this involved the seven classes of antifungal agents tested in this study. These findings on MDR pose serious clinical challenges as they seem to suggest the emergence of MDR *Candida* strains in hospitalised patients at the IDS and SUM hospital (SOA University) Bhubaneswar, Odisha, India.

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Biomarker for Evaluating Peripheral Vertigo-A Study at a Tertiary Care Teaching Hospital of Eastern India

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ABSTRACT

Aim: To investigate the relationship between peripheral vertigo to neutrophil to lymphocyte ratio (NLR) as an inflammatory marker.

Materials and Method: We had taken 68 patients with peripheral vertigo those attended the Otolaryngology department during January 2014 to October 2016. The systemic diseases, malignancy, neurological diseases or any inflammations in the body were excluded from our study. We recruited 68 healthy subjects those came to the hospital for routine health check up. Detail neuro-otological examination and audiological tests were done to rule out peripheral vertigo.

Results: Neutrophil to lymphocyte count was calculated in all cases and a comparison done between the vertigo patients and control groups. The mean NLR was statistically significant among the patients of peripheral vertigo than control groups ($P=0.0021$). There were no statistically significant between patients and control groups when comparing white blood cell count, hemoglobin, mean platelet volume, lipid profile, liver function tests.

Conclusion: NLR is higher among peripheral vertigo and it is statistically significant among patients than control groups. NLR is a potential marker in vertigo with peripheral origin.

Keywords: Peripheral vertigo, biomarker, neutrophil to lymphocyte ratio (NLR), inflammation.

INTRODUCTION

Maintaining balance of the body is a complex mechanism which depends on the integrity of vestibular system, vision, the somatosensory system and finally controlled by brain and cerebellum. If any system fails, lead to dizziness or vertigo¹. Controlling postural balance is the ability to maintain balance in relation to gravity and adjust the body position on the support base.

Vertigo is a common and disabling clinical symptom often associated with peripheral vestibular diseases. Vertigo is a feeling of imbalance which can be defined as a movement delusion or hallucination which is a sense of disorientation either of rotational type or non-rotational such as imbalance, instability and visual distortion. It is commonly affect more than 10% of the population and approximately 85% cases of dizziness are of vestibular causes². Common vestibular disorders seen among patients are benign paroxysmal positional vertigo (BPPV), vestibular neuritis, Ménière's disease, labyrinthitis, acoustic neuroma and perilymph fistula. Vertigo, stress and anxiety are often concomitant may be due to increased secretion of stress related hormones³. Total white blood cell (WBC) and certain WBC subtypes like neutrophil and lymphocytes are considered as inflammatory markers especially in cardiovascular diseases⁴. The WBC subtype cells like neutrophil to

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lymphocyte ration(NLR) is a very good indicator of inflammation in the human body and a novel marker of inflammation in non-cardiac and cardiac diseases⁵. The NLR is a marker of systemic inflammation, an inexpensive, easily calculated, easily reproducible and widely available blood test⁶. There are numerous studies presented with high preoperative value of NLR among patients with different malignancy along with poor prognosis ⁷.There are almost no study of NLR with peripheral vertigo in this region of the world. In this study we had done comparison of NLR between peripheral vertigo patients with healthy persons.

medicine those attended for health check up and found no diseases. There were 68 control subjects including 41 male and 17 female with mean age of 37.42 years. Blood samples were collected from antecubital veins of all subjects and sent for blood glucose level, liver function tests, renal function tests, lipid profile and hemograms. The laboratory data were analyzed and compared between control groups and patients.NLR was evaluated and comparisons done between two groups. Statistical analysis was done by using chi-square test and 95% confidence interval. The significance was defined when p value was less than 0.05.

MATERIALS AND METHOD

This study was conducted in the department of Otorhinolaryngology during January 2014 to October 2016.This study was approved by our Institutional Ethics Committee. All subjects involved in the study were given their informed written consents. This is a prospective study included 68 patients. There were 38 male and 30 female patients with mean age of 35.68 years. All patients were undergone neuro-otological examinations along with audiological tests. The audiogram of patients showing moderate or severe hearing loss was excluded from our study as stress effect of hearing loss on patients. Patients of neurological disorders, malignancy or any inflammatory diseases or any systemic diseases along with vertigo were also excluded from this study. Along with vertigo patients, the age and sex matched control subjects were recruited from the department of

RESULTS

Out of the 68 patients with peripheral vertigo, 67.5% were male and 31.2% were female with mean age is 35.75 years. Out of the 68 control subjects, 68.5% were male and 31.5% were female with mean age is 33.52years. When comparing age, gender, live function tests, lipid profile, WBC count, hemoglobin, platelet, vitamin B₁₂, there were no stastically significance between patients and control groups (Table.1). The mean value of NLR was significantly more in the peripheral vertigo patients than control subjects (P<0.05).That higher value of NLR was due to high neutrophil count among peripheral vertigo patients than control subjects.(Table.1)In this study, the most common etiology of peripheral vertigo was BPPV(61.5%),vestibular neuritis(13.5%), Ménière’s disease(9.6%), temporal bone injuries(3.4%),Ramsay Hunt syndrome(2.5%) and other idiopathic(9.5%).

Table.1: Laboratory data in the peripheral vertigo and control groups

Biomarker	Vertigo group	Control group	P value	95%Confidence interval
Hemoglobin(g/dL)	12.4	12.6	0.8064	-2.66 to 2.09
Neutrophil count(10 ⁹ /L)	4.7	4.1	0.0788	0.12 to 1.3
Lymphocyte count(10 ⁹ /L)	2.2	2.1	0.6574	-0.37 to 0.58
Neutrophil/Lymphocyte ratio	2.13	1.95	0.0021	0.079 to 0.352
WBC count	7.8	7.4	0.2734	-0.37 to 1.26
Platlet count	255	252	0.889	-0.46 to 6.33
Glucose(mg/d)	104	102	0.555	-0.05 to 3.76
Triglyceride(mg/d)	128.7	123.6	0.7134	1.638 to 9.858
Total cholesterol(mg/d)	198.8	192.3	0.6821	1.910 to 11.274
HDL cholesterol(mg/d)	51.5	56.3	0.9212	-7.331 to -2.005
LDL cholesterol	121.3	112.5	0.0954	6.470 to 11.754
Serum urea(mg/d)	27.6	23.5	0.5681	3.097 to 5.199
Serum creatinine(mg/d)	0.81	0.79	0.5681	-0.0899 to 0.1619
TSH(Mu/m)(μIU/m)	2.2	2.1	0.6695	-0.2813 to 0.4341

DISCUSSION

The peripheral vestibular system includes vestibular nerve, three semicircular canals, utricle and saccule. This peripheral vestibular system is one of the three sensory components help to maintain spatial orientation and posture, whereas the other two sensory components are visual and somatosensory systems. Any disorders of these systems lead to vertigo. Vertigo is not a separate disorder, but a multisensory and sensory-motor syndrome with different etiologies and pathogenesis⁸. The pathology in the peripheral vestibular diseases are limited to either vestibular nerve or semicircular canals or utricle and saccule. The clinical manifestations in the peripheral vestibular disorders are vertigo and nystagmus. The direction of the nystagmus is always towards the side contralateral to the vestibular lesion. The nystagmus in the peripheral vestibular diseases is suppressed by visual fixation, worsens when gaze directed away from the lesion side whereas it improves when gaze is directed towards the pathology side. There are numerous causes for peripheral vestibular disorders causing vertigo. The common peripheral vestibular disorders are BPPV (52.5%), Ménière's disease (14.6%) and sudden idiopathic hearing loss (2.9%)⁹. Less commonly seen peripheral vestibular disorders are labyrinthitis (0.7%), benign paroxysmal vertigo in pediatric population (0.7%) and vestibular schwannoma (0.3%). Otosyphilis, Ramsay Hunt syndrome, delayed endolymphatic hydrops, vestibular neuritis, temporal bone trauma, cervical vertigo and epilepsy are rare lesion causing vertigo⁹. In our study, most common clinical conditions causing vertigo are BPPV, vestibular neuritis and Ménière's disease. Common symptoms presented by patients are giddiness, nausea, vomiting, sweating and bradycardia. Recovery from vertigo decreases with increasing age of the patients, increasing severity and it improves with vestibular suppressant medications. Leucocytes, particularly neutrophil and lymphocytes are inflammatory markers in the human body. NLR can be calculated from blood samples by counting neutrophil and lymphocytes. NLR is a potential biomarker of inflammatory in non-cardiac and cardiac diseases^{10,11}. NLR is an easily available biomarker which gives information for complex inflammatory process in the body¹². NLR acts as potential index for predicting bad clinical outcomes and a novel biomarker in oncology. Few authors documented the significant role of NLR as a marker in papillary microcarcinoma in goiter and also

concluded that it is significantly elevated in papillary carcinoma of the thyroid gland¹³. Jin et al. studied the role of NLR on the survival of patients among nasopharyngeal carcinoma with metastasis. They concluded that NLR is an important prognostic factor in patients suffering from nasopharyngeal carcinoma with metastasis¹⁴. Dogan et al. showed relationship between NLR and myocardial infraction with ST segment elevation where NLR was more among patients with occluded arteries causing infraction than patients with elevated ST segment myocardial infarction¹⁰. Although NLR is biomarker in cardiac diseases, it is also a significant marker in non-cardiac diseases like Bell's palsy. Ozler et al. showed a relationship between Bell's palsy and NLR where there was significant relationship between NLR value and the prognosis of Facial nerve paralysis¹⁵.

There is neurogenic inflammation in migraine where triptans help by blocking the neurogenic inflammation and acts as therapeutic medication¹⁶. Turan et al. documented that inflammatory markers are elevated during attack of migraine¹⁷.

There is a vicious cycle thought to exist between somatic symptoms of Ménière's disease and psychological stress. There is a strong co-existence between vertigo and stress. Even though stress can cause vertiginous attack; vertigo can also be the cause for vertigo. Vertigo attack in patients create fearful situation and also increase anxiety and worsens the emotional status of the patient. The anxiety of vertigo patients produce different symptoms by increasing stress related hormones³. One study documented that patient with vertigo give rises to different somatic symptoms in relation anxiety in dizzy patients. The somatic symptoms like insomnia, palpitation, headache, dyspnea, general fatigue, depression, chest pain, constipation and stress are accompanied with vertigo patients who should not be treated first but vertigo should be treated by physician by first priority¹⁸. It is proved that stress can cause inflammation¹⁹. In this study we investigated the relationship between inflammatory biomarker (NLR) and peripheral vertigo. We could not compare with other inflammatory markers like C-reactive protein, fibrinogen or myeloperoxidase as these are not studied in routine practice. Unlike other inflammatory markers, NLR is an inexpensive and readily available biomarker in clinical practice of peripheral vertigo. As NLR is a potential biomarker for influencing the patient selection

and universally available test with no additional cost in routine work up in comparison to expensive and sophisticated one, will be accepted by clinicians in day to day practice²⁰. This study is an observational single institution study with relatively small sample size, thus subject to different unaccounted confounders inherent to this data.

CONCLUSION

Vertigo cannot be dismissed as a trivial clinical symptom. Vertigo causes feeling of spinning sensation, anxiety and stress. Stress increases the inflammatory markers in the body. NLR represent features of inflammation and this ratio will be increased in peripheral vertigo as with other inflammation and acute stage. Although NLR is a simple inflammatory marker, gives a significant role in assessing peripheral vertigo. NLR can be easily calculated from the blood sample of the patients from outpatient and inpatient department. The important finding in our study is that NLR is an independent predictor for peripheral vertigo. NLR is an ease and conventionally measured inflammatory biomarker at a low cost which can be done in daily clinical practice. Again, well designed prospective studies with a large sample size and multicenter study are needed to verify our findings.

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An Unusual Cause of Peripheral Facial Nerve Palsy- A Case Report

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ABSTRACT

Chondrosarcoma is rare and potentially lethal neoplasm and it is even more rare in the head and neck region. It is an extremely rare clinical entity at sinonasal tract. The diagnosis of this neoplasm is based on the histopathological study showing malignant chondroid tissue proliferation. The prognostic factors for chondrosarcomas are grade of malignancy and histological surgical margins. The primary treatment of this tumor is radical surgery with wide safe margin. The other adjuvant treatment like radiation and/or chemotherapy remain uncertain. Here we present a case of chondrosarcoma of 48 year old man presented with nasofacial region mass for one year. The biopsy confirmed the diagnosis of myxoid chondrosarcoma. Clinicians should be aware of this lesion in the differential diagnosis of maxillofacial mass which prevent delayed treatment.

Keywords: Chondrosarcoma, sinonasal region, maxillofacial area, wide surgical excision

INTRODUCTION

Chondrosarcomas are rare malignancy and its origin is from cartilaginous tissue or bone derived from chondroid precursors.¹ It accounts for about 10 to 20 % of all malignant bony tumors in the body whereas its incidence is rare in head and neck region. In head and neck area it affects commonly the mandible, maxilla, nasal cavity and paranasal sinuses.² Rare location for chondrosarcomas in the head and neck region are skull base and tempormandibular joint.³ The sinonasal tract has rarely been documented in the medical literature and the maxillary sinus is the most common location to be affected but it rarely extend into the nasal cavity.

The common clinical presentations of the patients with head and neck chondrosarcomas are localized swelling, mass formation, nasal obstruction and sometimes pain. The prognosis of this disease is often variable and it is influenced by histological grading and site of origin.⁴

Here we are presenting a case report of chondrosarcoma showing a mass at nasofacial area which originating at the maxilla and extending into the nasal area and ethmoidal sinuses. Here we discuss the details etiopathology, clinical presentations and management.

Case Report: A 48 year old man attended outpatient department of Otorhinolaryngology with complaints of swelling at the left nasofacial region, left side nasal blockage and occasional nasal bleeding since 1 year. He was farmer by occupation. On examination, there was diffuse swelling involving left side of the face and lateral wall of the nose(Fig.1).The consistency of the swelling is firm and ill defined margin. The skin over the swelling was free but tense. There was no bulging in the palate during oral cavity examination. On anterior rhinoscopy, there was smooth swelling at the floor of the nose hence causing nasal obstruction. There was

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blood stained nasal discharge present inside the nasal cavity. The routine hematological tests were within normal limit. Fine needle aspiration cytology showed inflammatory lesion. Computed tomography(CT) scan showed mass involving the left maxilla, left ethmoid and left side nasal cavity(Fig.2). Orbit and cranium were within normal limit. A diagnostic nasal endoscopy was done which showed firm bulging in the floor of the left nasal cavity. The left nasal cavity was narrowed due to pushing of lateral wall of the nose medially. The nasal cavity lining was reddish in look. The mucoid discharge from nasal cavity sent for fungal culture in Sabour's medium and bacterial culture. A small of tissue from bulging inside the nasal cavity was sent for histopathological examination. The fungal and bacterial culture were negative. The histopathological report was suggestive of myxoid chondrosarcoma(Fig.3).He had undergone wide surgical excision by performing left maxillectomy(Fig.4).The mass is excised with healthy margin(Fig.5).The follow up at 1 year did not show any evidence of recurrence.



Fig. 2: CT scan picture showing mass involving left nasal cavity, maxillary and ethmoid sinus

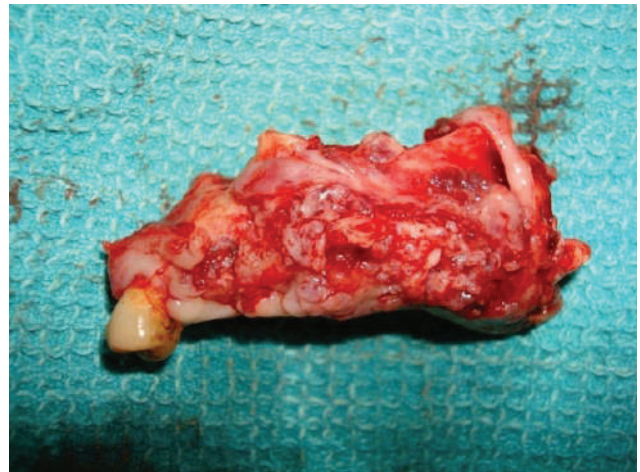


Fig. 3: Microphotography showing myxoid chondrosarcoma with an abundant myxoid matrix containing round or slightly elongated cells with small hyperchromatic nuclei



Fig. 1: Patient showing mass at the left maxillofacial region



Fig. 4: Intra-operative picture during maxillectomy

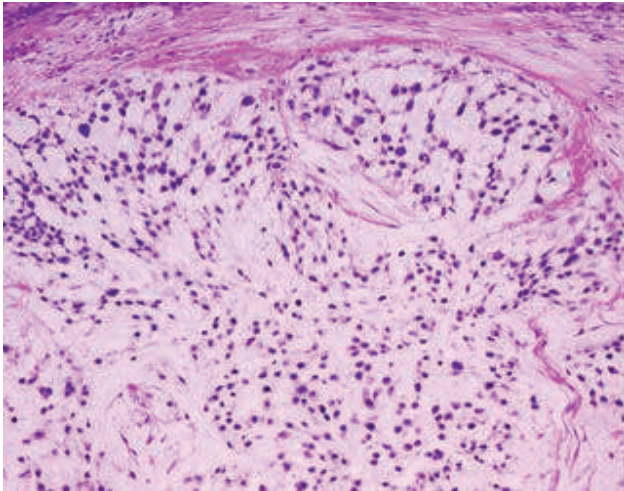


Fig. 5: Tumor mass after excision

DISCUSSION

Chondrosarcoma is an extremely rare malignancy at the head and neck area, represents less than 0.1% of all the tumors in this region.¹ It is a slow growing malignant neoplasm with a relatively high chance of local recurrence rate. This tumor originates from the cartilage, soft tissue and bone. Common primary bony sites for origin of chondrosarcoma are pelvic bone, long bones such as femur.⁵ The common sites in head and neck area for chondrosarcoma are mandible, nasal cavity, paranasal sinuses. This tumor mostly arises from the bony tissue of the head and neck region.¹ It is often seen in adults and rarely seen in pediatric age group. The clinical behavior of the chondrosarcoma are variable and in majority of the cases low grade malignant tumors as in our case. This tumor is relatively smaller in size at the maxillofacial regions and sinonasal tracts whereas it is typically large in axial skeleton.⁶ Computed tomography(CT) scan often shows a well-defined mass with presence of stippled calcified areas. Magnetic resonance imaging(MRI) report are quite variable. The noncalcified areas shows isointense to hypointense signal intensity on T1 weighted images and hypointense on T2 weighted images. MRI with gadolinium contrast reveals inhomogeneous enhancement. The imaging findings often shows variable calcification, lobulation, hypervascularity and destruction of bone.⁷ The cut section of the neoplasm shows blue-gray fragments, with focal hemorrhagic spots. There is biphasic pattern of well differentiated chondroid elements seen in microscopic picture. There may be myxoid degeneration and hemorrhagic necrosis may be seen. Tumor cells are

seen around the vessels with a hemangiopericytoma like pattern are often seen. In immunohistochemical study, the small round cells are mostly positive for CD99. The chondroid areas are often positive for S-100 proteins.

The diagnosis is often based on the histological study. Histologically, it is classified according to microscopic appearance into conventional, myxoid, clear cell, mesenchymal and dedifferentiated chondrosarcoma. The classical and conventional chondrosarcomas are characterized by a lobulated malignant cartilage, mitosis, nuclear pleomorphism and binucleated cells. The histological classification for chondrosarcomas is graded from grade-I to III.⁴ The differential diagnosis include small cell osteosarcoma, a small blue round cell neoplasm as Ewing's sarcoma or primitive neuroectodermal neoplasm, embryonal rhabdomyosarcoma and lymphoma.⁸ Identification of undifferentiated mesenchymal cells and chondroid matrix is crucial for exact diagnosis of this neoplasm.

The goal of the treatment is always to ensure the whole lesions should be removed. Wide local or radical resection of the tumor are the preferred treatment of chondrosarcoma. The surgery of this tumor includes surgical resection of the primary lesion with adequate margin. In case of maxillary neoplasm, maxillectomy is often required. As anatomy of the maxillary bone region is complex, complete surgical excision of the chondrosarcoma with histological clearance of the margin is often challenging.⁹ Chondrosarcoma is regarded as a radioresistant lesion. Sometimes the primary role of radiation therapy is for the treatment of un-resectable disease and in case of incompletely resected tumors. Radiation therapy is often recommended in case of postoperative adjuvant therapy for patients with high grade chondrosarcomas.¹⁰ In some cases of chondrosarcoma, preoperative and postoperative chemotherapy are helpful.¹¹

The incidence of distant metastasis is rare and often seen in more advanced stage or recurrent cases. Distant metastasis commonly occurs to the lungs, although it may occur to vertebrae. In chondrosarcoma, the incidence of distant and local metastasis is low and seen in approximately 5% of the cases.¹ Metastasis occurs mainly in late stage of the tumor. The cause of death in patients of head and neck chondrosarcoma is local recurrence with tumor invading the vital structures.¹² The important prognostic factors in head and neck

chondrosarcoma are anatomical locations, histological grading and adequate surgical excision.⁴ The most important prognostic factor in chondrosarcoma is resectability where complete excision is the single most factor for determining the prognosis. This fact is supported by the fact that the commonest cause of death in chondrosarcoma is recurrence at the primary site not due to metastasis. The surgical treatment should be aggressive even in cases of recurrence as the common pattern for recurrence is local failure and not due to metastasis. Complete excision of the primary location is of utmost importance for successful outcome. Postoperative radiotherapy is often helpful in case positive margins. The survival rate of the patients with head and neck chondrosarcoma is approximately 60% at five years and around 50% at ten years.¹³

CONCLUSION

The myxoid variety of chondrosarcoma at the nasofacial area is an extremely rare lesion and presented here because of rarity of this clinical entity. As it is a slow growing tumor and resistant to radiation therapy, radical surgical excision is a good treatment option. There is a good chance of cure if it is diagnosed early. Postoperative follow up is essential for monitoring the recurrence. Clinicians should be aware of this rare clinical entity and keep it in mind in case of differential diagnosis of maxillofacial mass so that to prevent delayed intervention.

Conflict of Interest: Nil

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Ethical Clearance: Not required

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Anti-Candidal Activity of 5 Rare Plants against Drug Resistance Candida Species

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ABSTRACT

Candida species is the fourth common cause of blood stream infections all over the world which is life threatening. Invasive candidiasis leads to increased mortality and morbidity especially in immunosuppressed. The antifungal resistance pattern in high-risk patients is major concern. . The present study was to access the anticandidal activity of leaves of 5 medicinal plants against fluconazole resistant Candida species and *C. albicans* isolated from patients of IMS and SUM Hospital. Ethanol, chloroform, petroleum ether and aqueous extracts of leaves, bark and seeds of *C. fistula* linn. was evaluated against Microbial type culture collection (MTCC) Candida strains and 21 fluconazole resistant clinical isolates. Antifungal activity was evaluated by agar diffusion and broth dilution techniques. The active phytochemical component present in the ethanol extract of seeds was accessed by high performance thin layer chromatography. The docking study was done with lanosterol 14- α demethylase, the azole drug target with the predominant phytochemical from the extract having antifungal activity.

Keywords: Antifungal activity, candidiasis, medicinal plants, MIC, MFC, resistant Candida strains

INTRODUCTION

Candida genus is part of the indigenous microbial flora in humans. Candidiasis is a superficial or deep or opportunistic fungal infection with very wide clinical entities. The incidence of fungal infections has increased significantly since the 1980s¹, especially in immunocompromised patients²⁻⁶. Invasive candidiasis leads to increased mortality and morbidity in immunosuppressed, in spite of recent medical advances. Extensive and indiscriminate use of azoles has led to multidrug resistance (MDR), which poses a major hurdle in antifungal therapy. This emerging problem with the continuing emphasis on health-care costs has drawn the attention of the scientific community regarding the

search for new cost-effective, broad-spectrum drugs of natural or synthetic origin. The choice of an appropriate antifungal treatment is important, though limited to a few licensed agents⁷. Natural products for the management of fungal diseases can be considered as an alternative to synthetic fungicides due to their less toxicity, reduced cost and less adverse reactions. According to World Health Organization (WHO), more than 80% of the world's population relies on traditional medicine for their primary healthcare needs. In view of possible difficulties strong incentives are there to develop new, cost effective, nontoxic, broad spectrum natural fungicides for effective patient management. Cassia fistula Linn — “the golden shower tree” belongs to the family Caesalpiniaceae, is cultivated throughout India as an ornamental plant. In Ayurvedic medicine, the tree is known as “disease killer” because every part of the tree has medicinal properties. *C. fistula* exhibited significant antimicrobial activity and showed properties that support folklore use in the management of some diseases as broad-spectrum antimicrobial agents⁸. Evaluation of the antagonistic effect of hydro alcohol extracts of leaves of *C. fistula* against bacterial and fungal strains showed significant

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inhibitory effect on the growth⁹. Studies on aqueous, alcohol, chloroform and ethyl acetate extracts from the flower showed positive result¹⁰. Another experiment revealed that the minimum inhibitory concentration of methanol extract of *C. fistula* seeds ranged from 1.563—50.00 mg/mL against the strains tested¹¹. In this study, we determined the antifungal activity of medicinal plant and evaluated their MIC and MFC.

MATERIAL AND METHOD

Collection and Processing of clinical samples for isolation of fungi: A prospective cross-sectional study was undertaken over a period of 5 years, from September 2009 to April 2014, in the Department of Microbiology of IMS and Sum Hospital. Clinical samples from patients from CA source and HA sources such as, skin swabs and skin scrapings, wound swabs, nail cuttings, blood, urine, vaginal swabs, surgical wound abscesses, hair from scalp, etc., were tested for presence of fungal infections. With the prescribed safety precautions, samples were transported and processed without delay. Each sample was examined macroscopically for the presence of any caseous, purulent or bloody and necrotic material prior to further processing. The staining method was followed up with the temporary incubation of a clinical sample in 10 % KOH ordinarily, but 20 % KOH was used for nail cuttings and other hard pathological materials. The presence of fungal hyphae/spores in clinical samples was checked using a microscope.

Isolation and identification of fungi: Small portions of a clinical sample were inoculated into two sets of test tubes of *sabouraud dextrose agar* (SDA) or *potato dextrose agar* (PDA) as well as in 100 mm diameter Petri plates, which were incubated at room temperature, 25° C and in parallel at 37° C (BOD incubator, REMI), for a week. Inoculated media were checked every day following the incubation for possible growth of fungi. Plates were opened only within a biological safety cabinet to prevent any cross contamination. After a week of incubation, if there was any visible growth of fungus on SDA tube, further identification was done by gross examination of the obverse and reverse sides of the culture tube. Little lots of grown mass from samples were used for fungal identifications¹². Staining test was repeated for a little lot of grown mass by using LCB, for confirmation¹³⁻¹⁵. The following fungal species were isolated and identified with macroscopic features with obverse and reverse sides of culture tubes.

Antifungal sensitivity pattern of *C. albicans*: All the strains were screened for antifungal sensitivity test with 6 antifungal discs namely nystatin (100 units), clotrimazole (10 µg), fluconazole (10 µg), itraconazole, ketonazole and amphotericin-B (100 units) (all from HiMedia), by the disc diffusion method (Chakrabarti et al., 1995), along with the reference strain of *C. albicans*. Inocula were prepared by picking five distinct colonies of approximately 1 mm size from 24 h old culture grown on SDA at 35 ± 2° C. Colonies were suspended in 5 mL of sterile 0.85 % saline. Vortexing was done for making a suspension of the pellet of *C. albicans*, which was adjusted to a turbidity to yield 1 x 10⁶ - 5 x 10⁶ cells/mL (i.e., 0.5 MacFarland standard).

Sterile SDA plates with a depth of about 4 mm were used for carrying out susceptibility of antifungal discs against *C. albicans*. A sterile non-toxic cotton swab was dipped in the standardized inoculum (turbidity so adjusted, as to obtain semi-confluent growth on the Petri plate) and the plate was rotated with the swab for uniform distribution of the inoculum. Streaked of the entire agar surface of the plate was done with the swab three times turning the plate at 60° angle between each streaking. The inoculum was allowed to dry for 5-15 min with its lid in place. Hexagonal antifungal discs were placed on plates aseptically. After 15 min of standing, plates were inverted and incubated in the BOD incubator at 35° C; each plate was examined after 20 - 24 h of incubation. But, at 48 h only when sufficient growth was observed, size of zones of inhibition were noted. The MDR strains of *C. albicans* from those plates were maintained weekly and preserved at 4°C.

RESULTS

Identification of *C. albicans*: Isolation and identification of *C. albicans* were done basing on both microscopic and macroscopic characters. Clinical samples from patients were cultured on SDA containing 0.5 % chloramphenicol, pH 6.5, for 24 h at 37° C. Creamy moist colonies were picked up and used for presumptive identification on HiCHROM agar-Candida medium (HiMedia). Plates were incubated at 30° C for 24 h. Green colonies developed on HiCHROM agar Candida,

were identified as *C. albicans*. Germ-tube formation assay, carbohydrate assimilation test and Corn meal agar test were used as confirmatory tests. Formation of germ-tube at 37° C in serum, after 2 h of incubation indicated the germ tube test positive. In carbohydrate assimilation test, growth and fermentation profile on several sugars confirmed the fungus *C. albicans*. Formation of chlamydo spores on corn meal agar plates, at 25° C after 7 days was observed for *C. albicans*. Media components and chemicals were purchased from HiMedia. Isolates were numbered depending on the number of samples from which, they were isolated. A total number of 134 *C. albicans* were isolated during the study. Pure cultures of isolated fungi were maintained on SDA slants, at 4° C temperature. The standard strain of *C. albicans* (MTCC 3017) was used as the reference control.

Antifungal sensitivity of *C. albicans*: Among the 6 antifungal discs, the amphotericin B was the highest 92 % sensitive to screened isolated *C. albicans* and fluconazole was the highest 84 % resistant (Table 2). The MIC of the amphotericin B was range from 0.25–1.0 µg/mL and the MIC of the fluconazole was in the range 0.12-128 µg/mL (Table 3).

Antifungal activity of 5 leading plants

Antifungal activity test by agar-well diffusion method: Antifungal activities of methanol extracts of 5 plants (*Argemone mexicana*, *Alangium salvifolium*, *Butea*

monosperma, *Combretum albidum* and *Strychnos nux-vomica*) were used by the agar-well diffusion method on lawns of 19 isolates of *C. albicans* and the MTCC strain. All these 5 methanol extracts had prominent anticandidal activities (Table 4)

Kruskal-Wallis *H* test was applied to the dataset of anticandidal activity with methanol extracts of selected 5 plants. The computed Kruskal-Wallis *H* value was 72.37, when tabulated value was 13.277 at *P*= 0.01, for degree of freedom (df) 5 extracts minus 1 = 4. Since the tabulated value is far less than the computed *H* value, at *P*= 0.01, the null hypothesis that there was no difference between inhibitory zones due to methanol extracts of 5 individual plants was outright rejected. Differences in values of zones of inhibition of individual 5 methanol extracts are highly significant (Table 61). Secondly, the ‘total rank signs’ recorded in Table 61 for the methanol extract of *C. albidum* was 1769.5, against similar values due to extracts of *A. mexicana*, *A. salvifolium*, *B. monosperma* and *S. nux-vomica* were 725, 513.5, 789 and 1244.5, respectively. These ‘total rank signs’ values clearly indicated that the methanol extract of *C. albidum* was the most suitable extract for inhibition of the growth of *C. albicans* (Table 5). All 5 leaf-extracts had differential activity in the control of the fungus, in the decreasing order: *C. albidum* > *S. nux-vomica* > *B. monosperma* > *A. mexicana* > *A. salvifolium*.

Table 1: Identification of fungus by correlation of microscopic and macroscopic features of the isolated fungus from patients

Identified fungi	Macroscopic features		Microscopic features
	Obverse	Reverse	
<i>Candida albicans</i>	White colored, convex, entire margin, non-mucoid and smooth textures of cream colored pasty colonies (Figures 20a, 20b)	White colored and smooth, shiny edged (Figure 20c)	Budding yeast cell showing germ tube (Figure 20d) Chlamydo spore formation in <i>C. albicans</i> (Figure 20e)
<i>Candida</i> sp.	Off- white and smooth, shiny edged cream pasty colonies (Figure. 21a)	White colored and smooth, shiny edged (Figure 21b)	Round-oval shaped budding cells (Figure 21c)

Table 2: Antifungal sensitivity pattern of *C. albicans*

Antifungal agents	Sensitive (%)	Resistant (%)	Zone diameter in mm		
			Sensitive	Intermediate	Resistance
Amphotericin B(AP)100	92	8	≥20	19-12	≤11
Clotrimazole (CC)10	53	47	≥20	21-15	≤14

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Fluconazole (FLC)25	16	84	≥22	21-12	≤11
Itraconazole (IT)10	21	79	≥10	21-15	≤14
Ketaconazole (KT)10	32	68	≥30	29-23	≤22
Nystatin (NS)100	18	82	≥20	19-12	≤11

Table 3: MIC range of the antifungals by E-strip

Antifungal agents	MIC range (µg/mL)
Amphotercin B(AP)100	0.25–1.0
Clotrimazole (CC)10	0.016-259
Fluconazole (FLC)25	0.12–.128
Itraconazole (IT)10	0.015–.8.0
Ketaconazole (KT)10	0.016-259
Nystatin (NS)100	0.12–.128

Note: MIC, minimum inhibitory concentration

Table 4: Inhibition zone size (mm) of 5 plant extracts against *C. albicans*

	PE	Chloroform	DM	EA	Acetone	Ethanol	Methanol	Water
<i>A. mexicana</i>	9(11)	10(12)	-(-)	10(12)	12(13)	10 (11)	12(14)	8(10)
<i>B. monosperma</i>	12 (14)	-(-)	9(12)	-(-)	13(13)	13(12)	12 (12)	13 (13)
<i>C. fistula</i>	-(-)	-(-)	9(13)	-(-)	12(14)	9(11)	11(13)	10(12)
<i>S. nux-vomica</i>	10(13)	12(14)	8(10)	10(12)	9(11)	11(13)	10(12)	9(11)
<i>C. albidum</i>	10(13)	12(14)	8(10)	10(12)	9(11)	11(13)	10(12)	9(11)

DISCUSSION

Increased incidence of fungal infections with underlying conditions, drug resistance and undesirable effects of available antifungals, studies have been focused on new antifungal compounds. Researchers have been interested on medicinal plants with bioactive compounds as they are natural products, less likely to be toxic and to develop drug resistance. The antimicrobial potential of this plant extracted in different solvents (e.g. aqueous, diethyl ether, ethyl acetate, dichloromethane, methanol, ethanol and chloroform) has been evaluated against different bacterial and fungal human pathogens. Variable activities of plant parts including flowers, leaves, pods, seeds, stem bark in different solvents has been reported¹⁶⁻¹⁹. MICs of different extracts of *C. fistula* were tested against fungi and the results revealed that ethyl acetate extract had highest activity²⁰. A Study²¹ showed highest inhibitory activity of the methanolic extract of stems followed

by flowers, pods and leaves. This study was supported by pre-vious studies of Lachumy¹¹ that *C. fistula* seed methanol extracts strongly inhibited *Candida* species. All the aqueous extracts showed less pronounced activity. It may be due to insufficient quantities of active compound in aqueous extracts. Polarity of the active compounds makes them readily extractable in organic solvents. The present study is the first to report the potentiality of this plant against fluconazole resistant *Candida* species. Earlier reports with scanning electron microscopic examination of *C. albicans* cells treated with *C. fistula* seed extract showed decrease in size, irregular cell walls, ruptured cell membranes, disrupting the permeability barrier of cell membrane, unclear periplasm and dense cytoplasm without differentiated features. Actually, the anticandidal action of *C. fistula* seed extract involves the initial membrane disruption followed by accumulation of extract in the plasma membrane resulting in cell death. *C. fistula* plant parts are known to be an important source of secondary metabolites,

notably poly phenolic compounds²¹. HPTLC studies confirmed the major component as gallic acid. Earlier studies reported anticandidal activity of gallic acid²¹. Conclusion Polyphenolic compounds from plants can be used as a viable alternative against *Candida* species especially against drug resistance strains for the effective management of candidiasis. The study further emphasis the need of virtual high throughput screening of these compounds by the way of molecular docking and QSAR studies against various drug targets of *Candida* spp. to find the effective antifungal agents.

CONCLUSIONS

Medicinal plants can be used as a viable alternative against *Candida* species especially against drug resistance strains for the effective management of candidiasis. The study further emphasis the need of virtual high throughput screening of these compounds by the way of molecular docking and QSAR studies against various drug targets of *Candida* spp. to find the effective antifungal agents.

Conflict of Interest: Nill

Source of Funding: Self

Ethical Clearance: Not required

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Surveillance of Ciprofloxacin Resistance Bacteria in Chronic Suppurative Otitis Media

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ABSTRACT

Background: To isolate causative bacteria and antibiotic sensitivity pattern for CSOM and confirmed with 16S rRNA for identification of bacteria. The ciprofloxacin resistant bacteria were identified with molecular markers.

Materials and Method: A total of 115 ear swabs of clinical suspected CSOM patients were cultured on specific cultured medium and identified the bacteria with both conventional and 16S rRNA methods. Then all the identified bacteria were subjected with specific antibiotics by the Kirby-Bauer's method to know the resistance pattern of antibiotics. With specific primers (molecular marker), we have identified the ciprofloxacin resistance bacteria.

Results: A total of 103 bacteria were isolated from 112 CSOM patients among them *P. aeruginosa* (29.17%), *Staphylococcus aureus* (22.40%), *A. baumannii*(13.80), *E. aerogenes*(18%), *C. freundii* (6.77%), *K. oxytoca* (6.25%), *P. vulgaris* (5.99%), *K. pneumoniae* (4.69%) and *P. mirabilis* (4%) were identified. From antibiotic disc diffusion methods 79.46% ESBL strains and 9.90% MBL strains were documented. Multidrug resistant strains of *P. aeruginosa* were more prevalent than those of *S. aureus* and other bacteria in ear discharges. The commonly used antibiotic ciprofloxacin was 55% resistant. The gene responsible for ciprofloxacin resistant gene were identified with synthesized molecular markers.

Conclusion: Continuous and periodic evaluation of microbiological profile and antimicrobial sensitivity pattern of bacterial is essential for optimum management of CSOM patients. Empirical use of antibiotic should not be practiced while prescribing drugs. PCR method should be implemented for early detection of ciprofloxacin resistance bacteria.

Keywords: Antibiotics, CSOM, MDR, Gram negative bacteria, Drug resistance

INTRODUCTION

Chronic suppurative otitis media (CSOM) is defined as a chronic inflammation of the middle ear and mastoid cavity, which presents with recurrent ear discharges or otorrhoea through a tympanic membrane perforation. The disease usually begins in childhood^{1,2} as a tympanic membrane perforation due to an acute infection of the middle ear, known as acute otitis media (AOM), or as a

sequel of less severe forms of otitis media (e.g. secretory OM)³⁻⁵. The infection may occur during the first 6 years of a child's life, with a peak around 2 years⁶. The point in time when AOM becomes CSOM is still controversial. Generally, patients with tympanic perforations

The sensitivity of bacterial detection in middle ear infections has been improved by PCR. It is useful for the detection of pathogens that are slowly growing, difficult to culture, or hazardous to handle in a diagnostic lab. In brief, the culture sensitivity method is a time consuming and required at least 3-5 days to give the report. But in the polymerase chain reaction, we can understand the resistance of ciprofloxacin with same day. After getting the result, the clinician may or may not prescribe these antibiotics^{7,8}.

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The aim of this study was to determine the microbial profile (aerobic a) and the antibiograms of active CSOM patients among the patients attending at IMS and SUM Hospital, Bhubaneswar. Also developed a molecular marker for early detection of the efficacy of ciprofloxacin with the clinico-microbiological profile of CSOM and to analyze the susceptibility pattern of the aerobic bacterial isolates, so that an antibiotic policy can be formulated for CSOM, for better patient management.

MATERIALS AND METHOD

The ear swabs from clinically diagnosed CSOM cases were collected, during July 2016 to June 2017 with sterile cotton swab sticks. Pus swabs were cultured on blood and MacConkey agar plates that were incubated at 37 ° C overnight for pathogenic bacteria, which were identified according to the standard method used for bacteria⁹. Antibiotic susceptibility tests of isolated bacteria were done according to Clinical Laboratory

Standard Institute guidelines was carried out as described earlier¹⁰. Standard antimicrobial disks (HiMedia, Mumbai) used for isolated bacteria were amikacin 30, gentamicin 30, ciprofloxacin, amoxycylav 30, aztreonam 30, piperacillin 100, piperacillin/tazobactam 100/10, cefepime 30, cefoperazone 75, cefoperazone/sulbactam 75/30, ceftazidime 10, ceftriaxone 10, imipenem 10, gatifloxacin 30, Oxacilin and Vancomycin. The standard MTCC strains and all the clinical isolated bacteria were subjected to antibiotic sensitivity tests with antibiotics, by the Kirby-Bauer's method (disk diffusion) detailed previously¹¹.

RESULT

There are different number of mixed and pure cultures are there while in 12(10.43%) specimens there are no growth. On gram staining, gram positive bacteria accounted for 58(50.4%) specimens and gram negative bacteria 43(37.3%) specimens (Table 1).

Table 1: Correlation between Gram stain and Culture

Culture		Gram positive bacteria	Gram negative bacteria	
Pure Culture	Count	58	43	101
	% of total	50.40%	37.30%	87.80%
Mixed Culture	Count	1	1	2
	% of total	0.80%	0.80%	1.73%
Number of No Growth is 12(10.43%)				
Total	Count	59	44	103
	% of total	51.30%	38.20%	89.50%

Bacterial findings were categorized into gram negative bacteria and gram positive bacteria. The most common gram negative bacteria are identified which included *Pseudomonas* 30(26.08%), *Proteus* species 04(3.47%) and *Citrobacter* 03(2.60%). The most common gram positive bacteria identified which included Coagulase negative staphylococcus 30(26.08%) and *Staphylococcus aureus* 16(13.9%). Other organisms were identified in small numbers.

Table 2: Gram positive bacteria isolated

Names	Frequency	Percentage
Coagulase Negative Staphylococcus(CONS)	30	26.08%
<i>Staphylococcus aureus</i>	16	13.90%
<i>Streptococcus</i>	6	5.21%
<i>Enterococcus</i>	3	2.60%
Gram positive bacillus	3	2.60%
Total	58	50.04%

These are the total 58(50.4%) numbers of Gram positive bacteria which are isolated from pure culture (Table 2).

Table 3: Gram negative bacteria isolated

Gram Negative Bacteria		
Name	Frequency	Percentage
<i>Pseudomonas</i>	30	26.08%
<i>Acenetobacter</i>	2	1.73%
<i>Proteus species</i>	4	3.47%
<i>C.freundii</i>	1	0.80%
<i>E.aeruginosa</i>	1	0.80%
<i>Salmonella species</i>	2	1.73%
<i>Citrobacter</i>	3	0.80%
<i>Total</i>	43	37.30%

These are the total 43(37.3%) Gram negative bacteria which are isolated from pure culture.

Mixed cultures are 2(1.73%) of total specimens collected. These are the mixtures of Gram negative bacteria *Pseudomonas* and Gram positive bacteria *Enterococcus (Pseudomonas + Enterococcus)* (Table 3).

Gram positive bacteria are identified through biochemical tests such as Catalase test, Coagulase test, Bile esculine test. These all tests have both positive and negative results which are mentioned with frequencies and percentage details in the Table 1 on the above.

Similarly Gram negative bacteria are identified through the biochemical tests like Oxydase, IMViC.

In case of Antibiotic Sensitivity Test (ABST) different antibiotics are used for Gram positive and Gram negative bacteria. These are detailed mentioned in the next Table 4 & Table 5.

Table 4: Antibiotic Sensitivity and Resistance result of Gram Negative Bacteria

Organisms	CIP	LE	GEN	AZM	IC	LZ	AK	CLR	AMC	COT	TGC	NX	TI	CL	TE	MO
<i>Pseudomonas</i>	14(12.1%)	12(10.4%)	8(6.9%)	12(10.4%)	15(13.04%)	11(9.5%)	13(11.3%)	0(0%)	10(8.6%)	10(8.6%)	17(14.7%)	7(6.08%)	0(0%)	0(0%)	3(2.6%)	8(6.9%)
<i>Acenetobacter</i>	1(0.8%)	2(1.73%)	0(0%)	1(0.8%)	1(0.8%)	1(0.8%)	1(0.8%)	0(0%)	0(0%)	0(0%)	2(1.73%)	2(1.73%)	1(0.8%)	1(0.8%)	1(0.8%)	2(1.73%)
<i>Proteus sp.</i>	2(1.73%)	2(1.73%)	1(0.8%)	3(2.60%)	3(2.60%)	2(1.73%)	2(1.73%)	3(2.60%)	3(2.60%)	1(0.8%)	1(0.8%)	2(1.73%)	2(1.73%)	4(3.47%)	0(0%)	1(0.8%)
<i>C.freundii</i>	1(0.8%)	0(0%)	0(0%)	1(0.8%)	0(0%)	0(0%)	0(0%)	0(0%)	1(0.8%)	1(0.8%)	1(0.8%)	0(0%)	0(0%)	0(0%)	1(0.8%)	0(0%)
<i>E.aeruginosa</i>	1(0.8%)	0(0%)	0(0%)	0(0%)	1(0.8%)	1(0.8%)	0(0%)	1(0.8%)	0(0%)	0(0%)	1(0.8%)	0(0%)	1(0.8%)	1(0.8%)	0(0%)	1(0.8%)
<i>E.aeruginosa</i>	1(0.8%)	1(0.8%)	1(0.8%)	2(1.73%)	1(0.8%)	1(0.8%)	1(0.8%)	0(0%)	0(0%)	0(0%)	2(1.73%)	2(1.73%)	1(0.8%)	1(0.8%)	1(0.8%)	0(0%)
<i>E.aeruginosa</i>	1(0.8%)	2(1.73%)	2(1.73%)	3(2.60%)	2(1.73%)	1(0.8%)	1(0.8%)	0(0%)	0(0%)	0(0%)	0(0%)	2(1.73%)	1(0.8%)	1(0.8%)	3(2.60%)	0(0%)

The details result of Antibiotic sensitivity and resistance of each Gram negative bacteria with percentage are mentioned here in the Table 4 on the above.

Table 5: Antibiotic Sensitivity and Resistance result of Gram Positive Bacteria

Organisms	CIP	C	AMC	OX	CXM	CX	GEN	CTX	NX	OF	P	AK	NV	NA	VA	AZM
<i>CONS</i>	16(13.9%)	12(10.4%)	13(11.3%)	12(10.4%)	15(13.04%)	11(9.5%)	13(11.3%)	0(0%)	15(13.04%)	10(8.6%)	18(15.6%)	7(6.08%)	0(0%)	0(0%)	3(2.6%)	0(0%)
<i>S.aureus</i>	8(6.95%)	7(6.08%)	12(10.4%)	5(4.3%)	6(5.2%)	8(6.95%)	9(7.8%)	0(0%)	0(0%)	10(8.6%)	3(2.6%)	0(0%)	0(0%)	16(13.9%)	4(3.4%)	0(0%)
<i>Streptococcus</i>	2(1.73%)	2(1.73%)	0(0%)	0(0%)	0(0%)	6(5.2%)	3(2.6%)	1(0.8%)	4(3.4%)	5(4.3%)	4(3.4%)	0(0%)	0(0%)	6(5.2%)	0(0%)	0(0%)
<i>Enterococcus</i>	1(0.8%)	1(0.8%)	0(0%)	3(2.60%)	2(1.73%)	0(0%)	1(0.8%)	0(0%)	0(0%)	0(0%)	0(0%)	2(1.73%)	1(0.8%)	1(0.8%)	3(2.60%)	2(1.73%)

Similarly the details result of Antibiotic sensitivity and resistance of each Gram positive bacteria with percentage are mentioned here in the Table 5 on the above.

Now the lists of Ciprofloxacin resistance bacteria are mentioned in the next Table 6.

Table 6: Lists of Ciprofloxacin Resistance Bacteria

Organisms	Total Frequency of CIP resistance Organism	% of Total Frequency	Frequency of Resistance	% of Frequency of Resistance
CONS	30	26.08%	16	13.91%
S.aureus	16	13.91%	8	6.95%
Streptococcus	6	5.21%	2	1.73%
Enterococcus	3	2.60%	1	0.86%
TOTAL	55	47.82%	27	23.47%

The details result of Ciprofloxacin resistance bacteria with their frequencies and percentages are mentioned in the above Table 8. Here all the Ciprofloxacin resistance organisms are Gram positive bacteria. That means in this experiment the gram positive bacteria are well resulted as Ciprofloxacin resistance organisms. According to the table from total 55(47.82%) Gram positive bacteria 27(23.47%) are Ciprofloxacin resistance organisms. Their individual frequency and percentage are mentioned above in the Table 6.

DISCUSSION

CSOM is formed by chronic inflammation of the middle ear and mastoid mucosa in which the tympanic membrane intactness (perforation or tympanostomy tube) was disturbed and otorrhea is usually present¹². However there is no consensus about the duration of the symptoms. CSOM in some studies is described as otorrhea through a perforated tympanic membrane continuing for at least 2 weeks, whereas other studies accept this period lasting for 2-6 weeks. It is thought that CSOM develop after an unsuccessfully treated acute otitis media infection¹³. Dysfunction of the eustachian tubes and bacterial infection are the most relevant pathogenic factors for CSOM. The correct choice of antibiotics is essential for treatment, but the recent misuse and overuse of antibiotics has induced changes in predominant bacterial species and their susceptibility to antibiotics, making it more difficult to manage CSOM. It is nowadays common for an otologist to see discharging ears, whose bacterial flora have already been modified by prior antibiotic therapy leading often to sterile culture and hence treatment becomes a problem. This may be because of microbial resistance to these antibiotics

thereby suggesting their failure leading to continuation of purulent discharge in the discharging ear. It is hence important to know what type of bacteria taking part in event of suppuration so that appropriate antibiotics may be instituted early and effectively to prevent complications. Chronic otitis media is generally of long duration with repeated active inflammation. Thus, repeat empirical prescription of antibiotics over a long period of time can induce multidrug-resistant strains. Frequent local treatment during repetitive active inflammation also causes the spread of resistant strains from hospital to patients and vice versa. In our case, the patient also suffered from CSOM. Moreover recurrent CSOM is due to one or a combination of several factors¹⁴.

Analysis of the total 115 specimens collected revealed that pure and mixed culture growth were obtained in numbers of 103(89.56%) each while in 12(10.43%) specimens there was no growth. Figures reported by other authors vary significantly where pure cultures were isolated in more patients than mixed cultures. It is mostly seen that aerobic gram negative rods outnumber gram positive cocci organisms in COM as reported by some authors which is comparable to the findings in the present study where gram negative rods accounted for 43(37.39%) and gram positive cocci 55(47.82%) and gram positive bacillus 3(2.60%) which are included in gram positive cocci but not resulted as Ciprofloxacin resistance bacteria. So, these are considered as CIP resistance organisms.

CONCLUSION

CSOM is a common clinical entity where topical and systemic antibiotic are the main treatment. However the emergence of antibiotic resistant strains

is leading to increasing treatment failure. MDR strains of *P. aeruginosa* and MRSA were most prevalent in ear discharges of patients with CSOM. Continuous and periodic evaluation of microbiological profile and antimicrobial sensitivity pattern of bacterial is essential for optimum management of CSOM patients. For early detection of ciprofloxacin resistant from CSOM, the PCR method with corresponding antibiotic gene resistant primers should be implemented.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

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Oral Benign Fibrous Histiocytoma: Immunohistochemical Study of Two Cases

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ABSTRACT

Fibrous histiocytoma is a benign soft tissue tumour that may present as a fibrous mass anywhere in the human body. The involvement of the oral cavity is extremely rare and very few cases have been reported in literature till date. We here report two cases of benign fibrous histiocytoma, one being present in gingiva and other in labial mucosa. Immunohistochemical evaluation of CD 68, CD 163 and S-100 are done to understand the pathogenesis of benign fibrous histiocytoma. The clinical, histopathological and immunohistochemical features of both cases are discussed precisely in the light of literature review.

Keywords: Oral benign fibrous histiocytoma, s100, CD 163, CD68

INTRODUCTION

Fibrous histiocytoma is a benign soft tissue tumour arising as a fibrous mass everywhere in the human body. The involvement of the oral cavity is rare. Fibrous histiocytoma can present as malignant fibrous histiocytoma or benign fibrous histiocytoma BFH and may involve soft tissue as well as bony hard tissue. The sites reported to be commonly affected by this tumour are: upper and lower limbs, orbit, retro peritoneum, pelvis, knee, head and neck¹. BFH is recently included in the so-called "fibrohistiocytic tumours of the soft tissues" that are divided into cutaneous and non-cutaneous types, and in the "fibrohistiocytic tumours of the bone"²⁻⁴. Although BFH is reported to occur at any age there is a greater predominance in male adults (2.5:1). It has been reported in males older than 25 years and with a mean age of 40

years. Oral BFH, in most cases present as painless solitary tumour, slowly enlarging, from 2 to 3 cm up to more than 10 cm, over a period of several months^{2,5,6}. Dysphagia, dyspnoea are most common symptoms with large lesions. Dysarthria is another symptom particularly when the lesion is located in the tongue. The treatment of choice to oral BFH is en-block surgical excision. The prognosis is good and the oral BFH recurs in cases with incomplete excision. There has been not a single reported case of metastasis of the oral BFH. However, a regular period of clinical follow-up is always recommended^{6,8}. The purpose of this article is to describe the clinical and microscopic appearance of two cases of BFH occurring in the oral cavity, focusing on the immunohistochemical profile.

Case 1: A 23-year-old female reported with a chief complaint of swelling in the right lower back teeth region. History revealed that patient was apparently alright 2 months back when she noticed a swelling in the same region. There was history of pain in the associated area. Her past medical and family history was non-contributory. Extra-orally, no abnormality was noticed. On intraoral examination mucosa over the alveolar ridge was normal in color and texture. On palpation, a soft tender swelling measuring approximately 1 cm × 1 cm was evident on the right side vestibule near to mental foramen region. Based on the nature of the swelling, located in posterior mandible, conditions

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such as neurofibroma, irritation fibroma and BFH were considered in our differential diagnosis. The patient was operated under local anesthesia and the growth was excised using intraoral approach. Gross examination of the specimen revealed well encapsulated mass with areas of firm but non-mineralized yellow tan tissue.

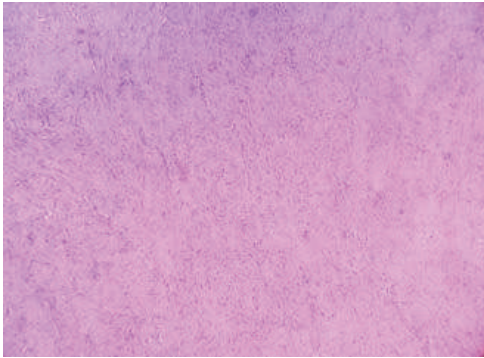


Figure 1: Hematoxylin eosin stained image (10x) showing dense collagen fibres, spindle shaped fibroblasts, histiocytes and minimal inflammatory cells

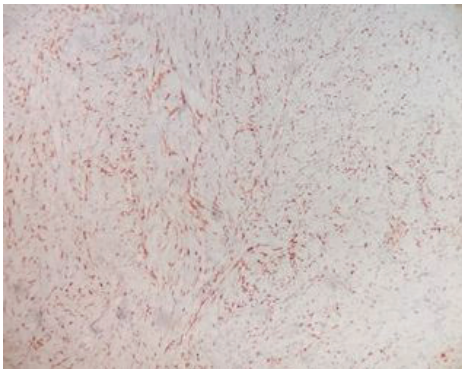


Figure 2: Positive immunoeexpression of CD163



Figure 3: Negative immunoeexpression of S-100

The microscopic examination (Figure 1) revealed a well circumscribed lesional tissue predominantly composed of two cell population such as actively proliferating plump fibroblasts arranged in the form of streaming fascicles and islands of histiocytes. Occasional mitotic figures of fibroblasts were seen. Multiple endothelial cells lined branched blood vessels were

also seen in the given tissue. Few spindle shaped cells resembling neurites were seen in the stroma. Areas of hyalinization were noticed in the given section. Normal looking muscle fibers and nerve bundles were also evident in the given tissue. Minimal chronic inflammatory cells were noticed in the given section. The histopathological features were suggestive of BFH, Nodular fasciitis, neurofibroma etc. Immunohistochemical staining showed positive CD163 (Figure 2) and negative S100 (Figure 3) cells in the lesional tissue. The final diagnosis of benign fibrous histiocytoma was made. The patient has been followed up periodically, but no recurrence or other changes were noted for 6 months.

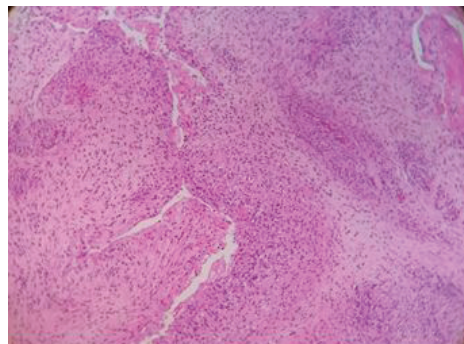


Figure 4: Hematoxylin eosin stained image (10x) showing dense collagen fibres, spindle shaped fibroblasts, histiocytes and minimal inflammatory cells

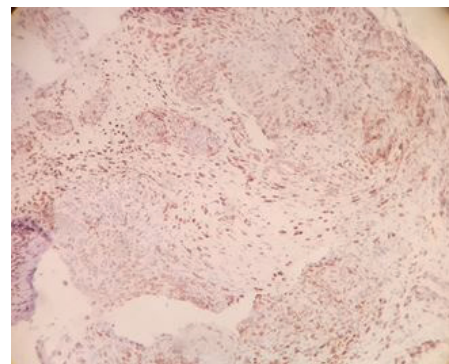


Figure 5: positive immunoeexpression of CD 68



Figure 6: Negative immunoeexpression of S-100

Case 2: 23 year male reported with chief complaint of growth in the lower lip since 8 months. He was apparently well until he developed a mucosal growth on lower lip which slowly increases in size to reach the present size. The growth was grey in colour and non-tender on palpation. Histopathologically the lesion revealed parakeratinized stratified squamous epithelium beneath which moderate to dense collagenous connective tissue stroma is seen. The connective tissue stroma shows diffusely arranged spindle shaped cells resembling neurites and round cells resembling histiocytes. Occasional storiform arrangement of spindle cells is noticed. Foamy histiocytes are also seen in focal areas. Diffusely arranged minimal amount of chronic inflammatory cells are arranged in the connective tissue stroma (Figure 4). Areas of myxoid changes and hyalinization are seen. Immunohistochemical staining showed positive CD 68 (Figure 5) and negative S100 cells (Figure 6) in the lesional tissue. A final diagnosis of benign fibrous Histiocytoma was made.

DISCUSSION

Until recently the term fibrous histiocytoma (FH) referred to both benign and malignant neoplasms. The differential diagnosis between the two entities was often difficult⁹. Although retained in the 2002 WHO classification of soft tissue tumours, it has long been recognised that these tumours have no relationship to true histiocytes¹⁰. The benign fibrous histiocytoma has a controversial diagnosis because of its uncertain histogenesis^{3,8,9}. The biphasic cell population of histiocytes and fibroblasts¹¹ are the most obvious microscopic feature of BFH. Resemblance of mesenchymal cells in BFH to myofibroblasts, primitive mesenchymal cells, and cells having intermediate or mixed features is noticed in few cases. The presence of a homogeneous population of fibroblast-like cells has also been described³. Both of our cases showed biphasic population with predominance of Histiocytic cells in first case and predominance of fibroblast-like spindle cells in second case. Multinucleated giant cells, abundant vascularity, and inflammatory infiltrate³ are other associated microscopic features previously described in literature though both of our cases did not show any of these. The main differential diagnosis of oral BFH includes nodular fasciitis, solitary fibrous tumour (SFT), neurofibroma (NF), and dermatofibroma (DF)¹². CD34 positivity is a useful aid for distinction between BFH and SFT, the former reported as usually

negative¹³. Differentiation between BFH and NF can be based on S-100 positivity, more frequent mitoses and different fascicle configuration for the latter¹²⁻¹⁴. BFH and DF show similar immunoreactivity^{12,15}. Distinction between cellular fibrous histiocytomas (FHs) with a deep component and dermatofibrosarcoma protuberans (DFSPs) can pose diagnostic problems. While CD68, CD34, and Factor XIIIa are helpful in distinguishing between these entities, none are diagnostically absolute. CD163 expression was found to be helpful in distinguishing between BFH and DFSPs¹⁶ which made us to evaluate CD163 immunoreexpression in the first case. The negativity for SMA and S-100 could differentiate the lesion from leiomyosarcoma and neurogenic tumours¹⁷.

Due to lack of specific markers for fibrohistiocytic lesions, the diagnosis of BFH is generally based on the absence of markers for cells of other lineages⁴. Immunohistochemical staining and ultrastructural examination of the tumours and cell lines derived from them has revealed features of myoblastic and histiocytic differentiation as evidence of mesenchymal origin⁴. Immunostaining for CD68 can be found in any tumour-containing lysosomal granules or phagolysosomes as in our case⁴. Factor XIIIa has occasionally been reported for BFH²⁸.

In the present study, the diagnosis was confirmed using immunostaining for vimentin CD68 (+) and S-100 (-) in one case whereas CD 163 (+) and S-100 (-) in another case.

Complete resection of tumour is the only treatment of choice for BFH with an excellent prognosis and nil recurrence rate¹⁵⁻¹⁸. Fewer than 5% of cutaneous fibrous histiocytomas recur following local excision whereas most reported cases of oral BFH featured no recurrences¹⁹ and no metastatic potential¹⁵⁻¹⁸.

CONCLUSION

Knowledge of such rare cases is necessary to broaden the horizon of diagnostic ability of pathologists as well as surgeons.

Conflict of Interest: None

Source of Funding: Self-funded

Ethical Clearance: The ethical clearance was obtained from Institutional Ethics committee, Institute of Medical science and SUM Hospital, Bhubaneswar, Odisha.

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Hyperplasia of the Mandibular Condyle: A Rarity

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ABSTRACT

Unilateral condylar hyperplasia (UCH) is one of the uncommon developmental disorders that affect the mandible. It is a disorder of unknown aetiology, generally unilateral and as the condyle is the growth centre for the antero-posterior growth of the mandible, it results in facial asymmetry and disfigurement. Although self-limiting the facial deformity may be extensive and even cause functional problems, hence the growth centre needs to be removed by partial condylectomy with the correction of the facial asymmetry by a combination of orthodontics and orthognathic surgery. We present a case of UCH in a 20-year-old male patient who had facial asymmetry and malocclusion and was treated with surgical excision of the hyperplastic condyle.

Keywords: condylar enlargement, developmental disorder, facial deformity, malocclusion.

INTRODUCTION

Hyperplasia of the mandibular condyle is a clinical condition of over-growth and development due to excessive uncoordinated cellular growth of one condyle of the mandible, causing facial asymmetry, mandibular deviation or deformity and condylar enlargement. In addition, an elongated condylar neck leads to articular dysfunction and malocclusion¹. Posterior open bite and occlusal slanting are the other important features of unilateral condylar hyperplasia (UCH). Since the condyle serves as a growth centre for the antero-posterior growth of the mandible and hence the face, with time the facial asymmetry and functional disturbances increase². This condition has to be differentiated from condylar neoplasm and facial hemihypertrophy, in both of which such facial asymmetry is observed. A rare case of UCH has been presented for documentation.

Case Report: A 19-year-old male patient reported to the dental hospital with swelling on the right side of the face since 6 years. History revealed the patient noticed a painless swelling on the right side of the face which has been gradually increasing in size. The swelling was not associated with toothache or any discharge. There was no history of trauma, any systemic diseases, infection, or surgery of the face and jaws. His medical, surgical, dental and family histories were non-contributory.

On examination diffuse swelling was seen in the sub-masseteric region and facial deformity was observed on the right side of the face with a prognathic mandible with a convex facial profile. [Figure 1a & b] Examination of the temporomandibular joint revealed swelling in the right TMJ with hypo-mobility. Intra-oral examination revealed class III molar relationship with anterior cross-bite.



Figure 1: A 19 year old male patient with swelling and facial asymmetry on the right side of the face, frontal view (1a) and profile view (1b)

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A clinical diagnosis of Skeletal Class III with malocclusion was made. In the differential diagnosis Condylar Hyperplasia, Hemifacial Hypertrophy and Osteochondroma were considered.

INVESTIGATIONS

- Postero-Anterior view of mandible showed enlarged right mandibular condyle with deviation of mandibular midline towards the left side. [Figure 2a]

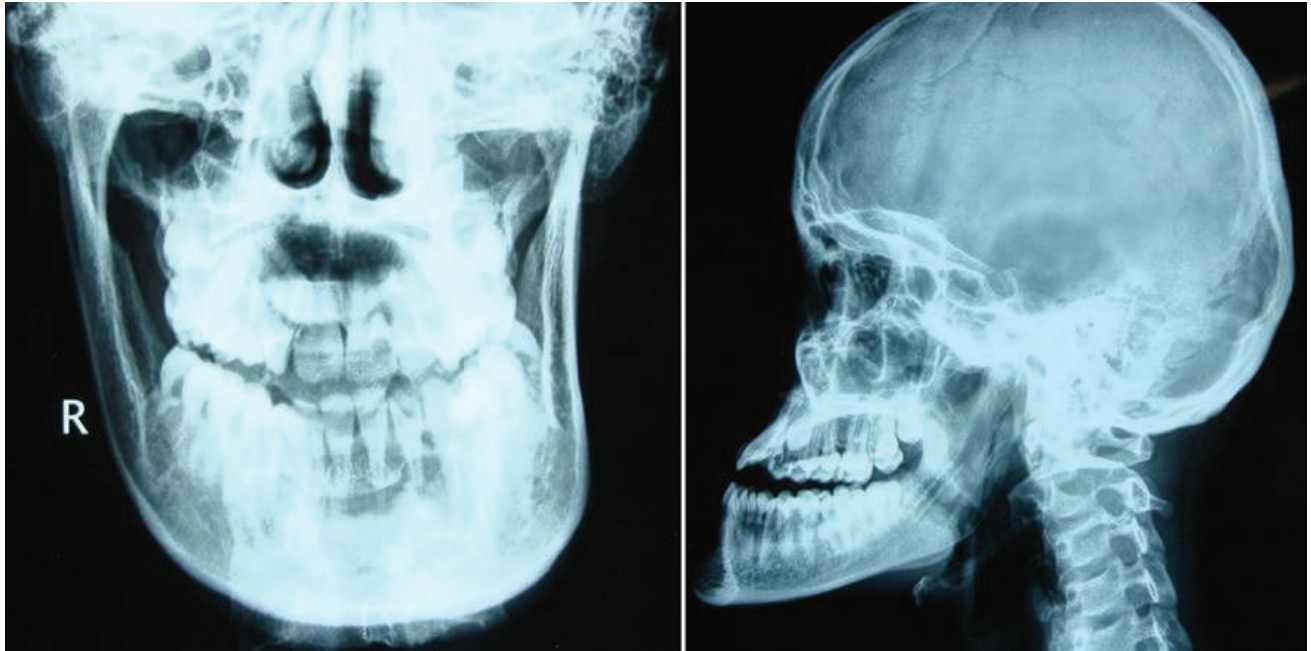


Figure 2: PA view of mandible showing enlarged condyle on right side with deviation of mandible towards contralateral side. (2a) Lateral view of skull showing a prognathic mandible with a concave facial profile. (2b)

- Lateral skull view revealed prognathic mandible and concave profile. [Figure 2b]
- Panoramic radiograph showed enlarged condyle on the right side with deformity in the right body of the mandible. [Figure 3]

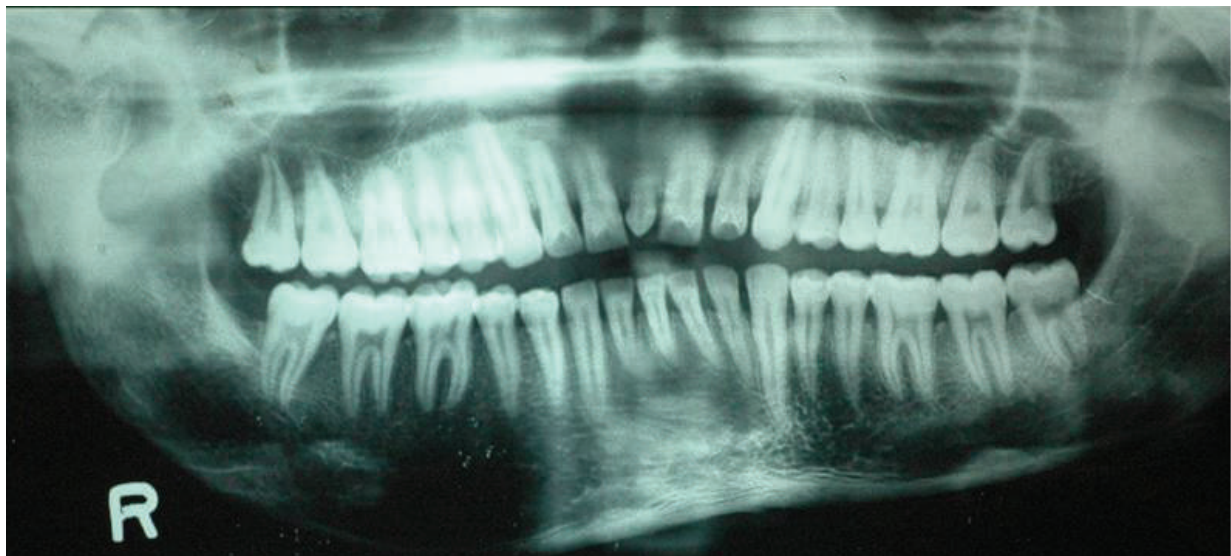


Figure 3: Panoramic radiograph showing an enlarged mandibular condyle on the right side with bending of the body of mandible with downward growth

- Contrast enhanced computed tomography scan (CECT) coronal section revealed enlarged irregularly shaped right mandibular condyle. [Figure 4]

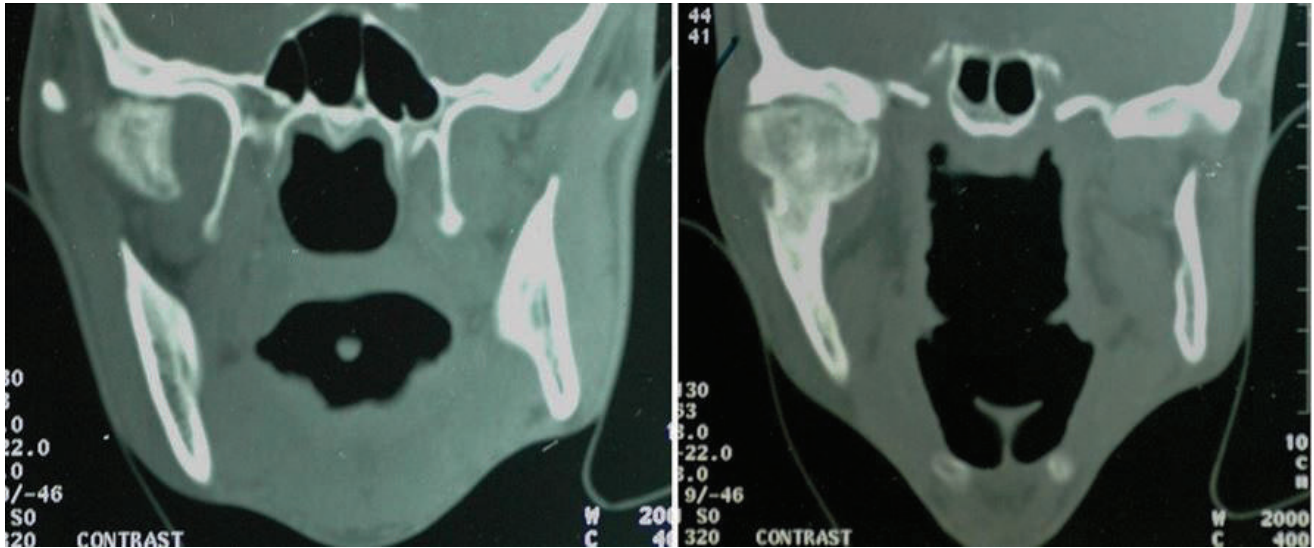


Figure 4: CECT scan of mandible, coronal section shows enlarged irregularly shaped left mandibular condyle with elongation and widening of the neck of the condyle

- Bone Scintigraphy revealed a hot spot in the right mandibular condyle. [Figure 5]

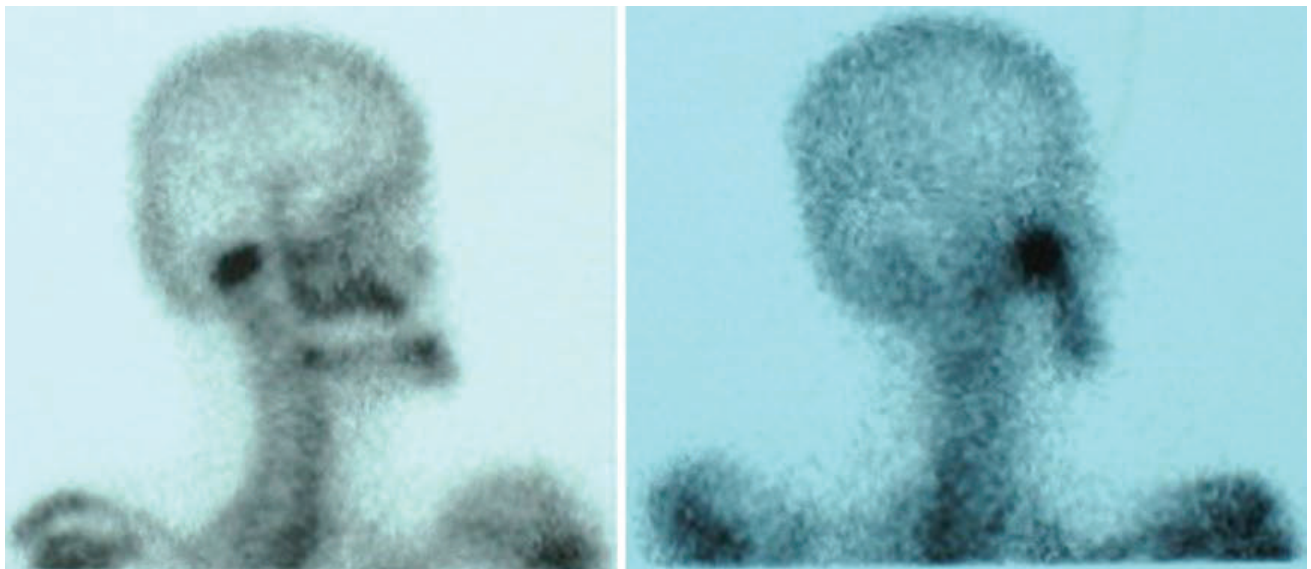


Figure 5: Bone scan (99Tc) of the face showing hotspot with increased radiotracer uptake in the right mandibular condyle

- Histopathologic evaluation of the excised mass revealed numerous cartilage cells with the bony trabeculae.

Treatment and Follow up: Partial condylectomy was done on the right side under general anaesthesia. The patient had been followed up 2 weeks after surgery and there was uneventful healing. [Figure 6] The patient is still undergoing orthodontic treatment.



Figure 6: Post-operative frontal (6a) and profile (6b) pictures of the patient following condylectomy of the right side

DISCUSSION

Unilateral Condylar Hyperplasia (UCH) is a rare developmental malformation in which there is a discrepancy in size and morphology of one of the mandibular condyles¹. This disorder occurs in the second and third decades of life and there is no side or gender predilection.² Due to the unilateral growth of the condyle there is elongation of the face towards the affected side with deviation of the chin to the contralateral side. UCH of the mandible leads to facial asymmetry, deviation, malocclusion and articular dysfunction. The aetiology of this disorder is debatable, with trauma, regional vascular stasis, endocrine disturbances, arthrosis have been proposed by various authors.²⁻⁴ UCH progresses as long there is growth and may be self-limiting with the growth of the individual.

UCH of the TMJ is an unusual condition first described by Adams in 1836 as overgrowth of the mandibular condyle which is not observed in other joints in the body.⁴ Since the condylar cartilage persists in adulthood, under some unknown stimulus it produces cartilage and it is ossified to form bone.⁵ UCH is considered a developmental disorder of the mandibular condyle which results in facial asymmetry when the hyperplasia occurs during the growth period and derangement of occlusion when the growth of the mandible is over. Hence it is both an aesthetic as well as functional disorder.

The aetio-pathogenesis of UCH is unknown. Different theories have been propounded, intrinsic and extrinsic factors have been considered. The condyle is the primary growth centre responsible for the antero-posterior growth of the mandible and chondrogenesis/osteogenesis in the periosteum covering the head of the condyle may occur due to trauma, local vascular disturbances, hormonal changes, abnormal loading and cartilaginous exostosis.⁶⁻⁹

Based on the clinical and radiographic features Obwegeser and Makak classified UCH into 3 types:

1. Hemimandibular hyperplasia (HH), it includes enlargement of condyle, condylar neck, ramus and body with tilting of the occlusal plane
2. Hemimandibular elongation (HE), it includes, condylar neck enlargement and variable displacement of the ramus and body without tilting the occlusal plane

3. Condylar hyperplasia (CH) of condyle alone.⁴

In CH, condylar enlargement, elongation of the neck of the condyle, on the ipsilateral side outward bending and downward growth of the body of mandible causing swelling and flattening of the face contra laterally are observed.¹⁰ There is slanting of the occlusal plane if the deformity occurs before the active growth phase of the individual as in the present case and posterior open bite if the abnormality occurs after puberty.

PA view of skull or mandible, panoramic radiography and lateral skull radiographs are the initial diagnostic radiographic procedures. CT scan helps to delineate the exact extent of the deformity in all aspects. To evaluate whether the condyle is still in active growth phase which is of paramount importance in surgical planning bone scan is performed as it is a non-invasive functional imaging technique which uses ⁹⁹Technetium phosphate radio-isotope. It identifies the active growth centre in the condyle if any.¹¹ Histological evaluation of the excised mass generally is used to exclude condylar neoplasms. Generally widening of the articular fibrocartilage with highly vascularized proliferation of large cartilage cells near the bony trabeculae are observed in CH.¹²

The treatment is surgical and is based on the bone growth. If there is no active growth centre in the condyle bilateral sagittal split osteotomies (BSSO) of the mandible are performed with or without a Le Fort I osteotomy of the maxilla depending on the maxillary compensatory growth.¹³ But if the growth was active like in the present case, the growth centre is removed by a high condylectomy.¹⁴

Conflict of Interest: None

Source of Funding: Self-funded

Ethical Clearance: The ethical clearance was obtained from Institutional Human Ethics committee, Institute of Medical science and SUM Hospital, Bhubaneswar, Odisha.

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Adenoid Cystic Carcinoma of the Hard Palate: A Case Report

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ABSTRACT

Adenoid cystic carcinoma (ACC) is an uncommon epithelial malignancy of the salivary glands that exhibit indolent growth and loco-regional invasion with recurrences observed after many years from the initial diagnosis. All salivary glands are affected, but the common site is the hard palate which is detected late with metastasis into the maxillary antrum or peri-neural invasion. Histologically it is classified into 3 types cribriform, tubular and solid; the solid type generally has a poor prognosis as compared to the other two varieties of adenoid cystic carcinoma. The treatment of choice is surgical excision with wide surgical margins followed by radiotherapy.

Keywords: *Indolent lesion, peri-neural invasion, salivary gland malignancy.*

INTRODUCTION

The Adenoid cystic carcinoma is a relatively uncommon epithelial malignancy of the salivary glands comprising of about a tenth of all salivary gland neoplasms and about 1% of all malignancies in the head and neck region. It is usually seen in elderly patients with a slight female gender predilection.¹ The disease is characterised by slow progression, local invasion, peri-neural spread leading to distant metastasis and is associated with high recurrence rates after surgery.² A case of adenoid cystic carcinoma of the hard palate is presented here for documentation.

Case Report: A 45 year old male patient reported to the dental hospital with the chief complaint of swelling and bleeding since 4 months. History revealed that the patient noticed a small swelling in the left side of the upper jaw which gradually grew in size and there was pain and nasal fullness/stuffiness since the past 2 months with bleeding from region of the swelling since 15 days.

Extra-oral examination revealed a single diffuse swelling on the left side of the face, measuring about 3x5 cm in size, ovoid in shape with ill-defined borders with mild tenderness elicited on palpation. Intra-orally diffuse swelling was seen on the left side of the maxilla, irregular in shape, of the oral mucosal colour, measuring about 3x5 cm in size, with a sinus having sanguineous discharge. The swelling was warm to touch with moderate tenderness on palpation, smooth surfaced, diffuse edges with tenderness in the surrounding bone. The base was sessile, the swelling was firm in consistency and attached to the underlying bone.

Correlating the history and clinical features a clinical provisional diagnosis of malignant growth left maxilla was made. Further Squamous cell carcinoma palate, Maxillary antral carcinoma, Muco-epidermoid carcinoma and Adenoid cystic carcinoma were considered in the differential diagnosis.

The following investigations were advised to come to a final diagnosis:

- Periapical & Occlusal Radiograph: Periapical and maxillary occlusal radiographs reveal obliteration haziness of maxillary antrum with indistinct floor of the antrum and destruction at some areas.
- Panoramic Radiograph: Panoramic radiograph reveals destruction of the antral floor and haziness in the antrum

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- Occipitontental Radiograph: Paranasal Sinus radiograph reveals obliteration haziness of maxillary antrum with indistinct floor of the antrum and extensive destruction of the antrum including the orbital floor.
- Contrast Enhanced Computed Tomography Scan: Axial view of contrast enhanced CT scan reveals an irregular soft tissue lesion occupying the left maxillary antrum, causing expansion in the antrum with erosions in its walls. There is extension of the soft tissue mass into the pre maxillary space, left nasal cavity, left buccal and retromaxillary spaces. Sagittal view of contrast enhanced CT scan reveals an irregular soft tissue lesion occupying the left maxillary antrum, causing expansion in the antrum with erosions in its walls. Coronal view of contrast enhanced CT scan reveals an irregular soft tissue lesion occupying the left maxillary antrum, causing expansion in the antrum with erosions in its walls. There is extension of the soft tissue mass into the pre maxillary space, left nasal cavity, left buccal and retromaxillary spaces, features suggestive of carcinoma maxillary antrum.
- Histopathologic study with Hematoxylin-Eosin staining shows predominantly tubular pattern of tumour cells. (10x) Tumour cells are seen merging into the superficial stratified squamous epithelium. (10X) At high power (40x) Isomorphic darkly stained tumor cells showing a predominantly cribriform pattern containing a basophilic mucoid material. The patient was finally diagnosed with adenoid cystic carcinoma left side of the hard palate.

The treatment plan included left hemi maxillectomy and radiotherapy.



Figure 1: Diffuse swelling is seen on the left side of the face.



Figure 2: Swelling obliterating the buccal sulcus in the left maxillary premolar-molar region



Figure 3: Sero-sanguinous discharge from the intra-oral swelling.

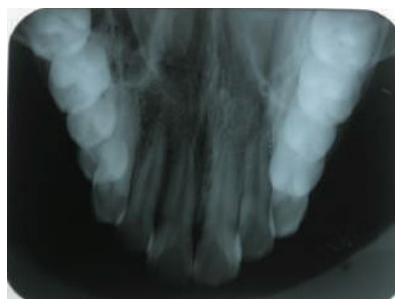


Figure 4: Maxillary occlusal radiographs reveal obliteration haziness of maxillary antrum with indistinct floor of the antrum and destruction at some areas



Figure 5: Occipitontental Radiograph: Paranasal Sinus radiograph reveals obliteration haziness of maxillary antrum with indistinct floor of the antrum and extensive destruction of the antrum including the orbital floor



Figure 6: Panoramic Radiograph: Panoramic radiograph reveals destruction of the antral floor and haziness in the antrum

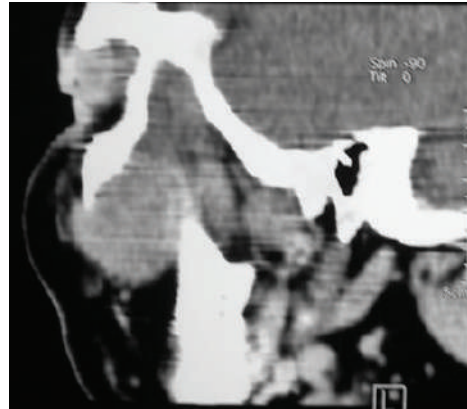


Figure 7: Sagittal view of contrast enhanced CT scan reveals an irregular soft tissue lesion occupying the left maxillary antrum, causing expansion in the antrum with erosions in its walls

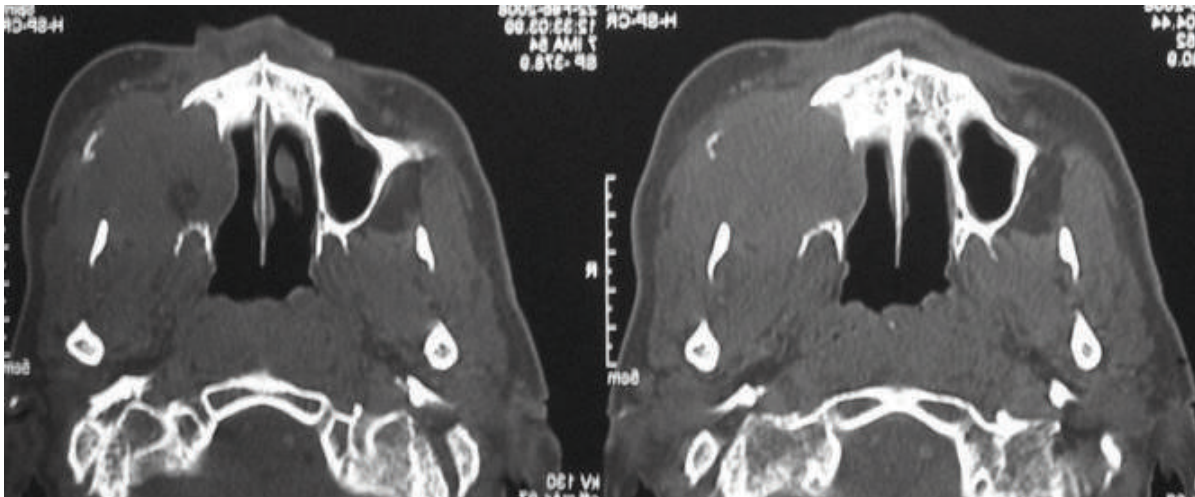


Figure 8: Axial view of contrast enhanced CT scan reveals an irregular soft tissue lesion occupying the left maxillary antrum, causing expansion in the antrum with erosions in its walls. There is extension of the soft tissue mass into the pre maxillary space, left nasal cavity, left buccal and retromaxillary spaces

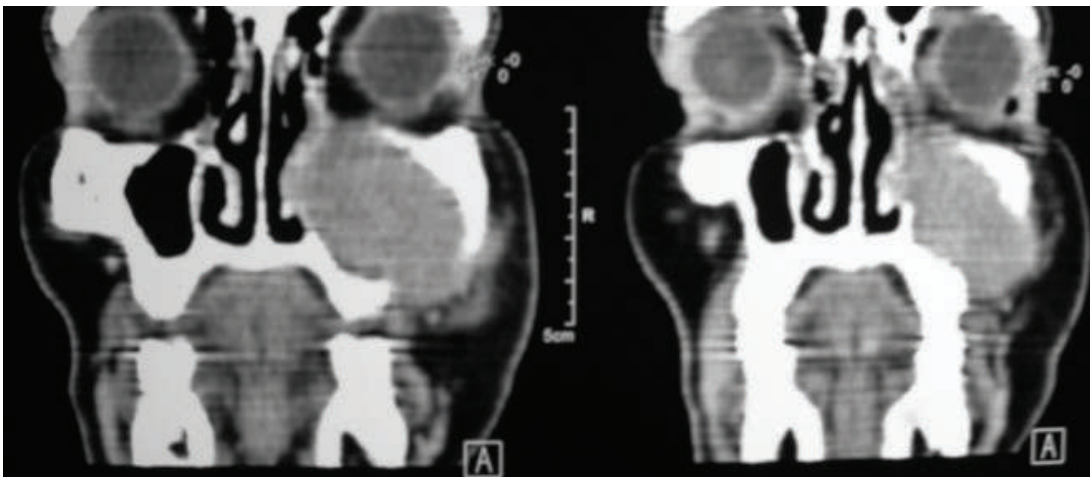


Figure 9: Coronal view of contrast enhanced CT scan reveals an irregular soft tissue lesion occupying the left maxillary antrum, causing expansion in the antrum with erosions in its walls. There is extension of the soft tissue mass into the pre maxillary space, left nasal cavity, left buccal and retromaxillary spaces

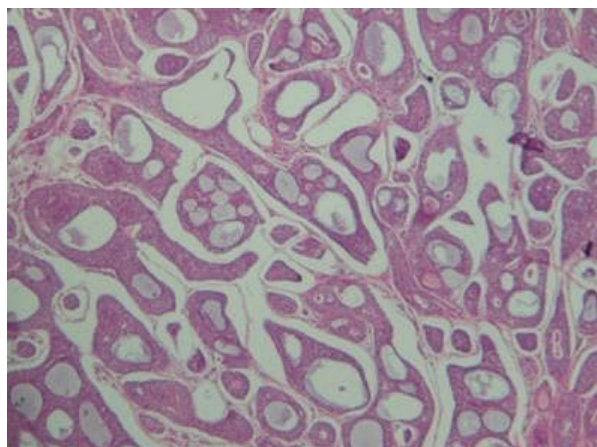
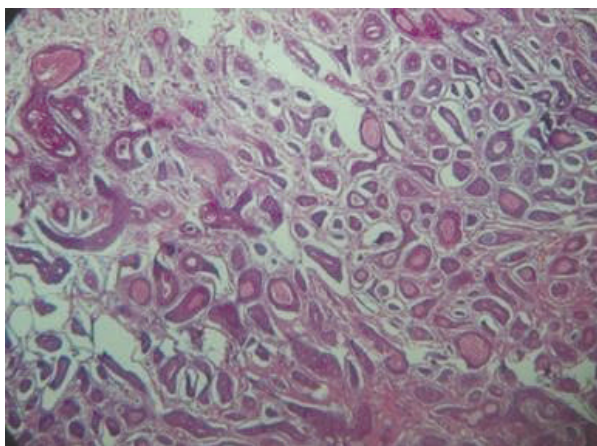
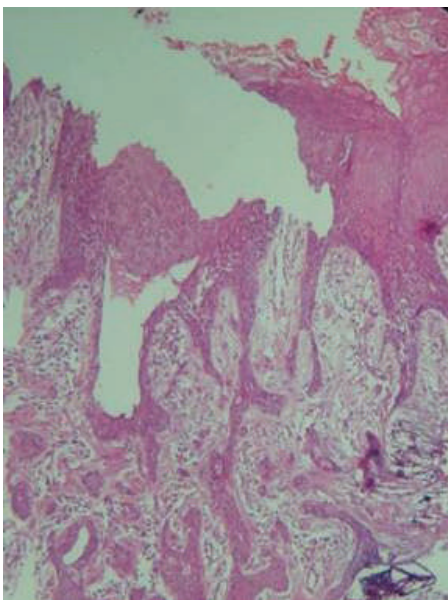


Figure 10 a,b,c : Histopathologic study with Hematoxylin-Eosin staining shows predominantly tubular pattern of tumour cells. (10x) [a] Tumour cells are seen merging into the superficial stratified squamous epithelium. (10X)[b] At high power (40x) Isomorphic darkly stained tumor cells showing a predominantly cribriform pattern containing a basophilic mucoid material[c]

DISCUSSION

ACC was first described in 1853 by Robin and Laboulbene and then named ‘cylindroma’ by Billroth in 1856.^{3,4} Now it is characteristically an aggressive malignant epithelial tumour which is slow growing, spreading through peri-neural invasion and known for its local recurrence and ability to metastasize to distant sites.⁵ The World Health Organization has defined ACC as a “basaloid tumor consisting of epithelial and myoepithelial cells in various morphological configurations, including tubular, cribriform and solid patterns, having a relentless clinical course and commonly fatal outcome.”⁶

ACC accounts for about 5-10% of all salivary gland tumours, which in turn represent for 2-4% of all head and neck malignancies.⁷ The minor salivary glands of the posterior hard palate are the most common site of occurrence followed by the submandibular gland and parotid gland. It has no pathognomonic clinical features and an asymptomatic slow growing swelling is the most frequent presentation.⁸ The surface may be smooth or ulcerated and the consistency is usually firm, sometimes mimicking a cyst. Pain or paraesthesia may be associated and serve as a warning sign for peri-neural invasion. While the regional lymph node metastasis is rarely encountered, distant metastasis is seen, especially in recurrent cases, with the lungs as a common site of occurrence.⁹ The minor salivary glands carry a poorer prognosis as compared to major salivary glands as peri-neural spread as well as distant metastasis is a common occurrence in the former.¹⁰

Imaging plays a vital role in detection of the spread and magnetic resonance imaging (MRI) or a contrast enhanced computed tomography (CECT) scan is indicated specially to detect the extent and spread of the disease to aid in wide surgical excision to prevent recurrence.¹¹

Histologically, three variants of ACC have been described: cribriform, tubular and solid. The most frequent histologic pattern is the cribriform one and has been described conventionally as Swiss cheese appearance.¹² Peri-neural invasion through the cranial nerves, necrosis and peri-vascular invasion can be seen and serve as predictor for recurrence/ survival.¹³

The treatment of ACC depends on its extent at the time of detection and ranges from wide surgical

resection, radiotherapy, chemotherapy or a combination of all of these. The patients are kept on long term follow up owing to the high rates of recurrence.¹⁴

CONCLUSION

An inconspicuous, slow growing, firm swelling on the palate should be thoroughly investigated with ACC in the differential diagnosis owing to propensity of occurrence in that site and possible peri-neural spread to distant sites. Hence an early diagnosis ensures prompt surgical treatment and a favourable prognosis before local spread of the disease, thereby reducing the morbidity and mortality associated with it.

Conflict of Interest: None

Source of Funding: Self-funded

Ethical Clearance: The ethical clearance was obtained from Institutional Ethics committee, Institute of Medical science and SUM Hospital, Bhubaneswar, Odisha.

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“Oral Health Related Quality of Life (OHQOL)–Perspectives of College Students of an Educational University in Bhubaneswar: Descriptive Cross–Sectional Study”

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ABSTRACT

Background: In the recent times, OHQoL has emerged as an important parameter with wide implications for clinical practice and research in dentistry. OHQoL is a multi-dimensional construct, integrated into general and oral health.

Aim: To assess and evaluate the effect and impact of oral health on quality of life (QoL) among college students of Bhubaneswar.

Material and Method: 1200 professional college students aged between 18 – 23 years participated in the study. The OHQoL questionnaire which was self-administered consisted of 16 questions accounting for effect and impact of oral health on their quality of life incorporating dimensions and an individualized weighting system was filled by the participants. Chi-square test was applied for gender variations of their responses on OHQoL.

Results: 1058 students eventually returned the filled questionnaire with 88% response rate. 65.6% of the participants credited enhancement of their quality of life because of their oral health; 10.2% thought their quality of life reduced due to their oral health. Majority (75.8%) of the participants believed oral health has an impact in all physical, social and psychological ways. Females had a greater positive effect on their quality of life than males with respect to their oral health especially among physical and social aspects ($p < 0.05$).

Conclusion: College students believe that oral health impacts their quality of life in physical, social and psychological ways in a positive manner.

Keywords: College students, Oral Health, Quality of Life

INTRODUCTION

A new concept measuring quality of life (QoL) of individuals over the last few decades have emerged changing the perception of professionals. As dentists, it is imperative on our part to incorporate measuring oral health

affecting the patient’s QoL, apart from routine care in our daily practice and research work. Numerous indicators measuring the impact, perception and effects of oral health on quality of life have been developed for use in dentistry.

¹ Many authors have also attempted to conceptualize oral health and oral health related quality of life.^{2,3}

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Some of the measures for OHQoL emphasize on oral health effecting negatively like Oral Health Impact Profile (OHIP)⁴ and Oral Impacts on Daily Performance (OIDP)⁵; some also stresses on the positive health and not merely absence of disease.^{6,7} But these instruments majorly measure only the prevalence of oral health effects on the individual’s QoL and does not capture

the overall impacts (Weighting) of oral health. With this backdrop, the aim of the study was to assess the effect and impact of oral health on QoL among Professional College Students of Bhubaneswar. Even though a younger population who have limited exposure to life was chosen for the present study, an effort is made to investigate the perception of youth.

MATERIAL AND METHOD

A cross-sectional descriptive study was conducted among 1200 college students of Institute of Business and Computer Sciences and SOA National Institute of Law, Bhubaneswar. All the students of two colleges were included in the study. Prior approval for conducting the study was obtained from the respective Heads of the Institutions. Keeping in mind hectic schedule of colleges, the study was largely organized during the lunch breaks and post college hours on the scheduled dates without disturbing the student’s routine classes and examinations. Ethical Clearance was obtained for the Institutional Review Board for conducting the study.

A pilot study among 50 participants was conducted to check the feasibility of the study before conducting the main study.

Inclusion Criteria:

- Students attending college on the day of data collection.
- Students who gave informed consent.
- Students who comprehended the questionnaire
- In the present study, a specially designed OHQoL questionnaire was used developed by McGrath C and Bedi R.⁸ The questionnaire used measures that assessed both effect and impact of oral health on QoL with the aid of 16 questions. Personal information of the participants like name, age, gender, address and college were also recorded. The OHQoL questionnaire was explained in detail to the participants and made to comprehend each question before administering the same to them. Each participant took approximately 10 to 15 minutes to fill the questionnaire. The data collection period was spread across two months.

The OHQoL questionnaire consisted of 16 items to record the “effect” of oral health. The participants were

then asked to grade the “impact” for each “effect” on a scale ranging from none-to-extreme “impact” to integrate weighting system. Each impact was thus scored on a scale of 1 to 9.

Scoring criteria for “Impacts”:

1. Bad effect of extreme impact
2. Bad effect of great impact
3. Bad effect of moderate impact
4. Bad effect of little impact
5. No impact
6. Good effect of little impact
7. Good effect of moderate impact
8. Good effect of great impact
9. Good effect of extreme impact

DATA ANALYSIS

The data obtained was entered into MS excel sheet for analysis (SPSS version 20.0). Descriptive statistics accompanied by Chi-square test was used to know the significant differences between gender on their responses to effect and impact of oral health on their QoL.

RESULTS

Table I: Profile of the study group

Age	Gender		n (%)
	Males n (%)	Females n (%)	
18 years	130 (40.6)	190 (59.4)	320 (30.2)
19 years	114 (36.8)	196 (63.2)	310 (29.3)
20 years	122 (53.9)	104 (46.1)	226 (21.4)
21–23 years	104 (51.5)	98 (48.5)	202 (19.1)
Total	470 (44.4)	588 (55.6)	1058 (100)

Out of 1200 subjects, 1058 eventually participated with an overall response rate of 88%. The remaining subjects were either absent on the day of data collection or did not give consent to participate in the study and hence excluded. The profile of the participants is given in Table-I.

Table II: Distribution of responses to OHQoL-Effects

Responses	Effects		
	Good effect n (%)	No effect n (%)	Bad Effect n (%)
Physical Aspects			
a) Eating	670 (63.3)	294 (27.6)	94 (8.9)
b) Appearance	564 (53.3)	344 (32.5)	150 (14.2)
c) Speech	660 (62.4)	292 (27.6)	106 (10)
d) General Health	672 (63.5)	268 (25.4)	118 (11.1)
e) Comfort	760 (71.8)	200 (18.9)	98 (9.3)
f) Breath odor	722 (68.2)	212 (20.1)	124 (11.7)
Social Aspects			
a) Social life	660 (62.4)	282 (26.6)	116 (11)
b) Romantic relationship	526 (49.7)	412 (39)	120 (11.3)
c) Smiling/Laughing	762 (72)	176 (16.7)	120 (11.3)
d) Work/usual jobs	780 (73.7)	200 (18.9)	78 (7.3)
e) Career	720 (68.1)	262 (24.7)	76 (7.2)
Psychological Aspects			
a) Confidence	750 (70.9)	204 (19.3)	104 (9.8)
b) Carefree	676 (63.9)	284 (26.8)	98 (9.3)
c) Sleep/ability to relax	688 (65.1)	280 (26.4)	90 (8.5)
d) Mood	740 (70)	190 (18)	128 (12)
e) Personality	748 (70.7)	192 (18.1)	118 (11.2)
TOTAL	65.6%	24.2%	10.2%

Table II shows the distribution of responses to OHQoL (Effects). Majority (65.6%) perceived oral health enhanced or improved their quality of life in all physical, social and psychological ways.

Table III: Distribution of responses of OHQoL-Impacts

Responses	Impacts				
	None n (%)	Little n (%)	Moderate n (%)	Great n (%)	Extreme n (%)
Physical Aspects					
a) Eating	294 (27.8)	242 (22.9)	290 (27.4)	148 (14)	84 (7.9)
b) Appearance	344 (32.5)	270 (25.5)	256 (24.3)	124 (11.7)	64 (6)
c) Speech	292 (27.6)	240 (22.7)	226 (21.4)	208 (19.6)	92 (8.7)
d) General Health	278 (25.3)	246 (23.3)	236 (22.4)	186 (17.5)	122 (11.5)
e) Comfort	200 (18.9)	218 (20.6)	272 (25.8)	240(22.6)	128 (12.1)
f) Breath odor	212 (20)	254 (24)	224 (21.2)	236 (22.3)	132 (12.5)
Social Aspects					
a) Social life	282 (26.7)	242 (22.9)	202 (19.1)	218 (20.6)	114 (10.7)
b) Romantic relationship	412 (38.9)	204 (19.3)	190 (18)	168 (15.8)	84 (8)
c) Smiling/Laughing	172 (16.6)	288 (27.2)	224 (21.3)	242 (22.8)	128 (12.1)
d) Work/usual jobs	200 (18.9)	230(21.7)	240 (22.9)	258 (24.3)	130 (12.2)
e) Career	262 (24.8)	216 (20.4)	216 (20.4)	254 (24)	110 (10.4)

Conted...

Psychological Aspects					
a) Confidence	204 (19.3)	248 (23.4)	226 (21.5)	242 (22.8)	138 (13)
b) Carefree	284 (26.8)	216 (20.4)	264 (25)	184 (17.4)	110 (10.4)
c) Sleep/ ability to relax	280 (26.5)	228 (21.6)	218 (20.6)	198 (18.7)	134 (12.6)
d) Mood	190 (18)	260 (24.6)	232 (21.9)	234 (22.1)	142 (13.4)
e) Personality	192 (18.1)	234 (22.1)	266 (25.3)	244 (23)	122 (11.5)
TOTAL	24.2%	22.7%	22.3%	20%	10.8%

Table III shows the impact oral health had the quality of life of the participants. Most of the respondents (45%) in the present study felt that the impact of oral health on their quality of life was very little or moderate (Both positive and negative included).

Table IV: Distribution of responses to OHQoL–Effects (Gender Variation)

Responses	Effects						p–value
	Good effect		No effect		Bad effect		
	Males n (%)	Females n (%)	Males n (%)	Females n (%)	Males n (%)	Females n (%)	
Physical Aspects							
a) Eating	270 (57)	400 (68)	148 (31)	146 (25)	26 (12)	42 (7)	0.03
b) Appearance	244 (52)	320 (54)	166 (35)	178 (30)	60 (13)	90 (16)	0.41
c) Speech	250 (53)	410 (70)	162 (35)	130 (22)	58 (12)	48 (8)	< 0.00
d) General Health	268 (57)	404 (69)	140 (30)	128 (22)	62 (13)	56 (9)	0.02
e) Comfort	300 (63)	452 (77)	94 (20)	100 (17)	76 (17)	18 (6)	0.00
f) Breath Odor	308 (66)	414 (70)	94 (20)	118 (20)	68 (14)	56 (10)	0.2
Social Aspects							
a) Social Life	268 (57)	392 (67)	140 (30)	142 (24)	62 (13)	54 (9)	0.07
b) Romantic relationship	246 (52)	280 (48)	152 (32)	260 (44)	72 (16)	48 (8)	0.01
c) Smiling/ laughing	312 (66)	450 (77)	86 (18)	90 (15)	72 (16)	48 (8)	0.02
d) Work/ usual jobs	324 (69)	456 (78)	98 (21)	102 (17)	48 (10)	30 (5)	0.03
e) Career	304 (65)	416 (71)	118 (25)	144 (25)	48 (10)	28 (4)	0.04
Psychological Aspects							
a) Confidence	320 (68)	430 (73)	94 (20)	110 (19)	56 (12)	48 (8)	0.3
b) Carefree	296 (63)	380 (65)	124 (26)	160 (27)	50 (11)	48 (8)	0.6
c) Sleep/ ability to relax	292 (62)	396 (67)	134 (29)	146 (25)	44 (9)	46 (8)	0.45
d) Mood	320 (68)	420 (71)	82 (17)	108 (19)	68 (15)	60 (10)	0.33
e) Personality	312 (67)	436 (74)	86 (18)	106 (18)	72 (15)	46 (8)	0.02

Table IV shows the gender variation of the effects of oral health on the respondent’s quality of life. Females in comparison to men were further likely to perceive their oral health having a positive effect on quality of life ($p < 0.05$) in almost all physical and social aspects, also on their personality ($p < 0.05$). With respect to romantic relationships, males felt oral health having more positive effect on their quality of life at $p < 0.05$.

Table V: Distribution of responses to OHQoL-Impacts (Gender Variation)

Responses	Impacts												p-Value		
	None			Little			Moderate			Great				Extreme	
	Males n (%)	Females n (%)		Males n (%)	Females n (%)		Males n (%)	Females n (%)		Males n (%)	Females n (%)			Males n (%)	Females n (%)
Physical Aspects															
a) Eating	148 (32)	146 (25)		102 (22)	140 (24)		136 (29)	154 (26)		56 (12)	96 (16)		28 (5)	56 (9)	0.2
b) Appearance	166 (35)	178 (30)		130 (28)	140 (24)		94 (20)	162 (28)		30 (13)	64 (11)		20 (4)	44 (7)	0.1
c) Speech	162 (35)	130 (22)		106 (23)	134 (23)		92 (20)	134 (23)		76 (16)	132 (22)		34 (6)	58 (10)	0.02
d) General Health	140 (30)	128 (22)		98 (21)	148 (25)		108 (23)	128 (24)		84 (18)	102 (17)		40 (8)	82 (14)	0.09
e) Comfort	100 (21)	100 (17)		82 (17)	136 (23)		118 (25)	154 (26)		108 (23)	132 (22)		62 (14)	66 (12)	0.43
f) Breath Odor	94 (20)	118 (20)		130 (28)	124 (21)		104 (22)	120 (20)		96 (20)	140 (24)		46 (10)	86 (15)	0.23
Social Aspects															
a) Social Life	140 (30)	142 (24)		110 (23)	132 (22)		98 (21)	104 (17)		86 (18)	132 (22)		36 (8)	78 (15)	0.13
b) Romantic Relationships	146 (32)	260 (44)		104 (22)	100 (17)		94 (20)	96 (16)		72 (15)	96 (16)		48 (11)	36 (7)	0.03
c) Smiling/laughing	86 (18)	90 (18)		138 (29)	150 (26)		98 (21)	126 (21)		112 (24)	130 (22)		36 (8)	92 (16)	0.07
d) Work/usual jobs	98 (21)	102 (17)		100 (21)	130 (22)		114 (24)	126 (21)		106 (22)	152 (26)		52 (12)	78 (14)	0.65
e) Career	108 (25)	144 (25)		92 (20)	124 (21)		104 (23)	108 (18)		114 (24)	140 (24)		38 (8)	72 (12)	0.45
Psychological Aspects															
a) Confidence	94 (20)	110 (19)		108 (23)	140 (24)		98 (21)	128 (22)		112 (24)	130 (22)		58 (12)	80 (13)	0.97
b) Carefree	124 (26)	160 (27)		108 (23)	108 (18)		122 (26)	142 (24)		74 (16)	110 (19)		42 (19)	68 (12)	0.54
c) Sleep/ability to relax	134 (29)	146 (25)		90 (19)	138 (24)		106 (23)	112 (19)		82 (17)	116 (20)		58 (12)	76 (12)	0.56
d) Mood	82 (17)	108 (19)		104 (22)	156 (27)		116 (25)	116 (20)		106 (23)	128 (21)		62 (13)	80 (13)	0.63
e) Personality	86 (18)	106 (18)		114 (24)	120 (20)		118 (25)	148 (25)		92 (20)	152 (26)		60 (13)	62 (11)	0.45

Table V depicted the gender variation of oral health impacts on participant's quality of life. Males felt that only their speech and romantic relationships were impacted due to oral health ($p < 0.05$).

DISCUSSION

Although many studies were conducted to relate oral health with quality of life in the past few decades, this study is one of the few endeavors to comprehend how the youth identifies oral health affecting their quality of life with respect to their effect and impact.

Majority (75.8%) of the respondents in the present study felt their oral health having an effect on their quality of life. This is probably due to the instrument used as questionnaire recorded together positive and negative effects on the quality of life. Similar results were found in other studies also.^{8,9}

An interesting finding of the present study was that the participants perceived their oral health status enhancing their quality of life (Positive effect and impact) which was evident in the OHQoL scores that were skewed towards positive. Majority of the existing quality of life scales currently used mainly measure negative impacts of oral health on life quality, the burden of oral disease and fail to incorporate the positive perspective.^{10,11}

A large section of the respondents (65.6%) felt that their quality of life was enhanced by oral health in all aspects (Physical, social and psychological). The other studies showed that only physical aspects of oral health were affected, which was different from the present study where social and psychological aspects were also influenced. The reason might be due to the younger age group of the present study who have limited or partial exposure to life.

In the present study, variations in gender were quite apparent. Overall females were more likely to perceive the effect oral health was having on their quality of life in all aspects except romantic relationships. This might be because females are more likely to use dental services for their specific oral health needs, which could be crucial in comprehending oral health behavior, which includes dental attendance patterns. These gender variations were similar to other studies.^{9,12} But findings of a study by Kumar S et al¹³ in Udaipur found that females had poor OHQoL than males which is different from the observations of this study. This divergent result may be because the females in the present study represented a younger age group, who are bound to be conscious of the esthetic implications of their oral health.

CONCLUSION

The current study demonstrated that even though a younger population were included, they felt that oral health had a positive impact on their quality of life with females perceiving a more positive effect. The youth's perception of how oral health affected their quality of life may have future implications for designing potential oral health quality of life measures.

Further studies relating to the various socio-demographic profiles like age, ethnic origin and socio-economic status influences their oral health related quality of life are highly recommended in India.

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Management of the Most Common Type of Anterior Temporomandibular Joint Dislocation: A Systematic Review

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ABSTRACT

Objectives: This review describes the most common and standardized management approach for anterior TMJ dislocation in recent times.

Data: The authors used “Pubmed” to search relevant articles written in English. Several keywords like “temporomandibular joint”, “dislocation”, “anterior” “surgical management”, “conservative management”, “articular eminence” “articular disc” and “recent methods” are used for the search.

Sources: Abstracts and full articles were used to identify causes & pathophysiology, advanced procedure for conservative & surgical managements of temporomandibular joint dislocations.

Study selection: only those articles dealt with temporomandibular joint dislocations & its management were selected.

Conclusion: Temporomandibular Joint(TMJ) dislocation results when the condylar head of the mandible is displaced beyond the articular eminence anteriorly. Anterior dislocation of TMJ is more common than the superior, lateral, and posterior dislocation of the condyle. It is associated with the limitation of mobility due to pain, hence patients find it very difficult in performing the essential functions (speaking, chewing). Therefore, it is very important to reduce the dislocation as early as possible to prevent the difficulty in reduction in delayed case and to reduce the risk of recurrences. This will have negative impact on the quality of life of the sufferer and lead to subsequent damage to the TMJ in the long run.

Keywords: Temporomandibular joint; Dislocation; Glenoid fossa; Subluxation

INTRODUCTION

Temporomandibular joint (TMJ) is a bilateral synovial joint and it is formed by the condylar head of mandible and glenoid fossa of the temporal bone. It is a bi-articular hinge joint which produces various movements required for mastication, deglutition, talking and yawning. It is the maximum utilized joint in the human body and the most complex one also¹. When the condyle's head goes beyond the glenoid fossa, dislocation produced. The dislocation may be in any direction like anterior, posterior, medial,

lateral or superior direction. The principles for diagnosis and treatment of TMJ dislocation were proposed by Sir Astley Cooper and he also introduced the terms complete dislocation (luxation) and imperfect dislocation (subluxation) in 1932². TMJ dislocation («Open lock») is a painful condition in which there is complete displacement of the mandibular condyles from its articulating surface within the glenoid fossa, this displacement is not reducible by the patient, hence necessitating presentation in the hospital³. Subluxation-transiently displaced joint without complete loss of the articulating function². TMJ subluxation and dislocation though uncommon, accounting for less than 3% of all reported dislocated joint in the body² and are very unpleasant and distressing conditions to patients⁴. Despite a variety of classification systems, TMJ dislocation is most commonly divided into three categories: acute, chronic persistent and chronic recurrent⁴.

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Patients with TMJ dislocation often present with inability to close the mouth, depression of the preauricular area, severe pain in the TMJ region and associated muscles, hypersalivation, elongation of facial profile, tension of muscles of mastication, amongst others². Acute condition is associated with more severe limitation in jaw functions. This is alarming to the patients prompting early presentation usually within the first day of occurrence, as seen in majority of the patients in this study. Patients with history of recurrence also presented very early probably due to an awareness of where to seek health care services. This finding is similar to reports by Ugboko *et al* which suggested that early presentation is due to the discomfort and disfigurement encountered by the patients⁴. Acute dislocations have rare long term effects if appropriate management is done⁵.

Chronic dislocations can be of chronic persistent or chronic recurrent types. Chronic persistent refer to dislocations which are not self-reduced and progress without treatment, and chronic recurrent dislocations in which patients gets frequent dislocations as a result of day to day activities for which the patient become both physically and emotionally distressing⁵.

TMJ dislocations could also be classified based on site (unilateral or bilateral) and direction of displacement of the condylar head (anterior, posterior, medial, lateral, superior). Though anterior dislocation is most common, it can occur in any direction particularly in condylar fractures^{3,6}.

Mechano-Pathogenesis: TMJ dislocation occurs when the head of the condyle is dislodged from its natural position in the glenoid fossa. Dislocation can be called subluxation when it is partial or incomplete and called luxation when it is complete. Based on the site of involvement it may be unilateral or bilateral. It can be acute or chronic according to the duration of dislocation⁷⁻¹⁷. Also, it can be superior, medial, lateral, anterior-medial, or posterior dislocation based on the direction of movement of head of the condyle and is due to either trauma or spontaneous dislocation,¹⁸⁻³⁰ forcefully opening the mouth during intubation for general anaesthesia, ENT/Dental procedures, endoscopy, and very wide mouth opening during yawning, laughing, vomiting and epileptic seizures³¹⁻⁴⁰. There may be the change in the condition of the components of the joint such as laxity of capsule, weakening of ligaments, small/short and atrophy of condyle, atrophy or elongation of

articular eminence and poorly grooved glenoid fossa. Some conditions which predispose for dislocations are Ehlers-Danlos syndrome, Marfan's syndrome and dystonic movements due to the side effects of drug used in many neuro-psychiatric diseases⁴¹⁻⁴⁶.

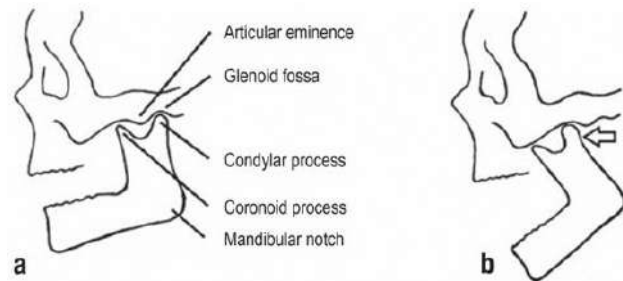


Figure 1: Anatomy of TMJ. a) Normal situation. b) Anterior TMJ dislocation (73)

The most common dislocations i.e. anterior dislocations occur when the condyle displaced anterior to the articular eminence. It is usually due to interrupted sequence of muscle action during closing of mouth from wide opening¹⁸. Before the lateral pterygoid muscle get relaxed the masseter and temporalis muscles elevate the mandible and hence the condyle came out of the fossa anterior to the eminence. Then spasm of the muscles result trismus and prevents the condyle from returning into the glenoid fossa¹⁸. Earlier there are many joint arthroscopy used to assess the position of condyle and meniscus in relation to fossa. They are Plain T.M.J x-rays the transcranio-oblique views, plain and contrast CT scans, i-CAT scans and MRI, linear and rotational plain digital tomograms etc. But recently the Dolphin imaging system which imports 2D facial photographs (facial wrap) on 3D stereographic images to enhance treatment simulation^{28,29} are very useful.

Management of acute Condition: All cases of acute dislocation can be reduced manually with the help of local or general anaesthesia, analgesic control with or without sedation. Several other methods also have been used in literature for the reduction of acute dislocation which include I) the wrist-pivot technique by Lowery *et al.* 2004¹⁸, II) combined ipsilateral staggering technique by Thomas *et al.* 2006³⁶, III) the extraoral technique by Chen *et al.* 2007⁴⁷, IV) Gag reflex procedure by Awang *et al.* 1987⁴⁸. In the gag reflex procedure the soft palate is rubbed with a dental probe/mirror to initiate relaxation of the lateral pterygoid muscle and thus spontaneous reduction and closure of the mouth. However, Hippocratic maneuver still has the highest success rate.

All non-traumatic TMJ dislocation should initially be reduced with manual reduction⁴. The greater the chance of success if the reduction is done early^{49,50}. Though the most frequently used method is the Hippocratic method of reduction^{3,50,51} (Figure 2a), studies show that the wrist pivot method also represents an alternative manual technique for TMJ reduction which is similar in success

rate, reduction-related pain and reduction time to that of the Hippocratic method of reduction^{6,50,52} (Figure 2b). Reduction can also be done by extraoral methods in patients with unilateral dislocation by considering the risk associated with the intraoral methods⁶ (Figure 2c). However, this method is somewhat more painful and time-consuming compared to the described intraoral methods⁶.

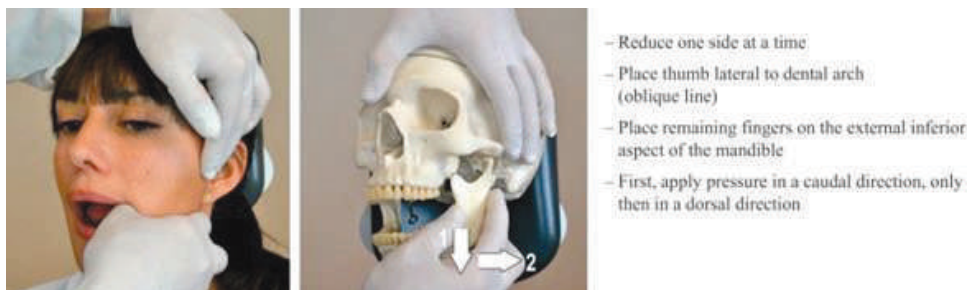


Figure 2a: Hippocratic Method of Reduction (73)

The extraoral method has a low success rate in bilateral dislocation cases (54.5% in bilateral dislocations vs 96.7% in unilateral dislocations). Hence its use is recommended only in case of increased bite or infection risks patients (for example, patients with dementia, hepatitis C infection)⁶. Figure 3 describes a flow chart of

the management of anterior TMJ dislocation. Reduction should be done with the patient in a sitting position and the patient's head stabilized using headrest^{47,52}. During intra-oral method of reduction bite blocks and gloves should be used to prevent bite injuries and associated infections^{18,52}.

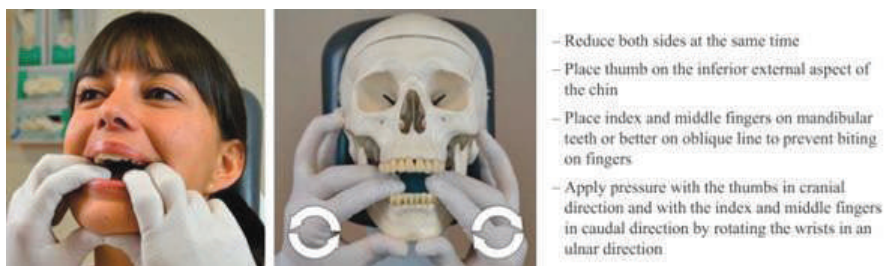


Figure 2b: Wrist Pivot method of Reduction (73)

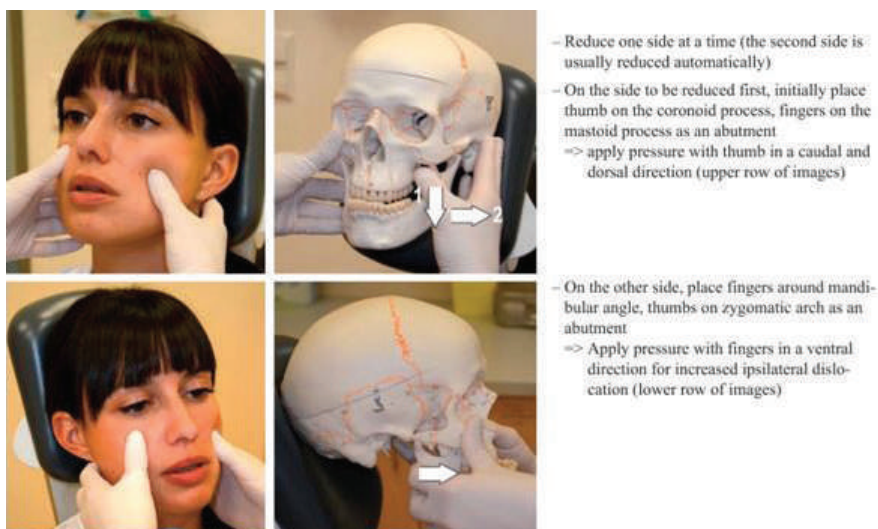


Figure 2c: Extraoral method of reduction (73)

As a general rule the physician's experience with the technique is vital to the success of the reduction and various manoeuvres can be used for the successful mobilization for reduction. Always manual reduction of an acute dislocation should initially be attempted without administration of any medications. If the attempt is painful and unsuccessful, then reduction should be attempted with medication (muscle relaxants and/or analgesics, Local / General Anesthesia).

The treatment of persistent temporomandibular joint dislocation: Approximately 30% of all TMJ dislocations are persistent dislocations types^{4,54}. When the dislocation has remained for 3 to 4 weeks, manual reduction attempts are usually no longer successful. Thus surgical reduction methods should be considered for this type of cases. The surgical methods used are Redressive methods (articular capsule opened for reduction) and more invasive techniques (eminectomy, condylectomy, special osteotomy techniques, endoprosthesis)^{3,53,54}.

The treatment of recurrent temporomandibular joint dislocation: There are at least 22% recurrent dislocations after initial dislocation⁴. Chronic recurrent dislocation cases can be treated by conservative methods like injecting sclerosing agents, autologous blood or platelet rich plasma into the lax pericapsular tissue and superior joint space weekly over a period of 6 weeks^{11,13}. The sclerosing agents used are either sodium psyllate or sodium tetradecyl sulphate. Some have also injected steroids into and around the capsule. The main role of these injections is to induce fibrosis. Moore & Wood and some other authors stated that in case of dislocation due to tardive dyskinesia and dystonias, injection of Botulinum A toxin into the lateral pterygoid muscle is done. It is a protein catalyst and prevents release of acetylcholine at the neuromuscular junction^{38,57}. It reversibly inactivates the protein that binds synaptic vesicles with the cell membrane. If it spreads to adjacent tissues, causes dysarthria, nasal speech, nasal regurgitation, painful chewing and swallowing, myasthenia gravis-like syndrome. It is contraindicated in pregnancy and lactating mothers.

Minimally invasive techniques (botulinum toxin injection, autologous blood injection, prolotherapy) for the treatment of recurrent temporomandibular joint dislocation are primarily indicated in patients with reduced compliance or increased surgical risk⁵⁷. However, long-term outcomes are often not satisfactory

and eventually invasive surgical management is required^{2,51}. Studies show that after single or multiple injections of botulinum toxin into the lateral pterygoid muscle, there are no further dislocations over a period of at least 5 months^{57,60,61}.

It is assumed that injection of autologous blood into and around the TMJ will reduce the mobility of the articular head in the long term, thus preventing recurrent dislocations. In many case studies, MRI follow up has been done after autologous blood injection. It showed that even though the development of fibrosis was not confirmed—if it were as postulated, TMJ mobility is restricted in the midterm so that the rate of recurrence of dislocation is reduced or the patient experiences no more recurrences at all. Yet, the exact underlying pathohistological mechanism remains unclear. Several studies also reported that approximately 80% of patients become symptom-free for the next 12 months and aggravation of symptoms as a complication has also not been reported^{59,62,63}. In case of prolotherapy (syn. sclerotherapy) similar assumptions are made as for treatment with autologous blood and also reported that 91% of patients experienced no recurrence of dislocation over a period of 6 months after the treatment using prolotherapy⁶⁴.

In recurrent dislocations cases, after the failure of conservative and/or minimally invasive procedures, open surgical treatment should be indicated^{59, 62}. Eminectomy, blocking or sling procedures and capsular ligament complex surgery are the most commonly used surgical techniques. Among all eminectomy procedures are the best documented and most successful techniques^{2, 49, 58}.

Lewis et al. used the Gillie's temporal approach used for zygomatic bone elevation to push the condyle into position with the help of Bristow's elevator by extending the incision to the preauricular region³⁴.

When recurrent dislocation is due to lax capsule, surgical capsulorraphy is preferred in which a wedge of the capsule is removed and the tissue repaired (capsular placcation). It restitutes and reinforces the lax capsule, in situations where the articular eminence is low and can be augmented or reconstructed with screws, plates or implants to improve the height.

Some surgeons have improved self-reduction of chronic recurrent dislocation that cannot be easily

self-reduced due to elongated articular eminence by doing total eminectomy described by Myraugh in 1951⁶⁵. Others have restricted the condylar movement by detaching the lateral pterygoid tendon via an open or closed condylotomy below the attachment of lateral pterygoid^{17, 66-69}. Recurrence is more in case of myotomy than condylotomy due to fibrosis or re-union. Another method of restricting the condyle by the use of Fascia lata, Mersilene tapes (Dacron) anchored around the zygomatic arch and passed around the condyle. Fascia lata can be easily harvested and treatment is cheaper but accompanied with many post-operative complications like pain, swelling, minor gait disturbance and movement of the lower limb⁷⁰.

In order to produce a mechanical obstacle to the condylar path, Dautery and his colleagues performed an osteotomy of the zygomatic arch and displaced the anterior segment downwards and inward to serve as a stop to the forward and upward movement of the condylar head⁷⁰. It is contraindicated in elderly patients due to the brittleness of the bone. Artificial materials like silicone wedge blocks and coralline hydroxyapatite blocks have also been used but complications like looseness, displacement and immune reactions are there for silicones.

Norman and his colleagues took bone grafts from the iliac or calvaria and placed the gap created in the middle of the articular eminence without using wires or plates for fixing the segments called interpositional eminoplasty⁴¹. On the other hand, Dautery used an onlay eminoplasty by adapting a graft (fixed with wires) directly on the eminence to increase the height⁷¹. Both procedures are used to create mechanical obstruction. The grafts must extend medially to prevent medial escape.

Dislocation due to altered disc morphology and position meniscoplasties and menisectomies are used. Total joint replacements should be considered when all appropriate treatments fail in chronic protracted and chronic recurrent dislocations and with associated degenerative joint diseases^{14, 42, 72}.

CONCLUSIONS

Small sample size, inhomogeneous study design and very short follow up are the main reasons of unreliable epidemiological data on various treatment approaches. Nevertheless, good success rates of some treatment approaches have been established as generally accepted standards on an international level. The treatment of

TMJ dislocation should be started as early as possible to limit degenerative changes or their progression and to increase the success rate of conservative/minimally invasive treatment methods. Conservative treatment approaches should be utilized appropriately before proceeding for the more invasive surgical procedures as the more complex and invasive procedures may not necessarily offer the better success. Individualized treatment approach is the best approach for selecting the treatment procedure for an individual as the success of any procedure is multifactorial. The factors include pathogenesis, age of patient, secondary diagnoses, compliance, treatment goal, and care structures, etc.

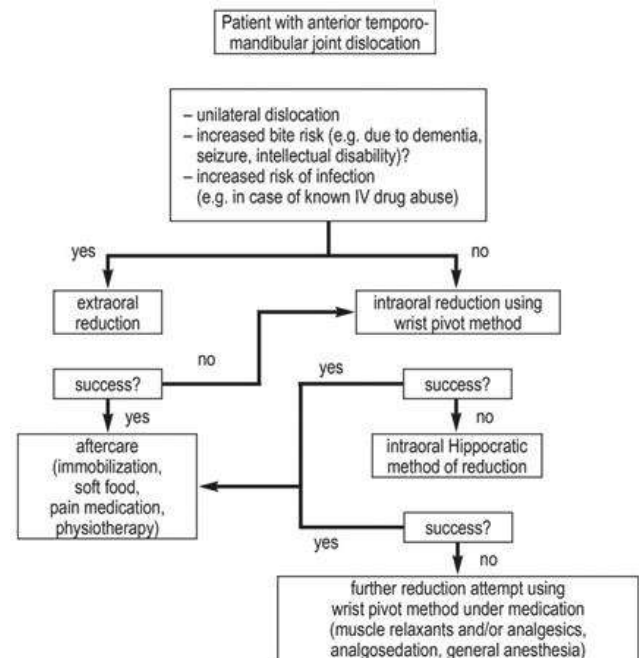


Figure 3: Flow chart showing management of anterior TMJ dislocation (73).

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- Picture source:** Ulla Prechel, Peter Ottl, Oliver M. Ahlers, Andreas Neff. The Treatment of Temporomandibular Joint Dislocation: A Systematic Review. *DtschArztebl Int.* 2018 Feb; 115(5): 59–64.[PubMed].

Caries Prevalence among Preschool Children of 3-5 Yrs Old in Bhubaneshwar, Odisha

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ABSTRACT

Dental caries is multifactorial disease with varying presentation and severity. If identified and corrected at an early age it can reduce the morbidity as well as health and financial burden. However planning and implementing preventive and corrective measures depends on the baseline data of caries status, which is lacking in our state.

Aim: To assess the prevalence of dental caries among preschool children of 3-5yrs in Bhubaneshwar, Odisha.

Materials and Method: A descriptive cross-sectional survey on randomly selected sample of total 780 preschool children aged 3-5yrs in Bhubaneshwar city, Odisha.

Results: The overall caries experience was found to be 31.5% in boys and 59% in girls. Incidence of caries was higher in maxillary arch in both the genders. Right side was showed higher prevalence mainly in girls.

Conclusion: The mean prevalence of caries in clearly shows the uprising caries prevalence among preschool children that indicates towards the need of implementing dental health awareness programs and planning of preventive and corrective procedures.

Keywords: dental caries, preschool children, prevalence

INTRODUCTION

Despite advances in science dental caries still remains as widely persistent vulnerable global health concern since many decades. No geographic area around the globe is spared by this. It affects all the races, sexes, socioeconomic status and every age group. In children it is the second most common reason of pain and morbidity¹

According to WHO, working definition of dental caries is “the localized posterruptive pathological process of external origin involving softening of the hard tooth tissue and proceeding to formation of dental caries. Dental caries being microbial mediated process leads to chemical dissolution of tooth structures leading to frank cavitation.²

Apart from damaging the tooth structures this disease effects every system of the body thereby negatively impacting on overall growth and development of children. The burden of caries is increasing day by day attributed to change in lifestyle and dietary pattern as well.³

Owing to sufficient scientific literature that caries is preventable, along with preventive programs and strategies implemented many developed countries have recently reported with declination in prevalence of caries among children, however in developing countries it still exists as a grave matter of concern. Global survey of WHO revealed the prevalence of dental caries 40-52% in childhood, out of which 23-40% comprised of early childhood caries.⁴

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Left untreated it not only causes pain and discomfort but also affect the growth and development of dental, psychological, somatic and overall growth of children along with increase in absent from school per se. ⁵

The prevalence and pattern of dental caries have been widely studied in various parts of our country to aid in formulating a preventive population targeted specific approach. However very few scattered reports are available in our scientific literature for Odisha. Thus keeping the lacunae in mind the present study was done to evaluate the prevalence of dental caries in preschool children in Bhubaneshwar, Odisha.

MATERIALS AND METHOD

The cross-sectional study was carried out among 3-5yrs old preschool children in Bhubaneshwar city. Institutional ethical clearance and written informed consent was taken from the parents.

Inclusion criteria were children under the age of 5 years of both sexes and obtaining written informed consent from parents. Any children beyond this age group, having any systemic or congenital illness and

without informed consent from parents were excluded from the study.

The sample was selected randomly and a total of 780 children were examined by a single calibrated examiner using sterilized mouth mirror and probe in natural day light. The caries experience of primary dentition was recorded using def index (Gruebbel 1944)

The data thus obtained were computed and evaluated statistically using SPSS (version 20.0) program with significance level fixed at 5%.

RESULTS

The prevalence study was conducted among 780 children aged 3-5 yrs. Out of total subjects 400 (51%) were boys and 380 (49%) girls. The mean age of study population was 4.34±0.64 yrs. The overall prevalence of dental caries in boys was found to be 31.5% and 59% in girls.

The mean def score of total population was 2.12±1.96 and showed increase in trend with age. Significant difference was found in caries experience was found in regard to age with p-value =0.04. (Table 1)

Table 1: Prevalence of Dental Caries in Children Aged 3-5 Years

Age (in yrs)	Gender	N (%)	Children with caries	Mean def ± S.D	p-value
3-4 yrs	Boys	128 (46 %)	46 (36%)	1.094 ± 1.96	0.02
	Girls	150 (54%)	63 (42%)	1.461± 2.34	0.04
4-5 yrs	Boys	272 (54%)	144 (53%)	2.021 ± 2.14	0.05
	Girls	230 (46%)	110 (48%)	2.422 ± 1.98	0.02

Interarch comparison showed significant differences between maxillary (34.5%) and mandibular arch (27%) involvement in case of boys. However among girls there was similar bilateral distribution across both arches. (Table 2)

Table 2: Interarch Comparison of Distribution of Dental Caries

Gender	N (%)	Caries in Maxillary arch	p-value	Caries in Mandibular arch	p-value
Boys	400 (51%)	138 (34.5%)	0.02	108 (27%)	0.03
Girls	380 (49%)	200 (52.6%)	0.01	181 (47.6%)	0.05
Total	780	330 (43.3%)	0.05	289 (37 %)	0.04

Irrespective of the gender, there was increased predilection towards involvement of caries on right side with p-value =0.004 in boys and p=0.02 in girls. (Table 3)

Table 3: Distribution of Dental Caries on Sides of Oral Cavity

Gender	N (%)	Caries on Right side	Caries on Left side	p-value
Boys	400 (51%)	162 (40.6%)	88 (22%)	0.004
Girls	380 (49%)	201 (53%)	72 (36%)	0.01
Total	780	363 (46%)	160 (20.5%)	0.01

DISCUSSION

Epidemiological studies from across the world unanimously proclaimed that dental caries still exists as a serious chronic disease despite advances in scientific technology and advancement. Presently oral health is a constituent part of global and overall health care of an individual. With increasing evidence based practice and emerging concept of minimal intervention and prevention, there has been marked reduction in caries in developed countries. However in developing countries like India the burden of caries on society and financially is yet to be resolved which requires not collective effort from society, government and individuals⁶

In the present study the mean caries experience was 31.5% among boys and 59% in girls. The result obtained is though contrasting to previously documented scientific literature which showed higher predisposition of caries in boys in comparison to girls.⁷

However similar results were reported by Vinay K Chugh 2018 and Khatib N et al 2013. In Asian countries distribution of caries showed similar results in Srilanka 38% and Pakistan 51 % caries prevalence. Meena K et al also reported similar range of caries prevalence from 44-67%.^{3,4,8-11}

The mean def score in the present study was 2.12±1.96 in the present survey, which is in consensus with earlier studies by Prakasha Shrutha S et al (2.03), Virjee and Aradhya (2.3-2.9) and Mahejabeen et al (2.7). Contrasting higher mean score were reported by Dixit et al (3.50) and Singhal et al (3.74). The observed def score could be related to extended exposure in oral cavity, limited oral health awareness and underutilization of oral health care services.¹²⁻¹⁶

Evaluating the gender differences the present survey revealed higher prevalence with significantly higher def score in girls as compared to the boys. These results are in consensus with studies by Singhal et al, Rosenblatt A and Chugh VK et al.¹⁶⁻¹⁷

The higher mean def score is mere reflection of societal gender biasing as well as under utilization of dental care and deficient preventive strategies.¹⁸

Interarch comparison delineate distinct relationship wherein mandibular arch was more involved in girls but maxillary arch was more involved in case of boys. Similar findings were obtained by previous researchers illustrating higher propensity towards mandibular caries. However the gender based difference in the present study could be rooted back to nutrition and feeding practices and parent dependent oral hygiene practices.¹⁹

Regardless of gender and age, right side manifested significant proclivity (in boys 40.6% and 53% in girls) with p-value < 0.05, which was contrary to earlier studies. The observed data could be ascribed to habits as well as manual dexterity among children.²⁰⁻²¹

The present study was a field survey intended to gather baseline data for assessment of severity and according planning and implementation of preventive strategies. Being a field survey there are certain limitations as well such as nominal instruments with compromised day light, lack of confirmatory diagnosis with radiographs, higher probability of underdiagnosis of initial dental caries and proximal surface lesion, which in turn could led to misconstrue the real extent of severity.

CONCLUSION

Within the limitation of study it can be well concluded that noteworthy prevalence of caries exists among preschool children of age 3-5 years. It also indicates towards remarkable segment of population being ignorant about deleterious effects of untreated dental caries in children encompassing. Unmet consequences lead to wide array of complications ranging from pain, swelling, space infections, loss of teeth, nutritional deficiencies, and overall psychosomatic growth and development of a child along with loss of school hours. However further elaborative descriptive studies are

required to identify, control or eliminate risk factors and determinants of dental caries and also to increase oral health awareness and improving utilization of dental care services.

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Surgical and Aesthetic Management of Severe Dental Fluorosis Associated with Chronic Generalised Periodontitis: A Case Report

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ABSTRACT

Developmental disturbance of enamel such as dental fluorosis is caused by excessive fluoride on ameloblasts during amelogenesis. Patients are mostly concerned about their aesthetic appearance due to discoloration and loss of tooth structure. These cases are often complicated by poor management of periodontal disease, presenting a challenge during treatment. This case report describes a combination of surgical and aesthetic procedures in management of a severe case of dental fluorosis with brown surface discoloration and small defects combined with chronic generalised periodontitis.

Keywords: dental fluorosis, periodontitis, discoloration, amelogenesis, aesthetics

INTRODUCTION

Fluoride has long been identified and used in the prevention and control of dental caries ¹. However, there are several endemic areas in India which have high water fluoride content and ² excessive fluoride may lead to dental fluorosis, skeletal fluorosis and non-skeletal fluorosis ³. Patients with dental fluorosis report with discoloration and cavitation of tooth surface and are mostly concerned about their facial aesthetics. Recently, even periodontal disease has been shown to be in association with fluorosis⁴.

Various geographical belts in Odisha such as Bolangir, Nayagarh, Angul, Dhenkanal, Jajpur, Kendrapara, Khurda, Kalahandi, Nuapada, Nowrangpur and Puri districts have considerable high fluoride content in water ⁵. The fluoride levels in the worst hit areas of Bolangir range from 1.5 ppm to 3.0 ppm. Bolangir area has people with poor socioeconomic status and minimal to no dental care available.

Though the effect of fluoride on reduction of dental caries is well established, its effect on periodontal tissues is very obscure. Similarly, in contrast to effect of fluorides, role of dental plaque is well understood. However, there is limited evidence of cases reported on the periodontal status of subjects living in high-fluoride areas. This case report describes a combination of surgical and aesthetic procedures to manage a severe case of dental fluorosis with chronic generalised periodontitis.

Case report: A 28 year male patient reported to the OPD with the chief complaint of deposits on tooth surface and discoloration of teeth. He was concerned for his compromised smile and facial aesthetics and wanted to get it corrected. Additionally, he complained of gum bleeding while brushing with intermittent pain and discomfort. He was apparently alright until he observed discoloration and surface defects on his teeth 6 years back which increased gradually to its present status. He was economically weak and hailed from Bolangir District of Odisha. His medical history was non contributory. No similar complaint was present among his parents and siblings.

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Fig. 1: Pre operative view



Fig. 2: Periodontal probing



Fig. 3: Aberrant mandibular frenum

Patient was cooperative, brushed with a toothbrush and toothpaste and had no tissue abuse habits. No abnormality was detected during his extra-oral examination. Intraoral clinical examination revealed soft and oedematous gingiva with generalised bleeding on probing. Miller's Class II gingival recession was seen in relation to 31 and Miller's Class I recession in 32, 33, 34, 35 respectively (Fig1). He maintained a very poor oral hygiene with abundant plaque deposit and presence of supra and subgingival calculus. There was a presence of purulent discharge with marked halitosis (McCulloch's Grade IV). Periodontal probing was painful and was done under topical anaesthesia and was found to be around 5-6 mm in all teeth (Fig 2). However, there was no associated mobility. There was an inadequate width of attached gingiva with an aberrant labial frenum in the lower anterior region (Fig 3).

Clinical assessment of hard tissues revealed presence of 29 non-carious teeth with only one mandibular third molar. There was generalised attrition of mandibular teeth with marked attrition in 33. Molar relation showed Angle's class I occlusion associated with anterior deep bite. There was presence of dental fluorosis (Deans Index) ⁶ with evidence of severe enamel defects and brownish discoloration



Fig. 4: Panoramic Radiograph

Panoramic radiographic view showed generalised horizontal bone loss with more than two third of remaining bone support (Fig4). Routine haematological parameters were within normal range. A provisional diagnosis of mild chronic periodontitis was made taking CAL into consideration (8). The patient was explained about the condition in detail with possible plan of treatment.

Considering his young age and his concern for aesthetics, a more conservative and cost effective treatment was proposed that didn't involve significant removal of tooth structure. The patient was explained the importance of oral hygiene and the cause of gingival recession and also the need to prevent inflammation and improve the gingival status before the formal aesthetic treatment.

The proposed treatment was based on a combined approach of periodontal management and aesthetic management of the enamel surface respectively.



Fig. 5: Post scaling



Fig. 6: Epithelial Undermining



Fig. 7: Suturing



Fig. 8: Healing

Phase 1 therapy was completed and oral hygiene instructions were given. The patient was recalled after 4 weeks and showed satisfactory healing of gingiva (Fig 5). Since frenal fibres radiated into marginal gingiva producing retraction or localized gingival retraction of 31 region, Conventional and classical type of frenectomy was planned (Archer 1961, Kruger 1964). After administration of local anaesthesia by infiltration, the lower lip was extended and frenum was clamped with small hemostat to the depth of vestibule. Incision was made with Bard Parker blade #15C and the triangular frenum tissue was excised. Underlying fibrous attachment to the periosteum were released. Epithelial edges were undermined (Fig 6) and the mucosal extent of incision was sutured with a continuous modified type of interlocking suture with 4-0 mersilk (Fig 7). Sutures were removed after 7 days and healing was found to be satisfactory (Fig 8).



Fig. 9a: Periodontal Surgery-1st Quadrant



Fig. 9b: Periodontal Surgery-2nd Quadrant



Fig. 9c: Fig 9b: Periodontal Surgery-3rd Quadrant

Objective of periodontal therapy was to restore the health and function of the periodontium. A full mouth periodontal surgery was carried out Kirkland flap 1931 (Fig 9 a,b,c). It included intracrevicular incisions and retraction of full thickness flaps followed by debridement. The surface defects were observed to be confined to enamel only and did not extend on to the radicular surfaces. Exposed radicular surfaces were cleaned to remove of any local deposits. Root surfaces were therefore root planed and flap was sutured by simple interrupted sutures. Necessary post surgical instructions were given. Healing was found to be satisfactory in all four quadrants.



Fig.10: Enamel microabrasion



Fig. 11: Acid etch



Fig. 12: Post etching



Fig. 13: Post Restoration

A combined approach of enamel abrasion, and composite resin infiltration for aesthetic correction was proposed for managing the enamel surface defects after 3 months. A Vita Classical shade guide (Zaharfarbnahme, Germany) was used to match the colour. Clear field was maintained throughout the procedure with help of cotton rolls, salivary ejectors, and retraction cords respectively. A chamfer finish line was used for preparing the facial surfaces (Fig 10). Prepared surfaces were acid etched with 35% phosphoric acid gel for 15 seconds, then rinsed for 10 seconds and dried (Fig 11, 12). 1100 mW/cm² intensity light cure unit was used to cure the two component adhesive system self-etch for 10 seconds, followed by a stratified layering technique that filled the tooth with micro-hybrid resin composite. Finishing and contouring was completed with finishing burs. Polishing disk, polishing paste, polishing points and

cups were used for polishing the restoration (Fig 13). Thus, correction of contour and removal of discoloration was done with a direct composite restoration which was considered as a conservative and economic alternative to full jacket crowns. Strong emphasis was given on oral home-care regimen.

The patient was satisfied with the final aesthetic result of maxillary arch. However, he was advised for similar procedure in the mandibular arch for complete and balanced aesthetics.

DISCUSSION

Dental fluorosis is a condition where cleavage and removal of enamel proteins are disturbed. Retention of the proteins and water lead to varying degrees of subsurface porosities. These porosities attract extrinsic stains causing enamel discoloration and hamper facial aesthetics. Also, the porosities are nidus for plaque and calculus accumulation leading to inflammatory periodontal disease. In addition, the fear of loss of tooth structure impedes good oral hygiene maintenance on the patient's part and results in poor oral hygiene maintenance⁷. To the best of our knowledge this is the first time a case with dental fluorosis and periodontal disease as its sequelae along with its management has been reported.

Therapy for chronic periodontitis aims to reduce etiological factors below the threshold level that is capable of producing a breakdown of disease progression and resolving inflammation⁸. Therefore, phase I therapy that includes scaling and root planing combined with motivated personal plaque control is beneficial⁹. However, for areas with attachment loss and inaccessible deep pockets need surgical attention to achieve stability of clinical attachment levels¹⁰.

While periodontal therapy will improve the periodontal support only a restorative work will be able to correct the white esthetics. Bleaching, micro-abrasion, veneering and crowning are few of the treatment options in Fluorosis. According to Thylstrup et al¹¹ more severe the enamel fluorosis, the more deep-seated are the subsurface porosities. According to Akpata et al¹², conservative management of dental fluorosis includes micro-abrasion at first and if found to be ineffective, laminate veneers can be used. In the present case, patient being young, composite resin was used. Initially, mega-

abrasion was selected to clear the superficial layer of fluoridated enamel. This eliminated deeper stains in the tooth surface and subsurface enamel was exposed to air. Low viscosity and lower enamel contact angles, with high surface tension of resin helps to penetrate porosities and rapidly occlude the pathways. Moreover similar refractive indices of resin and enamel improved the white opaque appearance of pores and reduced the original contrast between pores and enamel thereby enhancing aesthetic appearance of enamel. This technique was much cost effective than conventional treatment.

More invasive procedures such as full jacket ceramic crowns can arrest the destruction of tooth at an early age with fracture resistance, wear resistance and colour stability but are also expensive and sometimes beyond the affordability of the patient.¹³ Further fluorosis affects the bond strength of all enamel adhesive systems. Etch-and-rinse systems provide the highest bond strength to fluorosed enamel. Separate steps of etching and rinsing are required with self-etch adhesive in the case of moderate and severe enamel fluorosis¹⁴.

CONCLUSION

Dental fluorosis in endemic areas when combined with chronic generalised periodontitis can be challenging to treat. Successful non surgical and surgical phases of periodontal therapy were carried out before proceeding to restorative phase. Direct composite technique was applied to improve the structure and colour of the teeth using direct composites. The post operative outcome was found to be encouraging. However regular follow ups are needed to control the disease process.

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Implant Positioning in Esthetic Zone

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ABSTRACT

Aesthetic outcomes have become key elements that are crucial in defining success of the implant restorations. Long-term studies demonstrated that single or multiple implants are highly predict able with high survival rates. However, in the anterior maxillary zone, the aesthetic achievement of implant therapy is as important as the implant survival rates. Several factors contribute to this “success” and can be objectively evaluated. These include the patient’s healing capabilities, the level and condition of the existings of t and hard tissues, and the provisional and final restorations. In addition to these objective factors, Implant positioning also plays a significant role in achieving this“success.”This special issue contributes to the growing body of existing literature by examining several important issues related to the aesthetic aspects of maxillary implants and their increasingly important role in implant dentistry. These include implant positioning, surgical techniques for tissue augmentation, and the aesthetics offinal implant-supported restorations.

Keywords: *Aesthetic zone, implant dentistry, implant position, emergence profile*

INTRODUCTION

Aesthetic implant therapy in the present-day scenario aims to provide asuperlativesemblance and functional treatment outcome within the provided edentulous area. With the advances in the techniques of simulating the pink and the white, which results in healthy peri-implant tissues resisting mechanical forces and bearing the masticatory load.

Dentistry has seen a significant increase in the elective treatment for better aesthetics. The success of a restoration depends on sound mechanical, biological and aesthetic principles which can be planned by optimising the health, functions and the aesthetics of the patient. It is important to undertake the treatment in the sequence where health is first, followed by function and lastly aesthetics.¹

In an aesthetically challenging situation, we have to keep in mind shape, size, position and colour of the prosthetic toothmatches perfectly with the contralateral tooth and also develop a healthy peri implant soft tissue. These factors are important in the anterior maxilla; also known as the —aesthetic zone of the oral cavity. When rehabilitation of multiple missing anterior teeth is concerned, then it possesses a challenge of deficiency of both hard and soft tissue.^{2,3} This article presents the guidelines of how to diagnose and plan an ideal implant position in the aesthetic zone.

Diagnosis and treatment planning: The first step in aesthetic treatment is communication with the patient. Each patient has certain expectations from the treatment which needs to be discussed in detail and a thorough examination should be done. Various techniques described to do a consultation for an aesthetic rehabilitation treatment include pre-op and post-op patient photographs, waxed up diagnostic casts, direct composite resin mock-ups and CBCT reports and other imaging simulations. Of the mentioned options the computer-imaging simulations offer the best idea to the patient regarding the treatment outcomes⁴.

Facial and the periodontal status should also be evaluated for the patient. A facial assessment gives insight

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into general aesthetic parameters such as occlusal plane orientation, support and symmetry of the lip, gingival contour and smile line. evaluation of the edentulous site in three dimensions, provides knowledge about the occlusion, contralateral tooth and inter-arch relationships and presence of diastema. For a functionally acceptable result, a thorough periodontal investigation, home care assessment of gingival tissues and radiographic analysis should be done routinely.⁵

Assessment of the gingiva and gingival biotype:

Aesthetics in the anterior zone depends on how healthy and keratinized the gingival tissue is, which is required in both the natural dentition and implant supported prosthesis. The marginal gingiva, interdental papilla and colour and texture of the keratinized mucosa together contributes for an aesthetically pleasing implant supported prosthesis.⁶ Thus, the gingival biotype should be evaluated to determine the risk factors involved after the implant surgery.^{7,8} Two variants of gingival biotype is seen among the common masses that is the thin scalloped biotype (15%) and the thick flat biotype (85%)⁹. And when the implant placement in the anterior aesthetic site is considered, it is ideal to have a thick flat gingival biotype which exhibits less tissue shrinkage postoperatively. But if the patient presents with a thin gingival biotype which is friable with a narrow band of attached masticatory mucosa, then there are high chances of trauma while raising a flap and also this gingival biotype exhibits more chances of gingival recession both facially and inter-proximally. Thereby, thin gingival tissue biotype creates a challenging scenario when implants has to be placed in the aesthetic site where we have to keep in mind that minimum amount of trauma and laceration occurs to the gingival tissue so that a symmetrical soft tissue contour is achieved as that of the contralateral tooth and thus preventing the gingival recession over that area.

Furthermore if recession and resorption occurs, this leads to a flat gingiva between the roots exposing the implant marginally.¹⁰ So in such cases of minimal gingival thickness a soft tissue augmentation procedure is highly recommended in order to prevent the risk of aesthetic failure.¹¹ The longevity of the peri-implant soft tissue is dependent upon the amount and quality of soft tissue present not only in vertical direction but also in buccolingual direction.¹² A adequate volume and healthy soft tissue helps in providing a good emergence profile

which gives the rehabilitated tooth an appearance like a natural tooth which emerges from within the gingiva masking the metal part of the implant through the gingival cover around it.¹³

Implant Placement: The Concept Prosthetically Driven Implant Placement states that implant should be considered as the apical extension of the restoration for which prior planning of the design and location of the prosthetic part is mandatory for the surgical placement of the implant.¹⁴ Tischler came up with certain guidelines for the rehabilitation in the aesthetic zone. According to him, the surgeon should¹⁵

1. Conservative and atraumatic flap design
2. The prevalent bone and soft should be carefully evaluated.
3. The timing of the Placement of the implant has to be decided correctly.
4. The three-dimensional positioning of the implant has to be visualized prior to the implant placement
5. The healing time should be given much importance before implant loading has to be done
6. The emergence profile has to be kept in mind, if required soft tissue augmentation procedure should be performed in order to create the emergence profile around the implant after the implant placement.
7. The definitive abutment and the prosthesis should be carefully designed, if required a customised abutment design can be planned for better aesthetic result.

The Four positional parameters to look forward while planning the implant placement in the aesthetic zone are Buccolingual Position, Mesiodistal position, Apicocoronally position and Implant angulation which is of utmost importance for the treatment¹¹

Buccolingual position: If an implant is placed way too buccally, this creates occurrence of dehiscence in the buccal cortical plate which further increases the incidence of gingival recession. This placement also complicates the process of attachment of the prosthetic part over the implant. However, if implant is placed more in to the palatal aspect, then a ridge lap prosthesis is preferred in order to accommodate the excess buccal contour which results in a prosthesis that is both unhygienic and un-aesthetic.^{16,17,18}

The adequate buccolingual position of implant aids in creating a good emergence profile around the tooth, thereby helping in maintenance of oral hygiene. The thickness of the buccal wall should be maintained at least 1mm in order to prevent the gingival recession and improvising the aesthetics. Spray et al reported in their case study that as the thickness of bone approached 1.8-2mm, gradually the bone loss was also decreased.¹⁹ Thus, the implant should be placed in such a way that prosthesis that shall be provided should create a delusion of a natural tooth²⁰. In order to achieve this, the centre of the implant should match or positioned at the centre of the tooth that the implant replaces²¹

Mesiodistal position: The medio-distal position of an implant is strategically planned keeping in mind the adjacent tooth and the soft tissue surrounding the implant. Basing upon the size and edentulous site spacing, the implant position is planned mesiodistally. If the implant placed too near to the nearby tooth or implant, it will lead to the forfeit of the interproximal bone and papilla. So, a minimum distance of 1.5-2mm is mandatory to be maintained between implants and the adjacent teeth. When multiple implants have to be placed in a large edentulous area, 3-4mm of gap is highly recommended between the implants.^{22,23} When replacement of a Maxillary Central Incisor is planned, it is placed somewhat distal to impersonate the natural asymmetry of the gingival contour which is generally found anatomically with this tooth.

Apicocoronal position: Apical placement of the implant is denoted as the Countersink. For desirable aesthetic result, the metallic part of the implant should not be visible for which countersinking of the osteotomy site is required. The amount of countersink required depends solely upon the diameter of the implant planned to be placed.²⁴ If a wider implant is selected, then less countersinking of the osteotomy is required. This distance measured from the platform till the gingival margin is implied as "Running Room". The countersink which shall be performed should provide sufficient running room that helps in a steady shift between the implant platform and the contour of the definitive prosthesis that has been planned.¹¹

Howsoever, there shall be more amount of crestal bone loss when the implant-abutment interface is placed too apically in order to establish the healthy peri-implant biological width.^{25,26} The crestal bone that has been lost is re-established 1.5mm apical to the implant-abutment

interface which is called as Micro-Gap. Determining the pico-coronal position helps to maintain a balance between the health as well as meets the aesthetic demand in the anterior zone by creating an adequate emergence profile.

Implant angulation: Ideally, implants that are placed should have an abutment, that provides the prosthesis a natural tooth like appearance. When a screw retained prosthesis is planned, due to angulation error in the implant placement, the screw access hole location can impede the aesthetics in that zone.²⁷ Under these circumstances an angled or customised abutment should be planned for the patient where the normal alignment of the abutment and the prosthetic part is not possible. Furthermore, prefabricated surgical stents reduces the angulation error. In the maxillary central incisor region, palatal placement of the implant is advised in order to increase the bulk of the labial soft tissue and elude the glitches associated with the thin buccal walls.

Timing of implant placement: It is one of the most crucial aspect to be considered while placing implant in the anterior aesthetic zone. Garber categorised the three different timings for implant placement²⁸:

1. Placing the implant immediately following an atraumatic extraction
2. Implant placed 8 weeks after the extraction
3. Implant placed 3-4 months after the extraction

Broadly the timing of the implant placement is described under two situations firstly, immediate extraction and placement of the implant and the other is delayed placement of the implant after certain time interval.

Immediate implant placement at the time of surgery:

Following a tooth extraction, a substantial amount of alveolar ridge collapse occurs due to the bone resorption process. Around 3 to 4 mm of bone loss occurs during the first 6 months following an extraction which drastically reduces the amount of bone available at the site of implant placement. These defects can be corrected through complex regenerative procedure which adds on to the cost of the treatment and also increase the duration of the treatment procedure. To avoid such circumstances, immediate placement of implants is being opted now a days following a tooth extraction. This technique not only helps in the preservation of the hard and soft tissues but also remarkably reduces the treatment time.

Initially longer and wider implants were used for primary implant stability, which derived its support by engaging in to the apical and palatal portion of the socket.¹¹ Since through immediate implant placement the soft tissue hard tissue contour can be maintained by preserving the tooth emergence profile, hence this treatment modality is considered while placing implants in the aestheticsite. However, sometimes due to poor treatment plan and surgical catastrophe, deteriorated aesthetic resultsshould be expected following immediate placement of the implant.It can be done following an Atraumatic Extraction. After a thorough inspection of the tooth to be extracted both clinically and radiographically, it is extracted such that minimal trauma is caused to the buccal bone and surrounding soft tissue. To achieve minimal trauma instruments such as Peristome, is introduced in to the PDL space, to split the PDL from the tooth to be extracted. Thus, to protect the integrity of the socket, the tooth to be extracted is sectioned in to 2-3 parts and then each fragment is carefully removed without damaging the soft tissue surrounding the tooth.²⁹ The major aspect of a traumatic extraction is that the surgeon should defer reflecting a flap as much as possible so that the vascular supply and the periosteum that covers the bone is safeguarded thereby preventing bone resorption in the implant site.The extraction socket is debrided and evaluated carefully once the extraction is completed.³⁰

If immediate implant placement is planned, following factors should be kept in mind ¹¹:

1. No acute non-contained infection should be present;
2. Initial primary stability should be achieved; and
3. The quality and quantity of bone should be adequate

When a pathological infection is present in an extraction socket, then implant placement is deferred until 3 weeks until the infection has resolved completely with adequate amount of soft tissue healing.¹⁵ The socket wall when intact at both horizontal and vertical level after extraction, then immediate implant placement can be done. The initial primary implant stability can be obtained using a long implant which engages both apically and palatably. Even tapered implants or wider diameter implants are preferred as they better engage in to the bony walls.¹¹

1mm of buccal plate is required in order to enhance longevity of the implant and decrease the gingival recession. Along with-its soft tissue augmentation procedure may be required for the patient with a friable and thin gingival biotype to that prevents buccal bone resorption and gingival recession

Delayed implant placement (implant placement in edentulous sites): When an implant is planned to be placed in an edentulous site, the site should be carefully evaluated. A classification of such sites has been proposed by Garber ³¹

Garber Class I: Ideal positioning of implant is preferred, when adequate amount of bone and soft tissue present both horizontally and vertically. In a thin gingival biotype cases, along with implant placement a soft tissue augmentation procedure is planned.

Garber Class II: Bone expansion is done using serial osteotomes in those implant sites, where no vertical bone loss is present but horizontal bone loss of 1-2mm is present. This procedure was described by Summers.³² In this technique, expansion of the bony ridge is done horizontally by compressing the maxillary bone.

Garber Class III: Implant placement can be done in those cases with no vertical bone loss but a horizontal bone loss greater than Class -II. For such cases Guided Bone Regeneration has to be done mandatorily.

Garber Class IV: When there is significant amount of horizontal bone loss present in the implant site, but no vertical bone loss can be seen, then a staged implant placement approach has to be followed where the bony ridge is widened with guided bone regeneration technique. Then after a healing period of 4-6months, implant placement has to be done. Autogenous bone graft is the graft material of choice in such cases.

Garber Class V: In cases with apico-coronal bone loss, placing implant becomes challenging. There are no predictable and well documented surgical records available to determine the success of the treatment. In certain case reports, a guided bone regeneration using a non-resorbable membrane and delayed implant placement.³³ Some investigators suggested the use of submerged implant as device that helps in making space under the membrane.³⁴ Distraction osteogenesis procedure is used in order to increase the ridge height, but no follow up cases and clinical data is available regarding its use.³⁵

Flap management plays a pivotal role in the treatment success of the aesthetic site. For the preservation of the blood supply to the flap, proper incision design and flap design should be done prior to the start of the treatment. The main idea is to have anatraumatic extraction site for the implant placement with intact buccal bone plate and adjacent walls. For example, a papilla sparing incision preserves the blood supply to the interdental papillae and minimizes postsurgical recession.¹¹

CONCLUSION

Aesthetic zone is an important part of the dentoalveolar segment which comprises of the teeth, gingiva and the lips. This altogether determines the smile and aesthetics of the patient face. Thus, aesthetic implant therapy not only helps to achieve a perfect smile for the patient but also addresses the need of impairment and disability resulting from the aesthetic deficiency. There is inadequate scientific data proclaiming the success of the techniques used in implant placement in the anterior aesthetic zone despite improvement in clinical practice. Still standard surgical and prosthetic protocol should be followed during and after the implant placement in order to achieve required clinical outcome.

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Prevalence of Oral Habits among 6-12 Yrs Old Children of Bhubaneswar, Odisha

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ABSTRACT

Knowledge and early diagnosis of deleterious oral habits allows dentists to intercept and reduce the long-term consequences.

Aim: The present study was done to assess the prevalence of oral habits in children aged 6-12 years in Bhubaneswar, Odisha

Materials and Method: A descriptive cross-sectional was done on total of 850 children. A thorough history along with filled questionnaire Performa was obtained. Clinical evaluation was done to correlate presence and absence of oral habit. Obtained data was statistically analyzed.

Results: Overall prevalence of oral habits was found to be 24.8%. Prevalence of oral habit was observed to be statistically significant regarding age and gender.

Conclusion: Persistence of oral habits beyond normal age needs to identify and intervened to avoid occurrence of disharmonious maxilla-mandibular relationship and development of dental malocclusion.

Keywords: oral habits, mixed dentition, prevalence

INTRODUCTION

Heterogeneous oral habits in children have been the cause of concern for parents, pediatricians, psychologists, speech therapists and pediatric dentists. Persistence of these habits beyond certain age leads to unbalanced force on occlusion development, normal growth and development of muscles as well as jaw bones thereby affecting overall child quality of life. These habits are complex and learned pattern of muscular contractions, which at beginning are conscious activity but gradually turn into unconscious doing. The extension of these disorders varies differently in every individual depending on actual jaw relationship and frequency.^{1,2}

Over past few years, traditional approach of evaluating oral health has shifted from mere absence or presence of oral disease to multidimensional concept including every aspect altering the equilibrium and affecting the quality of life.³

As described by Baer PN and Lester M the oral cavity is the primary as well as permanent location for location for expression of emotions and thus stimulation of mouth with tongue, finger, nail becomes source of relief in passion and anxiety in every age group acting as a palliative therapy.⁴

Thumb or digit sucking habits are non-nutritive sucking are the normal observation in infants and young children and usually can be explained on basis of need to satisfy the urge for contact and security. However, its persistence beyond age of 3 yrs results leads to long term consequences with imbalance of stomatognathic system. It often results to angle class II malocclusion, increased overjet, open bite, posterior crossbite and narrow maxillary arch.^{5,6}

Persistence or delayed transition from infantile swallowing patterns leads to tongue thrusting. Tongue

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thrusting often is present with open bite and children with this habit often presents with long facial pattern and proclination of upper anterior teeth. Other associated features are high/narrow maxillary arch and class II div 1 malocclusion. It also leads to lisping and difficulty in speech.⁷

Chaves et al have described that the normal neutral posture of a child is also affected by mouth breathing habit where head is positioned forwardly to breathe. Also the physiological buccinators mechanism managing equilibrium between tongue and oral musculature is altered leading to mask-like appearance of face.⁸

Other oral habits like bruxism can occur due to stress, parasomnias, traumatic brain injury, neurological disabilities and morphological factors. It presents as habitual non-functional contact between occlusal tooth surface leading to attrition, headaches, temporomandibular joint dysfunction and muscle soreness.⁹

The oral habits either exist alone or in combination with other deleterious habits causing bone malformations depending on duration and frequency of habits. These detrimental habits if not diagnosed early leads to complex array of problems including poor dental health, speech disorders, altered facial features, poor self esteem, associated medical conditions and ultimately stigmatizing socially.⁶

Owing to its wide spread deterrent consequences it needs multidisciplinary approach to combat the consequences and provide integral care to child patients. Vast number of studies exists in scientific literature regarding prevalence of habits in young children so as to develop an efficient preventive measure to raise awareness, identify early and intervene the progress.^{10,11}

But to best of my knowledge no data exists assessing the prevalence of habits in our state. Thus, keeping this in mind the present cross-sectional survey was taken up.

MATERIALS AND METHOD

The present cross-sectional study was done in total of 850 school going children aged 6-12years, Bhubaneshwar, Odisha. Institutional ethical clearance was taken and after explaining the intent of survey written informed consent were obtained from the accompanying parents.

The inclusion criteria were children within age group of 6-12 years with mixed dentition. Children with congenital deformities, any systemic or medical conditions were excluded from the study. The sample was chosen by simple random sampling technique.

A close-ended questionnaire was given to parents to be filled on the same day to gather data about habits. Thorough clinical examination was done with mouth mirror and probe. Correlating the dental and extra-oral features the habits were assessed with specific tests. For mouth-breathing habit, water holding test was done. Data thus obtained was tabulated and statistically analysed (SPSS 15.0) to derive the prevalence of different oral habits. Chi –Square tests was done to compare the prevalence of habits in association with age group and gender. The probability level was set at $\alpha= 0.05$.

RESULTS

Out of 850 children aged 6-12 yrs, 400 were females and 450 were males. The mean age of the sample population was 8.78±2.32 yrs. Thumb sucking was significantly more common followed by bruxism and tongue thrusting. Thumb sucking. Also, these habits were found to follow to receding trend with higher prevalence among younger age group to lowering prevalence among older children. (p=0.000). However, mouth breathing, and nail biting were significantly more common in older age group. (p=0.000). Table 1 shows the prevalence of habits according to age.

Table 1: Frequency of Oral Habits According to Age

Age	N	Thumb sucking		Tongue thrusting		Bruxism		Mouth Breathing		Nail Biting	
6-8 yrs	250	45	18%	25	10%	31	12.4%	5	2%	0	0%
8-10 yrs	300	12	4%	17	7%	18	6%	24	8%	19	6.4%
10-12 yrs	300	03	1%	9	3%	3	1%	11	3.6%	13	4.4%
p-value		0.000		0.048		0.003		0.005		0.000	

The overall prevalence of deleterious oral habits was more in females (30.5%) as compared to males (21.5%). (Table 2)

Table 2: Frequency of Oral Habits According to Gender

Age	N	Thumb sucking		Tongue thrusting		Bruxism		Mouth Breathing		Nail Biting	
Male	450	32	7.1%	18	4 %	28	6.2%	25	5.5%	10	2.2%
Female	400	28	7%	33	8.25 %	24	6%	15	3.75%	22	5.5%
p-value		0.078		0.05		0.08		0.000		0.026	

DISCUSSION

This present study represents the first survey conducted in Bhubaneswar, Odisha to assess the prevalence of oral habits in 6-12 yrs old children. The main objective of assessment was done by means of closed ended questionnaire and absence or presence of habit was evaluated by clinical examination. The overall prevalence of oral habits in our sample population was found to be 24.8%. These observations were found to be consistent with reports by Basra AS and Kharbanda et al.^{12,13} However markedly higher prevalence have been reported by Garde et al (51%). On the other hand, Gauba A et al demonstrated as low as 3% prevalence of habits.^{14,15}

Present study revealed that thumb sucking was most prevalent with 7% frequency. Varied results are available in literature ranging 1.7% reported by Shetty et al to 50% reported by Kharbanda et al.^{13,16}

Mouth breathing is one of the established common etiological factor known to alter the normal growth of maxillo-mandibular and thus demands earliest diagnosis and prompt intervention. In the present study 4% of children showed mouth breathing habit. This was similar to results obtained by Garde et al (4.3%). The obtained frequency was lesser than as obtained by Vishnoi et al (10.6%) and Motta et al (17%).^{17,18}

Tongue thrusting was found be the second most prevalent habit among children in our population. However the observed frequency was lesser than earlier reported studies.^{13,16-18}

Bruxism was present in 6% of children which is in same range as found by Liu et al (6.5%) and Farsi et al (8.4%). The highest frequency was observed by Garde et al (17.3%). These differences can be attributed to variability in diagnosis and methods of collection of data. Also for deducing bruxism morphological variations of every region needs to be considered.^{14,19-20}

Nail biting habit was seen in mere 3.7% of study population which was way lower than as reported by Anila et al (20%) but in line with results by Sharma et al (3%). Wide variation in observation of nail biting can be attributed to stress levels, hormonal variations and diet pattern.^{21,22}

In the present study the overall prevalence of oral habits had females higher frequency (30.5%) as compared to males (25.1%). Similar distribution was also quoted by Kharbanda et al and Gildasya et al and this was explained on basis of societal and family setup along with hormonal changes.^{13,23}

In our study highest prevalence of oral habits irrespective of gender was highest in 6-8yrs (42.4%) followed by 8-10 yrs (30%) and lowest in 10-12 yrs (13%). The similar trend of decrease in frequency of habits among younger to older children was noted in studies by Shetty SR and Bhayya DP. This can be explained on the basis of craniofacial growth and developing musculature along with increase in level of intellect.^{24,25}

CONCLUSION

The present study was a cross-sectional study which depicts the frequency of oral habits in association with age and gender. However it fails to deduce the causal relationship and influencing environmental factors. Thus it becomes imperative to design and conduct analytical and more rational prospective study. With well known complications of oral habits on oral musculature and stomato-gnathic system it becomes most important to diagnose and intercept at the earliest to reduce the morbidity.

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Oral Self Injurious Habits—A Review

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ABSTRACT

Factitious or self-injury can be defined as a behavioural disturbance that consisting of deliberate damage to body tissues and is usually repetitive. It is well known that various developmental disabilities, psychiatric disorders and syndromes may precipitate episodes of self-injurious behaviour. Whatever be the underlying etiology, the wide range of clinical presentation of self injurious lesions often mimicking those of other diseases, makes the correct diagnosis of such lesions taxing even for the most astute of dental practitioners. Most frequently affected regions of the body are the oral and perioral tissues, hands and neck. Lesions are most common in lower lip & tongue followed by gingival and buccal mucosa. Clinically such lesions appear as ulcers on the gingiva or recession, trauma to tongue and lower lip resulting in chronic non healing ulcers. Early dental intervention in conjunction with pharmacological and psychological therapy may be significantly instrumental in improving the quality of life for such patients. Treatment is better if individualized be it extraction of offending teeth or fabrication of custom intra-oral appliances.

Keywords: *Self-injurious, habits, masochistic*

INTRODUCTION

The terms self-injurious behaviour (SIB) or self-mutilation (SM) describes a form of behavioural disorder characterised by an intentional damage to a part of the body without a conscious purpose to commit suicide^{1,2}. Oral SIB is quite common and usually expressed by repetitive biting of oral mucosa and perioral tissues. Most common affected are the tissues are lower lip and tongue. Partial or complete amputation of fingers, toes, and tongue has been reported too.³It is usually associated with a plethora of psychiatric disorders, development deficiencies or syndromes.^{4, 5}. According to Olson and

Houlihan (2000) a combination of physical restraints, behavioural treatment and pharmaceutical therapy may be used to manage self injurious behaviour. Also timely dental intervention using intraoral appliances may be essential to prevent further complications in such cases.³

DEFINITION

Defining self-harm is a challenge, and a variety of definitions have been proposed. According to Hawton & James (2005) deliberate self harm could be defined as a behaviour with no suicidal intent but rather is precipitated for the intent to communicate distress, relieve tension or to escape a troubling situation.⁷ Although the risk of completed suicide among people who self-harm is 30 times higher than among those who do not.⁶ According to Duffy (2006) self-injury is a behaviour that involves deliberately injuring one's own body, without suicidal intent and with or without pain.⁸

A lesion can be attributed to non-suicidal self-inflicted injury, if it satisfies the following criteria: the alleged behaviour must be considered socially unacceptable which helps in differentiating it from

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other social behaviors such as ceremonial piercings, intentional, repetitive, non-fatal, and producing mild or moderate damage⁹.

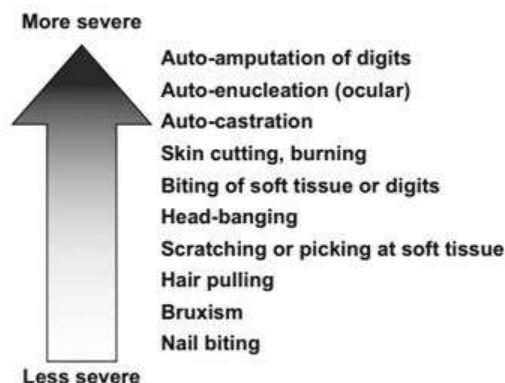


Fig. 1: Range of self injurious behaviour¹⁰

PREVALENCE

Although the exact prevalence of self-injurious behaviour in the general population hasn't been completely defined, it has been suggested that it may affect around 750 individuals per 100 000 populations¹¹.

Another study by John Briere (1998) have indicated considerably higher figures, of up to 4% in the general adult population⁹ while that figure rose to more than 17% in university students^{13,14} and up to 69% among young people considered to be of high risk (homeless and runaway youths, substance abusers, victims of sexual abuse).¹⁵ The reported prevalence among groups of psychiatric patients varies between 21% and 82%^{9,17}

RISK FACTORS AND ETIOLOGY

Self-injury is an critical health dilemma affecting individuals of any age, sex, or ethnic group, with an increasing incidence among adolescents and young adults.¹⁸ Although a plethora of causes have been suggested for precipitating self-injurious behaviour such as disorders causing discomfort, like sinusitis, toothache, or headache, it is particularly common in certain diseases, syndromes, and disorders.¹⁹ Also there exhaustive evidence in literature with reports on SIB in patients with normal intellect and psychiatric personality disorder.²⁰ Self injurious behaviour is often described as a "relief" from psychic pain or tension.^{21,22}

Also there have been several case reports of patients with cerebral palsy (CP) exhibiting SIB as a result of involuntary movement.^{23,24} and eye

poking serving a self-stimulatory function in those with visual impairment.¹⁶ It is also commonly seen among patients with Lesch-Nyhan syndrome, congenital insensitivity to pain with anhidrosis, Cornelia de Lange syndrome.⁴ Behaviourists have put down that individuals may exhibit SIB in various situations:^{26,27,28} as an attention-seeking mechanism, as a method of obtaining materials or activities that may otherwise be out of reach (positive reinforcement); as a means of to avoid stressful situations or undesirable tasks (negative reinforcement).

Lesch-Nyhan syndrome	Mental disorders (depression, obsessive compulsive disorder)
Mental retardation	Congenital insensitivity to pain with anhidrosis (CIPA)
Moebius syndrome	Infectious diseases (encephalitis)
Munchausen syndrome	Individuals with damage to the cerebral cortex, hypothalamus, reticular or pyramidal system, coma, etc.
Riga-Fede disease	Pharmacological or recreational drug reactions
XXY syndrome	
Gilles de la Tourette syndrome	
XXXXXY syndrome	
Cerebral palsy	

Fig. 2: Principal syndromes and conditions that favor the appearance of self-mutilation²

CLASSIFICATION

Oral self-injury may be classified as functional or organic. In organic self-mutilation, the person injures him/herself unknowingly, unintentionally and compulsively and this group includes disorders such as Lesch-Nyhan syndrome, psychiatric disorders and autism. Functional self-mutilation is performed knowingly and includes habits, with children often using this behaviour as a means of acquiring attention.²⁵

Functional self-injury may represent a method of manipulation or a true means to seek help.² Lloyd-Richardson et al.³⁰, in an anonymous survey performed in 2007 on 633 randomly selected adolescents (mean age, 15.3 years) in the United States, found that the most common forms of negative reinforcement reported by individuals with self-injury were to interruption unpleasant feelings or lethargy, to avoid school or work, or to avoid having to perform an unpleasant task; the principal positive reinforcements detected were to attract attention, to achieve control of a situation, and to pass the time when the individuals were alone.

Among other etiologic and pathogenic models proposed to explain organic self-injury, the dopaminergic, opioid, and serotonergic models are the most accepted. In studies performed in rats, it was found

that the frequency of self-injury increased after the administration of dopaminergic drugs and that dopamine antagonists helped to control this behaviour.^{2,29} It has also been proposed that addiction to self-injurious behaviour may be exhibited due to high level of endogenous opiate release in response to pain in affected individuals.² The association of self-mutilation with an apparent analgesia or insensitivity to pain and with certain dissociative states may be explained by this increase in endogenous opiate activity.³¹ Moreover, it has been reported that the administration of opiate antagonists such as naloxone or naltrexone can have favourable effects in patients presenting self-injurious behaviour.³²

ORAL FEATURES

Biting is the most common mode of self-inflicted injury, most frequently involving the oral and perioral regions.^{2,33} In a study by A. Amano et al (1998) to investigate the oral and dental manifestations in 18 patients suffering from hereditary sensory and autonomic neuropathy type IV (congenital insensitivity to pain with anhidrosis), it was reported that oral self-mutilations, such as auto extraction of teeth and severe biting injuries (with resultant scarring) of the finger tips and oral soft tissues (tongue, lip, and buccal mucosa), were most common. In infant patients the condition was typically characterized by decubital ulcers on the ventral surface of the tongue, resulting from trauma of the incisal edge of erupting mandibular primary incisors during sucking or nursing.³⁴

Compulsive self-injurious behaviour is the most distinctive symptom in Lesch-Nyhan syndrome. Hypertonicity and involuntary movements appear around the first year of age.³⁵ Common observations in such children include persistent biting of the lips, tongue, fingers, and shoulders and partial or total destruction of perioral tissues, especially of the lower lip.³⁶ Partial or complete amputation of fingers, toes and tongue have also been reported.³⁷ Cases of soft tissue lesions associated with self-inflicted tooth dislocation or even avulsion are known to exist as well. Oral self-injury is associated with lesions in other areas of the body in 20% of cases.¹²

MANAGEMENT OF SELF-INJURIOUS BEHAVIOR

A review of the medical, psychiatric, and dental literature reveals several common themes regarding

the treatment of SIB. Understanding the underlying mechanism of the patient's behaviour is key i.e., whether the SIB is serving any specific purpose. This may be instrumental in recognising the patient's cry for help as often such patients lack adequate communication skills.¹⁰

If the patient is determined to be in good physical health, a psychiatric evaluation may be prescribed to determine the existence of psychiatric conditions that may be corrected by pharmacotherapy.³⁸ A number of therapeutic modalities have been tried in patients with self-injurious behaviour. They may be classified into 3 groups: Behavioural treatment, pharmacological treatment and intraoral devices.

BEHAVIOURAL TREATMENT

This should be the preliminary therapeutic option to be considered by the health professional as it has shown an overall favourable response in many cases without the adverse effects of pharmacological treatment or the aggression and difficulties of intraoral devices.⁴² A bio-behavioural approach including functional analysis may lead to better outcomes than oral appliance therapy alone.²⁷ Potential intervention strategies include positive reinforcement by attention or tangible items, negative reinforcement by escape or avoidance of task demands and sensory reinforcement.¹⁰ To replace self-stimulating activities and allow for more functional ones sensory integration has been suggested as a treatment modality.⁴⁰ Extinction, systematic desensitization, and play therapy together have been reported to decrease SIB inpatients with.⁴¹ Aversive therapy such as shock have also been reported.³⁹

Klonsky evaluated 439 randomly selected individuals and found a prevalence of non-suicidal self-injury of 5.9%. A history of psychological therapy for emotional problems was detected in 39% of affected individuals.⁴³ In individuals with mental retardation, the method usually applied is positive reinforcement.⁴⁴ In most cases however, efficacy of behavioural therapy is often limited, and a conjunction with other therapeutic approaches such as pharmacological treatment or physical restraint is usually required.²⁸

PHARMACOLOGICAL TREATMENT

The serotonergic, dopaminergic, and opioid neurotransmitter systems have all been implicated in

the mechanism of SIB.¹⁰ Tricyclic antidepressants such as clomipramine and desipramine are commonly the drugs of choice. Leonard et al compared these 2 drugs and demonstrated that clomipramine (also used in the treatment of obsessive-compulsive disorder) was more effective in patients with onychophagia.⁴⁵

Agitations in SIB patients have been effectively treated using beta-blockers.⁴⁶ It is not unreasonable that opioid agonists such as naltrexone would be effective in treating patients with SIB. Interestingly however, failure of naltrexone therapy have also been reported in the literature.⁴⁷

ORAL DEVICES

Physical restraint is the only method that enables self-injury to be prevented directly and in an individualized manner. The possible options include helmets, face masks, gloves, special clothing such as straitjackets, and, in the case of lesions owing to biting, restrictive oral devices.²⁷ Intraoral devices basically work through 2 mechanisms: they hinder and discourage the patient from performing certain habits, helping to suppress the offending behavior, and they function as a direct barrier that prevents traumatization of oral tissues e.g., maintaining the lip at a distance from the dental arches.

Intraoral devices that prevent self-injury should ideally satisfy the following conditions- they should maintain the injured tissues at a distance from the dental arches, so that they do not suffer further injury; they must not provoke the formation new lesions; they should allow for full mandibular movement; they should not act as a hindrance for routine oral hygiene; they should be easy to manufacture and insert into the mouth, without causing discomfort to the patient; they should facilitate healing of the oral tissues; and they should be able to withstand masticatory and other oral forces without being displaced or breaking.²

Mouthguards have been the most widely used devices, although with variable results. They have been reported to be effective in some cases.⁴⁸ Another option is the use of acrylic splint positioned directly on the teeth either by cementation or held in place by extra-oral straps or by retention loops of orthodontic wires.² The 'lip bumper' is also frequently used. This consists of one long element and a small acrylic shield, fixed by inter-maxillary wires or elastic bands to tubes or bands

anchored to the first molar teeth. These devices act by displacing the lip downwards and forwards to prevent it being bitten, and they have been used successfully in a number of cases described in the literature.^{49,50} An oral screen may be used which has the advantage of not being fixed to the teeth, and it may therefore be indicated in infants and children in whom tooth eruption is not advanced.⁵¹

Intraoral devices however are not free of adverse effects, although they are not usually severe and are reversible. They may interfere with oral hygiene, favour the appearance of fungal infections, and can provoke new lesions.⁵²

In some patients, the severity of self-injury and the failure of other treatment modalities lead to a need to consider tooth extraction as a therapeutic alternative. Although this is a radical solution, it has been shown to produce an enormous reduction in damage to the soft tissues.²

CONCLUSION

SIB is a serious condition that often presents itself in the special needs population. Oral tissues are commonly involved and the form and function of the same are put in jeopardy. While behavioural and pharmacological treatment modalities are usually most often prescribed, their success rate at limiting self injurious behaviour is limited at best.

In such situations a comprehensive dental management by the dentist may be a much needed boon for the patient. The dentist should prioritize reduction of further harm to the oral and peri-oral tissues as the main objective while simultaneously ensuring the maintenance of adequate oral hygiene and minimizing appliance therapy driven ill effects.

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Dental Malpractice, The Odds in Dental Treatment

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ABSTRACT

The work of a dental expert who honestly prompts an individual or causes mental anxiety because of absence of proper or decent measure of working aptitudes can be classed as carelessness prompting to dental negligence. The main reason for dental malpractice is increased competition, advertising, higher costs for education and for opening a practice, lower incidence of tooth decay due to fluoridation and better oral hygiene, diminished dental education in methods & science, and the failure of organized dentistry to develop guidelines and polices for combating quackery. This article reviews the numerous causes leading to malpractice.

Keywords: Dental radiographs, malpractice, misdiagnosis, negligence, restoration.

INTRODUCTION

Dental malpractice is a form of medical malpractice focussing on injuries suffered during dental visits which range from obvious trauma to dental or oral tissues, negligence by the treating dentist or misconduct like abuse or molestation of sedated patients. Often dental patients have underlying systemic disease and are on multiple drugs; lack of proper history taking by the dentist or ignorance regarding the drug interactions or medical complications, even administration of correct dental treatment may still lead to medical emergencies and can be designated as dental malpractice. With advancements in oral and dental treatment modalities, many issues regarding wrong diagnosis, procedural delays in treatment, improper management and failure in follow ups have cropped up, comprising dental practice. In this article all issues regarding negligence, erroneous diagnosis and faulty treatment have been discussed,

avoiding erroneous practices and highlighting the principles of ethical and accepted standards of restorative dental treatment¹.

Diagnosis and Dental Radiographs: Dentists treat patients with an aim of restoring the patient's health. However adverse effects may occur in spite of all their efforts, some of which could have otherwise been prevented, hence amounting to malpractice. Any patient coming to the dental office needs to be diagnosed accurately first so as to formulate the correct treatment plan. Diagnosis is the identification of the disease through signs and symptoms by a careful history taking session and a meticulous clinical examination using scientific methods. Very often wrong diagnosis leads to wrong treatment, amounting to malpractice. Wrong diagnosis can occur due to the lack of expertise or inadequate experience of the dentist or the unavailability of appropriate diagnostic tools. Teeth affected by dental caries, fracture or regressive alterations like abrasion, attrition, erosion or abfraction generally require restorative treatment. Before performing any restorative treatment, the dentist has to evaluate the involved tooth, assess the amount of loss of tooth structure, depth of the lesion and then plan the restoration. Current evidence suggests that the use of a careful, methodical visual inspection of clean, dry teeth, supplemented where indicated by radiographic views, remains the standard of care in caries detection and diagnostics in spite of

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the availability of numerous devices or technology-enabled detection systems. Intra-oral radiographs serve as excellent diagnostic tools when used judiciously.

A dental radiographic procedure involves exposure of a patient to potentially hazardous ionizing radiation and even if does not involve physical touching it is considered as physical abuse if it is unduly advised. Bitewings and periapicals are the common intra-oral radiographs that are required to assess the depth of the carious lesion. However, it must be noted that incipient carious lesions are missed on radiographs and at least 40% demineralization of the enamel and dentin occurs before it is evident on radiographs. Hence conventional radiographs may miss out incipient carious lesions which left untreated cause more demineralization and destroy tooth structure. With the advent of digital intraoral radiography, the ease of taking radiographs has increased eliminating conventional film processing with less radiation exposure. But inadvertent and injudicious of digital dental radiography is also of concern. Due to improper image receptor placement or faulty exposure technique, the resultant radiograph may be totally undiagnostic requiring repeats.

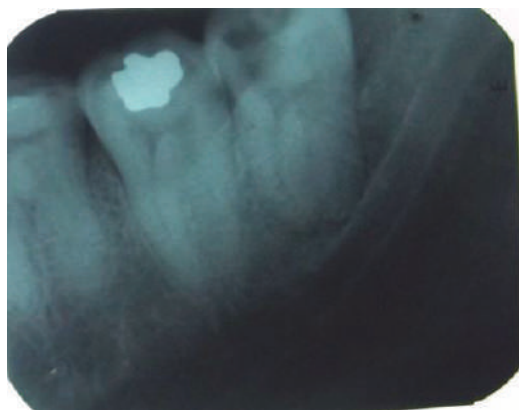


Figure 1: Secondary dental caries

In diagnostic radiology though the concept of ALARA is followed, still radiographs need to be repeated for diagnosis. Besides use of radiation protective gear like lead apron and construction of dental clinics as per the AERB guidelines wherever radiographic examinations are performed is mandatory, so as to reduce the harmful effects of radiation. Unnecessary exposure to X-ray radiation also amounts to malpractice^{2,3}. It is also essential to interpret the lesion correctly on a radiograph, knowledge of the radiographic anatomy and manifestation of diseases is a must, like differentiating dental caries from cervical burnout and secondary

dental caries from base below the restorations (Figure 1). Similarly, before planning a removable prosthesis like a cast partial denture or an implant supported overdenture pre-treatment radiographs are taken to assess the bone support of abutment teeth and the quality of the alveolar bone. For implant supported prostheses the quality of bone is to be evaluated using multi-planar imaging modality like CBCT so that assessment of the bone is possible in coronal, sagittal and axial planes. It is also imperative that the dentist be aware of the CBCT anatomy and able to use the digital software required to manipulate the images for measurements⁴. Whenever an implant needs to be placed in the mandibular alveolus its proximity to the inferior alveolar canal needs to be evaluated using CBCT as there is a chance of persistent paraesthesia following the procedure which can be avoided by accurately imaging the canal. Hence in such a circumstance, the pros and cons must be debated before advising for radiograph. Even for implant placement in maxillary edentulous ridge, decision has to be taken whether images of about 2-3mm superior to the sinus are enough or the entire sinus is needed, accordingly the imaging modality is to be advised⁵.

Before performing any treatment an informed consent is required from the patient a written informed consent is preferred over a verbal one. The dentist ought to inform the patient of the risks and benefits of the proposed treatment, the consequences of denying treatment and other available treatment options.

Malpractice in Conservative Dentistry: As stated earlier correct diagnosis is the key foundation to treating a patient. When it comes to our health, inaccuracy and wrong decisions are unacceptable. We place our full trust in our dentists. While it's clear that these mistakes are not deliberate and many misdiagnoses are caught quickly; overworked staff and inexperienced practitioners are leading to an increase in patient misdiagnosis and poor quality treatment. Malpractice in Diagnosis means that, dentist failed to spot a disease in their patient's mouth during the course of an oral exam. A dentist who is guilty of gross negligence, with no clinical reason for the performance, is incompetent and should have to suffer the consequences of the indefensible work⁶. If a dentist fails to correctly diagnose a condition it may lead to the wrong treatment being administered or no treatment at all. The condition may worsen, causing further oral damage. The inappropriate treatment may itself cause unnecessary injury and pain.

Negligence during patient history taking

- Dentists’ failures to take into account a patient’s relevant medical history.
- Ignoring test results, which do not fit in with the doctor’s preconceived idea of what is wrong with the patient, especially when those results are positive?
- Failure to obtain informed consent⁷.

Negligence during radiograph interpretation

- Dental radiographs not exposed properly may lead to misdiagnosis and untreated dental disease
- A diagnostic X- ray that shows all roots and surrounding anatomy is imperative. Potential complicating factors include hooked or curved roots and proximity to nerves and sinuses. Failure to obtain diagnostic radiograph or failure to interpret due to lack of knowledge can lead to wrong treatment plan.
- If the machine is not calibrated properly, the X-ray dosage could be excessive and result in an overdose. Also Failure to properly shield the body can result in a radiation overdose^{8,6}

Negligence during clinical examination

- Errors in clinical judgement
- Failure to follow up: Follow-up failures often result from the lack of a reliable tracking system to ensure that the patient kept the appointment with the specialist or underwent the diagnostic test that was ordered.
- Failure to screen patients ‘appropriately: infrequent examination of patients in a high-risk group

and failure to recommend routine screening examinations on a patient in a risk group.

- Evaluation Delays: involves repeated patient visits with continuing or progressive clinical findings, coupled with the practitioner’s failure to perform the indicated diagnostic tests on the patient or to refer the patient for proper testing; or failure to request a consult or referral when a definitive cause for clinical findings cannot be determined⁹.

Negligence in using diagnostic aids

- Diagnostic aids are essential to arrive at correct diagnosis. Advance diagnostic aids help in detecting early carious lesion and aid in rendering early treatment or preventive protocols. Failure to use such diagnostic aids leads to advancement of lesion and hence supports the issue of negligence by the dentist.
- Diagnostic aids also support the treatment plan can play vital role in saving the life of the tooth either through restorative dentistry or endodontics^{6,7}.

Negligence during anaesthetic solution administration

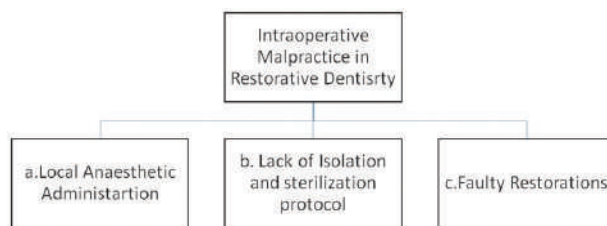


Figure 4: Intra oral malpractice in operative dentistry

- Malpractice in Restorative Dentistry- Intraoperative [Figure 4]

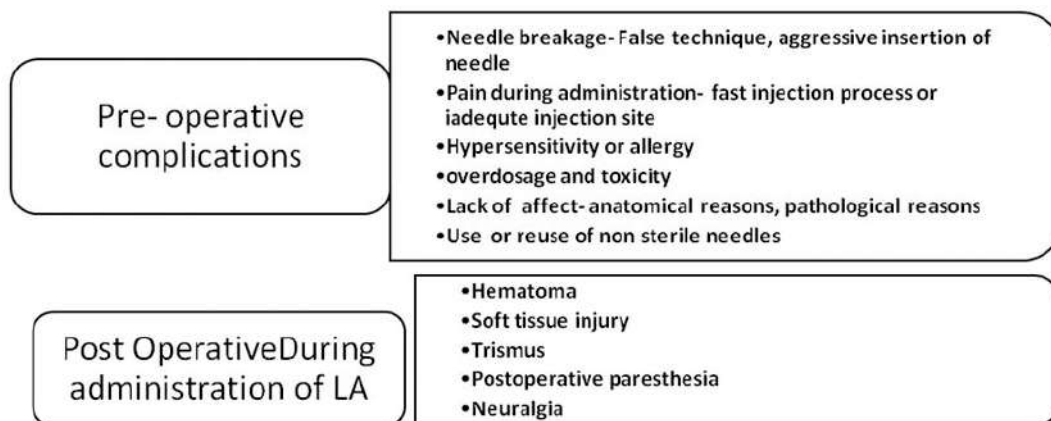


Figure 5: Dental equipment

- Perioperative dental damage is the most common of all medico legal complaints and improper administration of local anaesthesia is one of them, lack of anaesthesia or inadequate anaesthesia hampers the treatment procedure[Figure 5]

Malpractice in Restorative Dentistry due to Sterilization and Isolation Protocol

- Improper sterilization protocol in dental setup is one of the primary reasons for spreading infection in dental setup. It is also one of the leading causes of Professional malpractice or negligence.

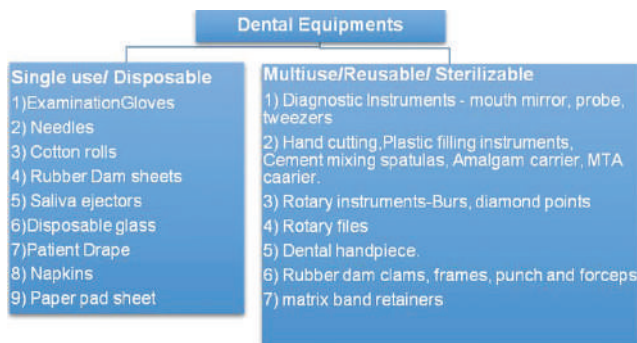


Figure 6: Classification of dental equipment

The dental equipment can be classified into: [Figure6]

- Improper or Lack of Isolation Protocol leads to
- Aspiration or injection of files, foreign bodies and restorative material to posterior pharynx or chest cavity
- Saliva which gets incorporated during restorative procedure hamper the quality of restoration and hereby leads to failure of restorations.
- Failure in restoration can occur due [Table 1]

Table 1: Causes of failure of restoration

Manufacturer’s Control	Operator Control
Faulty production	Improper diagnosis and treatment modality
Improper handling and storage	lack of knowledge about the material properties and usage
Impurities incorporated	Lack of skill and not fully understand the technique sensitivity issue of the material

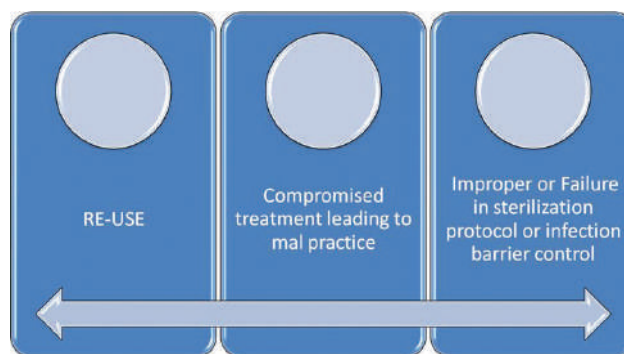


Figure 7: Failure due to infection control

Malpractice in manipulation and placing of restorative material in the cavity can lead to:

The main factors precipitating complaints and allegations of negligence can be summed up as follows:

- Pain
- Early failure and need for remedial treatment
- Perceived aesthetic deficits (e.g. unexpected display of metal)
- Overprescribing/over-treatment (e.g. patients feeling that they have been talked into treatment that they did not need, or which was of little benefit to them)
- Under-treatment/supervised neglect (before criticizing a previous dentist’s work and precipitating litigation, the new dentist needs to bear in mind that he or she may not have the full background behind the situation)
- Escalating or unexpected cost (patients have a right to know in advance how much their dental treatment is likely to cost with an explanation of potential situations which may necessitate costs to be revised)¹⁰.

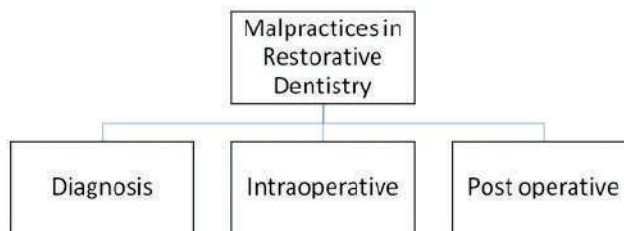


Figure 2: Malpractice in conservative dentistry

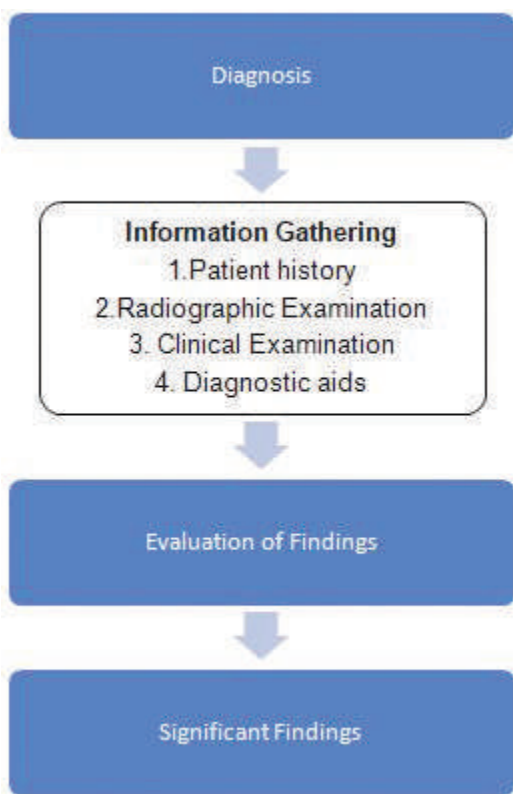


Figure 3. Importance of diagnosis

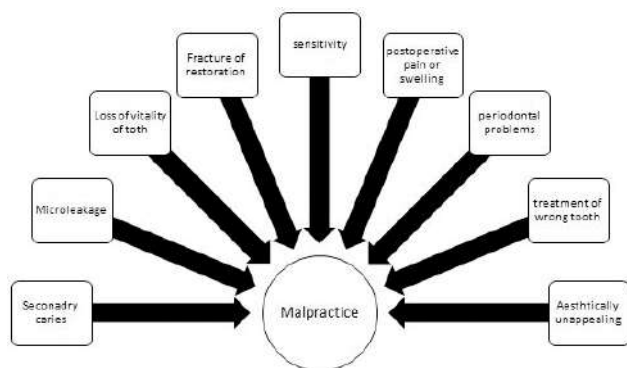


Figure 8. Restorative materials leading to malpractice

CONCLUSION

In conclusion it may be stressed that factors influencing “standard of care” include the diagnosis, advancing technologies and materials, and delivery methods for care. Thus adhering to ethical conduct means one must try to provide the most conservative procedure possible that is in the patient’s best interest. All dentists are ethically and even legally bound to follow some combination of all of the moral compasses. “Ethics and the needs of the patient should always be the priority of the clinician & do no harm should be the ethical and legal obligation of treating any patient.

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Apitherapy in Pediatric Dentistry: A Review

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ABSTRACT

The honeybee and its associated products have been used since time immemorial for its many therapeutic benefits. Those bee products being multifaceted materials are vital to the survival of the bee species and play a major role in the physiologic development and maturity of bees. Man has been harvesting this natural resource of infinite application. Use of this eco-friendly, bio compatible traditional medicine is termed as Apitherapy. So far, many scientific researchers had proved it to be beneficence in various human diseases due to its incredible nature in preventing infections, wound healing and in promoting health. As this natural remedy is showing promising results as a therapeutic agent in modern era this is a review article throwing some light upon this nature's sweet wonders clinical significance in pediatric dentistry.

Keywords: Honey, Propolis, caries

INTRODUCTION

Apitherapy (Apis is a Latin word that means bee) is the practice of using bee products such as honey, pollen, propolis, royal jelly, and bee venom for disease prevention or treatment proposes. As proposed by Dr. Stefan Stangacin "it is the art and science of treatment and holistic healing from the honey bee and her products for the benefit of mankind".¹⁻³

In 50 AD, Dioscorides described honey as being "good for all rotten and hollow ulcers."³ More recently, honey has been reported to have an inhibitory effect to around 60 species of bacteria including aerobes and anaerobes, gram-positives and gram-negative microorganisms.³ Honey is being used since ages

for its antimicrobial, antioxidant, sterility and anti-inflammatory characteristics.⁴

The word "Propolis" is believed to have been coined by Aristotle who identified how propolis was used to protect and defend the hive (Pro = before, Polis = city) based on the fact that honey bees use propolis to narrow the opening of their hives. Its chemical composition varies according to their source like different plant buds and bark exudates.⁵⁻⁷

Bees mix propolis with wax flakes and their saliva to reinforce their hive walls, humans use this product to boost immune system and because of its antibacterial, antiviral, anti-inflammatory, antioxidant and ant carcinogenic properties.⁸

Pollen grains are the reproductive spores of seed-bearing plants. Pollen collected by bees from flowers have benefits such as detection and immunization against allergies. Royal Jelly a combination of honey and pollen is a concentrated source of many nutrients including vitamin A, B, C, D, E and essential fatty acids.⁸⁻⁹

Apitoxin or honey bee venom, is a bitter colorless liquid which consists of a mixture of proteins that causes local inflammation and acts as a anticoagulant It can be administered in 2 ways, either directly by bee sting or by injection.^{3,10}

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Honey: The first known prescription for honey dates back to somewhere between 2100-2000 BC, was written on a clay table found in Euphrates valley.⁹Hippocrates stated that honey cleans sores and ulcers, softens ulcers of the lips, heals carbuncles and running sores.^{3,8,9}

In 1989 issue of the journal Royal society Medicine an editorial expressed that time has come for the conventional medicine to lift the blinds off this “traditional remedy” and give its due recognition.⁸

Table 1 : Components of Honey^{3,8}

Composition	Percentage
Carbohydrates	79.7
Sugar	73
Water	22
Proteins	0.2
Ash	0.1
Ester extract	0.0

Table 2: Composition of Honey^{3,8}

Carbohydrates	Invertase, Glucose oxidase, Amylase, Invertase
Sugars	Glucose, Sucrose, Fructose and others
Free Aminoacids	Lysine , Histidine, Arginine, Aspartic acid, Threonine, Serine, Glutamic acid, Proline, Glycine, Alanine, Cysteine-, Valine, Methionine, Isoleucine, Leucine, Tyrosine
Minerals	K, Na, Ca, Mg, Fe
Vitamins	Riboflavin, Niacin, Pantothenic acid, Folic acid, B6, C
Antioxidants	Flavonoids, Catalase, Vitamin C, Selenium

Properties of Honey

Antimicrobial Property: The antibacterial property of honey was first recognized by Van Ketel (1892). The minimum inhibitory concentration was found to range from 1.8%to10. 8% (v/v).¹¹

The antimicrobial efficacy of honey is driven by 3 properties i.e its hygroscopic properties, acidic pH and due to hydrogen peroxide which is formed enzymatically.

Hygroscopic Property - it has been shown that wounds infected with *Staphylococcus aureus* are quickly rendered sterile by honey. This effect is based on high osmotic properties so it can extract water from bacterial cells and cause them to die.³ Hydrogen peroxide and Acidic pH - White et al. identified the major antibacterial substance in honey as hydrogen peroxide. And stated that glucose oxidase, catalyses the oxidation of some of the glucose present in honey to form gluconic acid, the resulting low pH between 3.2 and 4.5 which inhibits microbial growth and the by-product hydrogen peroxide kills vegetative cells and microbial spores.^{3,12,13}

Tissue Repair: Honey being acidic in nature decreases the pH of the wound bed and makes more oxygen available to the regenerating tissues.¹¹ Honey (at a concentration of 1%) stimulates monocytes in cell culture to release cytokines, tumour necrosis

factor (TNF)-alpha, interleukin (IL)-1 and IL-6, which activate the immune response to infection. Honey at concentrations of 0.1% proliferates the stimulation of B and T lymphocytes in peripheral blood and phagocytes are activated by honey at concentrations as low as 0.1%.^{3,11}

Nutrient Effect: As honey constitute a wide range of vitamins, minerals, amino acids and readily available sugars, so, it can harbor a direct nutrient effect on regenerating tissues.^{11,14}

Clinical Applications of Honey–

- **Radiation Mucocytis:** Radiation mucositis develops early during radiotherapy. The acute mucositis response to radiotherapy is a result of mitotic death of epithelial cells, since the cell cycle time of the basal keratinocytes is about four days.

Soad K. Al Jaouni et al.¹⁵ had conducted a study for 1 year on 40 patients admitted to oncology ward diagnosed with hematological and nonhaematological cancer and concluded that significant reduction in the number of episodes of oral mucositis, bacterial and fungal infections, and hospital stay among pediatric cancer patients undergoing chemo/radiotherapy who are taking honey in conjunction with their regular therapy. Because of its high viscosity, acidic PH, hydrogen

peroxide, high osmolarity, and rich nutritional properties, honey can inhibit bacterial and fungal growth and enhance healing and is thereby a justified approach in the management of oral mucositis.¹⁴⁻¹⁶

- **As Pulpotomy Medicament in Primary Teeth:** Krishna kumari et al have conducted a study on 100 primary molars of 50 children using honey as medicament in one group and Formocresol in other group. After 24 months follow up they found higher radiographic success in sample treated with honey than formocresol. Its healing properties can be due to the fact that it offers antibacterial activity, maintains a moist wound environment that promotes healing and has viscosity which helps provide a protective barrier to prevent infection.¹⁴
- **Anti-Halitosis:** Honey has been observed to give rapid removal of malodor from infected wounds. Candies made with honey maybe useful for prevention of halitosis as along with its anti-bacterial effect, bacteria would also use the glucose in honey in preference to amino acids, and thus

would produce lactic acid instead of bad-smelling amines and sulphur compounds.³⁻⁴

- **Periodontal Therapy:** Honey contains a substantial level of antioxidants they protect the periodontal tissues from the free radicals formed during inflammatory process¹⁸. Honey also has other beneficial effects like it stimulates the growth of granulation tissue and epithelial cells, which would aid in repair of the damage done by infecting bacteria and free radicals. According to a study conducted by Hidaka et al honey has been proved effective as an anticalculus agent.¹⁹
- **Anti-Cariogenic:** As compared to sucrose honey at a concentration of 10% gave 75–80% less acid production from the streptococci and 30% less from *L.caseii*. There was no dextran produced from 10% solutions of the honeys. When the honeys were added at a concentration of 10% to a medium containing 10% sucrose the production of dextran from sucrose was inhibited by 75–89%. the minimum inhibitory concentrations of honey for *Strep. mitis*, *Strep. sobrinus* and *Lactobacillus caseii* were 7%, 7.5–8.5% and 8–12% respectively.³

PROPOLIS

Table 3:Composition of Propolis

Propolis Types	Composition	Properties
Brazilian (Baccharis type)	Prenylated p- coumaric acids, flavonoids, lignans,	Antibacterial, Antitumor, Antioxidant activity
Cuban	Prenylated benzophenones	Antibacterial and anti tumor activity.
European (Popular type)	Flavanones, Flavones, phenolic acid , caffeic acid phenethyl ester (CAPE), Ferulic acids.	Antibacterial, Antiinflammatory, antitumor, antioxidant, allergenic activity.
Taiwaneese	Prenylated flavanones	Antioxidant and anti tumor activity.

Table 4: Antibacterial Activity⁸

Gram-Positive bacteria	Staph.aureus, streptococcus: Citecus epidermis faecalis mutans, pyogenes, viridans, sobrinus, Enterococcus spp., Mycobacterium sp.
Gram-negative bacteria	Paratyphi B, typhi-shigella: Dysenteriae, Helicobacter pylori, Klebsiella ozaenae, proteus vulgaris, Pseudomonas aeruginosa, salmonella, Proteus vulgaris.
Fungi	Aspergillus sp., Candida albicans, Cryptococcus sp, neoformans, Histoplasma capsulatum Trichosporon cutaneum etc.
Viruses	Adenovirus, Coronavirus, Herpes simplex, influenza A and B Virus, Rotavirus, Vesicular stomatitis virus, Coronavirus
Parasites	Chlomonas paramecium, Giardia lambia, Trypanosoma cruzi etc.

Anti-Inflammatory Effect: Hyaluronidase is an enzyme responsible for several inflammatory processes. Ethanolic extract of propolis inhibits hyaluronidase activity.⁷ Application of 5% ethanolic extracts of propolis in the dental cavity of dogs showed its anti-inflammatory reaction, as well as antibacterial activity.²¹

Antioxidant Effect: According to an Italian Study, Propolis extract (with CAPE) and its active components showed a dose-dependent free radical scavenging effect, a significant inhibition of xanthine oxidase activity, and an antilipoperoxidative capacity.²²

Healing Effect: Propolis promotes epithelial formation as well as vascular and fibroblastic neof ormation of the connective tissue. Thus it can be said that the topical application of propolis on surgical wounds may promote faster epithelium and connective tissue healing.²³

Antitumor Activity: CAPE, a phenolic antioxidant, is potent and specific inhibitor of activation of the nuclear transcription factor . CAPE also suppresses the induction of prostaglandin E 2 synthesis mediated by 12-O-tetradecanoylphorbol-13-acetate and calcium ionophores. Therefore, CAPE can be considered as a potential anti-angiogenic agent that can reduce neovascularization.²³

Clinical Significance in Dentistry :

- **Anticaries:** Based on literature reports showing that propolis resin is a product with antiinflammatory and bactericidal activity, According to a in vivo study by Duailibe for 7 days , it was concluded that the propolis extract used as mouthrinse possesses antimicrobial activity against *S. mutans* present in the oral cavity. The extract might be used as an alternative measure to prevent dental caries.²⁴
- **Anti-Plaque:** Koo H et al studied the effect of a mouthrinse containing selected propolis on 3-day dental plaque accumulation and polysaccharide formation . On the 4th day they found that the PI for the experimental group was significantly less than for the placebo group. The experimental mouthrinse reduced the insoluble polysaccharide (IP) concentration in dental plaque by 61.7%. Hence it is concluded that mouthrinse containing propolis was thus efficient in reducing supragingival plaque formation and IP formation under conditions of high plaque accumulation.²⁵
- **Pulp-Therapy:** On addition of propolis to calcium hydroxide in order to add all beneficial biological properties of propolis, particularly its antiinflammatory, antibacterial, antifungal and antiviral properties to those of calcium hydroxide and as being oily in nature it may promote low-speed dissociation and diffusion when used as a component in an endodontic paste for primary teeth.²⁶ According to a study conducted in Manipal dental collage on premolars for direct pulp capping also showed that propolis is equally efficacious as calcium hydroxide. It has been concluded in a study that propolis can be used along with calcium hydroxide as an intracanal medicament.²⁷
- Rezende et al. found propolis was to be effectual againstn *Enterococcus faecalis* as an intracanal medicaments.²⁸In another study Al-Qathmi and Al-Madi stated that Propolis was as effective as NaOCl when used as an irrigant on extracted human teeth¹¹ Propolis stimulates circulation, cell metabolism, various enzymes and collagen formation hence can contribute in hard tissue bridge formation when used as a pulp capping agent.²⁹
- **New Storage Media:** Many studies have proved that propolis is effective in maintaining periodontal cell viability. Al- Shaher et al examined the tolerance of fibroblasts of the PDL and dental pulp to propolis and calcium hydroxide and concluded that propolis can be used as a suitable transport media for avulsed tooth.⁸ This success can be due to the antioxidant, antibacterial and antiinflammatory properties.³⁰
- **Dentinal Hypersensitivity:** According to an in vivo study conducted by Mahmoud et al, propolis has a positive effect on controlling dentinal hypersensitivity.³¹ Almas et al had conducted a study using an electron microscopy and found that propolis occluded dentinal tubules. ^[32] According to a study conducted by Sales – peres propolis can partially obliterate the exposed human dentin as its effect are similar to those of sodium oxalate gel.³³
- **Oral Candidiasis:** Brazilian researchers in their study have concluded that all patients treated with the commercial ethanol propolis extract showed regression of candida lesion similar to those patients treated with nystatin .³⁴

- **Safety:** Patients allergic to bee and bee products are more likely to experience allergic reactions, such as hypersensitivity, asthma, anaphylaxis and oral ulceration. Disadvantage also includes the fact that it gets frequently contaminated by yeast, fungus, bacterial spores. For adults and children above 1 year it is safe to be taken orally but it can be unsafe for infants and young children as ingestion of raw honey contaminated with Clostridium Botulinum spores can cause Botulism poisoning.^{6,8,32}

Conflict of Interest: None

Source of Funding: Self-funded

Ethical Clearance: The ethical clearance was obtained from Institutional Ethics committee, Institute of Medical science and SUM Hospital, Bhubaneswar, Odisha.

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Hand Hygiene an Important Need in Daily Practice

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ABSTRACT

Most common mode of disease transmission is inadequate hand hygiene as hands harbour numerous microbes. Hands are in constant contact of critical vectors for mediating microbes between people, pets, inanimate objects and our environments. Healthcare workers handle numerous animate objects which are colonized with bacteria and other microbes. Leading to increased chances of spread of infections. Antimicrobials may reduce the density of the skin resident flora, but they do not completely eliminate it. There is substantial evidence that the use of anti-microbial & proper understanding with daily correct following would lead to considerable reduction of infection. These infections are transmitted by hands when health-care workers or visitors are constantly in contact with the patient while providing assistance. Thus, using proper hand hygiene is critical in reducing the risk of infections in patients.

Keywords: *Disinfection, Hand Hygiene, nosocomial infection*

INTRODUCTION

Hand Hygiene refers to a process of physically removing dirt, blood, body fluids & microorganisms. It is important to the point that a few religions have additionally highlighted it. For instance, the Prophet of Islam made reference to it as an essential measure for general wellbeing and suggested it in various circumstances in day to day of life. The hands are in constant contact with the surroundings. Individuals utilize their hands for an assortment of exercises regular. It is greatly simple to interact with various microorganisms and to exchange them to different articles and perhaps individuals. Shockingly, fingernails harbor the most microscopic organisms found on the human hands.¹

It has been depicted as the foundation and beginning stage of all contamination. The hands of medicinal staff being the drivers and advertisers in treating diseased. Hand Hygiene has been recognized as the primary treating intervention framework that will drive down cross-transmission of pathogens.¹ It has been shown to decrease the recurrence of nosocomial contaminations even in intensive care patients. Proper hand cleanliness habits have been established to lessen the rates of gastrointestinal, respiratory tract, and skin diseases. Hand cleanliness practices of the ongoing time have incorporated the use of

liquor-based salves or rubs. In a dental setting hand hygiene should be mandatory before touching a patient, aseptic procedures, when exposed to body fluids or on coming in contact with a patient or its surroundings.²

Hand hygiene using a soap with water or waterless alcohol-based hand rubs all are methods which for be followed as basic mode of infection control. In dental practice hand hygiene is the most fundamental area of the disease control process and is without doubt the most basic need to diminish the threat of transmitting microorganisms from patient to the health care provider or vice a versa. It is low in spite of it being the least complex and most imperative parts of infection control^{2,3}.

HAND PATHOGENS NORMAL PROFILE

The skin of human hands is for all time exposed to resident microflora, present in the epidermis, sebaceous glands, and around nails in variable proportions. The occupant microflora comprises, most importantly, of coagulase-negative staphylococci, with the *Staphylococcus aureus* as the predominant strain. The non-pathogenic corynebacteria, and from parasites e.g. *Pityrosporum* (*Malassezia*) spp. are also most commonly found.⁴ It is likely for the resident microflora to cause a

disease. It could turn into a contamination of the operator at if the skin is broken.¹

Hands are the primary vector for contamination & transmission of diseases yet there has been no extensive or ongoing researches of the hand microbiome in disease transmission. When the hands are unwashed it contains the normal microflora or resident microscopic organisms and the transient microbes from the items that the hands are in constant contact. When hands are washed with cold water the residual dirt and a few microorganisms is expelled but principle pathogens are still present. Washing hands with cleanser and water decreases the quantity of transient microorganisms.⁶

Bacteria were the most prevalent microorganism (>80% relative abundance), then viruses, and fungi being least prevalent (<5% relative abundance) on hand. Studies stated approximately 8 to 24 families of bacteria were present on hands. Bacteria were present from almost four phyla in abundance which consisted of Firmicutes, Actinobacteria, Proteobacteria, and Bacteroidetes.⁷ Studies have found Staphylococcaceae, Corynebacteriaceae, Propionibacteriaceae and Streptococcaceae were found in a majority of which Propionibacteriaceae, if noticed were present in high relevance.^{6,8}

Indications for Hand hygiene: Washing hands with soap and water has been the primary method of hand cleansing. In 2002, however, the Centers for Disease Control and Prevention (CDC) published Guideline for Hand Hygiene in Health- Care Settings along with World health Organisation (WHO) which included several new evidence-based practices such as an alcohol-based hand sanitizer to replace traditional hand washing for all patient contacts except if hands are visibly soiled.⁹

- On presence of blood, body fluids and visible amount of dirt the health care providers should use either a non-antimicrobial or antimicrobial soap with water.
- If there is no visible dirt the health workers before coming in contact with patients could preferably use an alcohol hand rub or antimicrobial soap and water which should also be followed after removal of gloves. There are chances of tearing of gloves and thus fluid contamination.
- When there is potential exposure to spore forming organisms non-antimicrobial or antimicrobial soap

and water is recommended as the alcohol rubs is in effective against spore-forming organisms like as *Clostridium difficile*, *Bacillus anthracis* etc.¹⁰

- After using a washroom, before taking medications or having food & Concomitant or sequential use of alcohol rub with soap and water
- hand hygiene studies found that handwashing with soap and water was much more effective at removing bacteria when hands were dried with a paper towel then when hands were allowed to air dry. Other work supported this, showing increased bacterial transmission from improperly dried hand.¹¹

Who Needs to Perform Hand Hygiene?: In dental practice, microorganisms may be inhaled, implanted, ingested, injected, or splashed onto the skin or mucosa. They can spread by direct contact starting with one individual then onto the next, or through direct contact of instruments. When dental staff or others inhale small particles containing infectious agents.¹¹

A number of contaminating agents, like the bacteria or viruses can be transmitted through droplet infections from patients who are coughing, sneezing or talking. Transmission also occurs through close contact, through larger droplets that remain suspended in the environment. Annually healthcare personnel are held responsible for many healthcare-associated infections, of which primarily affected are the patients in in-patient settings and intensive care patients.¹²

Hand hygiene is also mediated to be the most crucial for decreasing the risk of transmission to patients and healthcare workers. As the principles of infection control hand hygiene is should be considered very important in the dental setting.

HAND WASHING METHODS

WHO has recommended hand hygiene in 6 basic steps with drying of hands being mandatory which should be done by sterilized gauze or towels. Reused of the towels are usually causes of contamination. Use of air dryer is time-consuming.

1. Washing of hands using warm water: It removes the dirt but will not be able to eliminate or reduce bacteria

2. Washing of hands with soap and water: This clears of the bacteria with reduction of resident bacteria.
3. Washing hands with water and an antimicrobial detergent: This method kills and eliminates the bacterial flora & to certain extent the viral population.
4. Hands washing with alcohol-based new disinfectants: This removes transient's bacterial flora, some viruses and spore of bacteria. This includes the newer antiseptic spray and gels.
5. Hands washing with traditional methods in operating room: This method involves using water and soap or an antimicrobial detergent such as 7.5% povidone-iodine and brushing. This hand washing method will take at least 1–3 min. In addition, being sure to scrub brushes should be used and concern with numerous skin lesions.
6. Newer method: In this method fast action cleaning solutions like deconexis applied. It doesn't require scrub brushes.

Hand Hygiene Technique: Wet hands completely with Luke warm water. Hot or cold water should be avoided, as hot water could lead to irritation of hands causing dermatitis. Hands should be rubbed together properly for a minimum of 15 seconds, covering all palms and fingers, then rinsed and completely dried. After hand wash care should be taken to turn off manual faucets by using a disposable towel to prevent recontamination of hands.¹³

- If utilizing a liquor-based hand rub, it ought to be connected to dry hands utilizing the sum indicated by the producer. Rub hands together, covering all surfaces and fingers, for something like 15 seconds until the point when hands are dry. (In the event that hands are dry following 10 seconds of liquor-based hand rub utilization, it is likely that too little of the item was utilized.)^{12,13}
- Surgical hand antisepsis is more important & should be routinely practiced. Jewellery likerings watches, bangles etc should be removed. Washed thoroughly under running water, fingernails are cleaned to evacuate debris. The microorganisms present are said to replicaterapidly under gloves.

ASSESSING THE THOROUGHNESS OF HAND HYGIENE

Monitoring hand hygiene should be made mandatory amongst the health care providers. It would be useful to identify gaps in our practices and to educate staff accordingly with a proper feedback of the information to those involved. The other aspects of hand hygiene which includes the finger nail length, artificial nails, wearing of rings, and proper use of gloves should be made mandatory.¹⁴ Improvement strategies could be developed for behaviour change towards Hand Hygiene should be advocated where in the staffs should be trained on the specific indications for hand hygiene. This could increase their awareness of the complexity of the indications of hand hygiene and make them more sensitive to non-adherence. The periodic performance measurement should be followed by comparative feedback on performance. The effective improvement should be monitored at both the provider and organizational levels. Even Visual or auditory reminders could be provided at multidisciplinary levels to analyse and improve hand hygiene processes.¹⁵

Indian Scenario: The quality of healthcare in India is governed by various factors as the facilities varies amongst the government or private-sector organisations. This could be primarily due to an economic and regional disparity across the country. Majority of medical and other health organisations are located in urban areas & it comprises 1/4th of the total population. There is unavailability of clean water for consumption. This is due to lack of support unavailability of trained personnel's, surveillance systems, sanitation, and understaffing in hospitals with overcrowding of patients. Although hand hygiene is an important custom for infection control it becomes difficult for all health care workers to practice proper hand hygiene.¹⁶

Thus practice of compulsory training on precautions, safe hospital practices on infection control should be practised amongst all health care workers. Such an exercise may be made mandatory across all medical and nursing colleges of India.

General considerations and conclusion: In India lack of hand washing facilities are major restraint for advocating hand hygiene. The alcohol-based hand sanitisers could be a solution to overcome these obstacles. They are handy and could be distributed individually to staff which they

can carry in the pockets and readily placed near patients. Health education has the potential to significantly alter the behaviour of students and their outlook towards hand hygiene.

Dental and medical professionals are exposed to a myriad range of disease conditions caused by bugs which has become resistant to current anti-microbial therapy. The blame is on healthcare workers to refresh the basics of infection control & to rate, reflect and implement effective measures to control and overcome the challenges we face in ineffective infection control measures. Dental faculties should be entrusted with teaching and training future dentists to practice infection control. Currently there are voids in awareness, training, compliance among healthcare workers in general and teaching faculty in particular.

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Mother's Knowledge & Attitude Regarding Oral Health of Pre-Adolescent Children's and Associated Risk Factors on Dental Caries Experience and Oral Hygiene Status

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ABSTRACT

Aim & Objectives: To determine mother's knowledge & attitude towards their child's oral health, dental caries experience & oral hygiene status of pre-adolescent children's.

Material and Method: In this descriptive cross-sectional study 400 pre-adolescents children & their mothers were randomly selected from 8 private & government school. A 21 item, self-administered questionnaire was used to assess the mother's knowledge and attitude towards child's oral health. DMFT/def index was used to record dental caries experience & oral health status was recorded by using OHI-S index. Descriptive statistics, t-test & chi-square test were applied to analyse the data.

Results: The Mean percentage of Mother's knowledge & attitude towards child's oral health of private & government school was 44.2% & 44.6%, 27% & 34.49% respectively. The mean±SD of oral hygiene status was 1.824±0.85 & 1.712±0.81, DMFT & def was 2.42±1.59 & 2.39±1.38, 0.61±1.40 & 0.50±1.46 among private & government school children respectively (p>0.05). Illiterate to literate mothers had 0.860 odds of having poor oral hygiene and 1.506 odds of having caries experience among their pre-adolescent children.

Conclusion: This study reflects that mother's knowledge & attitude towards their child's oral health is significantly associated with dental caries experience & oral hygiene status. The study signifies that as the mother's knowledge and attitude increases the caries experience decreases. Therefore, mother's education towards child's oral health is necessary.

Keywords: Attitude, Child, Knowledge, Mothers, Oral health

INTRODUCTION

It is well said that, children are the reflection of the parents, i.e. they follow the same behaviour as that of their parents. Children get accustomed with the behaviour of their parents especially their mother during the childhood and the preadolescent period of the life.

The same follows when oral health is considered.¹ It becomes important for the mothers to have a sound knowledge and attitude regarding the maintenance of oral health of their children.² It is in the early childhood period when the child starts to distinguish between the right and wrong practices in life, thus once concreted would be perceived throughout life of the individual.³ Mother helps the child to learn proper dietary habits, oral hygiene skills & healthy practices, which is proven by researches that mother's dental knowledge & attitude had an important role on their children's oral health & oral health related behavior.⁴

Other than the role of mother as oral health behaviour developer & modifier, they also are the primary caregivers to their pre-adolescent children,

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source of physical comfort & safety for the child.⁵ Some misconception do exist in this modern society among parents that the primary dentition are off less importance when compared to permanent dentition, so they misconceptualize that only proper oral health care is needed to be maintained with permanent dentition & they neglect the primary dentition, which results in grievances to the child.⁶

A negative impact on the day to day activities like performance skill in school and social life of the child occurs Due to the neglect and poor maintenance of oral health of the child .⁷ The most commonly encountered dental disease among pre-adolescent children include dental caries & malocclusion though which are preventable but still created havoc in most developed and developing countries. In India, the scenario becomes worse as they are preoccupied with the treatments that include emergency & curative oral health services rather than preventive oral health care.⁸ Oral health of pre-adolescent children is directly associated with the knowledge & attitude of their mothers and the foremost work of mother is to evaluate the oral health of their childrens, which is still questionable.¹

Due to the lack of knowledge about dental disease & importance of dentition an effective employment of disease control measure is not possible, which is added on with the fact that there are very few documented researches on mother's awareness of dental issues Hence the aim of the present study was to assess mother's knowledge & attitude towards child's oral health & a clinical assessment of pre-adolescent children's oral hygiene status & dental caries experience.

MATERIAL AND METHOD

This present descriptive school based cross-sectional study was conducted among pre-adolescent children of age 9-12 years, at 4 private & 4 government schools in Bhilai, Chhattisgarh. Using the Cochran formula, prevalence was taken from the previous study to be 92% & setting the confidence interval at 95%, margin of error at 5%, & design effect of 1.5, sample size was estimated to be 400.⁴ The total school in Bhilai city was obtained from the block education officer. The study was conducted for a period of 1 month from July 2017 to August 2017.

Incorporating the stratified random sampling technique the Bhilai city was divided into 4 zones (north,

south, east and west zones), from each zone 1 government and 1 private schools was randomly selected, and from each selected school 50 students between the age of 9-12 years were randomly selected.

Pilot study: The questionnaire was prepared in both Hindi and English language for ensuring comprehension by all mother's of the pre-adolescent children and pretested in a group of 10 mother's and modifications were made accordingly. Moreover, the validation was carried out by a panel of 10 experts in the subjects. Cronbach's alpha was calculated ($\alpha = 0.86$) and test-retest analysis showed a good reliability and consistency of 0.7 of the questionnaire. Those mothers who were involved in the pilot study were excluded from the final study. The knowledge questions were assigned score of one for the correct answer and zero for the wrong answer. The partially filled or incomplete questionnaires were excluded. Similarly for attitude score one was assigned for the correct answer and zero for incorrect answer. The option of don't know was assigned zero score.

Questionnaire:

A self-designed pre tested and close ended proforma comprised of two sections with a total of 21 items regarding mother's knowledge and attitude towards their pre-adolescent children's oral health was used.

Section-I: comprised of 10 questions to evaluate knowledge of mother's regarding their pre-adolescent children's oral health.

Section II: comprised of 11 questions to evaluate attitude of mother's regarding their pre-adolescent children's oral health.

After getting the completely filled questionnaire and signed consent from mothers, the oral hygiene status was recorded using Oral Hygiene Index-Simplified (OHI-S index 1964)⁹ & dental caries experience for permanent dentition was recorded using DMFT Index¹⁰ and for deciduous dentition def index was used.¹¹

STATISTICAL ANALYSIS

Descriptive statistics were derived; t-test was used to compare the mean of DMFT, def & OHI-S among private & government school children. Chi-square test was applied to check association between mother's knowledge & attitude with oral hygiene status & dental

carries experience of their pre-adolescent children. Simple linear regression model with odds ratio was incorporated for the statistical analysis of mother’s education and oral hygiene status, dental caries experience of their pre-adolescent children. The level of significance was set up at $p < 0.05$. The entire test were applied to analyze the data using (SPSS version 16.0 (IBM Corporation, SPSS Inc., Chicago, IL, USA).

RESULTS

A total of 400 subjects agreed to participate in the current study in which 181 (45%) were males and 219 (55%) were females with the highest prevalence in age among males 12 years (36.46%) & (33.33%) females were at the group of 11 years. In the present study kuppuswamy’s socioeconomic scale 2017 was used to assess the mother’s education & socioeconomic status, in which it was found that 114 (28.5%) mothers had a minimum of high school education & monthly family income ranging from 10357-15535 among 118 (29.5 %) mothers.⁶ (TABLE 1 & 2)

Table 1: Distribution of study subjects according to mother’s education

Sl. No.	Mother’s Education	Total n (%)
1.	Illiterate	57 (14.2%)
2.	Primary School	88 (22.0%)
3.	Middle School	99 (24.8%)
4.	High School	114 (28.5%)
5.	Higher Secondary	36 (9.0%)
6.	Graduate	6 (1.5%)
	TOTAL	400 (100%)

Table 2: Distribution of study subjects according to monthly family income

S. No.	Income (monthly)	n (%)
1.	< 2091	18 (4.5%)
2.	2092-6213	93 (23.2%)
3.	6214-10356	116 (29.0%)
4.	10357-15535	118 (29.5%)
5.	15536-20714	48 (12.0%)
6.	20715-41429	7 (1.8%)

Results from independent sample t-test on DMFT, def & OHI-S was compared on private & government

school children. It was found that mean DMFT, def & OHI-S was higher (values) among private school children but was not statistically significant ($p > 0.005$). (TABLE-3).

Table 3: Mean Comparison of DMFT, def & OHI-S among Private and Government school children

	DMFT (Mean ± SD)	Def (Mean ± SD)	OHI-S (Mean ± SD)
Private school	2.42 ± 1.59	0.61 ± 1.40	1.82 ± 0.85
Government school	2.39 ± 1.38	0.50 ± 1.46	1.71 ± 0.81
t-value	1.38	0.74	1.34
p-value	0.84 (NS)	0.45 (NS)	0.18 (NS)

Statistical test: independent t-test; ($p \leq 0.05$ -Significant, CI=95%)

Association between mother’s knowledge & attitude with caries experience & oral hygiene status was very highly significantly associated ($p < 0.001$) between study participants. This table implies that as knowledge and attitude of the mother’s regarding child’s oral health increases the oral hygiene status improves and dental caries experience decrease. (Table-4)

Table 4: Association of knowledge and attitude with caries experience and oral hygiene status:

	DMFT		Def		OHI-S	
	X ² -value	P-value	X ² -value	P-value	X ² -value	P-value
Knowledge	1.31	0.001*	1.50	0.001*	7.62	0.001*
Attitude	2.17	0.001*	3.77	0.001*	2.14	0.001*

Statistical test: X² = chi-square test; ($p < 0.001$)* = highly significant, CI=95%)

Simple linear regression model was applied and odds ratio was derived for literate and illiterate mothers for dental caries experience and oral hygiene status among the study subjects. The corresponding Odds ratio for each component is represented in table 5. It was evident from the table that the illiterate mother’s children had a odds of 1.5 of developing dental caries when compared to literate mothers children and this difference was found to be statistically significant. ($p < 0.001$) at 95% CI).

Similar findings were seen with the oral hygiene status among the pre-adolescent, this showed that the literate mothers had maintained a better oral hygiene

status for their preadolescent children when compared to the illiterate mothers.

Table 5: Simple linear regression model between mother's education & dental caries experience and oral hygiene status of their pre-adolescent children

Variables	β	SE	95% CI		R ² -value	OR	p-value
			LL	UL			
Mother's Education							
DECAYED	1.632	0.168	0.60	2.34	4.6	1.19	0.001*
MISSING	0.507	0.089	0.574	1.993	6.6	1.069	
FILLED	0.349	0.093	0.575	2.261	1.9	1.141	
DMFT	2.222	0.194	0.728	3.113	5.1	1.506	
d	0.476	0.147	0.724	4.305	4.0	1.766	
e	0.140	0.049	0.286	1.846	3.9	0.726	
f	0.071	0.052	0.365	7.118	0.9	1.613	
deft	0.715	0.186	0.558	2.292	4.6	1.131	
DI-S	1.017	0.061	0.377	99.050	1.1	6.107	
CI-S	1.019	0.064	0.464	2.109	1.2	0.989	
OHI-S	2.041	0.108	0.054	13.795	1.36	0.860	

Test applied: linear regression, ((p<0.001)* = highly significant, CI=95%)

OR-Odds Ratio between literate and illiterate mothers LL- lower Limit, UL, Upper Limit

DISCUSSION & CONCLUSION

This study was designed to determine mother's knowledge & attitude towards their pre-adolescent children's oral health. Children in their pre-adolescent years involve primary socialization & acquire childhood routine habits & oral hygiene practices. Parent's support towards maintaining their child's oral health is important for influencing the dental health of pre-adolescent children. It is essential that the mother have knowledge on oral hygiene practice that would play a key role in the development of oral hygiene habit among their pre-adolescent children. Not only the literacy level of mothers but also the social status of the family plays an important role in assessing the oral health status of pre-adolescent children in the society. It is assumed that a well-educated mother with good socioeconomic status will have knowledge and access to all the resources, which would be reflected in the pre-adolescent children's oral health.

Among 400 mothers who completed the questionnaire in the present study it was found that

64.0% mothers had knowledge that their children's teeth should be brushed twice daily. However it was found that, study conducted by Khanal K et al found that out of 76% mothers, only 10% of them brushed their child's teeth twice daily.¹² In our study 55.8% mothers had knowledge that tooth paste is the material of choice for cleaning their child's teeth. However study conducted by Mubeen N. & Nisar N found that majority of the mothers had inadequate knowledge in relation to duration of brushing and material to be used for brushing their child's teeth.¹³ In the current study 41.2% mothers had knowledge about what is dental decay and 74.0% mothers had knowledge that which food stuffs causes dental decay. Whereas a study conducted by Ashkanani F & Al-sane M also found that majority of the mothers had knowledge that consuming sugary food leads to dental decay.¹⁴

Among all the study participants assessing the attitude regarding evidence that good oral health related to good general health 68.8% mothers had a positive attitude whereas 13.2% mothers had a negative attitude

for the same. Study Alshehri A & Nasim V S found that approximately 85% of parents believe that dental health will affect child's general appearance.³

Mothers with the higher education level have better knowledge and attitude regarding oral hygiene and importance of deciduous tooth. This is similar to a study conducted by Szatko et al which reports that the mother with the lower level of education also have low level of oral health knowledge.¹⁵ In the current research, when it was asked whether deciduous dentition was as important as permanent dentition, 59.0% mothers had a positive attitude whereas 29.5% mothers did not believe that deciduous dentition was as important as permanent successor. However study conducted by Jain R et al found that majority of the mothers were in opinion that baby's teeth do not require good care as they will fall off.¹⁶

Majority of the mothers in the present study had a positive attitude that children should have regular dental visit. This result was in accordance with the study conducted by Moulana et al & Chand et al who also found that regular dental visit for their children is necessary, Thus it is suggested that the sooner the child visit a dentist the less is the dental problem.^{1,6}

This study concludes that the mothers play a very important role in promoting good oral habits & preventing dental diseases, thus positively influencing their children. This is the main reason for mothers to be well educated about good oral health. The result of present study reveals that the mother's knowledge & attitude regarding child's oral health were found to have a significant impact on oral hygiene status & dental caries experience of their pre-adolescent children. Mothers of high educational level have comparatively more knowledge and attitude about children's oral health than the mothers of low educational level. The present study also emphasizes the need to initiate more oral health awareness educational programs for mothers and their children at the school setups as well as to disseminate oral health awareness in the Indian population.¹⁷

This study has some limitations. Oral hygiene knowledge & attitude are influenced by a number of factors like occupation, dietary habits etc., which were not taken into consideration in the present study. This study carried out in only 8 schools, a large sample would be beneficial to reflect more appropriate results of the knowledge & attitude of mothers regarding their child's oral health in other part of the country.

This study strongly recommended that appropriate oral health strategies targeting mothers should be designed to improve the knowledge & attitude towards their pre-adolescent children's oral health. So during the planning of awareness programs for pre-adolescent children, mother's potential to promote good oral health should be advocated by oral health professionals.

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Ultrasonography in Maxillofacial Lesions

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ABSTRACT

Various kinds of diseases may be found in the oral and maxillofacial regions and various modalities may be applied for their diagnosis, including intra-oral radiography, panoramic radiography, ultrasonography, computed tomography, magnetic resonance imaging, and nuclear medicine methods such as positron emission tomography. Of these modalities, ultrasound imaging is easy to use for the detection of noninvasive and soft tissue-related diseases. Ultrasonography uses a probe with one or more acoustic Transducers to send pulses of sound into a material. Whenever a sound wave encounters a material with a different density a part of the sound wave is reflected back to the probe and is detected as an echo. The time it takes for the echo to travel back to the probe is measured and used to calculate the depth of the tissue interface causing the echo. Ultrasound is an inexpensive, non-invasive and readily available imaging technique, that can be used as a primary investigative imaging technique So as to avoid radiation hazards caused by X-ray radiation or to provide imaging in a cost-effective way ultrasonography is an alternative imaging modality. Hence proper application and utilization of this technique can be of great use in dentistry though it still has not made its place in routine imaging modalities of maxillofacial region. Its limited role in bony and intra-bony diseases and operator sensitivity makes it a less used and less appreciated imaging modality.

Keyword: *Ultrasonography, Maxillofacial Radiology*

INTRODUCTION

Sound is a form of energy which travels in the form of waves through a medium and it is audible to human ears. Ultrasound is acoustic energy which is also in the form of waves having a frequency greater than that of human hearing range. The maximum frequency that the human ear can perceive is roughly twenty thousand cycles per second (20,000Hz). Now it has

become an integral part of medicine to view internal organs. Some animals such as dolphins, bats and dogs have a higher frequency of hearing and hence can hear Ultrasound.¹ Various kinds of diseases may be found in the oral and maxillofacial regions and various modalities may be applied for their diagnosis, including intra-oral radiography, panoramic radiography, ultrasonography, computed tomography, magnetic resonance imaging, and nuclear medicine methods such as positron emission tomography. Of these modalities, ultrasound imaging is easy to use for the detection of noninvasive and soft tissue-related diseases.¹⁻⁴

In the oral and maxillofacial regions, Ultrasonography can be applied to various aspects such as to check salivary gland diseases, lymph node disease, subcutaneous lesions and tongue related lesions.² However, most dentists do not know the utilities of Ultrasonography for the diagnosis of various kinds of

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oral diseases and it is very disadvantageous for patients with any of the diseases mentioned above. In the present article, therefore, we explain the significance of the clinical applications of Ultrasonography -guided fine-needle aspiration (FNA), ultrasound identification and measurement of tongue cancer thickness, and ultrasound-based diagnosis of metastasis to cervical lymph nodes³

Regulation of Ultrasonography: Diagnostic ultrasound is regulated in the USA by the FDA and world wide by National regulation agencies. The primary regulatory metrics are MI (Mechanical Index) a metric associated with cavitation bio effect and TI (Thermal Index) a metric associated with tissue heating bio effect. These are strictly followed for safety.⁵

Creation of Image: The creation of an image from sound is done in three steps:

Producing a sound wave: In medical ultrasonography, a sound wave is typically produced by creating short, strong pulses of sound from a phased array of piezo electric transducers. The electric wiring and transducers are encased in a probe. The electric pulses vibrate the ceramic to create a series of sound pulses from each.³¹ The frequency of the sound waves can be between 2 and 13 MHz. The goal is to produce a single focused arc shaped sound wave from the sum of all individual pulses emitted by the transducer. To make sure the sound is transmitted efficiently into the body, the transducer face has a rubber coating. In addition, a water-based gel is placed between the probe and the patient's skin.⁶

Receiving the echoes: The return of the sound wave to the transducer results in the same process that it took to send the sound wave, just in reverse. The return sound wave vibrates the transducers elements and turns the vibrations into electrical pulses that are sent from the probe to the ultrasound scanner where they are processed and transformed into digital image.⁷

Forming of the Image: The ultrasound scanner must determine three things from each received echo, The direction of the echo, How strong the echo was, How long it took the echo to be received from when the sound was transmitted. Once the ultrasound scanner determines these three things, it can locate which pixel in the image to light up and to what intensity.⁷

Sound in the Body: Ultrasonography uses a probe with one or more acoustic Transducers to send pulses of sound into a material. Whenever a sound wave

encounters a material with a different density a part of the sound wave is reflected to the probe and is detected as an echo. The time it takes for the echo to travel back to the probe is measured and used to calculate the depth of the tissue interface causing the echo.²⁹ The greater the difference between the acoustic impedances, the larger the echo is. Seeing deep into the body with ultrasound is difficult. Some acoustic energy is lost every time an echo is formed, but most of it is lost in the form of acoustic absorption common model of this loss is $0.3\text{dB}\backslash\text{cm of depth}\backslash\text{MHz}$.⁸⁻¹⁰

To generate a 2D image, the ultrasound beam is swept. A transducer may be swept mechanically by rotating or swinging or a 1D phased array transducer may be used to sweep the beam electronically.¹¹ The received data is processed and used to construct the image. The image is then the 2D representation of the slice into the body.⁷

Ultrasound Terminologies: Echo- reflection of sound

1. Types of echoes

- Hypo echoic-less reflection of sound waves
- Iso echoic-medium level reflections of sound waves
- Hyper echoic-total reflection of sound waves

2. Internal echoes

- Homogeneous-evenly distributed echos
- Non-homogeneous-unevenly distributed echos

3. Boundaries

- Clear-well distinguished
- Unclear-moderately distinguished
- Obtuse-not demarcated from the surrounding structures

4. Shapes

- Oval
- Roughly oval
- Polygonal
- Irregular

Acoustic Enhancement:

- **Posterior Shadowing:** Complete propagation loss of sound wave due to strong reflector

- **Posterior Enhancement:** Increase in the propagation of sound waves.
- **Lateral Shadowing:** Partial propagation loss of sound waves along the lateral borders.

Advantages

- It creates excellent images of the muscle and soft tissues as well is mostly useful to delineate the interfaces between solid and fluid filled spaces.
- It creates a linear array of images so that the operator can dynamically select the required section and offer an apt and rapid diagnosis
- It can be used to study the structure of the organs.
- Has no side effects and has better compliance from the patient
- Readily available and easy to use.
- Portable hand-held scanners are also available which can be used as a bed side operators' tool.
- Cost effective as compared to other radiographical units.

Disadvantages

- Scattered image in obese patients as the adipose tissues and the greater depth needed to travel weaken the image strength.
- Ultrasound devices have trouble in penetrating bone
- It produces poor quality images if there is presence of a dead space in between the transducer and the structure to be viewed.
- Deep seated structures are difficult to view
- Experienced operators are required to gain high quality images.
- There is no scout image as there is with CT and MRI. Once an image is acquired there is no exact way to tell which part of the body was imaged.
- There are several disadvantages of ultrasonography which are encountered while performing the examination of Head and Neck.

Instrumentation for Head and Neck Ultrasonography:

In the diagnosing of head and neck diseases, device with A and B modes are used; A-mode is employed in

the diagnosis of the diseases of paranasal sinus and of maxillary frontal and anterior ethmoidal cells. The curve typical for a particular pathological entity allows the free content in sinuses, edema or polypoidally degenerated mucosa and tumor to be determined.¹²

B-mode is also used in the diagnosis of sinus diseases as well as the diseases of other parts of head and neck, including the following organs located in the area of drainage of salivary glands, being tumors of neck, thyroid gland and tumors of the larynx, oropharynx and pharynx.¹³ Linear, complex and sector probes are used for ultrasonographic examination. The probes must be of high frequency ranging between 7-10 MHz. A combination of various probes should be used during examination (eg) the neck structures and thyroid gland should be observed by linear probes, where as in the case of structures of smaller surface convex, micro convex or sector probes should be used concerning patient position on examination, sinus diseases are diagnosed in sitting position recent advancement in probes in that complex electron produce of the same frequencies with radius convexion of 40-80 degrees are now frequently used.⁹ Diseases of salivary gland and oropharynx are above examined in sitting position, whereas other structures of the head and neck are as a rule examined in supine position or occasionally a combination of various positions may be required.¹¹ The skin of the region to the observed should be anointed with gel. In case of lesion in the region observed, a sterile slip-on cover and sterile gel should be used.¹⁴⁻¹⁷

Indications for ultrasound in the Head & Neck Region

- Evaluation of swellings of the neck, particularly those involving the thyroid, cervical lymph nodes or the major salivary glands—ultrasound is now regarded as the investigation of choice for detecting solid and cystic soft tissue masses
- Detection of salivary gland and duct calculi
- Determination of the relationship of vascular structures and vascularity of masses with the addition of colour flow Doppler imaging
- Assessment of TMJ disorders
- Assessment of the Intraosseous lesions of the jaw
- Assessment of cervical lymph node metastasis.

- Ultrasound-guided fine-needle aspiration (FNA) biopsy.
- Assessment of Maxillofacial space infections
- Assessment of Soft tissue lesions such as carcinoma of tongue

MUSCLES

Measurements and cross sectional dimensions can be made through ultrasonography in the muscles of head and neck to assess asymmetry, muscle dimensions, thickness, etc.¹⁸ For temporalis muscle the scanner should be placed against patients head in vertical to horizontal direction overlying the anterior temporalis.¹⁹ For the anterior masseter muscle the transducer is placed against the patients face in horizontal direction just above the superior border of the mandible. For the deep masseter muscle, the transducer is placed against the patients face in a horizontal direction just above superior border of the mandible.¹⁹ Inflammation of the masseter muscle will show complete or partial absence of hyperechoic bands and decreased internal echogenicity.²⁰⁻²³

PARANASAL SINUSES

The superficially located sinuses such as frontal and maxillary sinuses can be easily accessible by ultrasound, but sphenoidal and ethmoidal sinuses are inaccessible.²⁴ In ultrasonography a total reflection of the ultrasound waves result while examining the air containing paranasal sinuses due to marked difference in acoustic impedance between soft tissue and bone material on one hand and between bone and air in the area of the anterior wall of the inspecting sinus on the other hand.²⁵ Only an anterior wall echo of the abnormal paranasal sinus can be depicted by sonography.²⁶ When a thin layer of air is located between the anterior walls of the sinus cavity, the anticipated pathological lesion of the sinus cavity cannot be detected sonographically. In effusion filling the sinus the ultrasound beam is not totally reflected but is transduced to the posterior wall where it undergoes reflection.¹⁴ This reflection of the sound appears on the monitor as a posterior wall echo. Depending on the depth of the investigating sinus below the surface, this posterior wall echo can be expected to show at a certain distance from the echo produced by the anterior wall.⁵ The patient is seated in an upright position. First a transverse image is obtained and then a vertical

image is obtained, and the images are comparatively and bilaterally assessed. While imaging the maxillary sinus, the transducer is placed at the level of the infra orbital nerve. For the frontal sinus, the ultrasound probe is placed between the medial portion of the eyebrow and glabella, near the lowest point of the frontal sinus cavity. The anterior ethmoidal sinus can be imaged from the medial corner of the eye.²⁷

Only the anterior wall of normal air containing maxillary sinus can be visualized. Total reflection at the bone air interface of the paranasal sinus prevents further distal echo signals from being generated.³² The imaged soft tissue layer in the anterior bone wall of the maxillary sinus has a thickness of about 0.8 to 1cm and the corresponding thickness of the soft tissue layer of the frontal sinus is approximately 0.5cm.²⁸ If a pathological lesion is present posterior wall echo can appear 3.5cm to 4.5cm further distally in maxillary sinus and about 1.5cm to 2.5cm in frontal sinus examination. Depth and extension of the ethmoid cell system cannot be visualized because of the distinct inter individual variations.²⁹ There will be propagation of ultrasound waves up to the posterior wall if there is secretion or swelling of the mucosa. The content of the sinus cavity appears homogeneously hypoechogenic to sonolucent with isolated internal echoes. If the pathology is in the anterior wall and the remaining part of the sinus cavity contains air and normal posterior wall, it cannot be sonographically visualized. In solid tumors the inhomogeneous echo pattern distinguishes this finding from the typical echo pattern produced by an effusion in which case no further sonographic changes occur as the signal travels from the anterior to the posterior wall.¹⁹ Due to the physical principles of ultrasound imaging, the paranasal sinuses are accessible to the sonographic examinations only to a certain degree. It is not possible to plan surgical intervention solely based on ultrasound findings. Ultrasound of the paranasal sinus can be used in the investigating the maxillary sinus and frontal sinus after the surgery has been carried out.³⁰

SALIVARY GLAND ENLARGEMENTS

Ultrasonography has become one of the important imaging technique and pathological changes of salivary gland can be studied with ultrasonography.⁹ It is easy to use, less expensive less time-consuming non-ionizing and suitable for peripheral location of the salivary gland enlargement.¹⁵

In this process the electrical impulses are converted into waves and these waves produce high frequency sound and sonic waves. These waves are transmitted into the tissue. As sonic waves pass through the pathological tissue, they produce different type of echoes. These echoes vary in different diseases and echogenicity is recorded for variations.¹⁷

These echoes are broadly described as hypo echoic, iso echoic and hyper echoic. The sonographic features include not only the echoes of sonic waves but also help to identify echoes, acoustic enhancement, presence of calcification vascularity etc. Many diseases of salivary gland appear as enlargement both in major and minor salivary glands.³¹ Salivary gland diseases mainly appear in the form of enlargement. In sialadenosis a non-inflammatory bilateral enlargement of salivary gland though clinically can be confusing whether the bilateral enlargement of salivary gland is sialadenosis or Sjogren's syndrome. It is found by Louis mantel-et al etc, that multiple hypo echoic areas bilaterally with sonolucency vary in size. Thus, sialadenosis though it is a bilateral enlargement can be diagnosed from ultrasound and differentiated from Sjogren's syndrome.³²

In sialolithiasis- when it occurs in the salivary gland it will produce pain and inflammation. In radiograph the salivary stone is in the process of calcification it will appear as radiolucent misguiding the radiographer. In such occasion's ultrasonography is very much beneficial, in ultrasonography stone can be detected in the enlarged duct. If we standardize the ultrasonographic calcified masses can be detected early.⁶ Ultrasonography can also be used to diagnose benign neoplasms. The ultrasonographic observation for a polymorphic adenoma is hypo echoic mass, non-homogenous internal echoes ovulated, spherical in shape. These features are general for a polymorphic adenoma but variants like calcification and vascularity can also be noted. The extension of the tumor and its extension can be accurately seen using ultrasonography.³³

There is not much difference in ultrasonographic observations between benign and malignant tumors. But the malignant tumors have non-homogeneous internal echoes. The non-lobulation is the characteristic of malignant tumours. The non-homogenous or hetrogenus internal echoes in the parotid swelling are the characteristic ultrasonographic finding in malignancy. However, ultrasonographic observation can help to

diagnose the parotid swelling as malignant but it cannot give the characteristic type of the malignant tumors, but observations suggest that it is very difficult to diagnose benign and malignant tumours as there are overlapping of sonographic findings.³⁴

Parotid swellings in HIV patients show multiple hypoechoic areas bilaterally with a variety of sonographic patterns are seen. Mostly, well circumscribed large sonolucent areas surrounded by well-defined borders with in these hypoechoic areas and debris are seen. In the second variety small oval hypoechoic areas with echogenic centre is seen. In the third variety define small hypoechoic region interspersed with normal echogenic areas. However large circumscribed sonolucent areas are a dominant feature in most of the glands.²²

COLOR CODED DOPPLER SONOGRAPHY

It is a combination of sonography pulsed Doppler system and the color-coded representation of perfused areas. The speed and direction at which the erythrocytes approach and move away from the transducer provides the information necessary for the functional duplex sonography which is coded with blue and red colors.²⁵ The assessment of the color distribution gives information about the vascularization of tumour masses. Color coded duplex sonography is mainly used for assessment of anomalies concerned with blood and vascularity of a lesion. It is especially indicated for angiomatous tumours, lymphangiomas, hemangiomas and other vascularized tumours. Color Doppler sonography is useful in analyzing changes in blood flow of submandibular salivary gland caused by gustatory stimulation. Doppler sonography can clearly depict the facial artery and its branches in the anterior face, and this method useful in the follow up examination of hemangiomas in this area.³⁵⁻³⁸

CONCLUSION

Ultrasound is an inexpensive, non-invasive and readily available imaging technique, that can be used as a primary investigative imaging technique So as to avoid radiation hazards caused by X-ray radiation or to provide imaging in a cost-effective way ultrasonography is an alternative imaging modality. Hence proper application and utilization of this technique can be of great use in dentistry though it still has not made its place in routine

imaging modalities of maxillofacial region. Its limited role in bony and intra-bony diseases and operator sensitivity makes it a less used and less appreciated imaging modality.

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Global Tobacco Control

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ABSTRACT

Tobacco related diseases are increasing, especially in the developing countries which are experiencing the highest increase in the rate of tobacco use. Tobacco use is one of the main risk factors for several chronic diseases, including cancer, lung diseases, and cardiovascular diseases. Dentist can help patient to quit smoking for better oral and general health. Various health agencies and professionals must work together to help patient to stop the habit of tobacco usage which may later emerge as the single most known cause of mortality and morbidity in the world. People will get aware of the ill effects of tobacco by the help of dentist. The next generation of dentists should be trained well enough in assessing and treating the patient with tobacco use. The present article reviewed the current scenario about the tobacco related diseases and the risk factors associated with oral health and general health and the measures taken to control tobacco by the various health programmes around the globe.

Keywords: Tobacco; Health risks; Public health; Tobacco control

INTRODUCTION

Use of tobacco and its hindering effect on human body has now become one of the greatest public health challenges in the world. Every year over 4.9 million deaths are caused by tobacco. By 2030, unless there are dramatic reductions in tobacco use, that number will rise to 10 million deaths annually. There is overwhelming evidence showing that tobacco use causes many diseases, including stroke; heart attack; chronic bronchitis; chronic cough; asthma; cold; and cancer of the lungs, throat, mouth, stomach, kidney and bladder. Half of all regular smokers die of a condition caused by smoking. Tobacco use is one of the main risk factors for several chronic diseases, including cancer, lung diseases, and cardiovascular diseases¹. Tobacco kills approximately 5

million people annually worldwide, accounting for over 20 percent of all deaths for adult men and 5 percent of adult women².

Many studies have shown that in the poorest households, less money for food, education and healthcare are because of spending 10% of total household expenditure on tobacco products. 10 – 14% of children from tobacco growing families stop attending schools and miss classes because of working in tobacco fields. 60 – 70% women from tobacco farm are often exposed to hazardous chemicals.

The institute for Global Tobacco control's mission is to prevent death and disease from tobacco products by generation of evidence supporting towards tobacco control intervention.(Global tobacco control.org.in) The US National Cancer Institute (NCI) launched an Initiative for the Study of Innovative Systems in the year 2002 to better understand strategies for integrating science and practice which includes broad consultation with tobacco control experts to map out the current extent of tobacco control activity and to identify tobacco control priorities. Developing an integrated model of tobacco control leads to a better alignment of tobacco control activities at the

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national levels which is proposed by the leading experts in systems and network theory. Enhancing global tobacco control research through information sharing and collaboration among researchers was developed by the Global Tobacco Research Network (GTRN) which also connects organizations to conduct, synthesize, manage, and disseminate tobacco control research³.

Tobacco related diseases are increasing, especially in the developing countries with increase in the rate of tobacco usage. By the third decade of this century, tobacco usage will be the leading cause of death causing more deaths than HIV, malaria, tuberculosis, maternal mortality, automobile crashes, homicides and suicides combined. Tobacco usage is also the leading preventable cause of death in the world today which can clearly be the most cost-effective measure. Tobacco control protects the rights and health of non-smokers, especially babies, children, youth and pregnant women. Most significant effects of smoking on the oral cavity are: oral cancers and pre-cancers, increased severity and extent of periodontal diseases, as well as poor wound healing. Oral health professionals should take part in tobacco control initiatives and cessation programmes.

FDI shares and fully supports the goal of the WHO Oral Health Programme, which is “to ensure that oral health teams and oral health organizations are directly, appropriately and routinely involved in influencing patients and the public to avoid and discontinue the use of all forms of tobacco⁴.”

The Framework Convention on Tobacco Control: The main vehicle to accelerate tobacco control is the WHO’s Framework Convention on Tobacco Control (FCTC) which is the first global treaty on public health. The FCTC has introduced evidence-based strategies as its formulation was driven by evidence from two major reviews of global tobacco control. FCTC has been limited largely by a statement of intent; the specific actions needed to implement the provisions in each country require ongoing technical support. In particular, the pressing priority is to counter the active influence of the tobacco industry, which seeks to secure complex tax regimes.⁴

After MPOWER was introduced a decade ago as a tool to help implement the World Health Organization’s Framework Convention on Tobacco Control (WHO FCTC) there has been remarkable progress made in global tobacco control. The important MPOWER measures are: Monitor tobacco use and prevention policies, Protect people from tobacco use, Offer help to quit tobacco use, Warn about the dangers of tobacco, Enforce bans on tobacco advertising, promotion and sponsorship, raise taxes on tobacco.¹

One in nine deaths in South Africa is related to tobacco use. Relevant to the dental profession, within the FCTC’s guiding principle of the need to protect all persons from the initiation, maintenance or increase of tobacco use are articles 12 and 14. These challenge parties to take action to train health workers and secure treatment for tobacco dependence. Tobacco control, whether in private practice or in public service, must be viewed as primary prevention within the ethical context. For implementing tobacco prevention and tobacco cessation, science-based guidelines are present. Dentists who implement an effective cessation programme in their practices can expect to achieve quit rates of 10-15% each year. However, this primary prevention effort can be no better than the knowledge, skills and values of the practitioners. Trained professionals should assume stewardship by providing support for the training of dental professionals in tobacco counseling for the adequate reimbursement of practitioners providing such services⁵.

WHO Oral Health Programme initiating Tobacco Control: Tobacco-related oral diseases and its adverse conditions through several strategies are aimed to control by the WHO Oral Health Programmes. Within WHO, the Programme forms part of the WHO tobacco-free initiatives, with fully integrated oral health-related programmes. By the help of international and national oral health organizations WHO encourages the adoption and use of tobacco-cessation. WHO Collaborating Centres and NGOs who are the primary partners, are in official relations with WHO, i.e. the International Association for Dental Research (IADR) and the FDI World Dental Federation⁵.

Table 1: WHO Oral Health Programme objectives and activities carried out in relation to tobacco control

<p>State-of-the-science and new knowledge</p> <ul style="list-style-type: none"> ● Analysis of existing knowledge about oral health – general health and relationships to tobacco use ● Update of the WHO Global Oral Health Data Bank, including periodontal disease data (CPI) ● Integration of oral health data bank into other WHO databanks on general health and tobacco use ● Update of the WHO Oral Health Surveys Basic Methods, including guidelines for recording risk factors/tobacco use and tobacco-induced oral diseases and conditions <p>Assistance to countries in risk behaviour analysis and risk surveillance</p> <ul style="list-style-type: none"> ● Development of indicators and tools for assessment of tobacco use and their impact on oral health, as part of national health programmes ● Tests of instruments in selected countries <p>Translation of knowledge into action programmes in countries/communities</p> <ul style="list-style-type: none"> ● Analysis of policy and analysis for policy in relation to tobacco use and oral health ● Effective use of schools in tobacco prevention among children and adolescents, based on Health Promoting Schools principles ● Guidelines on tobacco prevention and oral health for pregnant women and young mothers at MCH level ● Effective involvement of oral health professionals in tobacco cessation programmes – analysis of barriers and constraints <p>Evaluation, monitoring and surveillance</p> <ul style="list-style-type: none"> ● Operational research in tobacco behaviour modification ● Development of community/country specific goals for tobacco prevention, incorporating oral health ● Development of models for evaluation of community-based oral health promotion programmes, including tobacco control ● Outcome and process evaluation of community demonstration projects for sharing experiences ● Development of tools for surveillance and monitoring tobacco control programmes
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The tobacco control priority areas are outlined in Table 1. Firstly, state-of-the-science analysis and development of modern, integrated information systems will provide an important new platform for public health initiatives in tobacco control. Secondly, Programme provides assistance in risk behavior analysis and surveillance in order to help include oral health aspects in tobacco prevention programmes. Thirdly, it supports the translation of knowledge into action programmes, e.g. tobacco prevention activities in schools or by involving oral health professionals in national or community-based tobacco control. Fourthly, the WHO Oral Health Programme has intensified the work towards development of surveillance, monitoring and evaluation systems⁶.

The World Health Organization (WHO) has strengthened the work for effective control of tobacco use. In May 2003, at the World health Assembly, the Member agreed on a groundbreaking public health treaty to control tobacco supply and consumption which covers tobacco taxation, smoking prevention and treatment, illicit trade, advertising, sponsorship and promotion, and product regulation. Oral health professionals and dental associations worldwide should consider this platform for their future work for tobacco prevention since in several countries they play an important role in communication with patients and communities. This programme gives priority to tobacco control in many ways through the development of national and community programmes

which incorporates oral health and tobacco issues, tobacco prevention through schools, tobacco risk assessment in countries, and design of modern surveillance systems on risk factors and oral health.

Since the beginning of the twenty-first century prevalence of tobacco smoking has decreased steadily (Table 1). It was estimated by WHO that 20.2% of the world’s population aged ≥ 15 years were current smokers in 2015, indicating 6.7% smoking rate has decreased globally since 2000 and by 4.1% since the WHO FCTC came into force in 2005. The estimates thus show the prevalence among females decreased annually

at a rate of -0.38% to -0.22% in the period 2000–2015. If current tobacco control initiatives targeting women are maintained till 2025, the rates are projected to fall by a further -0.20% on average in the period 2015–2020 and by -0.14% in the period 2020–2025. Males have achieved annual reduced rates of -0.68% to -0.50% between 2000 and 2015. As the annual reduction required to attain the male target is -0.73%, males are not likely to reach the 2025 target of 25.6%. Smoking prevalence at the age 45-64 is maximum⁵(WHO global report on trends in prevalence of tobacco smoking 2000–2025, second edition. Geneva: World Health Organization; 2018, Table 2).

Table 2: The change in prevalence of smoking among >15/15 years of age and different gender from 2000-2050

	Year	Both sexes		Males		Females	
		Prevalence (%)	Average change over past 5 years (%/year)	Prevalence (%)	Average change over past 5 years (%/year)	Prevalence (%)	Average change over past 5 years (%/year)
Fitted	2000	26.9		43.0		10.9	
	2005	24.3	-0.52	39.6	-0.68	9.0	-0.38
	2010	22.1	-0.44	36.6	-0.60	7.5	-0.30
	2015	20.2	-0.38	34.1	-0.50	6.4	-0.22
Projected	2020	18.7	-0.30	31.9	-0.44	5.4	-0.20
	2025	17.3	-0.28	30.0	-0.38	4.7	-0.14
Target*	2025	15.5	-0.44	25.6	-0.73	5.3	-0.15
Gap		-1.8		-4.4		0.6	

* The average annual change required to achieve the 2025 target, with 2010 as the baseline, was calculated for the 15-year period 2010–2025.

SOURCE: WHO global report on trends in prevalence of tobacco smoking 2000-2025, second edition

There have been decrease in prevalence all income groups. In high-income countries the prevalence decreased from 33.6% in 2000 to 24.6% in 2015, representing an absolute reduction of 9% during that time (or an average absolute reduction of 0.6% per annum). The trend for both sexes clearly illustrates the strong correlation between income level and prevalence. In 2000, the prevalence in high-income countries was 4% higher than that in upper middle-income countries, 10.5% higher than that in lower middle-income and 17.5% higher than that in low income countries. By 2015, the gaps decreased to 1.2% in relation to upper middle-income countries, 7.2% to lower middle-income countries and 13.0% to low-income countries (Fig 1).⁵

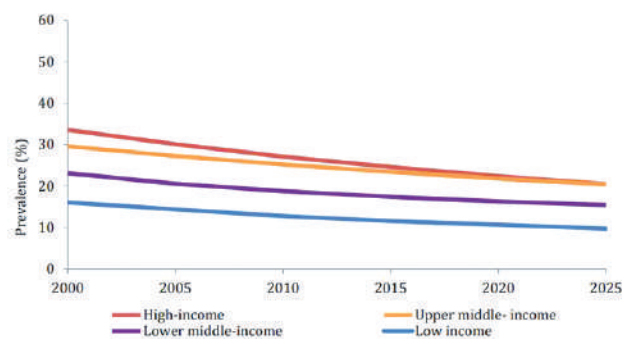


Figure 1: Prevalence of Smoking on the basis of income value, among HICs, MICs and LICs

SOURCE: WHO global report on trends in prevalence of tobacco smoking 2000-2025, second edition

Public Health Intervention: In 2003, the World Bank described six cost-effective measures for reducing population tobacco use/tobacco control measures—namely, price increases or increased taxation, comprehensive bans on smoking in public and workplaces, bans on advertising and promotion of tobacco products, better consumer information (including mass media campaigns), warning labels on tobacco products, and help for smokers wanting to quit.⁶

Tobacco Taxation increase Policy: Increase in taxation or price of tobacco is one of the successful public health interventions Tobacco control interventions, Tobacco control policies excises account for half of cigarette prices, a doubling (100% increase) of the cigarette tax will lead to a in revenues.⁷ Aggressive taxation is the key strategy for LMICs to reduce smoking at a rate faster. Over 100 studies demonstrate a strong negative relationship between cigarette pricing and consumption. Increased taxes are particularly effective in preventing young smokers from moving beyond experimentation into regular, addicted smoking. 2.11 was the estimated price elasticity of youth smoking.; a 10% increase in tobacco prices would result in a 21.1 percent reduction in consumption. Affordability is a concept that captures the interaction between consumers' income levels and tobacco prices. Typically, affordability is defined as per capita GDP relative to the wholesale price index for bidis or cigarettes.^{2,7}

Smoke-Free Environment: The CRD review identified 14 studies evaluating smoking bans in public or workplaces, since evaluations assessing exposure before and after legislation have failed to demonstrate a differential impact which is unclear.⁸

Bans on Advertising and Tobacco Products: The proposed legislation may prove less effective at controlling tobacco advertisement since it has ignored some avenues of advertising and promotion. Two developing countries, Brazil and Thailand, have recently passed legislation that may be effective in this area. Although Brazil has a big economic stake in tobacco, producing nearly as much unmanufactured tobacco as India and being the world's lead exporter of tobacco leaf, Brazil enacted measures in 2000 that outlaw all television, newspaper and magazine advertising of tobacco products, and event sponsorship by cigarette companies. Similarly, Thailand introduced comprehensive tobacco control legislation in 1992 that included strict advertising laws.⁸

The United Kingdom and the United States each took about 35 years, and Canada about 25 years, to halve per adult cigarette consumption (10 - 5 per adult per day). France took only 15 years to halve consumption. France's uptake of smoking was chiefly after World War II, and its prevalence rose until the mid-1980s. From 1990 to 2005, cigarette consumption fell from about six cigarettes per adult per day to three. Due to a sharp increase in excise tobacco taxation there is sharp decline in consumption in 1990 under President Jacques Chirac. Among men, the corresponding lung cancer rates at ages 35-44, which are a good measure of recent smoking in the population, fell sharply from 1997 onward. During this period, revenues in real terms raised from about 6 to 12 billion Euros. Tax levels—and the decline in per capita cigarette consumption—remained stagnant from 2004 onward but rose again from 2009 to 2010.⁷

Population-based media campaigns were generally found to have lower impact among low-SES smokers, while campaigns targeting low-SES smokers showed no clear impact on smoking behavior. Greater campaign responsiveness from Dutch study reveals more among educated smokers, while an evaluation of the UK's 'No Smoking Day' campaign also have similar responses by SES (Figure 2).⁶

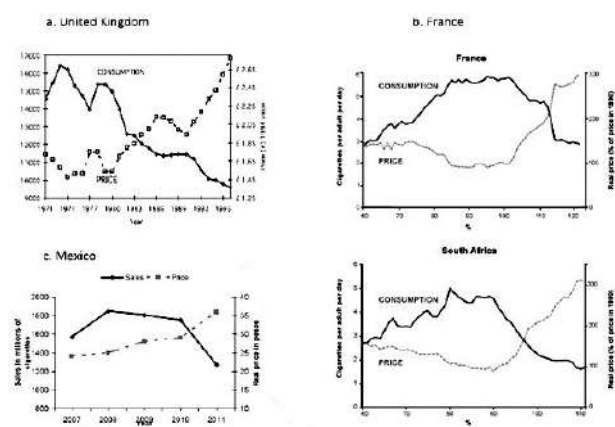


Figure 2: Tobacco consumption in UK, FRANCE, MEXICO, SOUTH AFRICA and their increase in cost price

Help Smokers Who Want to Quit: Exposure to worksite smoking bans and media antismoking messages were associated with higher odds of cessation is being recently analyzed by ex-smoking in the GATS data from 14 LMICs. Warning labels and cigarette and bidi prices were associated with higher odds of quit attempts, with success varying by country. Warning labels were

associated with a greater likelihood of recent quitting in the regions of Arab Republic of Egypt and Vietnam.⁹

Another way of counseling includes physician support or telephone- or internet-based counseling and cessation support. Other than educating and counseling medical treatment is also helpful. Pharmacological treatments, including nicotine replacement therapies, bupropion, and varenicline, further improve the likelihood of quitting, with success rates two to three times higher than when pharmaceutical treatments are not employed.⁸ The third largest grower of tobacco in the world, amassed 1.7 million disability-adjusted life years (DALYs). The WHO Framework Convention on Tobacco Control (WHO FCTC) is recognized as the pre-eminent global tobacco control instrument, containing legally binding obligations for its Parties. To implement effective strategies for selected demand reduction related articles of the WHO FCTC, WHO introduced a package of measures under the acronym of MPOWER.¹⁰

Tobacco and Oral Health: There are several moral, ethical and practical reasons for dental professionals to strengthen their contribution in tobacco cessation programmes, for example

- They are concerned about the adverse effects in the oropharyngeal region;
- They often have access to children, youths and their caregivers, thus providing opportunities to influence these individuals on the dangers of tobacco;
- They often have more time with patients than many other clinicians, providing opportunities to integrate education and intervention methods into practice;
- They often treat women of childbearing age, and are thus able to inform them about the potential harm to their babies from tobacco use;
- They are effective in quitting tobacco and it is known that a multi-disciplinary approach increases cessation rates; and
- By showing the actual effects of tobacco on the mouth smoking patients can quit their habit.

Brief counselling by health professionals on the dangers of smoking and importance of quitting is one of the most cost-effective methods of decrease smoking. Smoking cessation improves the health and wellbeing of

patients. Health professionals shall also lead by example. They should act as role-models for their patients, by ceasing to smoke, and by ensuring their workplaces and public facilities are smoke and tobacco-free¹¹.

ORAL HEALTH RISKS

The detrimental effects of tobacco on oral health are well documented; some of these involve a high degree of risk. According to studies it is shown that India is known as the capital of oral cancer. 7% of all cancer mortality in males and 4% in females are due to tobacco-associated oral cancers¹²⁻¹⁴. If the disease is detected soon, the survival rate in 5 years comes to around 85%. Nearly, all tobacco users develop periodontal diseases which have a diminishing effect on health and quality of life¹⁵. Maternal tobacco use during the pregnancy also has a negative impact on the fetus oral health. It is associated with intrauterine growth retardation that is harmful to the fetus and child's oral and dental development. Oral developmental anomalies include cleft palate, dental asymmetry, and morphologic variants such as reduced tooth crown size¹⁶. There is also some indication of an interaction between tobacco use and systemic disease, which creates further negative impact on oral health. For example, persons with diabetes are twice as likely to have periodontal attachment loss compared with nondiabetics. However, diabetics who smoke are 30 times more likely to have periodontal attachment loss than persons without these risk factors¹⁷. The biological mechanism whereby smoking impacts on periodontal disease requires further study and clarification. There is, however, some indication that it may include changes in the vasculature, the immune and inflammatory systems, tissue oxygenation, and the healing process¹⁸.

Tobacco quitting is a process which not only requires personal efforts but also requires good coordination from all the sectors to achieve greater success rates. The intervention which aimed at tailoring messages to the individual's stage of change can help the existing user move forward on the road to permanent abstinence¹⁸. Thus, adopting such tailored messages into the field of dentistry can be one of the most effective therapies for behavioural intervention.

CONCLUSION

Increases in tobacco taxes result in higher tobacco costs which also encourages the tobacco users to stop

using and consumption among the active users causing great impact to the younger generation and poorer people. Higher taxes effectively reduce death, disease and economic costs because of tobacco use. The positive health impact is evengreater when some of the revenues generated by tobacco taxincreases are used to support tobacco control, health promotionand/or other health-related activities and programmes.Dentist can help patient to quit smoking for better oral and general health. Various health agencies and professionals must work together to help patient to stop the habit of tobacco usage which may later emerge as the single most known cause of mortality and morbidity in the world. People will get aware of the ill effects of tobacco by the help of dentist. The next generation of dentists should be trained well enough in assessing and treating the patient with tobacco use. The experience of taxation is the best practice to reduce tobacco consumption and to gain control Globally on the rising situation and burden of diseases caused due to consumption or use of tobacco products.

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Current Trends in Implant Dentistry

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ABSTRACT

The science of implantology is highly dynamic. Ever since its introduction into the field of dentistry by Dr. Branemark, it has undergone numerous modifications and improvements. With each improvement and advancement made, implantology has proved to be a boon in disguise to the society and hence its acceptance by the general population has widely increased despite it being a relatively expensive treatment modality. This article gives a brief review of the current trends in the field of implantology.

Keywords: *Implantology; Dentistry; Recent trends; Modifications*

INTRODUCTION

The history of implant dentistry spans not only decades, but millennia. The ancient cultures of the world—in Egypt, Honduras, China, and Turkey, among others—substituted missing dentition with shells, stones, ivory, and other human or animal teeth.^{1,2} The establishment of metal replacements for teeth is a relatively recent development. In the 1800s, surgeons used gold, silver, lead, and platinum molded into various forms with varying degrees of success.

By the early to mid-20th century, more familiar implant morphologies developed. Dahl in 1940 created the subperiosteal implant, a structure that rested on, not in, the jaw.² These implants frequently were met with complications including infection and bone resorption. Leonard Linkow developed the blade fixture for areas of deficient bone.³

Attached directly to the flat blade, an abutment protruded from the tissue. With time, the blade design fell out of favor as its complication rate precluded its use. In its place came the root form implant, which is the current standard shape. Thanks to the significant research by Brånemark, it was realized that osseointegration occurred between bone and titanium.⁴

Endosseous implants made from titanium have now become the standard. Implant Surface Changes Surface area augmentation often drives alterations in implant design. Over the past 15 years, practitioners have gradually switched from press-fit, cylindrical fixtures to threaded ones. A threaded implant leads to more immediate stability and hence greater success of osseointegration.

A threaded form additionally facilitates self-tapping, which eases placement. Surface alterations could also be made microscopically. Surface roughness of the implant can be created through grit blasting, plasma spraying, etching, or coating. This raises the percentage of bone-to-implant contact and also accelerates wound healing.⁵⁻⁷

During the last two decades, a shift from a smooth to roughened design has transpired. Surgical Technique, Timing, & Loading the original Brånemark protocol

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published in 1977 influenced implant surgical technique and timing for years.⁴ It required that implants be submerged under the soft tissue for at least 4 months and discouraged load during the healing period.

As more research accumulated, so did the evidence for unsubmerged implantation (ie, placement of a transmucosal healing abutment).⁸ Barring the need for grafting, one-stage fixture placement is not only acceptable clinically but also easily accepted by patients, as it prevents the need for an uncovering surgery. This decreases the surgical experiences for the patient and minimizes chair time. Another time-saving surgical change is immediate temporization and immediate loading of dental implants within 48 hours of surgical implant placement. Case selection can be a thorny issue for these cases. Typically, immediate loading is non-occlusal, that is, non-functional temporization. The interim restoration placed should not occlude with the existing dentition.

These cases usually involve single teeth and short-span fixed bridges. While not voluminous, the initial data seems quite promising with the exception of single posterior teeth.⁹ Immediate occlusal loading of dental implants shows significant promise when full-arch treatment is considered.

Studies on full-arch immediate loading show success rates equal to conventional dental implant treatment.⁹ Contraindications for an immediate occlusal and nonocclusal load protocol consist of regions that experience undue mechanical stress, require grafting at the time of surgery or exhibit low bone density.¹⁰ Prosthetic-driven Surgical Placement The most critical advancement for implant dentistry concerned a philosophical reversal. All too often, restorative dentists were left frustrated by non-favorably placed implants.

“Well, that is where the bone was,” was a frequent refrain. Surgeons based implant positioning on the location or availability of the bone, for osseous grafting techniques were in their infancy. Today, this is not the case. The high predictability of current augmentation methods (ie, block grafting, guided bone regeneration (GBR), sinus elevation) allows for implantation based on prosthetic desires instead of biologic limitations.¹¹⁻¹⁵ Thus the treatment goal targets the ideal reconstruction of the dentition.

For the vast majority of cases, no compromises founded on anatomy need be made. Significant amounts of horizontal and vertical bony dimension is able to be achieved with GBR. GBR has been shown to equal

intraoral onlay grafting with respect to the amount of bone regenerated.¹⁶ Additionally, investigations do not demonstrate resorption of or lower implant survival in regenerated bone over time, when comparing GBR to onlay grafting.^{11,13} Block grafts are not by and large superior to GBR; the evidence simply fails to support that statement.

Current Implant Trends: As modern implantology is prosthetic driven, recent innovations affect the design, ease, esthetics and, in particular, the rapidity of fixture restoration. Professionally and publicly, there appears to be a trend to speeding the process of implant treatment. Faster treatment has both risks and benefits. An examination of the process follows. Immediate Implantation with Immediate Temporization Immediate loading of an edentulous mandible is not a new concept. However, full-arch or full-mouth edentulation followed by immediate implantation and temporization is, both to the literature and the clinic.^{17,18}

Because of its cursory appeal, a number of implant distributors offer their own versions of the immediate surgery-and-load protocol and advertise full-mouth reconstruction executed in one appointment to the public. It must be noted that hours of judicious multidisciplinary diagnosis, planning, discussion, and laboratory work prior to the surgical appointment are needed, regardless of the corporate protocol used. In the end, case selection becomes the limiting factor.

The patient requires a favorable occlusal scheme, sufficient bone to ensure primary stability, good health and a lack of parafunctional habits, among other traits. There is a trend in the direction of this treatment. While early results are promising, this protocol is currently not the standard of care. Abutments Abutment fabrication has and continues to undergo significant metamorphosis. Many abutment options exist: standard machined titanium, standard machined gold, standard ceramic, custom made gold abutments (eg, UCLA) and computer-aided design/computer-aided manufacturing (CAD/CAM) titanium abutments. From a practical stance, implant success criteria include not only stability and function but also esthetic harmony. Depending on the tissue thickness, implant location, and bone level, a standard titanium abutment may appear gray through the mucosa.

One solution involves use of abutments constructed from gold or ceramic. In certain cases the soft tissue will appear healthier and more esthetic.¹⁹⁻²² Improved

appearance in the presence of a thin mucosa is the goal. If the implant angulation falls short of ideal, a prefabricated straight or angled abutment may not compensate for offaxis orientation. Custom-made abutments, whether processed by the clinician or industrially, ease the restorative procedure and perfect results. Technology exists that reduces clinical work but still generates an abutment tailored to the individual.

Some manufacturers offer CAD/CAM implant prosthetics.^{23,24} In this process, the company typically requires only a fixture level index or a healing abutment or implant-level impression. The surgeon or restorative dentist sends that and the appropriate casts to a company laboratory, which fabricates a custom abutment.

Platform Switching: The interface between the abutment and implant, or the microgap, is subject to micromovement and bacterial seeding, and if it lies at or below the crest of the bone, prompts osseous resorption for those reasons.²⁵ An alternate design for the two-stage implant is platform switching, which is achieved by aligning a relatively wide implant platform to a comparatively narrow abutment and medializes the microgap, thus removing the interface from direct contact with the bone. With possible movement and infection compartmentalized more or less to only the soft tissue, less crestal resorption results. Clinical studies that employ this implant–abutment configuration observe reduced vertical bone loss, even after function.²⁶ Although a concept that garnered investigation only recently, platform switching data accumulates and shows potential.

Thread Modification: To enhance the fixture surface area, one may increase thread pitch, alter thread morphology, or augment surface roughness. At present, manufacturers fabricate implants that vary in at least one of the above characteristics. For example, integration of fluoride onto the implant surface boosts mineralization and attracts bone-forming cells.²⁷

Rather than exhibiting threads of similar size spaced evenly along the body, some implants possess microthreads at their coronal segments (body or collar) to amplify surface area—and, in turn, potential BIC—at the crestal bone. Correspondingly, other designs increase the area covered by a roughed surface, including even the collar. Another construct exhibits a scalloped body that abuts the curve of the interdental bone and in doing so, keeps it from resorbing.

All of these implant morphologies have little scientific evidence to substantiate claims of greater BIC, stability, or longterm survival but in some instances, previous versions of implants without these attributes are no longer available.

CONCLUSION

The usefulness of the implant trends discussed above is yet to be determined. With time, some of these innovations may become conventions; others will end up historical sidenotes. As always, we rely on biologic principles as well as longerterm clinical investigation to guide our judgment. Is a new design logical? Is it practical? Does it resolve or merely mask surgical or restorative problems? Most importantly, does it surpass significantly what is available? Clinicians, as individuals and as a collective, must be able to discriminate between a fad and a breakthrough, to separate the wheat from the chaff.

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Prosthetic Rehabilitation of Patient with Multifocal Central Giant Cell Granuloma

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ABSTRACT

The primary objectives of successful prosthetic rehabilitation are to provide function, esthetics and comfort to the patient. Clinical decision-making is critical in deciding the most suitable treatment option for a particular patient. Patient usually want replacement of missing teeth with fixed prosthesis but sometimes a removable partial denture (RPD) can be a viable alternative if it can be made to support and stabilize the remaining teeth as well as replace the missing anterior teeth and associated gingival contours. This case report describes the prosthetic rehabilitation of a patient with central giant cell granuloma for whom surgical resection was done. Prosthetic rehabilitation was done with cast partial dentures in both maxilla and mandible. Removable partial dentures were selected as treatment option for two reasons first financial constraint of the patient and secondly in this case flange of removable denture will aid in lip support.

Keywords: Giant Cell Granuloma, Mandibular Reconstruction, Bone Transplantation, Root Resorption

INTRODUCTION

Central giant cell granuloma (CGCG) is a benign intraosseous lesion first described by Jaffe in 1953. This is a relatively uncommon pathologic process accounting for <7% of all benign lesions of the jaws^{1,2}. It most commonly affects the Maxilla followed by the Mandible. Although benign, it can locally be destructive. The clinical behaviour of CGCG ranges from a slow-growing asymptomatic swelling to an aggressive lesion that presents pain, local bone destruction, root resorption and tooth displacement. The radiologic features of the CGCG have not been clearly defined, and conflicting descriptions appear in the literature³. Radiographically, CGCG present as radiolucent defects, which may be unilocular or multilocular with well-defined or ill-defined margins and varying degrees of expansion of the

cortical plates. Surgery is the most accepted method of treating the condition. Excision followed by placement of free bone grafts have been used frequently for mandibular reconstruction followed by treatment with implant retained fixed prosthesis⁴. In this case prosthetic rehabilitation was done with cast partial dentures in both maxilla and mandible. Removable partial dentures were selected as treatment option for two reasons first financial constraint of the patient and secondly in this case flange of removable denture will aid in lip support.

Case report: A 35-year-old male patient reported to the outpatient department of Institute of dental sciences, Bhubaneswar with the chief complaint of pain and swelling in left side maxillary and mandibular teeth region since last six months.

On extra oral examination swelling was evident in left mandibular and maxillary region. Intraoral examination revealed bony hard swelling from right side parasymphysis to left side body of the mandible. The swelling was lobulated on palpation with mild tenderness. Similar kind of swelling was also seen on left side maxilla extending from anteriors to second molar region. There was no discolouration or deviation of the regional teeth.

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Analysis of panoramic radiograph revealed multilocular radiolucency in mandibular anterior teeth region extending from right side canine to left side premolar region. Similar multilocular lesions were also evident in left maxilla involving the sinus, extending from midline to second molar region. Clinical and radiological findings suggested the lesion to be multifocal in nature with connective tissue origin. To confirm the diagnosis an incisional biopsy was advised.

The histopathological examination shows multiple giant cells in a background of highly cellular minimally inflamed connective tissue stroma. Each giant cell is composed of approximately 6-8 nuclei. Vascularity of stroma is intense.

Based on clinical findings, imaging results and histopathologic features a diagnosis of central giant cell granuloma was confirmed.

Surgical management was performed by department of oral and maxillofacial surgery. Surgical procedure involved excision and peripheral osteotomy with the removal of multiple teeth in maxilla extending from left lateral incisor to left second molar. In the mandibular arch from left first premolar to right side canine.

Patient was referred to department of prosthodontics for rehabilitation. With the loss of several teeth patient was having difficulty in mastication, impairment of speech and unpleasing appearance of face.

After surgery it was a case of Kennedy's Class III modification 2. However, the primary issue for this patient was the large anterior edentulous space, which approximated a Class IV situation and decreased lip support².

Treatment possibilities in this case could be fixed restorations or implant supported fixed restorations or removable partial denture. Due to financial constraint of the patient removable partial denture was planned. Also, the flange of the denture will aid in lip support⁵.



Fig. 1: Maxillary impression



Fig. 2: Mandibular impression

Diagnostic impressions were made with irreversible hydrocolloid impression material and poured in type III dental stone to obtain diagnostic casts.

Diagnostic cast was studied and surveying was done on Ney surveyor. The designing of cast partial denture for maxillary arch was done. Proper designing is essential to prevent any deleterious effect on the supporting structures. Forces that produce torque on abutment teeth should be controlled and reduced in the design of direct retainers⁶.

According to remaining teeth it was a Kennedy Class III Modification 2 situation in maxillary arch which is a wholly tooth supported partial denture.

Major connector chosen was anteroposterior or double palatal bar. It consists of thin bar of metal running both anteriorly and posteriorly on palate. The greatest asset of this major connector is excellent rigidity. The anteroposterior palatal bar minimizes soft tissue coverage, yet provides exceptional resistance to deformation, but because of its narrow bars the support provided is very less. So it must rely mainly on support from the remaining teeth. This major connector was chosen because remaining teeth had good periodontal support^{7,8}.

In mandibular arch also, it is Kennedy Class III Modification 2 situation. The major connector chosen was lingual bar. The basic form of the lingual bar is that of a half pear shaped with broadest portion at the inferior border of the bar. The advantage of lingual bar is its simplicity in design and construction. As it has minimal contact with the oral tissues. It does not contact the teeth, so decalcification of tooth surfaces because of food or plaque collecting around major connector does not occur.

The maxillary RPD design had occlusal rests on distal of right second premolar, mesial of right second molar and left third molar and cingulum rest on right

canine. Tooth preparation was done on 15, 17 and 28 in maxillary arch.

Tooth preparation was done 35, 36 and 38, 44, 45, 48 in mandibular arch.

Mandibular RPD design had occlusal rests on mesial of right first premolar and third molar and distal of right second premolar and on the left side mesial of second premolar and third molar and distal of first molar^{8,9}.



Fig. 3: Finished maxillary and mandibular prosthesis



Fig. 4: Intraoral view without prosthesis



Fig. 5: Intraoral view with Prosthesis

Maxillary and mandibular final impression were taken with addition silicon impression material (Aquasil, Dentsply) putty and light body consistency were used. Impression was poured in type 4 dental stone. (kalrock, kalabhai). The wax pattern was fabricated according to design planned. The metallic framework was tried in the patient's mouth to assess its fit. The jaw relation was recorded followed by articulation and teeth arrangement. Try-in was done followed by acrylicization with heat-polymerized acrylic resin. Finished and polished cast partial dentures were delivered to the patient. {Fig 3,4,5}

DISCUSSION

An RPD is also an excellent treatment modality in class III situations with large tooth-supported denture bases, where it is difficult to provide sufficient retention and stability for a fixed partial denture (FPD)^{8,10}. When the edentulous space is too large for a fixed prosthesis or when alveolar bone loss has been sustained that requires a resin flange to replace the missing bone to support the middle third of the face. In making the framework design, the dentist must consider the patient's comfort, esthetics, biomechanics of the prosthesis, and the prognosis of the abutments. In addition, the concept and design of the denture could have an impact on the incidence of mechanical failures of the framework. Finally, proper evaluation of the actual dental and periodontal situation, periodontal treatment, maintenance of good oral hygiene, and regular postinsertion controls are also of major importance in minimizing the sequel associated with wearing removable partial dentures (RPDs), such as caries, progression of periodontal disease, and residual ridge resorption¹⁰.

Schwartz et al. reported that RPD is an advised treatment option for the rehabilitation of Kennedy class IV situations where there are a) long span edentulous space that requires tooth- and tissue-supported designs, b) markedly resorbed ridge, where it is necessary to support the middle and the lower third of the face by denture flange, c) exposure of the gingival tissues during lip function, d) cleft palate and other maxillofacial defects, and e) young patients with large pulp horns for whom preparing the teeth is contraindicated for fixed prosthesis¹¹.

CONCLUSION

Prosthetic rehabilitation mainly aims for functional and esthetic well being of the patient. The phonetics of the patient was also improved due to the flange of the denture.

Conflict of Interest: None

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Rehabilitation of a Patient with Severe Attrition A Case Report

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ABSTRACT

Full mouth fixed rehabilitation is one of the greatest challenge in prosthodontics. Apprehensions involved in the reconstruction of debilitated dentitions are heightened by widely divergent views concerning the appropriate procedure for a successful treatment. When it comes to comprehensive, full-mouth rehabilitation cases, dentists don't plan to fail, but they may fail to plan. Dedicating time for developing a treatment plan that includes the proper sequence of diagnosis and evaluation, as well as how to utilize them to get the best possible final desired outcomes for the case can make proceeding with clinical protocol more predictable. This clinical report describes the prosthodontics rehabilitation of a patient with severely worn dentition resulting in an end – to – end relationship. Maxillary and mandibular fixed restorations were constructed with canine – protective occlusion.

Keywords: full mouth rehabilitation, metal fused to ceramic crowns, occlusal analysis, severe attrition

INTRODUCTION

Full mouth Rehabilitation has received considerable clinical interest from modern dental practices as a means of rehabilitation -restoration of functional and structural integrity of dental arches by the use of crowns, partial dentures and implants. Rehabilitation has proved a fascination to mankind since the dawn of history because unlike other parts of the body the teeth in a gross sense are incapable of repair.

When it comes to comprehensive, full-mouth rehabilitation¹ cases, dentists do not plan to fail, but they may fail to plan. The dentist must dedicate time to develop a treatment plan that includes the proper sequence of diagnosis and evaluation. Imperative to the process is recognizing the importance of anterior guidance, incisal edge position, diagnostic models, and suitable treatment modalities that will satisfy patient expectations. Envisioning and determining the final restorations prior to undertaking any preparation design is also essential.

Indication: Full mouth rehabilitation is indicated for the following 1) Mutilated dentition. 2) Severely worn dentition. 3) Developmental anomalies 4) Discoloured dentition and 5) multiple faulty FPD.

Treatment Protocol: Many schools of thought exist for the treatment procedure for full mouth rehabilitation and they are based on individual author's discretion on occlusion and treatment procedure. But this can be broadly divided into two 1} one stage procedure, 2} Hobo twin stage procedure in which the posterior is rehabilitated first and then only the anterior are given. Each one has its own merits and demerits. But the protocol common for both these procedures can be divided into seven phases which are as follows²

Stabilisation: In this phase the pain and discomfort for which the patient has reported is first relieved. The causative aetiology is identified and eliminated or controlled. And measures are taken to protect the remaining tissues.

Reassessment I: The patient condition is assessed after stabilisation. Patient is educated on the further course of treatment and his interest in the same is assessed.

Preliminary restorative phase: The vertical dimension of occlusion is assessed Diagnostic wax up is done, the goal of the diagnostic wax-up is to recreate the patient's new bite and smile in wax so that this can then

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be transferred to the temporary restorations. Creating excellent temporary restorations is a key step in the full mouth rehabilitation because they allow the patient to evaluate the smile, bite and jaw position and determine if any changes need to be made before the final restorations are made. Reversible interventional modalities like occlusal splint, overlay RPD, fixed provisional or direct composite restoration are also given. And these are observed for a period of 6 to 12 weeks.

Reassessment II: The patient is then assessed for response to the preliminary therapy. The temporomandibular joint and the muscles of mastication are assessed for pain or instability. If the vertical dimension is altered then patient's adaptation to this is assessed.

Definitive restorative phase: The teeth are prepared conventionally or conservatively according to the situation and the impression taken of the prepared tooth. The provisional are given till the permanent are ready.

Maintenance: Patient should be recalled every 6 months to be assessed for soft tissue, root caries and periodontal status for abutment teeth. Occlusal wear facet in canine are examined because wear in this area in a canine guided occlusion leads to excursive interfering contact of posterior teeth.



Fig. I: Pre operative photograph

CASE HISTORY

Clinical report: A male patient, aged 48-year, presented with a chief complain of severely worn teeth {fig I} and inability to chew food, at the Department of Prosthodontics, Institute of Dental Sciences, SOA deemed to be university, Bhubaneswar

Clinical findings:

- **Extraoral:** The patient had facial symmetry, and TMJ, and the muscles of mastication were asymptomatic.
- **Intraoral:** The following teeth missing 14, 16, 17, 27, 34, 36, 37, 46. Generalized attrition, abrasion, and erosion were noted. Composite restorations were present in 11, 12, 21, 22. Amalgam restoration were present in maxillary 18, 26, 28, and all mandibular teeth. Teeth 35 to 43 and 15 had undergone root canal treatment.
- **Occlusal finding:** The patient presented with a bilateral class I molar and canine relationship. The patient demonstrated a slide from centric relation to maximum intercuspation. The patient's lateral excursion showed a canine guided occlusion. Lower incisal edges glide along the palatal surface of maxillary anterior during protrusion. Due to attrition the vertical dimension was diminished {Category I – Turner & Missirian³ classification}. There was a high smile line with moderate display of gingiva. Maxillary and mandibular midline was 1.5 mm right to the midfacial vertical line.



Fig. II: OPG

- **Radio-graphical finding:** The patient radiographs showed a trabecular bone to be finely woven pattern. The crown root ratio of lower anterior were unfavorable. {fig ii}

Treatment procedure:

1. The patient received oral prophylaxis, periodontal therapy, and odontoplasty was done on mandibular and maxillary teeth with uneven and sharp cusp.
2. A permissive occlusal splint⁴ is constructed on mandibular teeth in heat cure acrylic, and it was inserted and adjusted to provide a mutually protected occlusion with increase in vertical dimension⁵ of 3mm.



Fig. III: Occlusal analysis by Broadrick occlusal plane analyser

3. Pankey-Mann Schuyler⁶ analysis gives the acceptable occlusal plane. Mandibular posterior occlusal plane was analysed using the Broadrick occlusal plane analyzer {**fig iii**}. On analysis it was found all mandibular teeth followed the curve of spee. Maxillary right premolar was supra-erupted due to absence of opposing teeth, which required occlusal correction.
4. Customized anterior guide table is fabricated with centric, protrusive & lateral record to preserve the natural anterior guidance.



Fig. IV: Mock Waxup

5. Mock preparation was done on articulated maxillary and mandibular cast and diagnostic wax patterns are developed in it. {**fig iv**}



Fig. V: Prepared teeth

6. Tooth preparations for full coverage metal ceramic crowns were completed for the entire dentition {**fig v**}. A final full – arch impression was made using polyvinyl siloxane {Aquasil, Dentsply Detrey, Germany} impression material with double-mix, double impression technique, the cast were poured in die stone { Kalrock ; Kalabhai Pvt. Ltd Mumbai. India}.
7. This assembly was mounted on a Whipmix articulator using a face bow {quick mount facebow} and centric inter-occlusal record made in Aluwax at previously determined vertical dimension.
8. Provisional restorations were made from the diagnostic wax-up template with autopolymerising acrylic resin, and esthetic and occlusion were evaluated. Provisional crowns were cemented with zinc oxide non-eugenol {Rely X, 3M ESPE, Germany} provisional cement.
9. Articulator was programmed with centric and two laterotrusive records. First posterior waxup is done to achieve a standard effective cusp angle of 25°. Then anterior wax up is done to achieve incisal guidance, which produce a standard amount of disocclusion⁶.



Fig. VI: Metal try-in

10. Definite restorations with porcelain fused to metal crowns exhibiting a vital and a natural appearance with proper contour, shade and optimal incisal translucency were designed⁷ and luted with glass ionomer type I {GC Corp, Tokyo} cement. **{fig vi}**. And oral hygiene instructions, emphasizing brushing habits and use of dental floss were given.



Fig. VII: Ceramic build up



Fig. VIII: Post operative

DISCUSSION

Every patient has unique treatment requirements. Proper diagnosis and treatment plan are an important aspect for full mouth rehabilitation. Planning is done with occlusal analysis, diagnostic waxup and correct programming of semi adjustable articulator. The treatment goal was to restore to worn out surfaces to enhance mastication and to improve the aesthetic appearance. The final prosthesis with mutually protective occlusion was aesthetically pleasing with good marginal fit.

Conflict of Interest: None

Source of Funding: Self-funded

Ethical Clearance: The ethical clearance was obtained from Institutional Ethics committee, Institute of Medical science and SUM Hospital, Bhubaneswar, Odisha.

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Lip Curve Changes in Patients with Premolar Extraction and Non-Extraction Treatment

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ABSTRACT

Background & Objectives: Most previous literature has given little consideration to the depth and regularity of the lip curves and their importance in the overall perception of the lateral facial profile. The present studies was undertaken to asses and compare the changes in lip curvature of upper and lower lips after the orthodontic treatment with or without bicuspid extraction in adult patients.

Method: A total of 26 subjects were included in this trial, which were divided into two main groups- extraction of upper 4 and lower 5 and non-extraction group. In order to access the soft tissue effects of treatment, the depths of upper and lower lip curves were measured on all pre and post treatment cephalograms, in relation to skeletally defined PM line as the principal reference line.

Results: The mean reduction in the depth of upper lip curvature in the 4/5 extraction group was 1.94 ± 1.84 mm. In non-extraction group it was 0.33 ± 1.77 mm

The mean reduction of lower lip curve depth in the 4/5 extraction group was observed to be 1.66 ± 3.66 mm. In the non-extraction group a mean increase of lower lip curve depth by 0.59 ± 2.97 mm was observed.

Interpretation & Conclusion: The study concluded that lip curve depth changes in a particular direction are not entirely dependant on extraction or non extraction of bicuspid rather it is a resultant of a range of individual variable factors. Changes in the lower lip curve depth in response to orthodontic treatment, is comparatively more predictable than those in the upper lip. However, it should be interpreted with caution, given the small sample size.

Keywords: Premolar Extraction; non-extraction; lip curve changes; lateral cephalograms.

INTRODUCTION

Successful evaluation of facial balance and harmony includes a study of the facial profile. Evaluation of the human facial profile has always been an essential part of orthodontic diagnosis and treatment planning¹. The relationships between the size and proportion of the nose, lips and chin have often been discussed as critical factors in the achievement of balanced facial profiles.²⁻⁴ However; less consideration has been given to the actual

depth of curvature of the lips and the importance of these curves to the overall perception of the lateral facial profile.⁵⁻⁷

The orthodontist is often confronted with the need to predict soft-tissue profile changes that may result from orthodontic treatment. Many problems aroused because the contributions of many of the factors influencing the soft-tissue profile were not fully understood. The development of the soft tissue profile is a result of complex changes within the hard and soft tissue structures of the face.

Most previous literature regarding soft tissue behavior during orthodontic treatment has focused on retraction of the vermilion border and changes in the nasolabial angle^{2,8-15}. This was interesting because facial harmony was often described as determined by the morphologic relationships and proportions of the nose,

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lips, and chin^{2,4}. Discussion was further complicated by the fact that the balance between these structures can be altered by both growth and orthodontic treatment. Little consideration has been given to the depth and regularity of the lip curves and their importance in the overall perception of the lateral facial profile. Holdaway's^{5,16} soft tissue analysis would appear to be unique in its inclusion of an assessment of upper lip sulcus depth. Holdaway also noted that ideal upper lip sulcus depths may actually vary with different underlying vertical facial patterns. Incisal movements could vary greatly in cases treated either with or without extractions. Although incisor retraction was seen in the majority of patients treated with premolar extractions, it was certainly possible for minimal movement, or even incisal protrusion, to occur^{19, 21-25}. Similarly, non-extraction treatment could also result in either retrusion or protrusion of the incisors. Shearn and Woods,²² noted that the primary determinant of the amount of incisor retraction occurring during treatment was the residual space present after initial alignment.

The morphology of the soft tissues themselves is a major factor in determining the overall facial profile. The presence of varying inherent internal soft tissue architecture, however, has complicated attempts at predicting soft tissue responses to treatment⁸. Consequently, ratios of lip to incisor retraction have gained only limited acceptance because it has been recognized that the interactions that might determine soft tissue changes are complex^{2, 9, 11-14}.

A predictable change in facial esthetics can be achieved only if the predetermined treatment objectives are adequately realized and the amount and direction of expected facial growth can be estimated.³ The predictability of such changes appears limited.

The present study a prospective clinical trial, was designed to evaluate the effects of treatments, with and without premolar extraction, on the lateral facial profiles of patients, with particular reference to the curvature of upper and lower lips.

The research question addressed: Is there a predictable change in upper and lower lip curve, associated with extraction or non-extraction orthodontic treatment?

OBJECTIVES OF THE STUDY

- To assess and compare the changes in lip curvature of upper and lower lips after the orthodontic treatment with or without bicuspid extraction in adult patients.

- To establish if there is a difference in lower and upper lip curve response to bicuspid extraction and non-extraction orthodontic treatment in the given sample.

METHODOLOGY

The present, prospective clinical trial was designed to evaluate the effects of treatments, with and without premolar extraction, on the lateral facial profiles of patients, with particular reference to the curvature of upper and lower lips, on selected subjects who reported to Department of Orthodontics, College of Dental Sciences, Davangere, seeking orthodontic treatment.

Sample Size: A total of 26 subjects were included in this trial. Prior to the commencement of the trial, all the participants were informed and verbal consent was obtained. Ethical clearance was obtained from the Ethical Committee of the college for this study. All the 26 cases were treated by postgraduate students, using consistent contemporary biomechanical principles and this study was done over a period of seventeen months i.e. December 2005 to June 2007.

Sample Selection: The sample eligible for this study was selected on the basis of following criteria.

Inclusion Criteria:

- Adult subjects with Class-I and Class-II molar relationships requiring orthodontic treatment.
- A minimum crowding of 4mm and overjet of 4mm.
- High quality pre and post treatment lateral cephalograms exhibiting good soft tissue definition with lips relaxed, teeth in occlusion are taken using the same calibrated cephalostat for all subjects.

Exclusion Criteria:

- Subjects with Class-I crowding and Class-III molar relationships.

Assignment: All the 26 patients were treated with Preadjusted Edgewise Appliance by postgraduate students, using consistent contemporary biomechanical principles and guidance.

The sample was divided into 2 main groups

Non-extraction Group: 20 patients treated with non-extraction line of treatment.

Extraction Group: 6 patients treated with extraction line of treatment.

Upper 1st premolars & Lower 2nd pre-molars extraction done.

The mean pre treatment age of the extraction group was 19 yrs 9 months and that of non-extraction group was 18yrs 9months.

Cephalometric Analysis: All pre and post treatment cephalograms were traced by one examiner. In order to provide a consistent reference plane for evaluating horizontal changes in landmarks, both sphenoethmoidale (Se) and the inferior pterygomaxillary point (Ptm) on the pterygomaxillary (PM) line were transferred from the pretreatment tracing to posttreatment tracing, by superimposing on the cranial base landmarks of the pretreatment radiographs, according to the method described by Bjork.⁴⁶ Landmarks chosen for the study were based on the definitions of Nanda et al ²⁸. Cephalometric measurements used in this study are listed in Table 1. Linear measurements were multiplied by a factor of 0.92 to take into account the 9 percent cephalometric factor.

In order to access the soft tissue effects of treatment, the depths of upper and lower lip curves were measured on all pre and post treatment cephalograms, in relation to skeletally defined PM line of Enlow, Kuroda and Lewis⁴⁷.

STATISTICAL ANALYSIS

All the data were analyzed with MINITAB version 13.1 & SPSS softwares.

Results are presented as mean ± SD. Correlation and regression analysis was performed to measure the relationship between various pre-treatment parameters and to predict the post-treatment changes in lip-curve. One-way ANOVA was used for multiple group comparison & Man-Whitney test for group wise comparison.

For all the tests a P-value of 0.05 or less was considered for statistical significance.

Formulae Used for Analysis:

$$\text{Mean, } x = \frac{\sum x_i}{N} \quad i = 1, 2, \dots, n$$

$$\text{Standard deviation, SD} = \sqrt{\frac{\sum (x_i - x)^2}{n - 1}}$$

One-way ANOVA,

$$F = \frac{\text{Between group variance}}{\text{Within group variance}}$$

Pearson’s correlation Coefficient

$$r = \frac{\text{Covariance } (x, y)}{\text{Var } (x) \text{ Var } (y)} = \frac{1/n \sum xy - \bar{x}\bar{y}}{S_x \cdot S_y}$$

Regression Coefficient,

$$b = r \frac{S_y}{S_x} \quad S_x, S_y = \text{SDs}$$

Regression Equation

$$Y = a + b_1x_1 + b_2x_2$$

Mann-Whitney Test-(Alternative to unpaired t-test):

Ranks are assigned to combined values of two groups & then separated to corresponding groups. Sum of the ranks are found for two groups (i.e. R₁ & R₂)

$$\text{Find } U_1 = n_1n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

$$\text{And } U_2 = n_2n_1 + \frac{n_2(n_2 + 1)}{2} - R_2$$

Least of the U₁ & U₂ is compared with table values for significance.

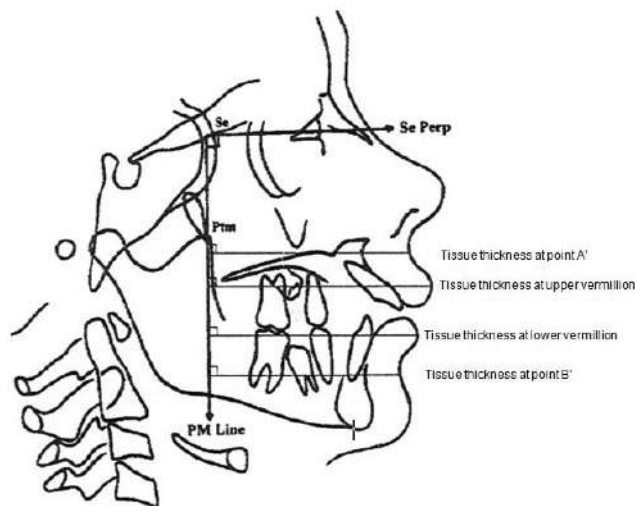


Fig. 1: Soft Tissue Measurements Taken in this Study

RESULTS

In the present study, the pre and post treatment lateral cephalograms of 26 patients (06 extractions & 20 non-extractions) were evaluated for the assessment of upper and lower lip curve changes associated with the extraction and non-extraction orthodontic treatment.

Changes in Depth of the Upper Lip Curvature Relative to PM Reference Line

The mean depth of upper lip curve was reduced with treatment in extraction groups as well as in the non-extraction sample. The mean changes in the depth of upper lip curvature in the 4/5 extraction group was 1.94 ± 1.84 mm and in non-extraction group was 0.33 ± 1.77 mm.

Within non-extraction and extraction groups there was a wide range of individual variation such that both increasing and decreasing upper lip curve depths were noted.

At a 5 percent level of significance, analysis of the variance demonstrated that the difference between the mean changes of upper lip curve in the non-extraction and extraction groups were statistically significant.

The changes in the upper lip curve depth in extraction, non-extraction in Table 1.

Changes in the Depth of Lower Lip Curvature Relative to PM Reference Line

The mean depth of lower lip curve was reduced in extraction group but not in the non-extraction group. The mean reduction of lower lip curve depth in the 4/5 extraction group it was 1.66 ± 3.66 mm. In the non-extraction group a mean increase of lower lip curve depth by 0.59 ± 2.97 mm is observed.

At a 5 percent level of the significance, analysis of variance demonstrated that the differences between the mean changes of lower lip curve depth in non-extraction, extraction group were not statistically significant.

Within all non-extraction and extraction groups there was a wide range of individual variation, and both increasing and decreasing lower lip curve depths were noted.

The changes in the lower lip curve depth are summarized in Table 2

Table 1: Post Treatment Upper Lip Curve Changes in Extraction and Non-Extraction Groups

Group		Upper Lip Curve				
		Pre	Post	Lip Curve Change		
				Mean+/-Sd	Min	Max
Ext 4/5		5.56+/-1.41	3.62+/-1.56	1.94+/-1.84	-0.1	5.7
N Ext		3.74+/-1.01	3.41+/-1.84	0.33+/-1.77	-5.1	2.7
t- Test	t				3.14	
	p*				0.04	

* - t- Test, $P > 0.05$ Not Significant

Table 2: Post Treatment Lower Lip Curve Changes in Extraction and Non-Extraction Groups

Group		Lower Lip Curve				
		Pre	Post	Lip Curve Change		
				Mean+/-Sd	Min	Max
Ext 4/5		5.65+/-2.43	3.99+/-1.43	1.66+/-3.66	-2.8	5.3
N Ext		6.15+/-2.46	6.74+/-2.16	-0.59+/-2.97	-6.4	4.3
t-Test	t				0.83	
	p*				0.49	

* - t- Test, $P > 0.05$ Not Significant

Table 3: Stepwise Regression Predictions

Groups	Post Treatment Lip Curve Changes	Prediction Equation	SE	R ² %
4/5 Extraction	ULCC	ULCC = -3.61 + 1.07 (ULC)	1.9	42.70%
	LLCC	LLCC = -6.24 + 1.41 (LLC)	0.9	95.30%
Non-Extraction	ULCC	ULCC = -1.01 + 0.35 (ULC)	1.79	4.10%
	LLCC	LLCC = -5.77 + 0.84 (LLC)	2.2	49%

Prediction of post treatment lip curve changes based on predictive pre treatment variables like pre treatment upper & lower lip curve depth.

SE = Predicted Variation

R² = Explained Variance

Table 4: Stepwise Regression Predictions

Groups	Post Treatment Lip Curve Changes	Prediction Equation	SE	R ² %
4/5 Extraction	ULCC	ULCC = 5.5 - 1.46(PMA') + 1.29 (PM-U V)	2.1	48.40%
	LLCC	LLCC = -5.7 - 1.4(PMB') + 1.37(PM-L V)	1.1	95.30%
Non-Extraction	ULCC	ULCC = -8.5 - 0.27(PMA') + 0.39(PM-U V)	1.8	9.80%
	LLCC	LLCC = -1.16 - 0.76 (PMB') + 0.94(PM-L V)	2.1	57%

Prediction of post treatment lip curve changes based on predictive pre treatment variables.

SE = Predicted Variation

R² = Explained Variance

DISCUSSION

Current concepts in diagnosis and treatment planning focus on the balance and harmony of the various facial features. Sincere attempts have been made to include an element of soft tissue profile assessment into it.

Previous published literature has given less consideration to the actual depth of curvature of the lips and importance of these curves to the overall perception of the lateral facial profile. Few articles^{43, 44, 45} have addressed this issue in Caucasian samples. But there has been no study reported in Indian population till date. The present study aimed to compare the responses of upper and lower lip curve to orthodontic extraction and non-extraction treatment in selected subjects who reported to Department of Orthodontics, College of Dental Sciences, Davangere, seeking orthodontic treatment.

As noted by Zierhut et al.,¹ lip tension will vary between individuals and also between time periods for any one individual. The inability to control this variable in the measurement of static lip positions and responses remains a shortcoming of all soft tissue cephalometric studies.¹⁵ In response to this potential

problem, every effort was made in this study to eliminate those radiographs with obvious lip strain and include those subjects whose lips appeared to be relaxed, with an even thickness of soft tissue.

The skeletally defined PM line of Enlow, Kuroda and Lewis⁴⁷ was used as a principal reference line. Other anterior reference lines like Ricketts E-plane, Holdaway's H-line or Burstones esthetic plane (Sn-Pg') are not used as they all used landmarks on nose and chin. As this study aimed to quantify the lip curve changes and compare the same between extraction and non-extraction group, the static skeletal reference line, PM line, was used.

The results of this study have indicated that greater the pre treatment lip curve depth, the greater the reduction in lip curvature with treatment is likely to be. This is seen in 4/5extraction group and non-extraction groups. This was not unexpected since a reduction in curve depth is generally a treatment goal in these cases. This was consistent with the results found in previous studies^{44, 45}.

The difference of pretreatment upper curve depth in 4/5 extraction group and non-extraction group were statistically significant. This was consistent with the suggestion of Brandt and Safristein⁴⁹ that extraction of second rather than first premolar might be undertaken to minimize retraction of incisal segment, in patients presenting with good pretreatment lip profiles and only mild to moderate crowding. This also explained the 4/5 extraction in the corresponding group.

The different post treatment changes in depth of the upper lip curve for the extraction and non-extraction groups were found to be statistically significant ($p=0.04$). This was expected when one considers the different pretreatment characteristics of the subjects within those groups. The 4/5 extraction group exhibited significantly greater mean pre-treatment upper incisor proclination and upper lip curve depth. This result was similar to previous studies^{44, 45}.

In this study the absence of significant differences in post treatment lower lip curve changes in the extraction and non-extraction groups might suggest that pretreatment skeletal or dental factors should take precedence over pre-treatment lip curve depth when deciding for the need of extraction in orthodontic treatment. This was certainly consistent with the suggestion by Bowman and Johnston³⁴ that factors such as crowding, midline correction, molar relation might be more important in extraction decision, given the surprisingly minor previously reported effect of premolar extractions on the lateral facial profile. This result was similar to the previous studies^{44, 45}.

Based on the strength of correlation coefficients for skeletal, dental and soft tissue variables with changes in lip curve, it appeared that soft tissue variables as a group may have a greater potential influence over changes in lip curvature, than dental or skeletal parameters. This would be consistent with previously published findings^{50, 51} supporting the concept that the soft tissues themselves are the ultimate compensators in the facial profile. In this way, the overlying soft tissues can actually mask significant underlying skeletal discrepancies. Hence in this study the correlation between pre-treatment soft tissue parameters and post treatment upper and lower lip curve changes are taken into account (Table- 3 & 4).

A high degree of positive correlation was found between pre-treatment upper lip curve and post treatment upper lip curve change in 4/5 extraction group. That

means deeper pre-treatment upper lip curve is associated with more post treatment upper lip curve change which agrees with studies done before^{44,45}. The explanation of this has already been discussed here.

A high negative correlation between soft tissue thickness at point B' and post treatment change in lower lip curve was found in 4/5 extraction group. Thicker the post treatment soft tissue at point B', lesser was the post treatment lip curve changes seen. This can be explained, that in most mandibular second premolar extraction cases the anterior retraction was minimal and the residual growth of lower lip could have played its role in increasing the lower lip curve.

A high statistically significant positive correlation between pre-treatment lower lip curve depth and post treatment lower lip curve change was found in 4/5 extraction group. Which is similar to studies done previously^{15, 44, 45}.

A high positive correlation between upper lip soft tissue thickness at point A and post treatment upper lip curve change in 4/5 extraction group was found. A high positive correlation between lower lip soft tissue thickness at point B and post treatment lower lip curve change in female non-extraction group was found and was similar to results of previous study⁴⁴.

Stepwise regression was used to identify not only those pretreatment variables with the most likely influence on lip changes but also to attempt to describe the extent of variability in lip response that might be explained by those variables. This analysis was conducted with the aim of perhaps providing the clinician with a tool to estimate the type and direction of lip response using only pretreatment factors. Higher percentage predictions were considered more clinically relevant than the less percentage predictions given the increasing deviation in the range of prediction. However, it should be interpreted with caution, given the small sample size.

When analyzing the results of stepwise regression, it became obvious once again that soft tissue factors such as the pretreatment lip curve depth are likely to influence lip curve changes to a greater extent than dental variables. It has been previously pointed out that the characteristics of the lip tissue themselves will greatly influence any response of the lips to orthodontic tooth movement⁴³. The fact that lower facial variables displayed a greater

potential for prediction than did those of the midfacial region, would support the findings of Woods⁴⁴ and Talass et al¹⁵ who noted that changes in the lower lip in response to orthodontic tooth movement, seem to be more predictable than those in the upper lip. Talass et al¹⁵ further suggested that, the reduced predictability of any upper lip response may be due to the more complex functional anatomy of the upper lip.

While various predicting ratios for lip to incisor retraction have previously been reported in the literature^{11,13}, no useful correlations between changes in upper lip curve depth and changes in underlying dental variables were found previously^{44,45}. Hence in current study the dental variables are not taken in to account. This is consistent with the findings of Wisth,¹² Roos,¹³ and Hershey,¹⁴ who all concluded that a wide range of individual variation makes reliable prediction of the amount of upper lip retraction in individual cases almost impossible.

CONCLUSION

The results of this study lead to the following conclusions–

1. The post treatment reductions in lip curvature were directly proportional to the pre-treatment upper and lower lip curve depth.
2. Post treatment change in the upper lip curve between extraction and non-extraction group was statistically significant, but was not clinically significant.
3. The lower lip curve depth change was significantly correlated to the pre-treatment lower lip curve. The upper lip curve did not have such correlation.
4. Analysis of stepwise regression showed, that changes in the lower lip curve depth in response to orthodontic tooth movement, was comparatively more predictable than those in the upper lip. However, it should be interpreted with caution, given the small sample size.
5. Lip curve depth changes in a particular direction are not entirely dependant on extraction or non extraction of bicuspids, were rather a resultant of a range of individual variable factors.

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Source of Funding: Self-funded

Ethical Clearance: The ethical clearance was obtained from Institutional Human Ethics committee, Institute of Medical science and SUM Hospital, Bhubaneswar, Odisha.

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Vertical Discrepancies in Orthodontics

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ABSTRACT

The vertical dimension problem is complex and multifactorial, the operator should recognize a vertical discrepancy (also known as Long-Face Syndrome) abnormality, and must be able to recognize its numerous components and understand their interrelationships, Many scientific investigators and orthodontic clinicians have contributed to the body of knowledge to which we have access. This article reviews some of the relevant literature and also some diagnostic and treatment planning suggestions to the clinical specialist who struggles with the vertical dimension enigma depending on various types of malocclusion.

Keywords: Vertical dimension, multi-factorial, malocclusion, long-face syndrome.

INTRODUCTION

Vertical dimension by the simplest definition is the vertical relationship between the maxilla and mandible. Vertical dimension can also be described as lower facial height using the distance between the anterior nasal spine (ANS) and gnathion.

The “Long face syndrome” includes multiple anomalies like open bite, hyperdivergent face, maxillary alveolar hyperplasia, maxillary vertical excess, anterior vertical excess of the lower face level, high angle facial type. Its separation into component parts is therefore necessary; for a better understanding and with a view to systematizing the therapeutic approach, it seems useful to suggest a classification of the facial height anomalies¹.

In order to define these height anomalies the authors Louis C. Merville and P.A. Diner have suggested the term ‘hypsoprosopia’. The main different aetiologies at three different levels are – A maxillary level between the dental apices and the nasal floor, - An inter-maxillary level between the anterior teeth and – A mandibular level between the dental apices and the lower border of the mandible, in the chin region.

“Hypsomaxilla” to indicate a height increase of the maxillary level. “Hypsogenia” to define the height increase of the chin, increased of the inter-maxillary or oral levels. The latter may result from three skeletal deformations, a vertical posterior maxillary dento alveolar excess through lowering of the upper premolar molar unit (VPMDE); a vertical anterior mandibular dento-alveolar deficiency, through lowering of the lower incisor unit (VAmDD); an excess give opening of the gonial angle of amblygonia (from “amblos” open, and “gonios” angle)¹.

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Development of vertical problem: Vertical malocclusion can be divided into those, that are, dentoalveolar in origin and those that are, predominantly skeletal due to the growth patterns of the jaws. Skeletal

deep bite is characterized by concave facial profile with a reduction of anterior face height while, skeletal open bite is a convex facial profile with a pronounced retrognathic mandible. The malocclusions are primarily the result of the growth pattern of face and functional factors, greatly contributing to the final malocclusion².

Mandibular Growth and Vertical malocclusion:

Studies of facial growth using the metallic implant technique by Bjork and Skiller have demonstrated that the direction of growth of the lower jaw varies greatly in the normal population. The most common direction of condylar growth is vertical, with some anterior component, a more extreme upward, forward growth pattern of the condyle is not uncommon.

Patients with upward and forward growth of the mandibular condyle often have reduced anterior face height, usually develop a malocclusion characterized by a deep bite. The direction of mandibular growth, as expressed at the chin, is mostly vertical. Growth in this direction results in more horizontal displacement of the mandible and effectively improves the position of the chin. In more extreme cases of upward, forward growth of the condyle, a Class II, division 2 malocclusion in combination with skeletal deep bite is common³.

The erupting dentition in this type of mandibular growth characteristically undergoes a considerable amount of mesial migration of both the maxillary and mandibular teeth with some degree of proclination of the mandibular incisors. Where the amount of mesial migration of the lower posterior teeth does not equal the advancement of the incisors by proclination, secondary crowding of the front teeth frequently develops.

Patients with the so called "long face syndrome" and a pronounced increase in lower face height, in contrast have a more posteriorly directed growth pattern of the mandibular condyle. The direction of mandibular growth, as expressed at the chin, is mostly vertical. The malocclusion observed in this type of patient is an anterior open bite often in combination with a Class I or II malocclusion. These patients have little or no improvement in horizontal mandibular position over time⁴.

Growth Rotations and Vertical Malocclusions: The changes related to facial growth in the two extreme growth patterns are due to differences in condylar growth direction, but are also the result of differences in anterior

face height (AFH) and posterior face height (PFH) development. These differences in height development lead to rotational growth or positional changes of the mandible that greatly influence the position of the chin. The factors that determine the increase in AFH are the eruption of the maxillary and mandibular posterior teeth and the amount of sutural lowering of the maxilla. PFH, is determined by the lowering of the temporomandibular fossae and condylar growth. When vertical condylar growth exceeds dentoalveolar growth, i.e. eruption of the teeth in the jaws, forward rotation of the mandible occurs. In contrast, if dentoalveolar growth is greater than vertical condylar growth, the resulting change in mandibular position is backward or posterior rotation of the mandible. Patients with an anterior condylar growth pattern usually have a greater amount of vertical growth than patients with posteriorly directed growth⁵.

Bjork demonstrated that under ideal circumstances the fulcruming point for anterior or forward mandibular growth rotation is located at the incisors. If, proper incisal contact is lacking, either as a result of lip dysfunction or a finger sucking habit or if a severe sagittal skeletal jaw discrepancy exists, the patient will develop a skeletal deep bite as a result of growth pattern. The fulcruming point in these instances is located further back along the occlusal plane.

The mandibular translates during growth without rotation. This posterior growth rotation may result in an anterior open bite, depending on the extent of vertical dentoalveolar compensation. When treated orthodontically these patients are at increased risk for further mechanically induced posterior rotation by acceleration of their molar eruption and require careful control⁶.

A common scenario affecting the skeletal problem is mandibular growth and growth rotation, which unfavorably impacts dentoalveolar development in both the maxilla and mandible. Bjork and Bjork and Skieller have performed numerous studies that have shown that the most common direction of condylar growth is vertical, with some anterior component. Patients with a pronounced short lower anterior facial height generally exhibit upward and forward condylar growth. These individuals generally have a deep vertical overbite with a deep mentolabial sulcus and a strong over closed appearance. In contrast, patients with long face syndrome have a more posteriorly directed growth pattern of the mandibular condyle. These backward growth rotators have increased anterior facial

height, a more posterior position of the chin, and in extreme cases, an anterior open bite may develop. Serial images of the patient taken to monitor the direction of condylar growth would be very useful or the diagnosis of vertical growth. At the present time, serial imaging poses certain concerns, most significantly radiation exposure. Advances in imaging technology may, in the future, permit the clinician to use these methods for diagnostic purposes with greater safety⁷.

An understanding of the maxillomandibular growth rotation of the patient would be most helpful in the diagnosis of vertical variations. Bjork has contributed information that offers some guidelines for the clinician to assist in the determination of the growth rotation of the mandible so that the concomitant vertical changes are more easily understood. Bjork's method of prediction of condylar growth rotation from a cephalogram offers the clinician some guidelines. Bjork identified seven specific structural features that might develop as a result of remodeling during a particular type of growth rotation. Bjork's suggestions for predicting condylar rotation have, however, not been widely used by the speciality because (1) some of the indicators cannot be easily seen on the average cephalogram, (2) the use of the indicators is very time consuming for the clinician, and (3) there has been no scientific validation of the suggested indicators because of difficulties encountered in study design. Some in the speciality also question whether several of the suggestions are valid indicators of a particular type of growth rotation. However, when used for their intended purpose, as guidelines only, the indicators have some useful clinical applications in the diagnosis of the patient with vertical dysplasia³.

The forward rotator, exhibits several of Bjork's indicators including observations that (1) the condylar head curves forward, (2) the mandibular canal is curved, (3) the symphysis has a backward cant, (4) the interincisal angle is obtuse and (5) lower anterior facial height is short.

The backward rotator exhibits (1) a straight inclination of the condyle, (2) a relatively straight mandibular canal, (3) the symphysis slopes forward and, (4) lower anterior facial height is long.

Anterior and Posterior Facial Height³: Vertical dimension skeletal abnormalities are not solely caused by condylar growth direction. They are also caused

by differences in anterior facial height and posterior facial height development. These differences in height development can lead to rotational growth or to changes in mandibular position that greatly influence the position of the chin. Etiologies influencing unfavorable differences in development of anterior and posterior facial height are multifactorial. These factors can, for simplicity, be subdivided into those caused by (1) dentoalveolar development and (2) environmental factors.

Dentoalveolar Development: Issacson et al studied dentoalveolar development in three groups of subjects – those with short anterior facial height, those with average anterior facial height, and those with excessive anterior facial height. The amount of maxillary posterior alveolar development was found to decrease as the MP-SN angle decreased. In patients with long anterior facial height (high MP-SN angles), the mean distance from the occlusal plane to the inferior edge of the palate was 22.50 mm. this distance decreased to 19.6 mm for the average group and 17.1 mm for the group with short anterior facial height (low MP-SN angles). This difference of 5.1 mm of dentoalveolar development between the high angle and low angle groups is of significance⁹.

Environmental Role–Swallowing and Tongue Posture: The role of tongue posture, swallowing and breathing are still subjects of debate, argument, and studying orthodontics. Their respective impact on the vertical dimension are in need of continued study and research.

Mouth Breathing: The relationship between mouth breathing, altered posture, and the development of malocclusion is not as clear cut as the theoretical outcome of shifting to oral respiration might appear at first glance. Recent experimental studies have only partially clarified the situation. Current experimental data for the relationship between malocclusion and mouth breathing are derived from studies of the nasal oral ratio in normal versus long face children. The data from the study show that both normal and long face children are likely to be predominantly nasal breathers under laboratory conditions. A minority of the long face children had less than 40% nasal breathing, whereas none of the normal children had such low nasal percentages. When adult long face patients are examined, the findings are similar; the number with evidence of nasal obstruction is increased in comparison to a normal population, but the majority are not mouth breathers in the sense of predominantly oral respiration.

Airway problems, such as large adenoids, tonsils, or blocked airways caused by septum deviations, large conchae, or allergies are frequently observed in high angle patients and may affect mandibular posture, allowing more freedom for posterior eruption. This hypothesis is supported by Linder-Aronson who showed closing of the mandibular plane angle and reduction in the anterior face height after removal of adenoids and tonsillectomy¹⁰. DiPaolo devised a classification of the basic facial types encountered.

Type 1: This face is characterized by a downward and forward type of growth. The quadrilateral generally exhibits fairly equal bony arch lengths and an average vertical height equal to the maxillary arch length, demonstrating a lower facial harmony with the upper face. All malocclusions in this group are dentoalveolar in origin, that is, there is an imbalance in size of teeth to arch, forward position of upper teeth to lower teeth, or forward position of the teeth to upper face.

Type 2: The dominant direction of growth in this type of face is horizontal accompanied by the vertical growth resulting in a reduction of lower face height. A deep bite associated with this pattern is always due to undesirable growth. The characteristic quadrilateral configuration exhibits a deficient average vertical height in relation to maxillary arch length.

The subdivisions of this group would be the deficient vertical height associated with any of three possibilities:

- A. Upper and lower bony arches are comparable in size.
- B. Upper bony arch is larger than lower bony arch.
- C. Lower bony arch is larger than upper bony arch.

All subdivisions may be accompanied by malocclusions of dentoalveolar origin.

Type 3 the dominant direction of growth for this last type of face is vertical accompanied by little horizontal growth, resulting in an increased lower face height. Posterior alveolar compensation may result in an acceptable anterior overbite. A open bite associated with this pattern is always due to an undesirable growth pattern. The quadrilateral configuration in this facial type would exhibit an excessive average vertical height in relation to maxillary arch length. The subdivisions of this group would be the excessive vertical height associated with any of three possibilities.

- A. Upper and lower bony arches are comparable in size.
- B. Upper bony arch is larger than lower bony arch
- C. Lower bony arch is larger than upper bony arch

All subdivisions may be accompanied by malocclusions of dentoalveolar origin.

Class II malocclusion with vertical discrepancies- 5 types

Type 1

- Disproportionately increased AFH than PFH.
- Palate may be tipped downward.
- Ant. cranial base tipped upwards.
- Mand and functional lines are steeper
- High angle case or long face syndrome

Type 2

- Horizontal MP, functional op & palatal plane.
- Gonial angle is small
- Ant. Cranial base is.
- Square face appearance with more vertical incisor position and skeletal deepbite.

Type 3

- Palatal plane tipped upwards anteriorly
- Decreased ant upper face height
- Open bite
- Steep MP angle
- Severe skeletal open bite

Type 4

- Rare type
- Palatal & functional planes tipped downwards.
- Mandibular plane normal
- Gonial angle is relatively obtuse
- Maxillary incisors tipped labial
- Mandibular Incisors tipped lingually
- High lip line

Type 5

- Palatal plane tipped downward
- Normal mandibular and functional occlusal plane angle
- Gonial angle is smaller than normal
- Skeletal deep bite
- Maxillary incisors are almost vertical
- Mandibular incisors are severely labially placed.

CONCLUSION

Diagnosis of the vertical dimension is a complex problem. Yet, it can be as simple as studying a face and applying common sense diagnostic tools to ascertain the reason that the lower face is too long or too short. The vertical dimension has been a subject of study and debate since orthodontics became a speciality. Researchers in the field of vertical dimension diagnosis have provided the speciality many useful guide lines and concepts that can be used by every orthodontic clinician as they diagnose a malocclusion that is complicated by a vertical dimension discrepancy. Orthodontists should continue to use the work of these researches and clinicians for a foundation as more studies are undertaken that will yield more knowledge so that diagnosis of the vertical dimension become less art and more science.

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Skeletal Anchorage System in Orthodontics

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ABSTRACT

The use of miniscrew and miniplate to obtain absolute anchorage has become very popular in clinical orthodontic approaches. The mode of anchorage provided by the implant systems is unique in that their use is temporary and transient. These characteristics have made them indispensable as a treatment option. The aim of this review is to discuss the development, classification, properties, clinical applications, site and placement procedures, and removal along with clinical benefits and drawbacks to obtain a temporary and yet absolute skeletal anchorage for Orthodontic applications.

Keyword: Anchorage, Implant, Onplant

INTRODUCTION

Conservation of anchorage in totality has been a perennial problem to the traditional orthodontist. Conventional means of supporting anchorage have been using either intra-oral sites or relying on extraoral means. Both of these have their limitations. The extra-oral forces cannot be used on a 24x7 basis to resist the continuous tooth moving forces and are also taxing on the patient's compliance. On the other hand, strict reliance on intra-oral areas - usually dental units does not offer any significant advantages, except the fact that the patient's co-operation is less critical. Due to these constraints therefore, at times, either the treatment options start getting limited or the end result compromised. The advent of osseointegrated implants, due to the pioneering studies of Prof. Branemark has changed this scenario. The implants made of titanium have been widely used by several orthodontists as they offer Absolute Anchorage.¹

CLASSIFICATION OF IMPLANT²

Implants can be broadly classified under the following headings:

Subperiosteal: In this design, the implant body lies over the bony ridge. This type has had the longest history of clinical trials but a decreased long-term success rate; probably due to the fact that the chances of getting it dislodged are high. Also, the complexity of their designs requires a precise casting procedure. The subperiosteal design currently in use for orthodontic purposes is the 'Onplant'.

Transosseous: In this particular variety, the implant body penetrates the mandible completely. These have enjoyed good success rate in the past. However they are not widely used because of the possible damage to the intrabony soft tissue structures like the nerves and vessels. Even in the field of Orthodontics, transosseous implants have not been used

Endosseous: These are partially submerged and anchored within bone. These have been the most popular and the widely used ones. Various designs and composition are available for usage in specific conditions. The endosseous implants are also the most commonly employed types for orthodontic purposes.

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ORTHODONTIC ANCHORAGE WITH OSSEOINTERGRATION

Implant-Bone Interface

The relationship between endosseous implants and bone consists of one of two mechanisms: osseointegration, when the bone is in intimate contact with the implant, or fibrous integration, in which soft tissues, such as fibers and/or cells, are interposed between the two surfaces.

The proponents of the fibro-osseous system of implant retention opinion that the presence of a dense collagenous tissue between implant and bone will act as an osteogenic Membrane. There is no wide support, however, for this concept. The osseointegration concept proposed by Branemark et al and called functional ankylosis by Schroeder.³

It states that there is an absence of connective tissue or any nonbone tissue in the interface between the implant and the bone. A more accurate term, microinterlock, is used in orthopedic implantology where tissue and implant are juxtaposed, providing a bioinert fixation with surface porosity grooves, or beads⁴.

Osseointegration refers to the direct contact of bone and implant at the light microscope level.^{5, 6} Osseointegration never occurs on 100% of the implant surface. Successful cases will have between 30% and 95% of the implant.

Bone Tissue: Three distinct types of bone (woven, lamellar, and composite) are involved in postoperative healing and maturation of the osseous tissue supporting an implant. Woven bone has high cellularity, a rapid formation rate (30 m/day or more), relatively low mineral density, high random fiber orientation and poor strength. It serves an important stabilization role in postoperative healing of endosseous implants. During the initial healing process woven bone fills all spaces at the bone-implant interface. Although capable of stabilizing an unloaded implant, woven bone lacks the strength to resist masticatory function.⁷

Lamellar bone is the principal load-bearing tissue of the adult skeleton. It is the predominant component of a mature bone-implant interface. Lamellar bone is formed relatively slowly (less than 1.0 mm/day), has a highly organized matrix, and is densely mineralized.

Composite bone is a combination of paravascular lamellar bone deposited on a woven bone matrix. Formation of composite bone is an important step in achieving stabilization of an implant during the rigid integration process

If there is good postoperative stability of the implant in cortical bone, the healing response involves six physiological stages:

1. Callus formation (0.5 month)-initial,
2. Callus maturation (0.5 to 1.5 months)
3. Regional acceleratory phenomenon (RAP) (1.5 to 12 months) remodeling of the nonvital interface and supporting bone
4. Osseous integration of the interface (1.5 to 12 months) completion of the RAP, increased direct contact of living bone at the interface
5. Maturation of supporting bone (4 to 12 months) completion of the RAP, secondary mineralization of new bone and increased direct contact of living bone at the interface
6. Long-term maintenance of osseointegration

APPLICATION OF IMPLANT IN ORTHODONTICS

Endosseous Implant:

a. Implants for intrusion of teeth: Creekmore in 1983 published a case report of usage of a vitallium implant for anchorage, while intruding the upper anterior teeth. The vitallium screw was inserted just below the anterior nasal spine. After an unloading period of 10 days, an elastic thread was tied from head of the screw to the arch wire. Within one year, 6mm intrusion was demonstrated along with 25 lingual torque⁸.

b. Implants for space closure: Extensive research relating to usage of retromolar implants for orthodontic anchorage has been done by Eugene Roberts. The first clinical trial was on an adult wherein an atrophic extraction site had to be closed. A special implant was developed of size 3.8 mm⁹

width and 6.9 mm length, which was placed in the retromolar area. A 0.021" X .025" SS wire was used for

used for anchorage from the screw around the premolar bracket . In the initial phases, this wire also aided in leveling. The extraction spaces were closed using forces from buccal as well as the lingual sides (activating the lingual arch. The premolar was prevented from moving distally with the help of 0.021 X .025” wire acting as an anchorage. The modification in this technique as suggested by him in 1994 includes the usage of a .019” X.025” TMAwire.

Disadvantage of Endosseous Implant

The important limitations are:

- a. Bulkiness of the implant and therefore the nonsuitability of placement in the inter-dental areas.
- b. It involves a two stage procedure and therefore a long waiting time before loading the implant
- c. Anatomical limitations - such as erupting teeth, nerve canal etc. also add to their minimal usage
- d. Cost of the implants - These are the root form implants used for tooth replacement and therefore, very expensive.

These factors made it imperative that newer implants, adapted specifically for Orthodontic usage be developed and from 1995 onwards, over 10 such systems have been introduced.

Subperiosteal Implant: The Onplant

This is a classic example of a subperiosteal implant in Orthodontics. Developed by Block and Hoffman in 1995, this system consists of a circular disc 8-10 mm in diameter with a provision for abutments in the center of the superficial surface . These abutments would enable the Orthodontist to carry out tooth movement against the Onplant. The undersurface of this Titanium disc is textured and coated with Hydroxyapatite (HA). The HA, being bioactive helps in stabilisation of the implant by improving integration with bone. The average thickness (height) of the implant is 3 mm¹¹.

Disadvantages of Onplants:

- a. A long waiting period prior to orthodontic force application
- b. Excessive surgical intervention - Two surgeries are necessary after onplant placement; one to uncover

the onplant cover screw and the other to remove the onplant itself following Orthodontic treatment.

c. Cost factor

Osseous Implant: Osseous implants are those that are placed in dense bone such as the zygoma, the body and ramus area or the mid-palatal areas. The implant systems under this category are the

- Skeletal Anchorage system,
- The Grazimplant supported system
- The Zygoma anchorage system.

Skeletal Anchorage System: The skeletal anchorage system was developed by Umemori and Sugawara. It essentially consists of titanium miniplates, which are stabilised in the maxilla or the mandible using screws. The earlier of these miniplates were the conventional surgical mini plates, which are used by Oral Surgeons for rigid fixation. The recent versions of these miniplates have been modified for attaching orthodontic elastomeric or coil springs. Different designs of miniplates are available and this fact offers some versatility in placing the implants in different sites. The ‘L’ shaped miniplates have been the most commonly used ones, while the ‘T’ shaped ones have been proposed for usage while intruding anterior teeth . The screws used for fixing the miniplate are usually 2-2.5mm in diameter. ¹²

ADVANTAGE OF SAS

The SAS enables tooth movement to be controlled 3-dimensionally, so that treatment goals can be accomplished, even when the amount of tooth movement required is more than the mesiodistal width of the premolars.

SAS, it is not always necessary to extract the mandibular first or second premolars, even in patients with moderate to severe crowding.

The molar relationship in patients with symmetric or asymmetric Class III molar relationships can be corrected without having to extract mandibular premolars

It does not interfere with tooth movement.

ZYGOMA ANCHORAGE SYSTEM

Hugo De Clerck and Geerinckx of Belgium introduced this system in 2002. The upper part of the

Zygoma Anchor is a titanium miniplate with three holes, slightly curved to fit against the inferior edge of the zygomaticomaxillary buttress. A round bar, 1.5mm in diameter, connects the miniplate and the fixation unit. A cylinder at the end of the bar has a vertical slot, where an auxiliary wire with a maximum size of 0.032" x 0.032" can be fixed with a locking screw.

The plate is attached above the molar roots by three self-tapping titanium miniscrews, each with a diameter of 2.3mm and a length of 5mm or 7mm. The miniscrews do not need to be sandblasted, etched, or coated. Square holes in the center of the screw heads accommodate a screw-driver for initial placement, while pentagonal outer holes are used to remove the screws at the end of treatment¹³.

CLINICAL APPLICATION

Orthodontic forces can be applied to the anchor immediately after implantation. To connect the Zygoma Anchor with the anterior teeth, a rigid power arm was designed to fit in the large vertical slot of a canine bracket. The hook at the end of the power arm is situated at the level of the canine's center of resistance. A nickel titanium closed-coil spring with a force of 50-100g is attached between the power arm on the canine and the Zygoma Anchor, so that the direction of force is parallel to the main archwire.

Advantage

- Miniscrews are small enough to be placed between the roots of the teeth in the alveolar bone.
- By connecting two or more miniscrews, the orthodontic reaction forces can be neutralized.
- The surgical procedure is uncomplicated because the screws are placed directly through the gingiva, without a mucoperiosteal flap, and can be loaded immediately after insertion.
- Miniscrews can be used in the anterior or posterior region and attached with elastics or coil springs to the fixed appliance for direct anchorage.
- Anchorage can be adapted to changing treatment needs in different parts of the dental arches.
- The ZAS uses three miniscrews, increasing total anchorage over other types of implants.

- The point of application of the orthodontic forces is brought down to the level of the furcation of the upper first molar roots.
- The vertical slot with the locking screw makes it possible to attach an auxiliary wire, which can move the point of force application some distance from the anchor.

Disadvantage

- The main disadvantage of these screws is their proximity to the roots, which may be damaged during placement of the screws or when the adjacent teeth are displaced.

GRAZ IMPLANT SUPPORTED PENDULUM

Graz implant supported system introduced by Karcher and Byloff, this anchorage system consists of a modified titanium miniplate, with provision for four miniscrews, and two oval shaped cylinders. This was used mainly as a support for the Nance button of a pendulum appliance in the palate. This system can be loaded within 2 weeks to distalize and anchor maxillary first and second molars¹⁴.

Appliance Design: It consists of a simple surgical plate (15 X 10 mm). Two cylinders (10 mm long and 3.5 mm in diameter) are soldered at right angles to the center of the plate. The plate is fixed to the palatal bone via four 5-mm-long titanium miniscrews. The 2 cylinders perforate the palatal mucosa to enter the oral cavity. The entire anchorage device is constructed of 100% titanium. No auxiliary wires are bonded to the premolars, making the GISP removable. In the palatal portion of the resin body are 2 cylindrical slots that correspond to the 2 cylinders. The system is based on a telescopic principle: the 2 slots of the removable pendulum (RP) are placed over the 2 fixed cylinders of the implant.

Advantages of Osseous implants:

- The osseous implants, specially the mini plate designs offer the Orthodontist a fair chance of success in effecting complex tooth movements such as molar intrusion.
- True intrusion of upper and lower molars in moderate anterior open bite cases converts a borderline orthognathic case into an orthodontic one.
- This emerging new area of implant application has been termed as '**Orthognathic Orthodontics**

Limitations of Osseous implants:

Disadvantage

- a. They need a fairly complex surgery and therefore have to be placed by a surgeon.
- b. The chances of infection are greater than the screw implants.
- c. Their removal is as difficult as the placement.

CONCLUSION

With skeletal anchorage, orthodontic tooth movements can be accomplished that is beyond the realm of usual orthodontic practice. Skeletal anchorage considerably extends the range of biomechanical therapy for decreasing the need for extra oral anchorage and orthodontic surgery.³⁰

The newer anchorage systems provide skeletal anchorage without requiring patient co-operation or compromising esthetics. With anchorage consideration no longer an issue, orthodontic mechanotherapy can be greatly simplified. These skeletal fixtures would make treatment outcome more predictable satisfying both patient and the orthodontist. The concept of absolute anchorage can now be effectively explored and employed.

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Dentistry with Ergonomics

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ABSTRACT

Dental professionals of all the specialties are often amongst the groups suffering from musculoskeletal disorders because of prolonged working hours with awkward positioning . Adding to it are the vibratory equipments and miniature instruments. The disorders ranges from simple sprain to carpel tunnel syndrome. Thus the only way is to prevent by incorporating principles of ergonomics to avoid illness and injuries thereby resulting in prolonged efficient work outcome.

Keywords: ergonomics, MSDs, dentists

INTRODUCTION

Developing and managing good musculoskeletal health in dentistry is a challenge.

Dentists often cannot avoid prolonged static postures. Even in optimal seated postures more than one-half of the muscles are contracted. This may results in microchanges (back, neck, or shoulder pain) and macrochanges musculoskeletal disorders). Thus to maintain optimal health during the course of career it require special exercise and ergonomic interventions.¹

Ergonomics: “Ergo” means work, “Nomos” means natural laws or systems. Ergonomics is the study of relationship between people and their working environment. OSHA refers ergonomics as the relationship of the human/environmental interface that does not produce injury.^{2,3}

Our profession exposes us to various risk factors like Sustained/awkward postures, Repetitive tasks, Forceful

hand exertions ,Vibrating operational devices ,Time pressure from a fixed schedule, Coping with patient anxieties and precision required with work. All these indirectly leading to fatigue, discomfort, illness/injury, absenteeism, errors, lower productivity and customer dissatisfaction.^{4,5}

Musculoskeletal Disorders (MSDs) as described by WHO are Disorder of the muscles, tendons, peripheral nerves and vascular system not directly resulting from an acute or instantaneous event. Also known as Repetitive strain injury (Australia), Cervico-brachial disorder (Japan) and Cumulative Trauma Disorders (North America). It shows higher prevalence among female dentist. The presenting signs are deformity, decreased grip strength, loss of muscle function and this decreased range of motion. Most often they complain of pain, numbness, tingling of forearm and fingers, burning and cramping and in long run also leads to stiffness.⁶⁻⁸

Types of MSDs⁹⁻¹²

- Neck And Shoulder Disorders
 1. Tension Neck Syndrome
 2. Myofascial Pain Disorder
 3. Cervical Spondylolysis
 4. Rotator Cuff Tendinitis/Tears
- Hand and Wrist Disorders
 1. Tendinitis/Tenosynovitis
 2. DeQuervain’s Disease
 3. Trigger Finger

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4. Carpal Tunnel Syndrome
5. Guyon's Syndrome
6. Hand-Arm Vibration Syndrome
7. Raynaud's Phenomenon

- Back Disorders

1. Herniated Spinal Disc
2. Lower Back Pain
3. Sciatica

Objectives of Ergonomics

- Permits a clear view of tooth being worked on
- Allows easy access of instruments
- Increases efficiency
- Prevents operator fatigue

Applying Ergonomics in Dentistry is needed for benefit of patient as well as dentist with objective of permitting clear view of operating field, allowing easy access for instrumentation thereby increasing efficiency and preventing operator fatigue and further long term complication. The principles of ergonomics can be described in every nook and corner of dental clinic and incorporating certain modifications in working style, which is explained as follows.^{13, 14}

Work Station Set Up

Provide sufficient space: Permanently place those equipments which is used in every clinical procedure within comfortable reach (within 20 inches of the front of the body) Sufficient space provide a clear line of sight to the oral cavity and all required equipment. It also maintain a neutral, balanced position.¹⁴

Accommodate Individual Preferences: Individuals vary in size, shape, training, and experience thus ensure equipment and work areas allow flexibility; examples may include:

- Allows right- or left-handed use,
- Allowing different working postures¹⁴

Operator Stool: The operator stool is the most vital but often neglected piece of dental technology. Ideally it should adjust to support your body in a neutral back, neck, and shoulder posture. The proper selection and adjustment of operator stools play a key role in the management and prevention of work-related pain in dentistry.¹⁵⁻¹⁶

BASIC FEATURES

- 1. Hydraulic controls:** For easy and smooth adjustments.
- 2. Tilting Seat Pan:** Research suggest that the most optimal seated posture for operator is hips higher than the knees, the slight downward inclination (10-15 degrees) helps facilitate lumbar curve.
- 3. Seat Contour:** The front edge of the seat should be padded and have a "waterfall" edge. This feature is especially important to reduce pressure on the posterior thigh's blood vessels when sitting with your thighs sloping downward. This allows an operator to maintain a forward and upward posture while operating and transfers some of the body's support to the feet. We refer to this as "leg balanced sitting"
- 4. Seat Depth:** Dental seat pans range from 14 to 18 inches
- 5. Backrest**
 - a. Should have good lumbar support
 - b. Should be convex and approx. 8 inches in height.
 - c. Lumbar support helps to preserve the lumbar curve, reducing muscle activity, disc pressure, as well as back and leg pain.
 - d. This is an especially important feature with nontilting seat pans, which tend to flatten the low-back curve.
- 6. Armrest:** Studies support the use of armrests in the prevention of neck, back, and shoulder pain. It Should be highly adjustable to provide support to the operator in a neutral working posture.
- 7. Cylinder Height:** It is recommended that a "short" operator have a stool with height adjustment from 16 to 21 inches, and taller operators from 21 to 26 inches

Operator Position¹⁶

- Feet should be flat on floor
- Back well supported
- Patient at operator's elbow level
- Elbows should remain close to body
- Operator/patient distance 14-18"

Dental Chair: Close Proximity is the Key^{17,18}

Headrests :Small and Thin Headrests

- (a) These allow for more legroom and easier/enhanced accessibility to the patient.
- (b) Double-articulating headrests allow for both rotation and tilt of the patient's head.(Aid in viewing the upper arch)
- (c) Magnetic headrests, on a flat and thin headrest, also allow side bending of the patient's head to further increase proximity

Backrest: Narrow Upper Backrest: A narrow upper backrest allows for easy movement around the head of the patient from 9 to 11 o'clock.

Adjustability

- (a) Should be able to accommodate different patient sizes and needs.
- (b) Tall patients will need a longer extension on the headrest, and geriatric patients with kyphotic head posture will need support of the head in a forward position.
- (c) Patient positioning aids can be very helpful when treating pedo patients

Height Adjustment

- (a) The chair should adjust low enough to allow the dentist to operate in a neutral seated posture, especially when the patient is in a semisupine position.
- (b) High enough for the dentist to have the option to comfortably stand for extractions, or impression taking without excessive forward bending.

Chair Length

- (a) Frequently overlooked consideration
- (b) Strive for a minimum of 24 inches between the top of the patient chair headrest (when fully reclined) and the counter, so you can easily move into the 12 o'clock position.
- (c) A chair with a "traverse" feature will allow the chair to glide horizontally back and forth to easily adjust this distance.

Working Positions:

Upper Arch

- (a) Fully supine position
- (b) Occlusal plane should be tilted backward up to 25° in relation to the vertical plane

- (c) Position the occlusal surface at elbow level or slightly higher while operating

Lower Arch

- (a) Semi-supine position(20° elevated from the horizontal supine position).
- (b) Occlusal plane of the lower jaw is close to horizontal
- (c) Forearms are parallel to the floor or sloping 10° upward

Lighting: The goal of overhead lighting is to produce even, shadow-free, color-corrected illumination that is concentrated on the operating field. The intensity ratio between task lighting (the dental operating light) and ambient room lighting should be no greater than 3:1. The light source should be in the patient's mid-sagittal plane. Directly above and slightly behind the patient's oral cavity. Fiber-optics lights mounted on handpieces adds concentrated lighting to the operating field thus minimising eyestrain.¹³

Instruments¹⁹: Various features of dental instruments may have an affect on ergonomic issues. These include:

- a. size and shape
- b. diameter
- c. surface configuration
- d. weight
- e. maintenance of the cutting edge

Four Handed Dentistry: Dental assistants create a more efficient environment for the operator by eliminating unnecessary motion; decreasing twisting and turning movement; decreasing long reaches and unbalanced posture thus increasing productivity and efficiency. Position of assistant thus impact and thus have certain recommendations as well like height of assistant in seated position should be higher than operator with feet on foot rest and thighs parallel to floor. They should remain close to patients and the instrument tray should be within their arm's reach.²⁰

Delivery Systems²¹

Rear Delivery System

- a. Poorest method of delivery.
- b. Limit access from 11 to 12 o'clock positions.
- c. Requires more trunk twisting.

- d. Equipment out of view of the patient which will decrease anxiety.

Side Delivery Systems

- a. Work especially well in 2 and 4 handed operatories.
- b. Require less trunk-twisting than rear delivery
- c. Tendency to “lock” into one working position resulting in fatigue and pain

Over-the-Patient Delivery System

- a. Allows moving freely from the 8 to 12 o’clock positions around the patient’s head.
- b. However, this system is highly visible and in close proximity to the patient thus making it undesirable for most pedodontic offices.

Transthorax Delivery Systems

- a. The transthorax unit design is positioned at the patient’s left side and designed to fully utilize the expanded duties of an assistant to maximize productivity.
- b. Designed for the practice of true 4-handed dentistry

Over-the-Head Delivery Systems

- a. Recently become recognized as a unique solution to dental delivery.
- b. Allow the operator the to practice from the 7 to 10 o’clock positions

Magnification²²: Forward head posture is common with unmagnified vision, which can lead to a pattern of painful muscle imbalances

Types of magnification

Procedure scope (1-23X): The newest magnification aid and allows the operator to sit upright while viewing images on an LCD screen.

Operating surgical microscopes (2-20X): A microscope fitted with an ergonomic adapter enables a near-neutral head posture.

Loupes (2-5X): Also referred to as telescopes, are the most popular type of magnification used in dentistry today.

Types

- a. Flip up loupe
- b. Through-the-lens (TTL)

Personal Protective Equipments^{14, 23}

1. Gloves:

- a. Ambidextrous (i.e., non-hand specific): exert more force than fitted gloves across palmar region of hand and may cause or exacerbate symptoms of carpal tunnel syndrome.
- b. Hand-specific (i.e., right vs left) is recommended as they Fit better and place less force on hand

2. Glasses:

- a. Lightweight, clean, well-fitted
- b. Magnifying lenses and head lamps are encouraged

3. Clothing: Should be loosely fit, lightweight and pliable

Scheduling of Appointments: Though overlooked most of times but it is of utmost importance to provide sufficient time to recovery of muscular fatigue, should have sufficient mental frame while treating difficult patients with unreachable accessibility. The appointments should be adjusted such that it alternates long difficult tedious patients and procedure with simpler shorter easier patients. It will not only enhance operator’s efficiency but also ensures quality treatment to patients.^{14,17}

CONCLUSION

As health professionals, we often focus our efforts on providing care for our patients, without taking proper care of ourselves. To deliver the best it is very important to begin to take care of yourself.

- a. Perform exercises/stretches
- b. Be aware of stress levels
- c. Get enough rest and relaxation times
- d. Be aware of pain signals
- e. Changing positions while working.

Applying ergonomics to the practice of dentistry not only could provide safety benefits but also improve performance objectives through greater productivity.

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Vistas of Smile Designing

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ABSTRACT

Everybody wants their smile to be beautiful. In Today's world appropriate application of principles of smile designing leads to drastic improvement of smile and aesthetic of the patient. It may be through conventional approach or more advanced application of Digital Smile Designing (DSD). DSD is a promising treatment approach toward s giving a beautiful smile to the patient.

Keywords: Dentistry, Smile, Esthetics

INTRODUCTION

First impression lasts long - They all say, and we follow. In our day today, life we all make assumptions right or wrong based upon our first impression. Great marketing is about great images and first impression. If the eyes are not grabbed the mind and heart are not either. Thus, we make the first judgement about a new person in the way he or she smiles and how confident they are. Smile says a lot about a person, about how confident they are, how satisfied they are, how wonderful and kind they are etc. But every individual is not so lucky to have such beautiful smile. A beautiful smile can be seriously compromised either by nature oneself or his or her dentist. But invariably we are all desirous of a beautiful smile.^{1,2}

In today's world we are lucky to transform worn out, broken, gummy and aging smile into most beautiful natural smile. Both art and science go hand in hand to create the most attractive, strong and confident smile. When good cosmetic artistry is combined with modern dental materials an expert training, we are assured of a durable vibrant healthy smile which imparts immense

confidence and winning thrill in ourselves. The ancient Greeks understood the concept of beauty and derived a parameter for it. They had given the most famous "Golden Proportion" that is used by famous artists and designers for long. Today we blend these design principles to create the pleasing smile. Attractive smiles are attractive as they follow the basic rules of nature. Natural beautiful smile is apparent to the subconscious eye and that's why they are universally attracted, noticed and rewarded.³

Making the smile perfect can be anything like making the teeth whiter and brighter, fixing the broken crooked teeth by aesthetic filling, shaping up the soft gum tissue to reduce its appearance in smile, replacing ugly dark filling by tooth coloured fillings, shaping up of teeth to look smaller, tilted etc – anything that can take years of our face and quickly and easily give that perfect smile. This perfect smile will seriously give the benefit of health, mind and spirit that come from a youthful attractive smile. We will understand why some smiles are so attractive and others don't by knowing some basic rules.¹⁻³

OBJECTIVE OF SMILE DESIGNING

The objective of aesthetic smile makeover is to develop a balance between teeth and soft tissue which would impart a bright and beautiful but believable appearance to the patient as well as impart a stable masticatory system where the teeth, alveolar bone, masticatory muscles and TMJ all function in harmony.

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Smile as a component of aesthetics

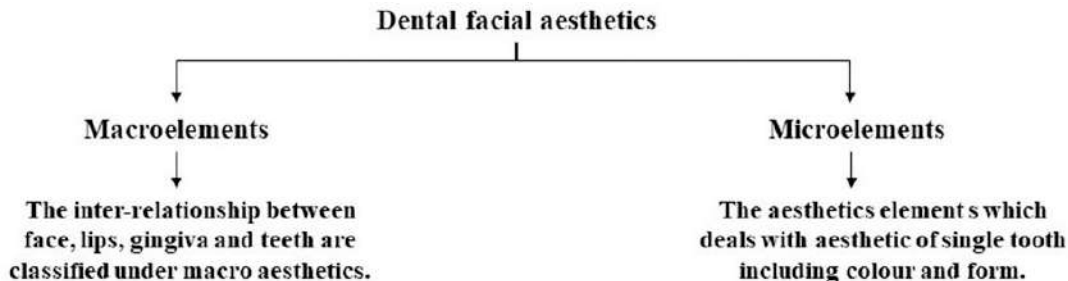


Figure 1: Dental facial aesthetics

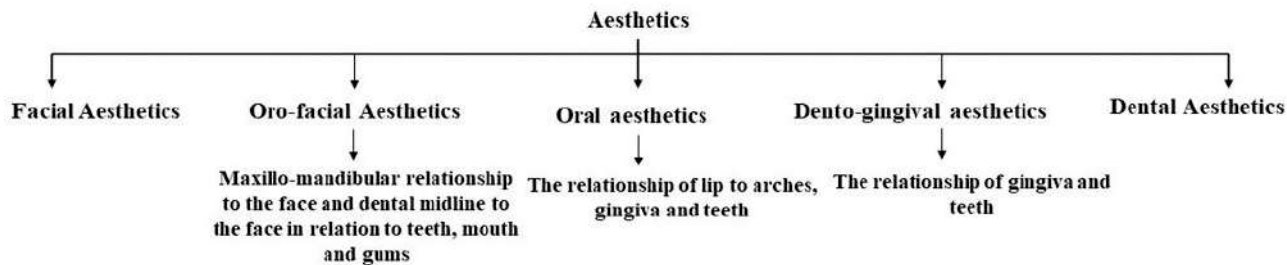


Figure 2: Types of Aesthetics

A. Facial aesthetics^{4,5}: Facial analysis includes the form and proportion of face. It has 2 components (Figure 1 and 2)

- a. Horizontal Component
- b. Vertical Component

Horizontal Component:

1. The width of the face should be the width of 5 eyes
2. The distance between the eyebrow and chin should be equal to the width of the face

Vertical Component:

1. The facial height is divided into three equal parts from forehead to eyebrow line, from eyebrow line to base of nose and base of nose to base of chin.
2. The full face is divided into two equal parts eyes being the midline
3. The lower part of the face from base of nose to chin is divided into two parts, the upper lip forms one-third and lower lip with chin is two-third of it.

Again, basic shape of the face when viewed from the frontal aspect can be of four types

1. Square
2. Tapering

3. square tapering

4. Ovoid

The lateral profile of an individual can be of three types

1. Straight
2. Convex
3. Concave

B. Orofacial aesthetics: The dental midline and facial midline are determined in this aesthetics, both of which should be collinear in a beautiful smile. Ideally facial midline is perpendicular to the horizontal imaginary lines like Interpupillary line, Commissural line and Opharic line (eyebrow line). Ideally all the horizontal lines should be parallel to each other. Now SMILE Creation is basically based on three pillars, Oral aesthetics, Dento-gingival aesthetics and Dental aesthetics.^{4,5}

C. Oral aesthetics: This analysis includes the placement of maxillary incisal edges and its proper display during static and dynamic lip movements. The parameter used to establish the maxillary incisal edge position are:

- i. **Degree of tooth display:** There should be 3.5-4mm of maxillary central display when the lips are at rest. In an ideal and fuller smile 2mm of the gingival tissue and proximity (not more

than 2mm) of the incisal line to the lower lip is seen. However, this display decreases with progressing age as the window of mouth begins to sag downwards showing more of the lower anteriors.

i. Phonetics: It is most important to determine tooth length. It is assessed by phonetics of M,E,F,V and S sounds.

ii. Patient input: Patient desires must be met as best as possible provided they do not interfere in the above parameters.

Correct incisal position is crucial as it is related to labial contours, lip support, anterior guidance, lingual contours and tooth display.

Lip line: It corresponds with the inferior border of the upper lip as it relates to the teeth and gingival tissues during smiling. Arbitrarily they are of three types:

- i. Average lip line-exposes maxillary teeth and only interdental papilla
- ii. Low lip line-exposes no gingival tissues while smiling
- iii. High lip line-exposes the maxillary teeth in full display and gingival tissues above gingival margin.

Smile Line: It is the imaginary line drawn along the incisal edges of maxillary anterior teeth. In an aesthetic smile the smile line follows the curvature of the lower lip. In reverse smile line, the centrals appear shorter than the cuspids along the incisal plane.

Smile arc: It is the relationship between a hypothetical curve drawn along the edges of maxillary anterior teeth and inner contour of the lower lip in the posed smile or social smile. They are of three types:

- i. Consonant smile arc,
- ii. Straight smile arc
- iii. Reverse smile arc

To provide an aesthetic smile we should prevent a straight or reverse smile arc. We should rather try to obtain some degree of curvature that parallels the lower lip curvature.^{4,5}

Smile symmetry: It is the relative positioning of the corners of the mouth in the vertical

plane during smiling. Symmetric smile is more attractive and so we should aim to give a balance form of teeth, gingival scaffold and lip framework to be near to the symmetry.^{4,5}

Buccal Corridor: It is the negative space visible during smiling between the corners of mouth and the buccal surfaces of maxillary posterior teeth. It is influenced by

- i. width of smile and maxillary arch
- ii. tone of facial muscles
- iii. the positioning of labial surfaces of upper premolars
- iv. the prominence of canines particularly at the distal facial line angle
- v. any discrepancy between the dimension of premolars and six anterior teeth.

This negative space should be kept minimum in a beautiful smile by restoring the premolars. The buccal corridor should not be eliminated as its complete absence gives the patients smile an artificial appearance.^{4,6}

D. Dento-gingival aesthetics: To have a beautiful smile there should be

- Gum line symmetry should be there on both right and left side. That means the height of scalloping should be symmetrical on both sides.
- The level of gingival zenith should be lower in the lateral incisor than that of adjacent central incisor and canine.
- Gummy smile is avoided where there is too much of the gum tissue seen during smiling. Ideal smile exposes 1-3mm of gingival tissue above the front teeth.
- Gingival zenith should be centred over each lateral and should be two-third away across the face of tooth in central incisor and canine.
- Attractive smile always has a good gingival health with regular dental cleanings. Healthy gums are light pink in colour and stippled in texture like orange peel.^{4,6}

E. Dental aesthetics: The final step of smile analysis is the dental aesthetics both intra tooth and intertooth. It includes

Tooth shape: It should be based on a facial appearance of the patient. Patient with longer face should ideally be matched with rectangular teeth whereas patient with square face will probably match teeth with 80% width to length ratio.^{4,6}

Dental midline: It refers to the vertical contact interface between two maxillaries central incisors. In a beautiful smile it should be perpendicular to the incisal plane and parallel to the midline of the face. The maximum allowed discrepancy of a tilted midline can be 2mm and sometimes greater than 2mm discrepancy is aesthetically acceptable so long as the dental midline is perpendicular to the interpupillary line. A midline that does not bisect the papilla is more noticeable than the one that does not bisect the philtrum. Maxillary and Mandibular midlines do not coincide in 75% cases, but this mismatch does not affect aesthetics as mandibular teeth are not usually visible while smiling.^{4,6}

Incisal length: In general, the maxillary incisors are 10-11mm in length, lateral incisors are 1-2.5mm shorter than central and canines are 0.5-1mm shorter than the central incisors. This incisal edge position is very vital in proper smile designing where only 3.5-4mm display of the tooth surface is there in relaxed mouth open position.^{4,6}

Tooth dimension: It is very essential criteria in creating an aesthetically pleasing smile. The width/height ratio in maxillary central incisor should be 75-80%. The relation of dimension of the maxillary central incisors with that of maxillary laterals and canines can be established by various guidelines like

- **Golden proportion:** As given by ancient Greeks, it is also called “rule of thirds”. Each tooth away from the midline should be two-third as width of previous tooth. So ideally central incisor should be 1.6 times as wide as lateral incisor and canine 0.6 times wide as lateral incisor e.g. If central incisor is 10mm wide, then lateral incisor would be 6.5mm and canine would be 4.4mm wide. Strict adherence to this golden proportion limits creativity and thus leading to cosmetic failure.
- **Recurring aesthetic dental proportion (As proposed by ward):** This is also called RED proportion. The successive width proportion when viewed from the

facial aspect, it should remain constant as we move posteriorly from midline. This offers great flexibility to match with facial proportion.

- **M proportion (As proposed by method):** This method compares the tooth width with the facial width using a software. The whole analysis is done by computer and thus have more mathematical touch rather than artistic.
- **Chu’s aesthetic gauges:** It is an instrument to make this analysis easier by following RED proportion and refuting Golden proportion. The gauge has colour coding which predefines desired tooth proportions.

Axial inclination: Each upper tooth seen in the smile has a slight inclination towards the midline of the mouth. These axial inclinations can be properly evaluated in the photograph of the patient’s anterior teeth.¹

Incisal embrasures: Failure to provide adequate depth and variation to the incisal embrasure will make the teeth appear too uniform and contact areas too long which gives box like appearance of the dentition. This is best seen as a triangle shaped wedge (which gradually increases from central to central incisor to lateral incisor to canine) on biting edge of the front teeth.¹

Interdental contact area and contact points (ICA and ICP): It is the broad zone at which two adjacent teeth touch. It follows the 50:40:30 rule in between central incisor to lateral incisor with canine. As a rule, ICP moves apically as one moves posteriorly from the midline.¹

Latest improvement in the field of smile designing: Digital Smile Designing (DSD) is the latest development in the emerging popular field of aesthetic dentistry. It is a software-based system which is a precise and efficient method for aesthetic rehabilitation which allows the clinicians, the lab technician as well as patient himself/herself to visualise and estimate discrepancy of orofacial and dento-gingival tissues. DSD employs digital editing software along with digital photography to provide digital simulations. It simplifies and demonstrates various steps involved in treatment planning. It also confirms patient’s expectations and thus provide greater treatment acceptance. DSD gives various treatment possibilities and their projected outcomes. It also compares patient’s existing smile to previous similarly treated cases.^{2,7,8}

DSD Procedure²: Equipment required for DSD are:

- (i) DSLR camera and a properly illuminated studio
- (ii) stabilising equipment for stabilising patient's head
- (iii) DSD software in the computer

Steps of DSD²

A. Four primary videos to be taken:

- A facio-frontal video should be recorded including with or without retractor smiling [keeping 1 metre and slightly zooming is recommended to avoid distortion]. Mouth should be opened in this video for better visualisation of aesthetic tissues.
- A facial profile video should be taken with lips at rest and in a wide E smile. Here the reference should be the upper lip of the patient.
- An occlusal video should be taken which allows visualisation of the incisal edges of the upper six anterior teeth. It is taken when the patient retracts his/her upper lip with both thumbs.
- A 12, O'clock video should be recorded from above the head with retracted upper lip by the patient's thumb as before. It shows relationship between facial midline, interpupillary line, commissural line etc.

Additional four complementary videos are taken:

- These are basically video of front to front interview with the patient by basic questions e.g. chief complaint, patient's desires about his/her smile.

These videos give way for facial, phonetic, functional and structural analysis. In these videos, patient is asked to perform various functional activities like protrusion and lateral movements. Thus facial analysis through these videos will guide the smile design process in both 2D and 3D.^{2,7,8}

B. These photographs and videos were downloaded and inserted in to slide presentation. Two lines must be placed on the centre of the slide forming a cross-the interpupillary line and facial midline.^{2,7,8}

C. Then these photographs are cropped to show only the intraoral view and three reference lines are marked- A straight line from canine to canine tip, a straight line touching the incisal edges of the upper central incisors and another straight line passing through the central interdental papilla which is referred to as dental midline.^{2,7,8}

D. With these lines being orientation landmarks, the previous photograph and to achieve smile is overlapped to allow a comparative analysis of teeth and face. Rectangles are placed over the incisors to mimic the required length and width of the incisors in proportion with the golden proportion grid (1.6:1) superimposed below maxillary anterior teeth. Digital ruler is calibrated on photograph by measuring width of central incisors in study model.^{2,7,8}

E. Desired morphology of tooth is then filled with a shade for which patient has agreed.

F. This is communicated with the laboratory where mock up in resin is done which is tried in patients' mouth. After functional evaluation effect of phonetics is also observed. Then tooth preparation for veneers or crowns are done. Impression is then taken after placement of retraction cord.^{2,7,8}

G. Permanent veneers or crowns when comes from the laboratory is then fitted after the restorations tried in to determine correct luting shade with try-in paste.^{2,7,8}

CONCLUSION

Be it with or without DSD it is very important to spend more time in the diagnosis and treatment planning to improve the treatment predictability and execution efficacy to obtain a beautiful smile. To improve treatment predictability, we can give complementary treatments like orthodontic movements, clinical crown increases by periodontal surgery etc. Combining the traditional and new techniques like mock up and DSD will give highly satisfying smiles to the patients.

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The Basic Genetics of Malocclusion

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ABSTRACT

The success of orthodontic treatment depends on the diagnosis of the the correct etiology of the malocclusion. Malocclusions occur due to an adverse interplay between genetic and environmental factors. Growth pattern and dentofacial morphology is genetically determined but it can be influenced to some extent by the environment. Advances in genetic sciences allowed the orthodontists to better understand the effects of genetics on the etiology of dentofacial characteristics and pathologies which in turn supported the effects of the genes in the development of dentofacial complex. Twin study is one of the most effective methods available for investigating genetically determined variables of malocclusion. Genetic influence on malocclusion is probably autosomal dominant with incomplete penetrance and variable expressivity. Therefore orthodontists should consider the genetic basis of a skeletal anomaly during the diagnosis and treatment planning. This review article focuses on the basic genetics and the effect of genetic factors on various malocclusions.

Keywords: Malocclusion, Maxilla, Mandible, Orthodontics, Pedigree.

INTRODUCTION

Genetics is the biological science which deals with the mechanisms of heredity and causes of variation in living beings¹. The term "Genetics" was coined by **Batason** in 1906. It is derived from a Greek word "Gene" meaning to become gene is the basic unit of hereditary.

Every process of growth, from multiplication, to cell death is ultimately controlled by the genes. Genes control reproduction and day by day function of all cells.

It is well known that the majority of malocclusions are produced by a combination of environmental and genetic factors.

Though growth is strongly influenced by genetic factors, it also can be significantly affected by the environment in the form of nutritional status, degree of physical activity, health or illness².

Many components of the head & neck region are involved in normal development of the occlusion. The most important are³ the size of the maxilla, the size of the mandible, the factors, which determine the relationship between the two skeletal bases such as cranial base and environment, arch form, size and morphology of teeth present, and soft tissue morphology.

Malocclusion may be defined as a significant deviation from what is defined as normal or ideal occlusion – **Andrews 1972**^{4,5}.

There is dental anthropological evidence that population groups that are genetically homogenous tend

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to have normal occlusion. In pure racial stocks, such as a Melanesians of the Philippine islands, malocclusion is almost non-existent. However, in heterogeneous population the incidence of jaw discrepancies and occlusal disharmonies is significantly greater^{6,7}. According to **Stockard**⁸ individual features of the craniofacial complex could be inherited independently of other portions of the skull, and that jaw size and the tooth size could be inherited independently, and as genetically dominant traits.

Fernex et al⁹ found boys to show more similarities to their parents than girls. Facial skeletal structures were more frequently transmitted from mothers to sons than from mothers to daughters. **Littons et al**⁴ recorded that siblings usually show similar types of malocclusion and examination of older siblings can provide a clue to the need or interception and early treatment of malocclusion.

FAMILY AND TWIN STUDIES ON DENTOFACIAL PHENOTYPES^{15,16,17}

The twin method, when appropriately applied, provides geneticists with one of the most informative technique available for analysis of complex genetic traits. Alternative method for investigating the role of heredity in determining craniofacial and dental morphology is by familial studies. Heritability in such studies is normally expressed in terms of parent/offspring correlation coefficients or correlation coefficients with sibling pairs, of which twins are a special kind.^{10,11}

The study of craniofacial relationship in twins has provided much useful information concerning the role of heredity in malocclusion. The procedure is based on the underlying principle that observed differences within a pair of monozygotic twins, whose genotype is identical, are due to environment and those differences within a pair of dizygotic twins, who share 50% of their total gene complement, are due to both genotype and environment.^{12,13}

A comparison of the observed within-pair differences for twins in the two categories should be provide a measure of the degree to which monozygotic twins are more alike than dizygotic twins. The larger this differences between the two twin categories, the greater the genetic difference effect on variability of the trait. This model implies the zygosity is accurately determined and that environment effects are equal in the two twin

categories. The bulk of the evidence for the heritability of various types of malocclusion arises from family and twin studies.^{14,15,16}

CLASS II DIVISION 1 MALOCCLUSION

Many studies have been carried out to determine the heritability of certain craniofacial parameters in Class II division I malocclusion¹⁷. These investigations have shown that, in the class II patient, the mandible is significantly more retruded than in Class I patients, with the body of the mandible smaller and overall mandibular length reduced. These studies also showed a higher correlation between the patient and his unrelated siblings, thus supporting the concept of polygenic inheritance for Class II division 1 malocclusions.

Environmental factors can also contribute to the etiology of Class II division 1 malocclusion. Soft tissues can exert an influence on the position or inclination of upper and lower incisors and the need to achieve lip tongue contact for an anterior oral seal during swallowing can encourage the lower lip to retrocline the lower incisors and the protruding tongue to procline the uppers, influencing the severity of the overjet. Likewise, digit sucking habits can produce a Class II division 1 incisal relationship, even if the underlying skeletal base relationship is Class I. Lip incompetence also encourages upper incisor proclination by virtue of the imbalance in labial and lingual pressures on the teeth¹⁸.

CLASS II DIVISION 2 MALOCCLUSION

This is a distinct clinical entity and is more consistent of definable morphometric features occurring simultaneously, that are a 'syndrome' than the other malocclusion types¹⁹.

It comprises the unique combination of deep overbite, retroclined incisors, class II skeletal discrepancy and high lip line with strap-like activity of the lower lip, and active mentalis muscle, etc. A further feature of the class II div 2 malocclusion is a tendency to a forwardly rotating mandibular development, which contributes to the deep bite, chin prominence, and reduced lower face height.

Familial occurrence of class II div 2 has been documented is several published reports including twin and triple studies by **Kloeppel** and **Markovic**.²⁰

Markovic¹⁷ carried out a clinical and cephalometric study of 114 class II div 2 malocclusion, 48 twin pairs and 6 sets of triplets. Intra and inter - pair comparisons were made to determine concordance/discordance rates for monozygotic and dizygotic twin. Of the monozygotic twin pairs, 100% demonstrated concordance for the class II division 2 malocclusion where as almost 90% of the dizygotic twin pairs were discordant.

These studies point to incontestable genetic influence, probably autosomal dominant with incomplete penetrance and variable expressivity. It could also possibly be explained by a polygenic model with a simultaneous expression of a number of genetically determined morphological traits, rather than being the effect of a single controlling gene for the entire occlusal malformation. The controversy regarding the etiology of the class II division 2 malocclusion arises from a failure to appreciate the synergistic effects of genetics and environment on facial morphology.

Markovic¹⁷ stressed the predominant role of genetic factors in the etiology of Class II division 2 malocclusions. These views are of course not incompatible if the lower lip morphology, behavior, and position relative to the upper incisors is considered to be genetically determined or influenced. Aspects of skeletal and muscle morphology are genetically determined and there is some recent experimental evidence from a twin study by **Lauweryns et al**¹⁸ indicating strong genetic factors in certain aspects of masticatory muscle behavior.

CLASS III MALOCCLUSION

Probably the most famous example of a genetic trait in humans passing through several generations is the pedigree of the **Hapsburg jaw**. This was the famous mandibular prognathism demonstrated by several generations of the Hungarians/Austrian dual monarchy.^{21,22}

Strohmayer²³ showed in his detailed pedigree analysis of the Haspsburg family line that the mandibular prognathism was transmitted as an autosomal dominant trait. This could be regarded as an exception and in itself, does not provide sufficient information to predict the mode of inheritance of mandibular prognathism. **Schulze and Weise**²⁴ similarly showed mandibular prognathism in both monozygotic and dizygotic twins. They reported that concordance in monozygotic twins

was six times higher than among dizygotic twins. Both of the above studies reported a polygenic hypothesis as the primary cause for mandibular prognathism.

According to **Ellis and Mcnamara**²⁴ a class III malocclusion resulting from a skeletal imbalance between the maxillary and mandibular bases may result from deficiency in maxillary growth, excessive mandibular growth, or a combination of both. Various studies have also highlighted the influence of a distinct cranial base morphology with a more acute cranial base angle and shortened posterior cranial base resulting in a more anterior position the glenoid fossa, thus contributing to the mandibular prognathism.

Various models have been suggested, such as autosomal dominant with incomplete penetrance by **Stiles and Luk**²⁵, simple recessive by **Downs**²⁶, variable both in expressivity and penetrance with differences in different racial populations by **Kraus et al**²⁷.

Litton et al²⁷ carried out an analysis of the literature to that date and also analyzed a group of probands, siblings and parents with Class III malocclusion, and analyzed the results in an effort to determine a possible mode of transmission. Both autosomal dominant and autosomal recessive transmission were ruled out and there was no association with gender (male or female).

The polygenic multifactorial threshold model put forward by **Edward et al**²⁷ however, did fit the data and accordingly proposed a polygenic model with a threshold for expression to explain familial distribution, and the prevalence both within general population and in siblings of affected persons.

When the soft tissue is considered there is a tendency for lip and tongue pressure to compensate for a skeletal Class III discrepancy by retroclining lower incisors and proclining upper incisors.²⁸ Polygenic inheritance implies that there is scope for environmental modification and many familial and twin studies bear this out.²⁹

Watnick⁴ concluded that the analysis of unit areas with the craniofacial complex represents local growth sites and revealed different modes of control within the same bone. Certain areas, such as the lingual symphysis, lateral surface of the ramus and frontal curvature of the mandible are predominantly under genetic control. Other areas, such as the antegonial notch, are predominantly affected by environmental factors.

Hughes and Moore³⁰ suggested that the mandible and maxilla are under separate influence of genetics control, and that certain portions of individual bones, such as the ramus, body, and symphysis of the mandible are under different genetic and environmental influences.

CONCLUSION

Multiple factors and processes contribute to the development of malocclusion. Heredity & environment, singly and in co-operation provide many variations. Some of these are desirable. Others including dentofacial disturbances are undesirable and need correction. The aim of the orthodontist is to correct these undesirable changes. The influence of genetic factors on treatment outcome must be studied and understood in quantitative terms. Conclusions from retrospective studies must be evaluated by prospective testing to truly evaluate their value in practice. Genome-wide association studies are necessary to evaluate the further evidence base for the practice of orthodontics. Only then we will begin to truly understand how nature (genetic factors) and nurture (environment factors, including treatment) together affect our treatment of our patients.

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Describing Role of Bacteria in Carcinogenesis with Special Emphasis on *Fusobacterium* species in Oral Cancer: An Overview

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ABSTRACT

Oral squamous cell carcinoma (OSCC) is one of the major global health problems with high prevalence and morbidity rates. This continues to be a major health concern, even after several decades of research and advancement in medical science. Studies conducted in last decade has established the fact that bacteria can be one of the etiologic agents of cancer. One such bacterium, *Fusobacterium nucleatum* has been identified as a potential carcinogenic organism. The methodologies ranging from traditional culture techniques to 16S rRNA metagenomics has established a significant difference in microbial counts between cancerous and healthy tissues. This article provides an overview on the association between bacteria and oral carcinogenesis with a special reference to *Fusobacterium* infection.

Keywords: Oral squamous cell carcinoma; Bacteria; *Fusobacterium nucleatum*; etiologic agents

INTRODUCTION

Oral squamous cell carcinoma (OSCC), is the 17th most common malignant neoplasm in the world and it is ranked 8th in India.¹ Despite the advancement in medical research prognosis of OSCC still remains an uphill task.^{2,3} Use of various forms of tobacco (both smoke and smokeless), alcohol, human papilloma virus (HPV) infections, nutrient deficiency, solar radiation and genetic predisposition have already been established as risk factors of OSCC.^{4,5} However, a significant proportion of OSCC (around 15%) is not explained by these risk factors, suggesting existence of other as yet unidentified risk factors worth exploring.⁵

After establishing *Helicobacter pylori* as the etiologic agent of in gastric cancer, many studies are being carried

out to find out the involvement of other bacteria in other forms of cancer.⁶ Similarly, the possible involvement of bacteria in oral cancer has taken centre-stage in scientific community. Several studies are being carried out using various methods starting from cultivation of bacteria to identification of 16S rRNA gene sequencing to establish the fact. However, the results have been insignificant across them. But *Fusobacterium nucleatum*, is an oral bacterium, indigenous to the human oral cavity, that plays a role in periodontal disease can and cause a chronic infectious/inflammatory condition that leads to soft tissue damage and carcinogenesis when there is a dysregulated immune response to host cells.⁷ *Fusobacterium* promotes cell proliferation, and in human epithelial cells, infection by *Fusobacterium* results in upregulation of 1, 2 kinases, those responsible in cell proliferation and cell survival signalling, as well as DNA repair.⁸

Bacteriology of Oral Cancer: Studies have confirmed data on interaction between the bacterial pathogenesis and the host cell environment regulatory systems. It has been shown that chronic bacterial infections produce toxins that have potency to disturb the normal cell cycle which leads to uncontrolled cell proliferation.⁹⁻¹¹ Chronic bacterial infections activate the mitogen activated kinase (MAPK) pathways and cyclin D1 which induce cell

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proliferation and DNA replication resulting in increased incidence of cell transformation and genetic mutation promoting tumour development.^{12,13} Intracellular accumulation of the pathogens suppresses apoptosis through stimulating Bcl-2 expression or inactivating retinoblastoma protein pRb.^{14, 15} These findings confirm that intracellular pathogen can survive rather the attempts of the host immune system to destroy the infected cells by apoptosis. Many pathogenic bacteria have the potency to alter the host cell signalling pathways, which increase the survival of pathogen. Thus, pre-cancerous lesion formed in such infections which can regress with antibiotic treatment.¹⁶ Pre-existing microflora of the oral cavity also facilitate carcinogenesis by converting ethanol into its carcinogenic derivative and increase acetaldehyde levels which is also capable of inducing DNA damage. This is also evident from the increased levels of microbial acetaldehyde production in tobacco and alcohol users.^{17, 18}

Bacterial cells catalyse the formation of N-nitroso compounds from nitrite and amines, amides or other suitable compounds and *Escherichia coli* is the known example.¹⁹ This nitrosamine formed by bacteria, appears to be the cause for carcinoma, not only of the oesophagus but also of other mucosal areas such as the oral cavity.²⁰ Bacteria involve in podoplanin-dependent pathway passively stimulates the progression of OSCC. Podoplanin is a transmembrane glycoprotein expressed in neoplastic tissues. Many bacteria causing periodontal diseases have butyric acid (BA) as an extracellular metabolite. BA/sodium butyrate (NaB) increases podoplanin expression in certain OSCC cell lines, suggesting that the progression of periodontal disease may promote the progression of OSCC.²¹

***Fusobacterium* in Oral Cancer:** *Fusobacterium* activated inflammatory cytokines such as TNF- α , IL-1 β , and IL-6. These events become cyclic, leading to periodontal attachment and tissue damage.⁷ The role of the lipopolysaccharide (LPS) of *Fusobacterium* is not like the classical *E.coli* LPS, rather it contains a small quantity of 2-keto-3-deoxyoctonate and heptose.²² *Fusobacterium* additionally activates p38, resulting in the secretion of MMP-9 and MMP-13 (collagenase 3). *Fusobacterium* infection triggers several anti-apoptotic pathways. Fischman et al. demonstrated that *Fusobacterium* induced NF- κ B signalling in tongue epithelial samples of mouse.²³ Exposure of OSCC cells

to *Fusobacterium* shows the initiation of additional bioactive molecules, enzymes, and cytokines implicated in OSCC proliferation, survival and aggressiveness (such as TNF α , cyclin D1, heparanase, and MMP9), like MMP-9, MMP-13 plays a very important role in tumour invasion and metastasis.²⁴ Recently, a precise correlation between *Fusobacterium* and tumour progression was studied whereby the fusobacterial adhesion antibody (FadA) binds to E-cadherin on colon carcinoma cells and activates β -catenin signalling pathway. This pathway enhances the transcriptional activity of WNT pathway, pro-inflammatory cytokines, oncogenes, and stimulation of CRC cell proliferation.²⁵

Studies describing association of *Fusobacterium* species and OSCC:

Nagy et al 1998 described the isolation and microbiological identification of *Fusobacterium* species from 21 tumour samples (OSCC) by taking surface swabs. Similarly, Hooper et al 2006 and 2007, described the occurrence of *Fusobacterium* species in 51 and 20 fresh OSCC tumour samples, respectively, by doing microbiological identification and confirming the same by 16s rRNA sequencing. Again, in another study done in 2014 by Schmidt et al, the association of *Fusobacterium* and OSCC was confirmed by next generation sequencing of 16s rRNA isolated from 94 samples taken from pre-cancer stage patients. Likewise, Al Hebshi et al 2017, Zhao et al 2017 and Yang et al 2018 confirmed occurrence and association of *Fusobacterium* species in OSSC tumour samples in separate studies. Yang et al 2018 conducted this study by taking 197 samples, which is the largest sample size by far.²⁶⁻³²

CONCLUSION

There is an increased interest in the potential role of bacteria in oral cancer as evident from the increasing number of publications addressing the topic. However, published studies disagree on which specific bacteria to associate with OSCC. This is probably due to the significant methodological variation between studies with respect to sampling (e.g. deep tissue biopsy vs. surface swab), selection of control tissues and microbial profiling technology. 16S rRNA metagenomics with NGS has great potential in exploring the oral microbiome shifts associated with oral cancer, but currently lacks adequate standardisation, particularly in terms of DNA extraction, selection of primers and hypervariable region

for amplification, and bioinformatics. In addition, 16S rRNA microbial profiling does not inform about microbial gene expression and microbial function. Therefore, future work should, in addition to methodological standardisation, analysis into casecontrol studies to fully explain the role of the oral microbiome in oral cancer and generate information of translational value, for example, identify diagnostic and prognostic markers.

The oral carcinogenic properties of *Fusobacterium* are well documented *in vitro* as well as in experimental animals; many of the mechanisms underlying these have been elucidated. Virulence factors such as FadA of *Fusobacterium* may also serve as novel targets for therapeutic intervention of oral cancer. However, it is important to note that a strong epidemiological evidence for the association of *F. nucleatum* with oral cancer is still lacking.

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Mini-Implants in Orthodontics

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ABSTRACT

Anchorage control during active orthodontic treatment is essential for uncompromised results. Conventional method of supporting anchorage have been using either tooth borne anchorage or extra oral anchorage. Extra oral anchorage can be used to supplement tooth borne anchorage and to deliver forces in directions not possible with intra oral forces but requires excellent patient co-operation. Intra-oral skeletal anchor units that are predictably stable, non-invasive, biocompatible and comfortable could make appliance design simplified and more efficient. With the introduction of Mini implants and microimplants they can be placed in areas earlier impossible. They are less expensive, allowing early force application and with reduced treatment time. The presently available implant systems are bound to change and evolve into more patient friendly and operator convenient designs. Long-term clinical trials are awaited to establish clinical guidelines in using implants for both orthodontic and orthopedic anchorage.

The objective of this article is to review the types of min-implants depending on the loading time, placement and insertion of min-implants, complications associated with and to formulate a definite clinical protocol for loading of orthodontic mini implants. It also deals with the future scope of min-implants usage during active orthodontic treatment.

Keywords: Anchorage, Extra-oral anchorage, Intra-oral anchorage. Mini-implants, loading time, design of mini-implant, complications.

INTRODUCTION

Attainment and control of anchorage is fundamental and critical to Orthodontics and Dento-Facial Orthopedics. Anchorage control throughout orthodontic treatment is essential for uncompromised results. Conventional means of supporting anchorage have been using either tooth borne anchorage or extra oral anchorage.

One of the greatest limitations in modern orthodontic treatment is Tooth borne anchorage. This is mainly due to the tooth movement in response to orthodontic tooth movement¹.

Extra oral anchorage can be used to supplement tooth borne anchorage and to deliver forces in directions not possible with intra oral forces but requires excellent patient co-operation.

Skeletal anchorage would offer capabilities heretofore unavailable. They expand the range of biomechanical possibilities with screws, pins or some readily removable implants anchored to the jaws, so that forces might be applied to produce tooth movement in any direction without detrimental reciprocal forces on the anchor teeth. Orthodontic forces might be applied directly to the jaws through skeletal anchorage².

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Intra-oral skeletal anchor units that are predictably stable, relatively noninterfering, biocompatible and comfortable could make appliance design simplified and more efficient.

Progress in the use of implants and in the development of specialized newer systems has made skeletal anchorage a more reliable and standardized one. As orthodontists begin to appreciate the efficiency of implant supported appliances, the mechanotherapeutic procedures may undergo profound transformation.

Mini implant screw design²: These are made of commercially available pure titanium, is designed to be used transmucosally for osseous orthodontic anchorage. The screw comes in three diameters (1.5mm, 2.0mm, and 2.7) and five lengths (7mm, 10mm, 12mm, 14mm, and 17mm). It has four components.

Types of mini implants: Types of mini implants, Bone screws(6-15 mm long, 3-5 mm in diameter), Mini implants(6 mm long, 1.2 mm in diameter), Micro implants (1.2–1.8mm in diameter)

Comparison of stability between cylindrical and conical type mini-implants: The conical group requires high removal torque, which means good initial stability, it also showed high insertion torque which could affect adjacent tissue healing. The conical shape may need modification of the thread structure and insertion technique to reduce the excessive insertion torque while maintaining the high resistance to removal. Tapered orthodontic miniscrews induce bone – screw cohesion following immediate loading

T-type screws can be used for orthodontic anchorage immediately after placement³: In case of immediate-loading, the bone – screw contact ratio with t-type screws was significantly greater ($82.3 \pm 15.0\%$) than with the s-type screws ($33.3 \pm 11.8\%$).

Titanium vs SS: More fibroblastic activity with less inflammatory cells reactions is observed in patients with titanium implants than in patients with stainless steel implants. Less metal impregnation in the soft tissue covering the titanium was found than in the tissue covering the stainless steel implants. Oxides grow when implant is contact with bodily fluids on both stainless steel and titanium devices. Osteo integration is better with titanium. Surfaces of stainless steel implants are much smoother, where average roughness ra = 6.5 nm

has been measured, while on coated titanium average roughness ra was 68.6 nm, since titanium surfaces are coated with hard coatings. Young's modulus of bone and titanium is equal to bone. Increased young's modulus – undue stress on bone – implant failure.

Immediate vs delayed loading:

Immediate implant placement loading⁴ : Osseointegration of orthodontic micro-screws after immediate and early loading. The 100% survival rate indicates that micro-screws implanted in maxilla can support both immediate and early orthodontic loading. The three groups had significantly different degrees of osseointegration, and the 4w group showed the highest degree of osseointegration. Therefore, a 4-week healing time should be considered before orthodontic loading to improve stationary anchorage.

Implant placement: Temporary anchorage device insertion variables: effects on retention. Placement of tads at 45 - 60° to the cortical plate is the most retentive insertion angle. Insertion at an oblique angle from the line of force reduces retention of tads. Increasing penetration depth of tads results in greater retention. Increased abutment head distance from cortical plate leads to decreased retention. Impact of insertion depth and predrilling diameter on primary stability of orthodontic mini-implants. Higher insertion depths result in higher insertion torques and thus primary stability. Larger predrilling diameters result in lower insertion torques. Insertion angle impact on primary stability of orthodontic mini-implants. Implant diameter has a great impact on insertion torque and hence primary stability of orthodontic mini-implants. To achieve a higher insertion torque, an insertion angle ranging from 60 to 70° is advisable. If the available space between two adjacent roots is small, a more oblique direction of insertion is more favorable to minimize the risk of root contact. Very high insertion torques may lead to higher failure rates caused by excessive bone compression;

Recommended placement torque when tightening an orthodontic mini-implant⁴: The interface characteristic between implant and bone can be expressed in relation to the implant placement torque (ipt) when tightening the mini-implant into the bone. When the cortical bone is stiffer or the screw diameter is larger, the ipt will be larger and the stability of the mini-implant will be enhanced. Conversely, when the ipt is too small, the miniimplants

will be unstable because of their mobility. The mean ρ ranges from 7.2 to 13.5 ncm according to the location of the implants. There was a significant difference between maxillary (8.3 ncm) and mandibular (10 ncm) implants.

Removal torque of osseointegrated mini-implants: an in vivo evaluation⁵: The removal torque value (rtv) is the torsion force required to remove an implant. For osseointegrated implants designed for orthodontic anchorage, the torque used must allow easy implant removal, with no risk of breakage of instruments or damage to adjacent anatomical structure. The rtv of the palatal implants ranged from 53.0 to 82.3 n/cm (mean value: 67.2 ± 9.4 n/cm) and, for the retromolar implants, from 36.5 to 90.9 n/cm (mean value: 68.6 ± 15.6 n/cm). Rtv \propto bone density

Achieving primary stability: Identify the quality and quantity of available bone for each implant site. Use an implant with optimal macro- and microgeometry. Undersize osteotomies and prepare them precisely for placement of tapered implants. Match the drilling sequence to the bone type. Perform the surgical procedure accurately;

Implant driving methods⁶

Self-tapping method: in this method the microimplant is driven into the tunnel of bone formed by drilling, making it tap during implant driving. This method is used when we use small diameter microimplants.

Self-drilling method: here the microimplant is driven directly into bone without drilling. This method can be used when microimplant of larger diameter (more than 1.5 mm) are to be used.

Safe zone for implant placement:

“Safe zones”: a guide for miniscrew positioning in the maxillary and mandibular arch: In the maxilla, the greatest amount of mesiodistal bone was on the palatal side between the second premolar and the first molar. The least amount of bone was in the tuberosity. The greatest thickness of bone in the buccopalatal dimension was between the first and second molars, whereas the least was found in the tuberosity. In the mandible, the greatest amount of mesiodistal dimension was between first and second premolar. The least amount of bone was between the first premolar and the canine. In the buccolingual dimension, the greatest thickness was

between first and second molars. The least amount of bone was between first premolar and the canine. The insertion of screws in the maxillary molar region above 8–11 mm from the bone crest has to be avoided with any type of screw because of the presence of the sinus. Another area that is generally not suitable for screw implantation is the tuberosity, where the amount of bone is very limited by the presence of wisdom teeth. If the screw is inserted perpendicular to the dental axis, it might reach the narrowest interradicular space earlier than when inserted at an oblique angle. It should be embedded for no more than 6–8 mm of bone depth, ie, the 50% of the buccolingual average measure between first and second molars. A miniscrew insertion at 30–40° to the dental axis allows the insertion of a longer screw in the available bone depth. Because of the reduced tip diameter, a conic screw insertion has a lower risk of damaging roots.

Various implant systems⁷

Mini implant: Ryuzo Kanomi introduced the Mini-implant in 1997. The mini implant is only 1.2 mm in diameter and 6 mm long making it much more useful in orthodontic applications. Mini implants are small enough to be used between the roots, placed in palate for molar distalization, molar intrusion and other tooth movements. Better oral hygiene. Can be easily removed after treatment.

Clinical Application: Conventional dental implants are 3.5–5.5 mm in diameter and 11–21 mm long. The mini-implant is only 1.2 mm in diameter and 6 mm long, making it much more useful in orthodontic applications. It is used for horizontal traction if placed on the alveolar ridge. The screw is inserted between the mesial and distal roots of a molar for molar intrusion it is placed in the palate, to provide anchorage for molar distalization. It can be used distraction osteogenesis, with the implant placed intraorally instead of extraorally.

Advantage of mini implant: It is small enough to place in any area of alveolar bone, even apical bone. The surgical procedure should be easy enough for an orthodontist or general dentist to perform and minor enough for rapid healing. The implant should be easily removable after orthodontic traction.

Screw selection⁶: The 1.5 mm- diameter bone screw is intended for tooth bearing areas, particularly the interseptal bone between teeth. The extra thickness

provides better mechanical retention with its deeper thread pitches. This screw should be placed in the interseptal bone. The 2.0mm and 2.7mm diameter screws are designed for use in non-tooth bearing areas such as the zygomatic buttress, the midsagittal region of the hard palate and mandibular buccal shelf region. These screws can bear forces as high as 500-600gms. The 14mm and 17mm screw lengths are primarily designed for insertion in the zygomatic buttress. The 7mm, 10mm, and 12mm lengths can be selected based on the bone height at the implant site.

Micromplant: Conventional endosseous implants have been used to provide anchorage control in orthodontic treatment procedures. 1.2-1.8mm in diameter. The titanium micro implant has been designed specifically for orthodontic use. These micro implants are smaller in diameter of 1.2mm-1.8mm allows its insertion into many areas of the maxilla and mandible previous unavoidable (e.g.) Between the roots of adjacent teeth. It is inexpensive, loaded immediately and provides anchorage throughout treatment

General rule in choosing proper size of microimplant⁷

According to the length of microimplant: The recommended sizes are more than 6mm in maxilla, and 5mm in mandible. The cortical surfaces of the maxilla are thinner and less compact than those of the mandible and accordingly will require longer microimplants. A general rule of thumb should be, to use the longest possible microimplant, without affecting the health of adjacent tissues.

According to the diameter of microimplant: Microimplants are available in 1.2 to 1.3mm diameter (no.12- 18 series). No. 12 series (1.2mm diameter) and no. 13 series (1.3mm in diameter) can all withstand up to 450g of orthodontic force when patient has good quality of cortical bone. In the mandible, the buccal surfaces and retromolar areas offer adequate thickness and high quality cortex for the acceptance of microimplants. Usually, those of 4-5mm in length with 1.2 – 1.3mm in diameter provide adequate retention.

Site for microimplant placement⁷

In the Maxilla: The micro implant can be used in both the maxilla and the mandible. Several areas of the maxilla can be used for insertion. One location is the inferior surface of the anterior nasal spine, where

the micro implant can be used for proclination of the incisors. The location can also be that of the implant and the onplant in the midpalatal suture, taking advantage of the density and height of the cresta nasalis, where the bone structure is dense enough for retention of the implant. The anteroposterior position can vary slightly according to the individual anatomy. The orientation may likewise vary from almost vertical to an oblique anterior direction. It is, however, important to avoid the incisal canal, and when situated anteriorly, the miniscrew should be inserted a slight distance from the midline or more posteriorly. In this position the micro implant may render direct anchorage for retraction and intrusion of flared and overerupted incisors. Anchorage in this location has also been used for symmetric mesial movement of lateral teeth when the anterior teeth could serve as anchorage. Indirectly this location can also be used for consolidating miniscrew anchorage with the teeth that are serving as anchorage but delivering too little resistance. Another location is in the Infrazygomatic crest. Level and direction may vary depending on the individual anatomy. From this position the zygom wire and the implant can deliver anchorage for retraction and intrusion of anterior teeth.

In addition, the screws can be placed so that they serve as anchorage for intrusion of molars that have over erupted secondarily to extraction of the occluding teeth. The force delivered with a micro implant anchorage will result in intrusion and buccal tipping, although the latter can be avoided with use of a lingual appliance with a one point⁸.

In Mandible: Three different locations are suggested for use in the mandible. Roberts et al routinely placed micro implant in the retromolar position and established a satisfactory anchorage for mesial movement of molars, thereby avoiding retraction of the anterior teeth in the case of space closure following extraction of first molar. Roberts et al also used this position to neutralize the eruptive force generated in uprighting mesially tipped molars⁹. A second location is within edentulous areas of the alveolar process. The purpose here would be to move single teeth without interfering with the remaining dentition. The micro implant can be inserted laterally in the molar and premolar region and can as anchorage for vertical and/or transverse movement of lateral teeth, molars, and premolars.

In the anterior region of the mandible the screws can be inserted into the symphysis to be used as

anchorage for intrusion and protraction mandibular incisors. A miniscrew in this location can be useful as indirect anchorage by consolidating with a dental anchorage, as indicated by Kanomi¹⁰.

CONCLUSION

Implants for the purpose of conserving anchorage are welcome additions to the armamentarium of a clinical Orthodontist. They help the Orthodontist to overcome the challenge of unwanted reciprocal tooth movement. The presently available implant systems are bound to change and evolve into more patient friendly and operator convenient designs. Long-term clinical trials are awaited to establish clinical guidelines in using implants for both orthodontic and orthopedic anchorage.

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Changes of Temporomandibular Joint from Child to Adulthood

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ABSTRACT

The Temporomandibular joint is the joint between the Temporal bone and the Mandible. It is a Ginglymodiarthroidal joint. It is related with some of the controversial and complex disorders. Under an identical situation, one person's TMJ may appear to worsen while another's doesn't. When the degenerative changes start in the TMJ, the pathology often leads to functional and morphological deformities. The usual pathology is non-inflammatory and characterized by abrasion of articular cartilage with thickening. This is followed by secondary inflammatory changes. The degenerative changes occur because of dysfunctional remodelling due to a decreased host adaptive capacity of the articulating surfaces or functional overloading of the joint. Thus, understanding the pathophysiology of the TMJ disorders is important for understanding the etiology, diagnosis, and treatment of TMJ. This paper reviews the factors associated with functional overloading of the joint and the clinical, radiographic and Biochemical findings important in the diagnosis of the Temporomandibular joint disorders.

Keywords: Temporomandibular joint, Temporal bone, Mandible, TMJ, articular cartilage, Temporomandibular Joint disorders.

INTRODUCTION

A Joint is a place of union of two or more bones. The Temporomandibular joint is the joint between the Temporal bone and the Mandible. It is a Ginglymodiarthroidal joint. It is related with some of the controversial and complex disorders. The prevalence of signs and symptoms of temporomandibular disorders (TMD) has been the focus of interest of many

epidemiological surveys. Signs and symptoms of TMD are common in the population, with a higher prevalence in women than in men. During the last decades, several investigations have focused on morphological and functional malocclusions as well as signs and symptoms of TMD. In other studies, efforts have been made to evaluate the possible etiological importance of occlusal factors for the development of TMD. These studies indicate, in general, that occlusal factors are of minor etiological importance for pain and functional disorders in the masticatory system. But the role of occlusion in the etiology of TMD is still controversial.¹

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ANATOMY OF TEMPOROMANDIBULAR JOINT²

A. Bony Components

Condylar Head: It has a 'Rugby ball' or 'Date-stone' shape. The medial pole is generally more

prominent than the lateral. Two distinct medial & lateral surfaces slope divergently from the condylar crest. Total medio-lateral length of the condyle is 15-20mm. Antero-posterior width is between 8-10 mm. The articulating surface of the condyle is quiet convex antero-posteriorly and only slightly convex mediolaterally.

Glenoid Fossa: It is the temporal component of the TMJ.

It is a concave area on the inferior part of the Squamous part of the temporal bone. Functional part of the glenoid fossa is covered by articular tissue, called the articular fossa. Articular fossa is bordered ⁴ anteriorly by the posterior slope of the articular eminence, Medially & superiorly by the wall of the temporal bone, Posteriorly by the post glenoid fossa or tubercle.

Articular Eminence: Anterior to the glenoid fossa is a convex bony prominence at the base of the zygomatic process of the temporal bone called the articular eminence. The eminence, assisted by the disc, guides condylar movement during jaw opening and closing. It has two slopes anterior and posterior, which are covered by fibro cartilage and has thick dense bone.³

B. Soft-Tissue Components

Joint Capsule/Articular Capsule/Capsular Ligament: It is the fibrous, non-elastic sheet of connective tissue that encloses the entire TMJ. The lateral aspect of the ligament is thickened to form a fan-shaped ligament known as the temporomandibular ligament. The capsule resist any medial lateral and inferior forces that tend to separate or dislocate the articular surfaces. Provide passive stability and seals joint space. The capsular ligament is well innervated and provides proprioceptive

Synovial Membrane: The membrane lines the entire capsule, with folds or villi protruding into the joint cavity except the articular surfaces of the joint or the disc, except for its bilaminar posterior region

Functions of the synovial fluid: Provides nutrient requirements for the non vascular tissues. Serves as lubricant during function by two mechanisms.

Boundary Lubrication: Primary mechanism; synovial fluid forced from one region to another by movement of the joint itself.

Weeping Lubrication: The articular surfaces itself absorb some amount of synovial fluid which due to the pressure during function is forced in and out of the articular tissues and provided the medium for metabolic exchange. This occurs only during compression but not all other movements.⁴

Articular Disc: The articular disc is a biconcave structure is composed of dense fibrous connective tissue devoid of any blood vessels or nerve fibers. Divides the joint space into upper and lower compartment. Anteroposteriorly the disc is divided into 4 parts: The Anterior band, The Intermediate band, The Posterior band, The Bilaminar zone.

Shape: Articular disc has the shape of a laterally wide ovoid. In frontal section the disc is wedge shaped thicker medially and thinner laterally

Ligaments

True ligaments: Collateral ligaments /Discal ligaments, Capsular ligament Temporomandibular ligament/Lateral ligament

Accessory ligaments: Sphenomandibular ligament, Stylomandibular ligament

Collateral ligaments/Discal ligaments: They function to restrict movement of the disc away from the condyle. They are responsible for hinging movements between condyle and articular disc. The discal ligaments have a vascular supply and are innervated ⁵

Capsular ligament: The capsular ligament encompasses the joint retaining the synovial fluid. It is fibroelastic, very well vascularised and well innervated and provides proprioceptive feedback regarding the position and movement of the joint.⁶

Temporomandibular ligament/Lateral ligament: The lateral aspect of the capsular ligament is reinforced by strong tight fibres that make up the lateral ligament or the TMJ ligament. It has two parts- Outer oblique portion -prevents excessive drooping of the condyle and limits the mouth opening. Inner horizontal portion. It limits posterior movement of the condyle and disc also prevents lateral pterigoid from over stretching.

Sphenomandibular ligament: Arises from the spine of the sphenoid bone and extends downwards to a small bony prominence on the medial surface of the ramus

of the mandible called the lingula. It does not have any limiting effects on the mandibular movement.⁷

Stylomandibular ligament: It Limits the excessive protrusive movements of the mandible.

Movements & Muscles Involved: The skeletal muscles provide the energy required for moving the mandible and allowing the function of the masticatory system

1. Jaw-closing: Masseter, Medial pterygoid, Anterior part of temporalis, Superior head of lateral pterygoid
2. Jaw-opening: Inferior head of lateral pterygoid, Anterior belly of digastrics, Mylohyoid and the infrahyoid muscles.
3. Protrusion: Inferior head of lateral pterygoid, Elevators
4. Retrusion: Posterior fibres of temporalis, Elevators
5. Lateral movement: Elevators, Posterior part of temporalis (retrusion on working side), Lateral pterygoid(protrusion on nonworking side)

DEVELOPMENTAL CHANGES IN TMJ^{8,9,10}

TMJ is formed from a secondary cartilage that arises ectopically rather than from the primary cartilage. It is transformed into bone except at its proximal ends where it forms an articulation with the temporal bone. In the condyle the growth cartilage is near the surface of the bone just beneath the fibrous articular layer. It quickly undergoes atrophic changes in the absence of function but regains endochondral capability when functional demands are reestablished.

Week 7: During week 7, mesenchymal condensation was observed in the temporomandibular joint region upon the future mandibular ramus. A mesenchymal condensation appeared cranio-laterally to the condylar anlage that formed the blastema of the zygomatic process of the squamous part of the temporal bone. Temporal and condylar blastemas were separated by lax mesenchymal tissue. During week 8 intramembranous ossification of the zygomatic process of the temporal bone begins. Intramembranous ossification of the ramus of the mandible reaches the base of the future condyle. Cranio-laterally to the future condyle there was a mesenchymal condensation that formed the anlage of the articular disc. There were no joint cavities during this stage¹¹.

Week 9: The intramembranous ossification of the squamous part of the temporal bone was continuous

and no cartilaginous regions were observed. At this week condylar chondrification began in the centre of the condylar blastema. Similarly, small spaces or clefts appeared between the anlage of the articular disc and the mandibular condyle that defined the initial formation of the inferior joint cavity.

Week 10: The organization of the inferior joint cavity was complete although crossed by a few tracts of connective tissue. There was still no sign of the superior joint cavity. The condylar cartilage had a conical shape and was surrounded by intramembranous ossification. The base of the condylar cartilage corresponded to the joint region and its vertex was placed next to the future mandibular foramen. In the posterior joint region, intramembranous ossification of the zygomatic process of the squamous part of the temporal bone was observed extending along the vertical part of the squamous region.

Week 11: The organization of the superior joint cavity began between the zygomatic process of the squamous part of the temporal bone and the articular disc. The articular surface of the squamous part of the temporal bone had a flat surface. The joint capsule was situated between the zygomatic process of the squamous part of the temporal bone and the condyle and was attached to the external part of the articular disc. In the external portion of the condylar cartilage, adjacent to the insertion of the articular disc, an invagination of mesenchymal cells was observed¹².

Weeks 12 to 17: During this period the organization of the temporomandibular joint system was complete and five events were noticed. During week 12, there were no significant changes in the joint surfaces. The joint cavities were clearly defined. By week 13 the joint surface of the squamous part of the temporal bone had acquired a concave morphology. After week 14 there was a clear reduction in the volume of Meckel's cartilage. During week 16 the narrow central portion of the articular disc appears avascular although small vessels can be observed on the peripheral portions. Vascular canals can be seen on the external part of the condylar cartilage. During week 17 there was a clear endochondral ossification of the anterior portion of the condyle is seen. In neonates cartilage layer constitutes a large part of the condyle & the outer most layer is richly vascularised. Condylar cartilage gradually decreases in thickness & by 5-6 years of age it constitutes only a thin zone on the top of the condyle. In neonates, the temporal component is

flat and lined by vascularized connective tissue, but, by the age of 3 years, the articular layer becomes avascular and contains few cells. A fibrocartilage layer is lacking in the fossa but is present on the articular eminence. At birth, the TMJ lies almost in line with the occlusal plane. Continued postnatal growth is largely dependent on the normal relationship of bone, muscles, and teeth. The condyle contributes to the continuing growth of the ramus in a posterosuperior direction until growth ceases and the joint is then positioned superior to the occlusal plane.

Condylar Fibrocartilage: The fibrocartilage of the growing mandibular condyle consists of several distinct zones, each with a characteristic organization and alignment of collagen fibrils. The fibrils in the articular zone are arranged in densely packed sheets running parallel to the articular surface.¹⁶ This layer passively adapts to the underlying tissue layers. The next layer, the fibrocartilaginous zone, contains dense, fibrous connective tissue in which the fibrils are organized in bundles with random orientation. The bundles in the calcified cartilaginous zone are also randomly oriented, although those just adjacent to the subchondral bone have a radial orientation.

Articular Disc: A concentration of mesenchymal cells between the developing temporal bone and mandibular condyle produces the articular disc, the capsule of the TMJ, and the lateral pterygoid muscle. The embryonic disc is vascularized until it becomes loaded by jaw movements in utero. At birth, the disc is flat on its superior surface because the articular eminence has not yet developed.¹⁸ By the time the primary teeth occlude, the temporal component develops its curvature, and the disc becomes biconcave. After approximately 20 years of jaw function, the compressed central part of the disc changes into fibrocartilage.

Temporal Component: The articular eminence of the TMJ, as a mechanical constraint, dictates the movement of the condyle-disc complex. It shows a symmetric growth pattern and grows rapidly, attaining almost half of its adult form by the age of 2 years. Bone deposition along the articular eminence leads to a steeper slope. This process occurs parallel to eruption of the primary incisors, the permanent first molars, and the permanent second molars. The eminence increases in height rapidly until the age of 7 years; growth almost ceases during the period of the mixed dentition, and the eminence acquires its final height by the age of 20 years.

Adaptive Remodeling: After growth has stopped, structural changes continue to occur in both the soft and the mineralized tissues of the joint. Such modeling changes reflect the functional demands on the joint structures. Modeling is characterized by slow morphologic changes under physiologic circumstances that permit adaptation of the shape of the joint components and, in this way, maintain joint function¹⁹.

Control of Growth & Adaptation: Overall shape of the mandible is genetically determined, But there are many variations in the size and shape of the components of the TMJ and their relationship to each other. These developmental variations likely reflect variations in function, both of the mandible itself and of its surrounding structures. This also applies to the period after growth has ceased and skeletal maturation has been achieved. The process of modeling continues so that adaptation in structure can meet changing functional demands.

Aging: The joint is believed to stop growing by 20 yrs but continues adaptation. Factors affecting the joint are: Aging and its accompanying decrease in muscle activity. Loss of teeth, changes in occlusion and attrition of teeth, which affects condylar morphology¹⁷

In edentulous mandible, following changes occur in different areas of joint

Condylar head decrease in convexity, decrease in condylar height. In extreme cases, drastic changes may produce disappearance of condyle.

Glenoid fossa and articular eminence- With age, flattening of the articular fossa and decrease in prominence of the articular eminence occurs. There is decrease in the vertical dimension of the glenoid fossa, lateral movement changes with resorption and flattening of the sigmoid curve²⁰.

CONCLUSION

The complex biologic, physiologic and psychologic factors involved in the craniomandibular articulation make the TMJ research and its interpretation more than a little difficult. TMDs comprise a substantial health problem and represent a major cause of non-dental pain in the orofacial region with so many controversies revolving around this topic, it is an area with scope for research. Extra care to be taken evaluating this area, to prevent any post treatment complications. More

studies regarding development and etiology of TMD are warranted. To be able to predict future development and demand for treatment of TMD would lead to improved diagnostic and treatment approaches.

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Source of Funding: Self-funded

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Denture-Adhesives: A Brief Overview of the Indian Scenario

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ABSTRACT

Patient satisfaction and success of treatment depends on various factors such as technique of the dentist, not only in clinical laboratory aspects, but also on interaction with patient and patient response. The retention, stability and support of the prostheses fabricated are the main criteria determining its success. Unfortunately, every patient's condition is unique and may or may not ideal to attain these parameters. Thus, denture-adhesives have been used as an adjunct to treatment. Identification of patients requiring use of denture-adhesives is done by the dentist/prosthodontists. Dentists and patients are educated regarding its use. Though, negative attitude towards its use persists as it may mask the clinical and technical errors, use of denture adhesives have never seen their end. Various functions such as chewing ability, stability, comfort, etc are improved which lead to increased patient satisfaction. Instructions regarding proper use should be explained to the patient. This article is a review of types, uses, advantages, limitations and availability of various types of Denture adhesives in the Indian set-up.

Keywords: *Denture adhesives, Fixatives, Adherents, Retention, Stability*

INTRODUCTION

An adhesive is a material, non-metallic in nature, used to bind two separate items together, after application on one or both the binding surfaces. According to GPT (9), denture adhesive is a material used to adhere a denture to the oral mucosa¹. US-FDA defines denture adhesives as pastes, powders or adhesive pads that may be placed in/on dentures to help them stay in place.²

Denture adhesives can enhance aspects of performance of complete well-fitting dentures as well as provide increased comfort, confidence, and satisfaction with dentures. In situations where it is not possible to obtain the desirable retention, adhesives can be used to increase retention and stability of complete dentures.³ Denture adhesives, also referred to as adherents or fixatives, have long been recognized by denture wearers as a useful adjunct to denture retention, stability, and function. Although denture adhesives were first used in the late eighteenth century, they were not mentioned in the dental literature until 1935, when the American Dental Association, Council on Dental Materials, Instruments and Equipment, described them as nonmedical. The earliest patent issued for a denture adhesive dates back to 1913, with others following in the 1920s and 1930s.^{4,5}

“The use of denture adhesives, no-doubt improves certain functions, but there are reports of damage to supporting structure in prolonged uses. The dentist who prescribes denture-adhesives should be completely aware of its pros and cons so that the patient be instructed regarding its judicious use.

Composition of Denture-Adhesives And Their Function: Denture adhesives are composed of three types of components. They are Adhesives, anti-microbials and other additional agents^{4,5}

Table 1: Groups of Constituents

Group 1	Adhesives
Group 2	Anti-microbials
Group 3	Additives, Plasticizing and Wetting agents ⁴

Table 2: Types of Adhesive agent

Natural	Synthetic
Cellulose	Polymethyl vinyl ether–maleic anhydride (PVM-MA/Gangtrez)- long acting – PVM-MA with divalent salts of sodium, calcium & zinc.

Conted...

Hydroxy methyl cellulose	Combination of CMC & divalent salts of PVM-MA.
Sodium Carboxymethyl cellulose	Polyvinylpyrrolidone (povidone)
Karaya gum, 5. Tragacanth, 6. Acacia Pectin , 8.Gelatin	

Table 3: Other components

Type of Component	Constituent
Anti-microbials : Group 2 agents	hexachlorophene, sodium tetraborate, sodium borate, and ethanol.
Binding agent- Group 3 agents	Petrolatum, mineral oil, polyethylene
Anti-clumping agents : Group 3 agents	calcium stearate , silicone dioxide
Flavouring agents : Group 3 agents	menthol, oil of wintergreen, oil of peppermint
Preservatives : Group 3 agents	methyl paraben, poly paraben
Plasticizing agents , Coloring agents: Group 3 agents	

Mechanism of Action and Application: Denture adhesives work by increasing the interfacial forces in between the tissue surface of the denture and basal seat area .The viscosity of saliva is increased in between these two layers such that the air bubbles are eliminated .The particles of the adhesive increase the volume by 50-150 % due to their hydrophilic nature, thus justifying the whole mechanism of adhesion as force required to separate the two surfaces become difficult . Constituents like PVM-MA zinc provide even greater cohesive strength for longer durations as strong covalent bond develops due to the divalent zinc cation present in them.⁶

Available Forms: These are available in insoluble forms and soluble forms. The soluble ones come in the form of pastes, powders and creams. Wafers and pads are the insoluble forms. Anti-clumping agents and binding agents are found in creams and pastes, but not in powders.^{7,8,9}

Commercially Available Denture-Adhesives In India:

Powder: Fixon by ICPA health Products Ltd; Y-dent’s Denti-ro by MDM Corporation; Fittydent Powder by Dr. Reddy’s

Cream/Paste: Denofit by Global Dent Aids Pvt Ltd.; Fittydent Cream by Dr. Reddy’s ; Super Poligrip by Polident ; Denture fit by Pearl white

Wafer: Sea-bond Denture- adhesive wafers by Sea-bon

Strips: Secure Denture Adhesive Comfort Strips among all the above, Fixon by ICPA health Products Ltd, Denofit by Global Dent Aids Pvt Ltd , Denofit by Global Dent Aids Pvt Ltd.are the most commonly used in practice as they are affordable and economical.

Ideal Requirements: Denture adhesives should have the following properties:^{4,9,10}

1. Non-irritant
2. Non-toxic
3. Odorless and tasteless or should be neutral to taste
4. Bio-compatible
5. Should retain adhesiveness for 12-16 hours
6. Should not promote growth of oral microflora
7. Should provide adequate cohesion and adhesion for comfort of the patient, retention of denture and stability of denture in all functional activities such as chewing,speech, smiling and yawning.
8. Should be available in easily applicable forms like powder,cream,pastes, etc.
9. Should be conveniently usable by patient.

Advantages:

1. Provide retention , stability to denture in function
2. Patient becomes more confident while using the denture.
3. Sometimes, denture adhesives(insoluble) also function as relining material.
4. Provide cushioning effect
5. Prevent food materials from collecting beneath the denture surface
6. Distribute occlusal forces on the denture-bearing tissues, thus reducing pressure points.
7. Improved incisal ability.^{6,10,11}

Disadvantages: Dentures when placed on basal seat areas allow lateral movement. But, use of denture adhesives do not allow such movement. Thus, these

masks the real needs of the patient which may actually require the dentist's intervention.⁶

Indications:^{6,9,11}

1. Jaw relation: Denture adhesives can be used to stabilize the denture-bases during jaw-relation.
2. Wax Trial: The accuracy of the denture trial improves with use of denture-adhesives. This also reduces patient's apprehension for the denture fit during the insertion stage.
3. Patients with compromised basal support: Denture adhesives increases their denture adaptability.
4. Immediate dentures: Healing of the surgical site may lead to loose dentures. Therefore, denture-adhesive acts as an adjunct to soft-liner.
5. Reduction of tissue irritation: Denture adhesives reduce discomfort caused by tissue -irritation for patients with sensitive oral mucosa.
6. Patients with systemic diseases: Patients with dry-mouth, Parkinson's disease, Alzheimer's disease benefit with use of denture adhesive.
7. Prosthesis for Maxillo-facial defects: Denture adhesives act as a retaining aid for large defects.
8. Administration of drug therapy: It provides psychological security for people who socialize frequently and have public appearance.

Contra-Indications:

1. Allergy to any component of denture adhesives
2. Ill-fitting dentures
3. Improper hygiene maintenance of old-denture
4. Fractured dentures
5. Excessive bone-loss

Effects of Improper Usage: There are various problems that arise due to imprudent adhesive use.^{12,13,14} They are listed as follows:

1. Freeway space reduction
2. Resorption of residual ridge
3. Gag reflex
4. Mucosa erosion
5. Constipation due to prolonged use

6. Micro-organisms growth including Candida infections
7. Allergic reactions to mucosa.

Denture-adhesives have progressed from zinc-containing to zinc-free formulations, with time, to prevent detrimental effects of zinc on denture-wearers using denture-adhesives.^{12,14}

All the above are associated with prolonged usage, unacceptable hygiene maintenance protocol and irregular dental visits even when intervention is necessary.

Application Techniques: Application technique varies according to form of denture-adhesive being used. They are applied to the tissue surface of the denture. Cleaning the tissue surface of any kind of residue before application is mandatory. For powder form of denture-adhesive, the tissue surface should be wet. For cream or paste form, wet surface may or may not be required. Reading the manufacturer's instruction is a must before application.¹³

CONCLUSION

Denture adhesives can be advised as a supplement to a well-fitting denture. Since, the patient or the patient's attendant must use it at home, proper instruction regarding the usage of the prescribed denture-adhesive. Patient should also be made aware regarding the importance oral hygiene maintenance and regular dental visits. Though, denture performance and patient confidence is enhanced with the use of denture-adhesives, it should not be used to cater for gross denture inadequacies. Patient should also be cautioned regarding misuse and the importance of intervention by professional as per need.

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Dentist Role in Child Abuse and Neglect

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ABSTRACT

Child abuse is a globally prevalent phenomenon presenting as state of emotional, physical, educational, sexual and financial phenomenon towards child below eighteen years of age. However, in our country there is still very limited understanding of extent and needed approach towards identifying, reporting and treating such cases. As dentists we come across many usual presentation of this abuse but fail to understand and correlate. Thus with increasing awareness it also becomes imperative for dentists to realize to identify and report thereby assisting in the struggle against child abuse.

Keywords: *child abuse, neglect, dentists*

INTRODUCTION

Violence towards children has been noted between cultures and at different times within the same culture since early civilization. Infanticide has been documented in almost every culture, so that it can almost be considered a universal phenomenon. Ritualistic killing, maiming and severe punishing of children in an attempt to educate them, exploit them or rid them of evil spirits has been reported since early biblical times and ritualistic surgery or mutilation of children has been recorded as part of religious and ethnic traditions.¹

With the advent of urbanization and technological advancement in the 18th century, more economic value was placed upon the child by society and they were often used as a cheap source of labor. Harsh punishments for relatively minor mistakes were accepted²

In the 19th century, Western societies become more protective towards children and it gradually improved. However, the mortality rate remained high, and the isolated death of a child probably did not arouse suspicious.^{1,3}

In 1946, Caffey, described six infants suffering from chronic sub dural hematomas who were first seen with multiple treatments in their long bones. It was in this classic article that some of the common features of child abuse were first described.⁴

In 1962, Kempe et al published his paper “The Battered Child Syndrome” where the full impact of the physical maltreatment of children was brought to the attention of the medical community and subsequently the general public.⁵

The “Battered–child–Syndrome” with now called as “Non accidental injury” (NAI) had such and profound effect upon the professions and the public that within a few years the majority of states of USA had introduced laws which made it mandatory for physicians, dentists and other health related professionals to report suspected cases.⁶

Terminology:^{7,8} *Child Abuse* is defined as the non-accidental physical injury, minimal or fatal, inflicted upon children by persons caring for them (Selwyn et al 1985).

Battered Baby: Is a child who shows clinical or radiographic evidence of lesions that are frequently

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multiple and involve mainly the head, soft tissue, the long bones, and the thoracic cage and that cannot be unequivocally explained (Selwyn 1985)

Battered-Child-Syndrome: The syndrome should be considered in any child exhibiting evidence of treatments of any long bone, sub dural hematomas, failure to thrive, soft tissue swelling or skin bruising. (Henry Kempe 1962).

Neglected Child: Is one who shows evidence of physical or mental health primarily due to failure on the part of the parent or care takers to provide adequately for the child's needs.

PREVALENCE

Children of all age are subjected to physical abuse, but the majority of cases occurs in younger children and often remains unnoticed in general. This is because they are more vulnerable and unable to seek help elsewhere. The number of boys subjected to violence slightly exceeds that of girls, and first born children are more often affected. Within a family; it is common for just one of the children to be abused and the others not.^{1,9}

Etiology:^{2,9} Varied etiology has been proposed leading to child abuse and neglect like:

1. Personality traits of the parents/abusing adults.
2. Child's characteristics and the environment conditions.
3. Poor socio-economic groups.
4. Often the mother of affected child maybe divorced or single.
5. Contributing factors- Alcohol, Drug Abuse, Poverty, Unemployment, Martial problem, Handicapped child, Unwanted pregnancy, Fail to attain the expectation of parents.

Types of Child Abuse¹⁰⁻¹²

1. Physical abuse – (31.8%) It is defined as injuries inflicted on a person less than 18 years of age by a caretaker.
2. Educational abuse (26.3%) - Exists when a parent or caretaker intentionally keeps the child at home or fails to enroll the child in school.
3. Emotional abuse which accounts for 23.3% Defined as the continual scapegoating and

rejection of a child by parents, caretakers, or teachers. Others forms include psychological terrorism, abnormal child rearing practices by a severely disturbed parent or caretaker or the close confinement of a child.

4. Sexual abuse (6.8%)- Child pornography, rape, molestation incest and child prostitution. Also include contacts or interactions between a child and an adult when the child is being used for sexual stimulation of the perpetrator or another person.
5. Failure to thrive (4.0%)- A child who is under weight and malnourished is Child fails to grow due to insufficient caloric intake and the parents are responsible for it.
- 6 Intentional drugging or poisoning : Administration of a harmful drug which is not indicated for normal use by a child.
7. Munchausen syndrome by proxy- Children who are victim of parentally fabricated or induced illness. Involves children who are too young (<6 years) to be aware of or able to tell others about this reception. Factitious signs and symptoms may includes bleeding from various sites, recurrent sepsis, from injecting contaminated fluids, chronic diarrhea from laxatives, fevers or skin rashes

Types of Child Neglect¹⁰⁻¹²

1. Emotional Neglect
2. Health care neglect including dental neglect: When a parent or caretaker ignores the treatment recommendations of a healthy professionals for the management of a treatable illness that a child has and that is becoming ware, HCN exits.
3. **Physical Neglect:** Defined as failure to care for a child according to accepted or appropriate standards. Example: Lack of personal hygiene. Inadequate clothing, diet or medical attention.
4. **Safety neglect:** Defined as gross lack of direct or indirect supervision of a child that result in an injury.
5. **Emotional neglect:** Include inadequate nurturance or affection is lack of "Mothering", knowingly "Permitted" mal adaptive behavior such as delinquency or substance abuse, or refusal

to allow needed remedial care for diagnosed emotional problems.

- 6. Dental Neglect:** Specific type of health care neglect. Dental neglect is “the failure by a parent or guardian to seek treatment for visually untreated caries, oral infection, and or oral pain, or failure of the parent or guardian to follow through treatment once informed that the above conditions exists”.

Abused Child-Identifying features are:¹³

1. Child is unduly afraid or passive (especially or his/her parents).
2. Child shows evidence of prolonged confinement.
3. There are evidence of repeated skin or other injuries
4. There has been inappropriate treatment of injuries by parents (Example in appropriate bandages or medications).
5. Child is undernourished and inappropriate intake food or drink
6. Child is wearing inappropriate dress for weather conditioning.
7. Child is aggressive, demanding or hyperactive.
8. Child is cranky or irritable or cries easily.
9. There is evidence of “Role reversal” (i.e., the child takes over the role of parent and tries to be protective or otherwise take care of the parents need).

The Abuser^{13, 14}

1. Poor self esteem, coping skills, and lifelines
2. Violent temper or outbursts, depressed and demanding
3. Unrealistic expectations of child’s behaviour
4. Inappropriate responses to the seriousness of the child’s condition (over reaching or under reaching, hostile).
5. Overly critical behaviour toward the child and never describing the child in +ve terms.
6. Reluctance to give the history of the accident or giving on unrealistic explanation.
7. Request for treatment long after the injury has occurred.

Diagnosis: The diagnosis is a difficult intellectual and emotional excursion and is most difficult tasks requiring time, experience and emotional energy. The aim of intervention is to diagnosis and cures the disordered parenting. In the 1970’s it was estimated that in USA 5% of abused children died and 35-30% sustained serious re-injury.^{13,15}

The Dentist and staff should be educated to get a visual impression and identify interaction of the child as they enters the reception room.

Seven Classic Indications to the Diagnosis^{16,17}

1. There is delay in seeking medical help
2. The account of the accident is not compatible with the injury observed.
3. The parents mood is abnormal, and tend to be more pre-occupied with their own problems, withdrawn or frightened.
4. The child may say something concerning the injury i.e. different to the parents story.

Common Sites to be Observed and Examined^{16,17}

1. Appear overly vigilant or display a ‘frozen watchfulness’ staring constantly. There are no spontaneous smiles and almost no eye contact.
2. The dentist should observe the child for lack of cleanliness, for small stature with respect to age, evidence of mal nutrition.
3. Over dressed children, should also be noted, long sleeves and high necked shirts or blouses during not summer may be worn to cover signs of physical abuse.
4. Face neck should be examined for peri-orbital ecchymosis, sclera hemorrhage, and ptosis, DNS, cigarette burn and hard slap marks.
5. A spoon or fork applied with enough force, for forceful feeding → treatment of anterior teeth, turn frenum.

Types of Oro-Facial Injuries^{18, 19, 20}

Bruising on the skin overlying bony prominences such as the forehead or cheekbone. Inflicted bruises occur at typical sites and/or fit recognizable patterns. Bruises on the ear are commonly due to being pinched or pulled by the ear and there will usually be a matching bruise on the posterior surface of the ear.

Bruises or cuts on the neck are almost always due to being choked or strangled by a human hand, cord. Accidents to this site are extremely rare and should be looked upon with suspicion. Bruising of the upper labial frenum of a young child can be produced by forcible bottle feeding and which may remain hidden unless the lip is carefully everted. Violent rubbing of the face; and may be accompanied by facial bruising /abrasions. A frenum tear is not uncommon in the young child who accidentally falls while learning to walk (generally between 8-18months) However, a frenum tear in a very young non-ambulatory patient (less than 1 year) or an older more stable child (2 years) should arouse one's suspicion as to the possibility of this injury being non-accidental.

Human Hand Marks: The human hand can leave various types of pressure bruises; grab markers or finger tip bruises, linear marks or finger edge bruises, linear marks or finger edge bruises, hand prints, slab marks and pinch marks. The most common types are grab marks or squeeze marks which leave oval shaped bruises that resemble finger prints. These linear bruises are due to the capillaries rupturing at the edge of the injury (between the striking fingers), as a result of being stretched and receiving a sudden influx of blood.

Abrasions and Lacerations: Penetrating injuries to the palate, vestibule and floor of the mouth can occur during forceful feeding of young infants; these are usually caused by the feeding utensil. Abrasions and lacerations on the face may be caused by a variety of objects, but are most commonly due to rings or finger nails on the inflicting hand and injuries are rarely confined to the orofacial structures.

Burns: Burns of the oral mucosa can be the result of forced ingestion of hot or caustic fluids in young children. Burns from hot solid objects applied to the face are usually without blister formation and the shape of the burn often resembles its agent. Cigarette burns give circular, punched out lesions of uniform size.

Bite Marks: Human bite marks are identified by their shape and size. The nature and location of the bite is likely to change with increasing age of the child. In infants, bite marks tend to be punitive and are often a response to soiling or crying. As a result, bite marks may appear any where; but they tend to be concentrated on the cheek, arm, shoulders, buttocks or genitalia. In childhood, bite marks tend to be less punitive and more a function of assault or defense. Sexually oriented bite marks occur more frequently in adolescent and adults.

The duration of bite mark is dependent on the force applied and the extent of tissue damage. Teeth marks that do not break the skin or visible up to 24 hours.

Dental Trauma: Trauma either to the primary or permanent dentition can be due to blunt trauma. A similar range of injuries to those found in accidental trauma is seen.

Eye Injuries: Most periorbital bruises involving one or both sides of the face. Ocular damage includes acute hyphema, dislocated lens, traumatic cataract and detached retina.

Bone Fractures: They may occur in almost any bone and may be single or multiple, clinically obvious, or occult and detectable only by radiography showing different stages of healing. Most fractures in physically abused children occur under the age of 3. In contrast, accidental fractures occur more commonly in children of school age.

Role of Dentist in the Management of Child Abuse^{13, 21}: The dental practitioner may be the first professional to suspect physical abuse as a result of injuries involving the orofacial structures. The aim of all professionals involved is to ensure the safety of child, help and counseling for the parents or care givers so that the abuse stops. A child with a severe injury is usually referred immediately to a hospital based consultant pediatrician. Where suspicious are aroused, the dentist should speak to the child's medical practitioner immediately and arrange for a medical examination within 24 hours. As far as possible, parents should accompany the child for the medical examination. If the parent is not available, the local child welfare department should be contacted.

Dental practitioners should ensure that their clinical records are completed immediately with illustrations of the size, position and type of injuries. Photographic documentation would be beneficial in this respect. These records may be referred to in any subsequent case conference or legal proceedings. Dental practitioners should not feel any guilt about referring children to a pediatrician or general medical practitioner. Because of the high frequency of intra oral and facial injuries, dental professionals comprise a very important part of the team necessary for identifying and importing child abuse and neglect.

CONCLUSION

The dental practitioners are in unique position to recognize the possibility of physical abuse and provide emergency dental treatment. Also role of dentist becomes crucial because it becomes mandatory to report and detailed documentation of the observed abuse and neglect. Thus need of hour suggest to take and correlate detailed history of all the dental, oral and perioral structures along with behavior assessment of the children, and accompanying parents or guardian. Also all the dentists and in specific pediatric dentist should be made well aware of emergency contact person or number to report any such doubtful cases.

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Application of Virtual Reality in the Public Health

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ABSTRACT

Recent advancements in technology have made virtual reality an effective technique for the treatment of psychological disorders. VR consists of a three-dimensional, computer-generated environment viewed through a head-mounted display. This tool has opened new treatment possibilities of in the field of psychology. Creating various virtual environments for the treatment of different psychological disorders provides a patient friendly and cost effective treatment alternative. Virtual environments that have positive stimuli and are made in association with the medical personals provide a valuable tool for the treatment of public health related disorders.

Keywords: Anxiety Disorders, Information Technology, Stress Disorders, Virtual Reality.

INTRODUCTION

Virtual Reality is an application field in computer and information technology. It is defined as a sophisticated human-computer interface that creates an authentic simulation analogous to reality. The user interacts actively and in real time within an immersive computer-generated three-dimensional environment. The basic equipment consists either of a head-mounted display (HMD) or a computer automatic virtual environment (CAVE). In advanced VR systems, devices such as synchronized tracking systems, earphones, gesture-sensing gloves, scent machines, and haptic-feedback devices are employed in order to enhance the liveliness of Virtual Environments¹.

Especially tracking devices that enable to run user's real-world body movements consistently in the Virtual Environment (VE) and the incorporation of sound effects relating to the user's position in a VE, are of particular importance for the virtual experience. However, vital

to the success of VR systems is the credibility of the perceived (virtual) reality, called "sense of presence"².

Virtual reality (VR) is a new mode in the field of human-computer interaction where Individuals are actively involved in a computer-generated virtual environment (VE) in form of operating different devices and performing tasks. VR provides the opportunity to simulate different and difficult real-world environments and situations. As a result VR-based therapy serves as a substitute for psychotherapies requiring contact with real-world stimuli since exposure in vivo has become apparent to be an insurmountable obstacle for some individuals³. This therapy has been reported to be highly cost effective and successful mode of treatment when compared to the gold-standard therapy in vivo therapy.

The effectiveness of VR-based therapy has been recorded for various psychological conditions like variety of anxiety disorders, specific phobias and post-traumatic stress disorder.

The therapeutic approach of VR based therapy is based on exclusive Cognitive Behavioral Therapy (CBT). CBT-based exposure in vivo is the most frequently applied psychotherapeutic approach amongst all anxiety disorders. Characteristic is the systematic exposure to an external or internal feared stimuli that leads on to habituation and, eventually, to extinction

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of the pathological behavior. The underlying principle is rooted in the model of emotional processing of fear. Based on the assumption that fear settles down in memory structures that pave the way for fear behavior, and that change occurs by altering these structures⁴.

Systematic desensitization for the decrease of pathological fear can be done in various steps. At first, the fear network must be activated through exposure to the anxiety-provoking stimulus. In the next step, concurrently cognitive and affective new information needs to be integrated into the original memory structure, in order to achieve an emotional change and thereby reducing fear behavior. In particular, the fear eases through prolonged or repeated exposures, causing its full disappearance. Cognitive behavioural therapy assisted by VR devices can be used in treating anxiety disorders, as it can substitute real stimuli or situations⁵.

VR-based therapy only serves as an intermediate stage before subjecting the person to the real fear-evoking stimuli or in vivo therapy. VR-based therapy is similar to the in vivo therapies during the initial sessions which may range from psycho-educational sessions that may be composed of an introduction in relaxation training and of explaining the rationales behind the therapy, to trauma interview and training in breathing techniques, to anxiety management techniques, thought stop technique, and cognitive restructuring.

Virtual Reality-Based Therapy in different psychological disorders: The evidence for VR in psychotherapy has been documented widely in the field of anxiety disorders. In these type of situations though there is lack of real danger, yet the individuals feel a disproportionate fear followed by avoidance of a situation or a specific object.

Agoraphobia: Panic disorder is diagnosed if a panic attack, including symptoms such as sweating, palpitations, trembling, nausea, derealization and depersonalization, results in consistent concern about having additional attacks, worries about its consequences or behavioral changes. Persons suffering from panic disorder frequently develop agoraphobic avoidance behaviors.

Agoraphobia refers to anxiety about being in places or situations from which escape might be difficult or in which help may not be available in case of having an unexpected panic attack, such as being in a crowd, on a

bridge, train or the like. Therefore, agoraphobia often has to be included in the treatment of panic disorder as well⁶.

Exposure to anxiety evoking situations is considered to be highly prolific in treating agoraphobic avoidance behavior. However, the complexity of agoraphobia combined with panic disorder calls for focus on both agoraphobic avoidance behavior and panic, which can be addressed through VR-based therapy by creating VEs such as an airport building and a plane, a square and a street, or an elevator to achieve greater clinical significance⁷.

Arachnophobia: Arachnophobia is categorized within the group of zoophobias and is characterized by a persistent fear of spiders, an immediate anxiety response to exposure to a spider, and avoidance of spiders. The category of “bugs, mice, snakes or bats”, which includes spiders, accounts for about 40% of specific phobias. Approximately 3.5 to 6.1% of the general population suffers from arachnophobia, whereof the majority is constituted by women. Even though most arachnophobic persons recognize that their fear is unreasonable, daily life can be restrained.

Garcia-Palacios, Hoffman, Carlin, Furness III, and Botella were the first authors who compared the outcomes of a controlled study concerning spider phobia. VRbased therapy produced clinically and statistically improvements on all objective and subjective tests, whereas the data of the control group remained unchanged across all measures^{8,9}.

Aviophobia: Fear of Flying: Fear of flying, or aviophobia, is characterized by an intense fear of flying that often results in flight avoidance or experiencing substantial distress while flying. aviophobia affects 10-20% of the general population and 20% of airline passengers consume alcohol or sedatives to deal with their fear of flying. Most persons suffering from acrophobia fear a plane crash, while some fear being closed in and therefore often meet the DSM-IV criteria for claustrophobia. Further fears concern experiencing a panic attack and not being able to escape the situation or get medical attention, complying with the concept of panic disorder with agoraphobia, or a general fear of heights. Therefore, co-morbidity with other anxiety disorders occurs very frequently¹⁰.

The use of VR applications in the treatment of aviophobia could be advantageous to an exposure in-vivo

because financial and logistical expenses are essentially lower. Furthermore, the privacy and confidentiality of a VR exposure in contrast to a regular flight should be emphasized.

The first RCT in aviophobia traces back to Rothbaum et al. They compared the effectiveness of VR exposure and exposure in vivo against a control group. The participants' self-reports revealed virtually identical outcomes in the two forms of therapy, and superiority with respect to the control group¹¹.

Acrophobia: People suffering from fear of heights experience severe impairments, as they have to avoid a number of places such as elevators, planes, and bridges. Even offices and flats in high buildings may pose an insurmountable obstacle.

The VE which may replicate such environment like a multi-storey mall with escalators and balustrades, a fire escape, and a rooftop garden can be used in treatment of such people which is as effective as exposure in vivo¹².

Social Phobia: Social phobia is defined as an unreasonable or excessive fear of social situations and the interaction with other people that automatically brings on feelings of self-consciousness, judgment, evaluation or inferiority. Symptoms of social phobia include intense fear, blushing, sweating, a dry mouth, trembling, a racing heart and shortness of breath. There are two subtypes of social phobia: specific social phobia that is limited to a small number of fears inducing situations, and generalized social phobia, that involves almost all social situations. Situations that may evoke fear include speaking in public, establishing contacts, protecting one's interests and being under scrutiny. Usually, persons suffering from social phobia are worried that their fear is being noticed by others¹³.

The effectiveness of VR treatment of social phobia has been compared with cognitive-behavioral group therapy by Roy et al which showed similar clinically and statistically significant improvement in both the groups. Several studies also suggested similar results on the effectiveness of virtual environments in treating public speaking anxiety¹⁴.

Obsessive-compulsive disorder: Obsessive-compulsive disorder (OCD) is a debilitating mental disorder that is characterized by either obsessions, compulsions, or both. According to the DSM-IV, obsessions are defined

as recurrent and persistent thoughts, impulses, or images that may cause anxiety, including the obsession of contamination, need for symmetry or aggression. Compulsions refer to repetitive behaviors, such as hand washing, ordering, and checking, or mental acts such as praying, counting, or repeating words silently, that are performed to respond to an obsession or to rules in order to reduce distress. Lifetime prevalence rates are estimated about 2% worldwide.

Preliminary data concerning the use of VR in the treatment of OCD is available. A South Korean research group presented first results of VR exposure therapy of OCD which showed that VR is a potential device for the assessment and treatment of persons with symptoms of arranging compulsion¹⁵.

Post-Traumatic Stress Disorder: Posttraumatic stress disorder (PTSD) is a serious condition that persons experiencing a traumatic event may suffer from. According to the ICD-10, the traumatic event needs to be exceptionally threatening or catastrophic and would distress most people. Such disasters can be either manmade, as it is the case in war, torture, or sexual abuse, or they can be natural disasters, such as earthquakes, accidents, or life-threatening diseases. Criteria for PTSD include intrusions such as flashbacks and repeating dreams, avoidance of situations similar to the traumatic event, loss of memory about certain aspects of the event, and symptoms of hyperarousal. Experiencing psychological distress right up to PTSD is common among military members who are constantly confronted with threatening situations¹⁶.

These patients avoid anxiety-provoking stimuli, but they need to be faced with those in order to achieve treatment success. However, due to its nature it is evident that in multitude cases exposure in vivo therapy is hardly feasible, as a rape victim cannot be faced with the perpetrator or a combat veteran cannot be sent to a war zone for the sake of therapy.

A published RCT included current military members with a diagnosis of combat related PTSD showed clinically significant change for the better in VR-based therapy¹⁷.

CONCLUSION

VR has proven to be advantageous in psychotherapy in various manners when compared with in-vivo psychotherapy. Though the VR therapy may cause

nauseous feeling in some people after the initial use, it provides more predictable environment which makes the participants willing to undergo the therapy. It also reduces the cost and times spend on the in-vivo therapy. VR-based therapy can also be performed within a standard session at safe and familiar surroundings. VR therapy also allows the therapist to focus on monitoring the patient's behavior, which facilitates the therapist to intervene adequately, while keeping the experimental variables under constant control engenders good internal and ecological validity.

Several studies show a lower dropout rates in VR-based therapy compared to the in-vivo. VR technology also allows the imaginative environments to be create thereby reducing the difficulties to imagine the anxiety-provoking stimulus or situation.

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Internet of Things Applications in Agriculture: A Survey

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ABSTRACT

Agricultural activity in India is considered to be the largest, as it feeds larger population. The application of Internet of Things (IoT) in Agriculture field is acting as an aid to the traditional farmers and inspired youths who are interested in agriculture by assisting them in Organic farming by solving several problems of the producers. The need of the hour is sustainable cultivation and Organic food production with technology support. This study aims at discussing the merits and demerits of the organic and conventional farming methods respectively. It also elaborates the deployment of different technologies like IoT, Cloud Computing and Image processing in various field of Agriculture. It also summarizes the methodologies of IoT applications like monitoring soil fertility, biological pest control, Crop cultivation, animal husbandry and smart irrigation.

Keywords: Agriculture, Conventional farming, Cloud Computing, Image Processing, Internet of things (IoT), and Organic farming.

INTRODUCTION

Conventional farming includes the use of the chemical and synthetic fertilizers and pesticides to promote plant growth and soil fertility. Pesticides are used by the farmers to control growth of the weeds, insects and pests and prevent the crops from damaging. However the residue of the pesticides remain in food causing many health hazards to the human.

All the human beings from new born to oldsters^[1] are unknowingly taking in food with pesticide residues, which leads to birth defects like Attention Deficit Hyperactivity Disorder (ADHD), Nervous system disorder, Reproduction deficiency, chronic illness like diabetes, and degenerative disease like cancer.

The pesticide residue persistence refers to duration of the pesticide stay in the environment. Persistent^[2] pesticides are non decomposable and they quickly accumulate in the organisms. Example of persistent pesticide is Poly Chlorinated Biphenyl (PCB), an industrial chemical which is used as a additive in paint. Non persistent pesticides are able to break quickly in the environment. Example of Non-persistent pesticides is insect repellents, which are used in the homes.

Organic farming^[3] is a system of agricultural production which relies on organic waste, animal manure and biological pest control. It avoids the

use of pesticides, synthetic and chemical fertilizers. Organic farming ensures health security to all the living organisms and enhances the nutritional value of the food and soil health. The organic farming is yet to bear fruit among the producers, due to the lack of technology support^[4] and ignorance of methodologies like Internet of Things (IoT), Cloud computing and Image Processing in agriculture. This survey summarizes the technology application of IoT in the agriculture and also elaborates the methodologies used^[5].

This paper is organized as follows. Section 2 covers the basics of IoT architecture. Section 3 describes the application of IoT in various agriculture. Section 4 covers the summarization of methodologies used in applications and finally conclusion in Section 5.

BASICS OF IOT ARCHITECTURE

The IoT is defined as network of internet connected objects, which are able to collect and exchange data using Sensors, with internet as a backbone.

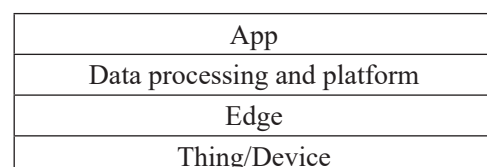


Fig. 2.1: IoT stack

The figure 2.1 describes the IoT stack, where the thing/device refers to the sensors or hardware devices used like Arduino/Raspberry Pi to integrate with software stack. The Edge is used to establish a secure and robust connection with cloud or edge devices to collect and manage the device data. The Data processing and platform is used to store and analyze the sensor data and to construct decision support system. The app level of the stack is used to build and run applications. The developed application can be hosted as Application Platform as a Service (APaaS).

APPLICATIONS OF IOT IN AGRICULTURE

a. IoT based Smart Soil Monitoring and Irrigation:

This system ^[6] uses embedded technology which is used to monitor the soil content and behavior using different sensors. The three types of the sensors used in this system are pH sensor, humidity sensor and temperature sensor.

The pH sensor is used to measure the hydrogen-ion concentration in the soil and indicates whether soil contains acidity or alkalinity. The humidity sensor responds to humidity changes and measures the humidity level. It is easier to integrate the humidity sensor with the application. The temperature sensor is used to record the temperature level. The device used is Raspberry pi 2, Model B. The system also contains web camera which capture the still images of the crops to identify the weeds and video streaming of the motion captured.

It also reduces the difficulty of the farmer by suggesting the suitable crop for the soil condition. It also automates the irrigation process based upon humidity sensor values.

b. Wireless Mobile Robot for Smart Agriculture:

In this system ^[7], Wireless Sensor Robot is used to implement the Smart agriculture. The Wireless robot is equipped with Raspberry Pi 2 Model B controller and many sensors. The Robot is controlled using remote by give commands to move around the crop field. It has cameras to capture the insects or weeds in the crop. Based upon the moisture, humidity and temperature sensor level values, the robot will switch on/off the motor for irrigation. It also monitors and suggests nutrients for the crops.

The various types of sensors used in the wireless mobile robot are CO₂ sensor, Moisture sensor,

Thermo Hygro sensor, pH sensor, Humidity sensor, Ultra Violet (UV) sensor and Passive Infra Red (PIR) sensor.

- CO₂ sensor- monitors the gaseous carbondioxide level.
- Moisture sensor - monitor the soil moisture level.
- Thermo hygro sensor - measure the outdoor temperature and humidity.
- pH sensors-to measure the pH value of the soil and supply nutrients
- Humidity Sensors-used to measure the humidity and convert it to the voltage value.
- The UV Sensors -to measure the UV light and give the value as voltage.
- The Passive Infra Red (PIR) sensors are used to detect the warm bodied organisms in motion like birds and animals. This sensor is used to protect the crop from the mammals and birds using bird scarer circuit which exhibits sound to scare them when they come near the crops without harming them.

The wireless mobile robot is capable of controlling the essential parameters for the plant growth and health. It also reduces the cost of the laborers and provides effective monitoring with the accurate data^[8].

c. Plant Health Monitoring using Image Processing and IoT:

This system ^[9] is used to monitor the plant health and prevent it from diseases. It uses the IoT sensing network to collect the humidity, moisture and temperature data using sensors and Arduino UNO is used as a device controller. It uses JPEG camera to capture plant images at regular intervals and data is fed to SD card for further analysis. The morphological analysis is done for the captured images using MATLAB and results are recorded as histograms. The variation parameter in the results is used to detect, whether the plant is affected or not.

This new approach enhances the possibility of combining the IoT and Image processing in the field of agriculture. The collected data is communicated to the farmers using CDMA/GSM at regular intervals. These processes immensely help farmers as they cannot be in their field always and assist them with accurate problem identification in plant health^[10].

d. Pesticide Residue Detection using IoT: This IoT enabled Pesticide Residue (PR) Detection system [12] is used to detect the pesticide residue in fruit and vegetables. It uses Acetyl cholinesterase (AChE) bio sensor and IoT for this process.

The traditional pesticide residue analytical technique uses Liquid Chromatography (LC), Gas Chromatography (GC) and the combination of the both. Though these methods are good in quantitative analysis, they consume more time and more expensive.

The PR detection system contains four components,

1. Hypogynous Computer-which has AChE bio sensor to detect pesticide residue in vegetable and get the concentration of pesticide residue.
2. Epigynous Computer receives the detected information from hypogynous computer and stored it in the data base.
3. Epigynous computer integrate detection is used to generate and print the QR code. The same code is pasted on the corresponding vegetables.
4. The customers while buying vegetables scan the QR code in their mobile. The Scanned QR code retrieves pesticide residue concentration range of the vegetable.

The delivered experimental output is acquired for eight kinds of vegetables and fruits and found it to be stable and accurate. This system of PR detection is fast and inexpensive.

e. Remote Monitoring System (RMS) Using IoT: This system [10] provides Remote Monitoring to monitor the weather pattern and crop using IoT .It sends collected data as a alert to the farmers as Short Messaging Service(SMS) and advices with necessary action.

The RMS contains three layers

1. Perceptron Layer.
2. Network Layer.
3. Application Layer.

1. Perceptron Layer: The Perceptron layer contains Ubi-Sense mote (M), a generic sensor board with Temperature and Relative Humidity, Light-Intensity, Barometric Pressure and Buzzer sensors. The Ubi-Sense mote (M) collects the values from sensor, detects Proximity Infra Red (IR) LED and generates an alarm through Buzzer. It transmits the measured physical value from the Ubi-Sense mote over the network.

A web camera is used in perceptron layer to capture the image of the crop and monitor its health and prevents it from the diseases.

2. Network Layer: The network layer is used for the reliable transmission of the collected data in wireless network. It contains Ubi-mote and ZigBee Wireless IP Network Gateway (WINGZ) devices to control and effectively monitor the wireless network and IP network.

3. Application layer: The collected sensor information including the crop's images are gathered in the database. Once the data is gathered, comprehensive analysis is done and decision support is constructed. For example based upon the soil moisture the water sprinkler will be switched off or on.

This RMS system helps the farmers who are planting the same crop for centuries, but unaware of techniques to maintain and monitor it, during changing weather and soil conditions. This system assist them by providing alerts based upon the soil moisture and humidity which reduces their time and increases their crop productivity.

f. Cloud and IoT based Architecture for Precision Agriculture: This Cloud and IoT based model [11] is used to provide precision agriculture, where precision emphasizes on accuracy and correctness. This model contains three layers.

1. Front-end layer
2. Gateway layer
3. Back-end layer

1. Front-end layer: The front layer contains physical hardware or sensing nodes. The four modules of the front end layer are Micro controller, Environmental sensor or actuator, Interfacing circuits and wireless communication module.

The Microcontroller is responsible for collecting the information from the sensor nodes and sends it to the other layer in the architecture. The various sensors used are

- Air Temperature Sensor
- Air humidity Sensor
- Soil Moisture Sensor
- Leaf wetness Sensor
- Wind speed/direction Sensor

These sensors are used to monitor the soil moisture, humidity, volume of the rain, wind speed and direction. The interfacing circuits are used to convert signal to voltage values and wireless communication module is used to communicate the information to the nearest gateway for immediate action.

2. **Gateway Layer:** The Gateway is used to collect the information and store in the Cloud Virtual Machines (VM) to avoid data corruption. The VM can be migrated according to the user requirements.
3. **Back-end Layer:** The back-end layer is used facilitate the end user to access the sensed data with the integrated Application Programming Interfaces(APIs). The user can view the soil

moisture, humidity, wind direction, speed of the wind and amount of rainfall. The same can be visualized in graph format.

This system provides frame work for cloud based IoT precision agriculture. It also suggests efficient way of integrating cloud and IoT in Agricultural applications. It monitors soil moisture and humidity level to spray the water and fertilizer at the appropriate time. It also monitors the rainfall and wind speed to safeguard crop from damage.

SUMMARIZATION OF METHODOLOGIES

This section summarizes the sensors and functions of the different methodologies discussed in Section 3. It provides complete framework of the application used in Smart agriculture.

Table 4.1: Summarization Table

Sl. No.	System	Sensors	Functions
1.	IoT based Smart Soil Monitoring and Irrigation	<ul style="list-style-type: none"> ● pH Sensor ● Humidity Sensor ● Temperature Sensor 	<ul style="list-style-type: none"> ● Smart irrigation ● Soil monitoring
2.	Wireless Mobile Robot for Smart Agriculture	<ul style="list-style-type: none"> ● CO2 Sensor ● Moisture Sensor ● Thermo Hygro Sensor ● UV Sensor ● PIR Sensor 	<ul style="list-style-type: none"> ● Smart irrigation ● Soil monitoring ● Crop health maintenance. ● Prevention of crops from birds and animals
3.	Plant Health Monitoring using Image Processing and IoT	<ul style="list-style-type: none"> ● Humidity Sensor ● Moisture Sensor ● Temperature Sensor 	<ul style="list-style-type: none"> ● Soil monitoring ● Crop health maintenance.
4.	Pesticide Residue Detection using IoT	<ul style="list-style-type: none"> ● AChE Bio sensor 	<ul style="list-style-type: none"> ● Pesticide residue range detection using Bar code link.
5.	Remote Monitoring System(RMS) Using IoT	<ul style="list-style-type: none"> ● Ubi-Sense mote (M),a generic sensor 	<ul style="list-style-type: none"> ● Soil monitoring ● Crop health maintenance. ● SMS alerts.
6.	Cloud and IoT based Architecture for Precision Agriculture	<ul style="list-style-type: none"> ● Air Temperature sensor ● Air humidity Sensor ● Soil Moisture Sensor ● Leaf wetness Sensor ● Wind speed/direction Sensor ● Rain Volume Sensor 	<ul style="list-style-type: none"> ● Watering the plant ● Spraying fertilizers ● Rainfall monitoring and wind speed monitoring to safeguard crops.

CONCLUSION

This study aims at summarizing different framework where technologies like IoT, Cloud computing, Image Processing and their combination are deployed for effective smart agriculture. This study also outlined the various IoT based architectures and explained their implementation details. It also act as an aid for the researchers to contribute their innovation with technologies to make the organic farming easier and effective.

Ethical Clearance: Taken from Department

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A Study on Medical Imaging Techniques with Metrics and Issues in Security Cryptosystem

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ABSTRACT

In the domain of medical imaging, Computer Tomography (CT), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT) and rest of the other modes of medical images which will reflect human data from different views. We use medical images in radiography for diagnosis, clinical observations and in many other treatments. In this paper, we explored diverse medical imaging methods utilized for diagnosis of breast cancer, includes X-Ray mammography, MRI etc. we analyzed their adequacy, points of interest and weaknesses for distinguishing beginning time of breast cancer. Further we studied image fusion, a technique to expel the redundant information from the original medical images along with medical factors UIOQ, fusion factor, entropy etc. Be that as it may, from visual point of view, images that are fused gives better results than fuzzy systems. We further extended by investigating the medical tools to increase the speed and to enhance the study and analysis of medical images. The tools simulate the complete work, done by the human observations with numerous predefined components integrated in the software. However, protection software's or medical tools are challenging issue, since the tools provide content are routine in nature. We concluded our paper with few image encryption mechanisms along with their functionality.

Keywords: Breast cancer detection, Image fusion, medical imaging tools, metrics, and protection

INTRODUCTION

In the domain of medical imaging, Computer Tomography (CT), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET), Single Photon Emission^[1] Computed Tomography (SPECT) and rest of the other modes of medical images which will reflect human data from different views. CT will vividly reflect anatomical pattern of bone tissues. It gives complete cross-sectional views of all tissue types. SPECT can detect the tissues lesion and also organs and give details regarding flow of blood and body temperature. PET scanning shows the flow of blood, metabolism of oxygen and glucose in brain tissue^[2]. In clinical diagnosis and the treatment, the issues of comparison and synthesis of images such as CT-PET, MRI-PET and CT-MRI were frequently detected. To give much useful details for clinical diagnosis^[3], it is necessary to integrate that data from multiple source images.

As per American cancer society^[4], the breast cancer is said to be the second leading reason for mortality of

woman in USA [1]. In the year 2013, about 232,000 women are going to be diagnosed with the breast cancer and above 39K women would die with this disease. Hence the integrated effectiveness to find breast cancer with the mammography, ultrasound, and MRI is greater than the one of those imaging approaches. Whenever the diagnosis of breast cancer is done, the ultrasound or MRI controlled biopsy confirms cancer. Various choices for treatment are there to diagnosis the breast cancer. Mastectomy is the most common treatment among them that removes cancer related tissues and prevents it from spreading. Even though the breast mastectomy is performed, still breast cancer may repeat and be a cause to death. In this paper, we described about a brief study on medical images techniques along with the research gaps. In section 2, we presented the literature work in the medical study. Section 3, is a formal discussion of various medical imaging techniques. Section 4 is about image fusion with some mathematical metrics for medical images for comparison. Section 5 depicts the security cryptosystem and conclusion is presented in Section 6.

Related works: According to Solomon et. al. [5], the process of using computer paradigms to apply image processing over digital images is known as digital image processing. As a domain of digital signal processing, a digital image processing having more merits than analog image processing. Narendra et al. [6] recommended a procedure for encrypting the gray images with the use of secret key of 128-bits. Here an image is send into some active blocks and then those blocks are approved by the diffusion and few of substitution methods. Jose Luis et. al [7] introduced an electronic health record that allows the organized health images to be combined in between the accepted health users so that to improve the medical images value. Jani Anbarasi et al. [8] suggested a scheme of sharing multi images on the basis of interpolation polynomial. Akila et.al. [9], the performance of this approach is evaluated using a measure of improvement and the peak signal to a noise ratio. Rinki Pakshwar et. al. [10] Proposed some procedures related to image encryption to improve the security levels by providing chaotic border for encrypting an image. Joseph Cooley and Sean Smith introduced a keyboard video mouse that captures instant text redaction for producing exact text which recovers the patient's requirements and increases the influence of an end-user on the system.

Mammography: A mammography, or mammogram, is a breast related X-ray. It is an instrument of screening which is for finding and diagnosing breast cancer. Mammograms are the important element in earlier diagnosis of the breast cancer. Here in this paper work, we depict the merits and demerits of an X-ray mammography, ultrasound and MRI.

X-ray Mammography: X-ray Mammography is extensively used in modality of medical imaging for speed detection of a breast cancer. This model utilizes X-ray radiation with the frequency range of 30pHz to 30 eHz (3×10^{16} Hz to 3×10^{19} Hz). It results an image which is a projection of complete breast (3D to 2D). This method can find about 78% of confined breast cancer and the sensitivity is as much as 98% in women of 50 years ago with the fatty breasts. One in the key limitations of an X-ray mammography is its least sensitivity in case of denser breasts. In young women the mammograms of the denser breasts is common and

are hard for interpretation. These denser breasts are likely to cause breast cancer and the mammography's sensitivity lies between 30%-48%. One more drawback with this approach is when a patient is exposed to X-ray ionizing radiation may induce the cancer related cells. Additionally, the screening procedure of mammography is not comfortable sometimes because the compression of the breast is done between flat surfaces in order to enhance the image quality. The below figure shows the mammographic signs of breast cancer.

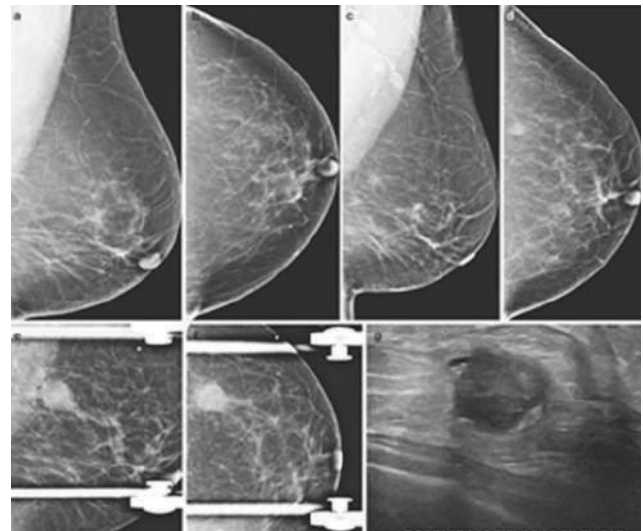


Fig. 1: Mammographic signs of breast cancer

Ultrasound Imaging: In ultrasound imaging, the breasts are irradiated with the help of sound waves via examining an array of transducers. The sound waves that range between 2 to 20 Mhz is lesser than the X – ray frequency range and so it is safer. The systems of Ultrasound imaging produce single plane images. Because of enhancements in transducers and in ultrasound technology, the current systems of ultrasound imaging can find the breast cancers upto 3mm of size. Earlier studies advise a predictive value about 98% to identify invasive lobular carcinoma when the both mammography and ultrasound imaging are applied for screening. In the other recent study, about 88% of the invasive lobular carcinomas are detected by a X-ray mammography was also found through ultrasound imaging. The outcomes of the recent studies shows that increase in the breast density, the rate of detecting breast cancer also develops through using ultrasound screening. The following figure displays how the ultra-sounding is done on breast.

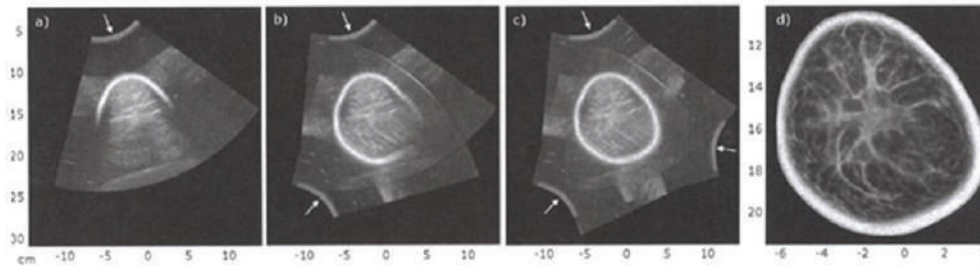


Fig. 2: Ultrasound breast imaging

MRI: Magnetic Resonance Imaging (MRI) is an important instrument for local staging before surgery of breast cancer. Small invasive cancers and ductal carcinoma in situ can be found by using a breast MRI because of remarkable advancements in the temporal and spatial resolution as well. MRI is done in view of an ultrasound imaging. The American cancer society has updated its breast cancer imaging guidelines and now advocates the breast MRI for specific groups of high-risk women. When compared to the other techniques in imaging, MRI is comparatively costly and needs an intravenous injection of gadolinium that causes the nephrogenic systemic fibrosis development within a few patients with the impaired renal function. Hence the patient with the renal disease background is unable to proceed with breast MRI. Since this approach uses huge magnets it can't be performed for finding breast cancer in the patients. MRI imaging approaches consumes more time and yield images with blur. The misinterpreted MRI images need that the patients must undergo the similar process many times. From total imaging approaches that are being studied till now, MRI has greatest sensitivity in finding confined with breast carcinoma and could give important information related to it.

Image Fusion: The word fusion refers to a model for extracting the data attained from various domains. The main aim of this Image Fusion (IF) is to combine the complementary multisensor, multitemporal and/or multiview data to single new image which has quality of information. The IF approaches that we are having discussion here are broadly categorized into two are 1. Pixel or spatial level image fusion. 2. Image fusion based on transforms. When compared to feature or decision-level fusion, pixel-level fusion can preserve more actual data.

Performance Evaluation Metrics: Our fusion principle's performance is evaluated on the basis of the following metrics.

A. Universal image quality indexing (UIQI):

The combination of the three factors are; loss of Correlation (C), luminance distortion (LD), and contrast distortion (CD).

$$Q = C * LD * CD.$$

It is also being expressed in detailed as below:

$$Q = \frac{\sigma_{xy}}{(\sigma_x \sigma_y)} \cdot \frac{2\bar{xy}}{(x^2 + y^2)} \cdot \frac{2\sigma_x \sigma_y}{(\sigma_x^2 + \sigma_y^2)} \quad \dots(1)$$

The initial component measures a degree of correlation between the images x and y and the dynamic range of them is [-1, 1]. The next component measures how close the mean luminance is between x and y with values [0, 1]. And the third measures how similar the contrast of images is with values [0, 1].

B. Entropy: Entropy is the quantity of data resides in an image. Here P is probability of pixel.

$$E = \sum_{i=1}^N p(x_i) \log_2 p(x_i) \quad \dots(2)$$

C. Fusion Factor (FF): Fusion factor of a fused image F and the input images are A, B is evaluated as: $IF=IAF+IBF$. IAF and IBF are the mutual data between the images A and F, B and F respectively and is evaluated as:

$$I_{MN} = \sum_{xy} P_{MN}(x, y) \log \frac{(P_{MN}(x, y))}{(P_M(x)P_N(y))} \quad \dots(3)$$

Greatest value of FF represents that a fused image comprises a relevant data from the both images.

D. Fusion symmetry (FS): Fusion Symmetry (FS) is the representation of a degree of symmetry in data content of both images. The least value of FS denotes better symmetry in a fused image.

$$FS = abs\left(\frac{I_A F}{I_A F + I_B F} - 0.5\right) \quad \dots(4)$$

Medical Image Processing Tools: Medical imaging is a technique, and is considered as a process of generating visual representations of internal body for the purpose of clinical analysis and also for the medical intervention. This approach tries to reveal the internal structures covered by skin and as well as bones for diagnosing and treat the disease. This technique also forms a database of

general anatomy and physiology for making it happen to find abnormalities. The main aim of this paper is to concentrate on survey of the medical image processing instruments. Table 1 contains, few of the widely used processing tools for a medical image. Some of the medical images processing tools are ANTS, Camino, DTI-TK, FSL, Elastix, GIMIAS, ITK, and MITK and so on.

Table 1: List of widely used Tools

Tool	Description
ANTS	Advances Normalization Tools is made by Brian B. Avants and presently managed by Hands J. Johnson. An ANT has the ability to retrieve the data from a complex Dataset, and it is more useful for managing, interpreting and visualizing multidimensional data [27].
DTI-TK	DTI-TK is a spatial normalization and atlas construction toolkit reduced to evaluate white matter morphometry by using DTI information. This software was developed by Gary Zhang. In 2011, a publication has been published in NeuroImage. It ranked DTI-TK as the top-performing tool in its class [28].
GIMIAS	Graphical interface for medical image Analysis and Simulation (GIMIAS) is a workflow-oriented environment for solving advanced biomedical image computing and individualized simulation problems, which is extensible through the development of problem-specific plug-ins [29].
NiftyRec	NiftyRec is a software project developed at UCL London, which enables code for tomographic reconstruction [30].
Elastix	Elastix is open source software, based on the well-known Insight Segmentation and Registration Toolkit (ITK). The modular design of Elastix allows the user to quickly configure, test, and compare different registration methods for a specific application [31].

Security of the medical image cryptosystem: Figure 3 shows, an efficient technique for encrypting a medical image in real-time so that to secure the transmission of that medical image in a public network. Therefore the security of a medical image cryptosystem is secure over all types of security attacks. The patient’s details such as name, birth date, address and rest of the other necessary details are required for medical diagnosis. The security of a medical image becomes a mandatory issue whenever the details of patient are transmitted over a public network.

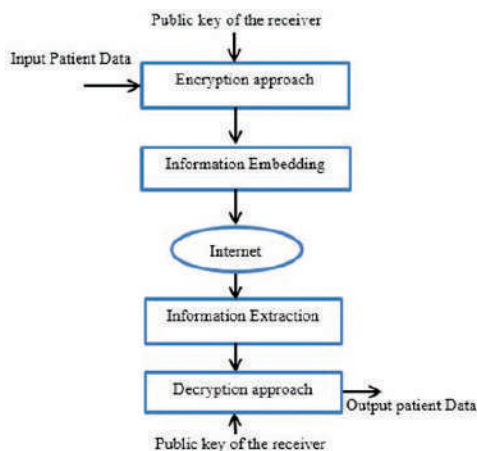


Fig. 3: Encryption and Decryption Technique

There exist different approaches like Encryption and Decryption, Information embedding and Information Extraction. The cryptography in the encryption and decryption is a mathematical procedure for performing encryption on information; therefore that data becomes cipher text which is not easily understandable and needs the usage of the key for transforming the data back to its previous form. Some of the instances of the encryption algorithms are Blowfish, AES RC4, RC5 and RC6. An encryption paradigm including with the key is utilized in data encryption and decryption as well. An information embedding is a scheme of hiding the data and its purpose is to perform encryption on images. Significantly it is used for embedding the extra text to some distortion, so that an original text and can be restored exactly even after the hidden text extraction. Data extraction is a process of extracting framed data instantly from semi-structured documents which are able to read by the machine. In many situations this task concerns the processing of human language messages similar to the processing of natural language. The table 2 provides the comparison of some research methods including with advantages and disadvantages of those methods. The primary objective of this comparison is to mention the security of the patient’s details during transmission.

Table 2: Some of the research methods along with their advantages and disadvantages

Method used	Advantages	Disadvantages
AIDM algorithm	No change in the size of a file.	Because of embedding image is invisible.
Situation based access control model.	It has the ability to state the patient's scenarios.	Maintains the mandatory process.
Pseudomization methodology	Secure against all types of attacks.	Consume more time.
(k, n) secret sharing scheme	Secure while sharing medical images.	Risk with hidden security.
Joint water marking encryption system.	Guarantees the priori and a posteriori security of medical images.	The process of encryption is slow.
Histogram shifting method.	Simple and the naked eye is unable to percept the difference.	Encoding is very sensitive.
Chaos-based medical image encryption scheme.	Improved efficiency.	Illegal access of medical details.
Interpolation technique	Less computational complexity.	Preserves the image quality.
Combination of cryptography and watermarking.	Data is highly secured.	Data values will lose.

CONCLUSION

In recent health issues, breast cancer is considered as one of the causes of women's death who has 40 and above years of age. We have to prevent it as early as possible for this we have two aspects are early identification and reduction of risks with that. Screening may find noninvasive cancers at early and enables to treat it before they become complex. When performing screening, mammography is playing a key role. The combination of the mammography, ultrasound and MRI will give us better outputs in finding the ductal carcinoma of in situ and invasive cancer. Nevertheless additional enhancements of such medical imaging approaches are required so that to recover the current limitations and to improve their breast cancer detection effectiveness. The prevailing tools of Medical Image Processing and suggest various MIP's to apply on analyzing process of a medical image. For providing better security levels the encryption techniques are studied and analyzed as well. Further, in our next work as continuation, we focus on the analysis of medical images of a specific category and will provide a good protection mechanism.

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Impact of E-governance in Health Sector

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ABSTRACT

“E-governance is the power provided to the government and citizens through information and communication technological solutions enabling interactivity via the internet and electronic mediums.” E-Governance is the application of IT for delivering government services, exchange of information, integration various stand-alone systems and services. The industry which is witnessing the major transformation and innovation is the Healthcare Industry. It is noted that the industry is growing at a steady pace and is expected to be US \$ 280 billion by 2020. The reasons for growth are found to be increase in earning capacity of the population and ever-growing elderly population. India has become a preferred medical destination by people from other countries gaining reputation globally by providing quality service at low cost. Private health care companies are providing better service than government. The hospitals are accredited and standard is maintained. In this article I would like to share my views on the role of e-governance in Health sector and benefits.

Keywords: Health care, e-governance current status, Benefits and Barriers.

INTRODUCTION

According to Verma (2013), “E-governance can be defined as an interaction between people and government through the use of technology^[1]. Generally it is referred to the use of ICT and other web- based technologies and communication for the improvement of service delivery from government to people.”

The Indian Healthcare Scenario: The key statistical indicators of health care sector is Infant mortality, longevity^[2], infectious disease rates and provision of health services which indicates that there is a major development work to be done in this sector. India’s healthcare allocation in budget has not kept pace with the economies and sectorial growth^[3]. The lack of proactive information leads to lack of adequate counseling. The collaboration with foreign medical institutes is leading to a better quality of healthcare being provided to economically weaker sections of society. India has become a preferred medical destination by people from other countries^[4]. Private healthcare hospitals play a major role in this regard as this sector is financially stronger and well managed^[5]. The impact of globalization and IT especially internet are said to have facilitated the formation of interlinking all the hospitals thereby keeping themselves updated in the latest technology in medical field^[6].

Healthcare And Medical Insurance Cards: The state governments of India allocate a huge part of its revenue for providing healthcare services to the public^[7], especially for the economically weaker sections of society. Globally, medical insurance and networked healthcare system has helped provide a safe and secure system beneficial to the general public^[8].

Computerization and networking of all the hospitals throughout India will make treatment procedures as well as billing and insurance a very convenient process^[9]. The use of insurance smart cards has brought about a revolution in the way government hospitals service to the citizen^[10]. Every patient treated across any medical care facility will have a card which will be checked for data by the hospital.

CHALLENGES

Although the Indian government has come up with various benefits to provide better access to public services, the desired outcomes are yet to be fully implemented. This is attributed to various customer facing and database maintaining which challenges the government. Front-end challenges relate to user-specific issues such as, high illiteracy levels, non-availability of user friendly interfaces, inadequate power supply in rural

areas, low broadband penetration and most importantly, lack of awareness of governance initiatives. On the other hand, back-end challenges relate to technical, process or human resource issues within the government. These issues include lack of systems integration within a department, lack of integration across government departments, limited knowledge of using computers at various levels of bureaucracy and deployment of technology without proper process re-engineering.

BARRIERS

The types of barriers are:

- Human Barriers
- Financial Barriers
- Legal and Regulatory Barriers
- Organizational Barriers
- Technical Barriers
- Professional Barriers

Human Barriers is the lack of awareness of the importance and benefits of using EMRs. The solution is improving the awareness of the importance and benefits of using EMRs by focusing on the topic through a multi-phase approach. Starting from the level of medical schools and colleges - the undergraduate level - and through different levels of post-graduate medical education

Financial Barriers is caused by high operation and maintenance costs of EMRs. The solution is designing the annual budgets of the hospitals to capacitate the high operation and maintenance costs of EMRs, which should be a part of the regular expenses of operations and not a burden on the hospital resources, by being unscheduled or unplanned

Legal and Regulatory Barriers is caused by lack of policies that govern EMRs on hospitals and lack of laws or legislation that govern EMRs on national level. Health information can be easily accessed. The solution is that the Ministry of health should start developing rules and regulations - on the national level - for the use of EMRs. In parallel with that, hospitals should start developing their own policies and procedures that control the use of data, information and EMRs internally, including signing privacy and confidentiality agreements and consents.

Organizational Barriers is caused by workflow needs redesign to match with EMRs. The solution is to redesign their medical and administrative workflow to match with EMRs specifications. This adaptation is important for the successful implementation

Technical Barriers is caused due to lack of guidelines for using EMR. The solution is to ensure that HIS and EMRs vendors and commercial providers are supplying hospitals with the proper system documentations, user manuals and guidelines for using and troubleshooting EMRs

Professional Barriers is caused due to lack of motivation to learn and train on using EMRs. The solution is improving motivation of healthcare professionals to learn and train on using EMRs by providing them with direct and indirect incentives, including overtime payments, bonuses and rewards for the hospital sections and departments successfully implementing EMRs. Departments that achieved well should also be recognized

CONCLUSION

There are various challenges for the implementation of e-governance in India. The challenges faced are low literacy, lack of awareness, low broadband penetration, lack of system integration etc. A visionary leader is required to implement the e-government and its related policies in India. To attain the vision the environment need to be cultivated so that the challenges are overcome India has number of award winning e-governance projects. Therefore we can say that e-Governance is the key to the "Good Governance" for the developing countries like India to minimize corruption, provides efficient and effective or quality services to their citizens.

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The Impact on Emotional Intelligence among Lecturers Working in University

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ABSTRACT

The aim of this research paper was to investigate, the impact of emotional intelligence (EI) on Organizational Commitment and Job Satisfaction. This study considers emotional intelligence as the effect of these dimensions on job satisfaction and Organizational Commitment though there are many dimensions in previous research proven. In Chennai District Environment the Lecturers working in Arts College Facing a Challenge towards the Emotional Stress in their work place. A sample of 600 lecturers had been taken which comprised of 300 from Madras University Affiliation Colleges and 300 from Deemed University Affiliation like SRM, SATHYABAMA, and VELTECH. Further, both Affiliation Arts colleges were divided into three different strata: Professor (60), Associate Professor (100), Assistant Professor (100) and Lecturer (40) each in Chennai District. We used to examine the hypothesized relationships among study variables. The results of the study show significant positive relationship between emotional intelligence with Organizational Commitment and Job Satisfaction. The findings indicate that Lecturers in Art Colleges working under Madras University Affiliation are with high emotional recognition and Intelligence are more likely to have feeling euphoric levels of job satisfaction.

Keywords: *Emotional Intelligence, Organizational Commitment, Job Satisfaction*

INTRODUCTION

Ishak, Iskandar & Ramli, (2010) Teachers have a challenging^[1] work environment such as heavy workload, hectic working environments, insensitive administrators, and parents' expectation. These environments make the teachers more stress. Teachers make themselves more strong in their emotions and as well as to others feelings and emotions that's indicate their high organizational commitment and leads to better job performance^[2]. Salovey and mayer" the ability to monitor one's own and others' feelings, to discriminate among them, and to use this information to guide one's thinking and action .employees who have the ability to communicate with each other effectively can lead the organization toward success and effectiveness^[3]. Therefore, they should be aware of and understand emotions in the self while knowing that how to act with others, how they make decisions, how not to get angry, how to control one's own emotions with others^[4].

Emotional intelligence among Lecturers are high due to Organizational Commitment and job satisfaction are of particular importance to any Arts College Management considering as important factor for their Society Expectation nature based on direct communication to customers. As such, the goal of this study is to examine the impact of EI^[5] on job satisfaction of College Lecturers Working under Madras University and Deemed University Affiliation.

LITERATURE REVIEW

The term emotion indicates expressive communications and also explains inner stage feelings like sad,happy, love,hate,fear^[6] and joy etc. (Perlovsk, 2006) .Emotional intelligence has a valid relationship with job outcomes such as job satisfaction and organizational commitment (Wong and Law, 2002). Which are , employees where not appraise and regulate their emotions, as Abraham (1999) points out, have very less organizational commitment.

Nikolaou and Tsaousis^[7], (2002) showed a relationship of emotional intelligence and organizational commitment. Using emotions indicate a very strong link with organizational commitment irrespective of weak and average link between controlling and understanding of emotions.

Antoniou, Davidson, & Cooper^[8] (2003) relieved when stress is higher in working environment, in return job satisfaction reduces. As (Munro, Rodwell, & Harding, 1998) says there are various views or expectations or problems arise in the working situations which leads to dissatisfaction of work.

Farkas and Tetrick^[9], (1989) employees dissatisfied on the work relates to the organizational outcomes such as organizational commitment whereas studies show that punnett ,greenidge&ramsey ,2007and abraham . 1999, organizational commitment is more related to job satisfaction.

Lambert^[10] et al(2009) shows negative impact on employees such as absenteeism, lower job satisfaction and stress and also increased health problems. Mathieu and Zajac (1990) describes highly committed employees feels less stress in work place compared to less committed employes. Goleman (1998, p.317), has defined Emotional Intelligence as “the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships”. NahidNaderiAnari, (2012) suggest that the participants were selected by proportional stratified sampling and simple random selection. This study adopted a survey research design that utilized an ex post facto research type in which the researcher used questionnaires to collect data from the respondents. The results indicate that there is a positive significant relationship between emotional intelligence and job satisfaction, organizational commitment. It is also found there is no significant difference among high school English teachers of different genders and ages concerning their job satisfaction and organizational commitment. It provides support for gender differences, with females reporting higher emotional intelligence, but the results show no age differences among the participants.

OBJECTIVES

1. To measure the differences between emotional intelligence scale among Lecturers in Arts Colleges.

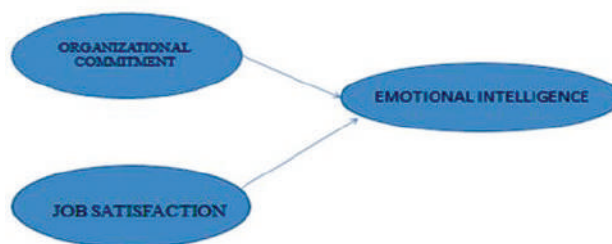
2. To estimate the difference between on organizational commitment scale among Lecturers in Arts Colleges.
3. To measure the difference between Lecturers in Arts Colleges on Job Satisfaction scale.
4. To determine the impact of emotional intelligence on organizational commitment among Lecturers in Arts Colleges.
5. To assess the impact of emotional intelligence on job Satisfaction among Lecturers in Arts Colleges.

Hypotheses

- H1: There is no significant difference between emotional intelligence of Lecturers.
- H2: There is no significant difference between organizational commitments of Lecturers.
- H3: There is no significant difference between Job Satisfaction of Lecturers.
- H4: There is no impact of emotional intelligence on organizational commitment among Lecturers.
- H5: There is no impact of emotional intelligence on Job Satisfaction among Lecturers.

CONCEPTUAL STUDY

Table 1: Independent and dependent Variables



Organizational Commitment: Organizational commitment was measured with Organizational Commitment Questionnaire (OCQ) developed by Allen and Mayer (1987) used the Three Component Model (TCM) of organizational commitment. They recognized affective, continuance, and normative commitment as unique components of organizational commitment. The instrument included 24 items investigating three dimensions: Affective, continuance, and normative commitment. A seven-point likert scale was used

with anchors ranging from 1 (strongly disagree) to 7 (strongly agree). Internal reliability coefficient was 0.78 for affective commitment, 0.77 for continuance commitment, and 0.65 for normative commitment.

Alikhani et al. (2015) Emotional Intelligence Impact in Organizational Commitment and Job Satisfaction to College Lecturers. It was concluded that individuals with high emotional intelligence had the ability to manage the pleasant mood, mental state and stress control. They also had high motivation and hope to achieve their aims at the failure

Hyun Jung Lee (2017), suggest that the training in emotional intelligence abilities may increase job satisfaction and decrease burnout of Teachers. Ashkanasy et al. (2003) showed emotional response related to stress affects employees’ performance. Gardner and Stough (2003) assessed the relationship between workplace, EI, job satisfaction and organizational commitment. Emotional self-regulation and emotional control were the strongest predictors.

Job Satisfaction: Maslow’s theory of hierarchy of needs could be presented as one of the theories related to job satisfaction. job satisfaction as “a pleasurable or positive emotional state resulting from the appraisal of one’s job or job experiences”. Hackman & Oldham proposed the job characteristics model, which is widely used as a framework to study how particular job characteristics impact job outcomes, including job satisfaction. The five core job characteristics can be combined to form a motivating potential score (MPS) for a job, which can be used as an index of how likely a job is to affect an employee’s attitudes and behaviours. Not everyone is equally affected by the MPS of a job. People who are high in growth need strength (the desire for autonomy, challenge and development of new skills on the job) are particularly affected by job characteristics.

Two sets of factors are considered to influence job satisfaction: intrinsic factors (recognition, tasks and responsibility) and extrinsic factors (working conditions, company policies and salary). Internal job satisfaction is an internal desire to perform a task which deals with pleasure and is related to internal motivation. External factors are defined as those external benefits provided to the professional staff by the organization. These factors are unrelated to the task and include money, good scores and other rewards.

RESEARCH METHODOLOGY

The Sample: The respondents for the present study were selected from Arts Colleges located in South Chennai of Tamilnadu .The sample consists of 600 College Lecturers.

Sampling Method: The sample collected using stratified random sampling technique. A sample of 600 College lecturers had been taken which comprised of 300 from Madras University Affiliation Colleges and 300 from Deemed University Affiliation like SRM, SATHYABAMA, and VELTECH. Further, both Affiliation Arts colleges were divided into three different strata: Professor (60), Associate Professor (100), Assistant Professor (100) and Lecturer (40) each.

Tools used for data Collection: Emotional Intelligence and Job Satisfaction scales developed by the researchers have been used for the data collection. The Emotional Intelligence scale consists of 23 items and Job Satisfaction scale consists of 12 items. To attain the responses related to the Organizational Commitment, a scale developed by Meyer, Allen and Smith (1993) was used. The reliability of all three scales has been estimated with the help of Cronbach’s alpha.

Table 2: Reliability Analysis

Variables	No. of items	Cronbach’s alpha
Emotional intelligence	23	0.903
Job satisfaction	18	0.914
Organizational commitment	12	0.925

DATA ANALYSIS AND INTERPRETATION

H1: There is no significant difference between emotional intelligence of Lecturers.

H2: There is no significant difference between organizational commitments of Lecturers.

H3: There is no significant difference between Job Satisfaction of Lecturers.

Table 3: Comparison of Emotional Intelligence among Lecturers working in arts Colleges

Variables	T-Value	Mean		S. D.	
		MU(300)	DU(300)	MU(300)	DU(300)
Emotional intelligence	1.236	3.04	0.518	3.837	0.515
Job satisfaction	4.218**	3.097	0.636	3.897	0.658
Organizational commitment	2.064*	3.727	0.618	3.416	0.638

* Significant at 0.05 level.

** Significant at 0.01level.

The meanscore of emotional intelligence was found to be higher in Madras University than Deemed University. The mean score for organizational commitment was found to be higher for Madras University than that of the Deemed, and the difference was found to be significant at 0.01level. The mean score for job satisfaction was found to be higher for Madras University than that of Deemed University, and the difference was found to be significant at 0.05 level. Meyer and Allen (2007) Suggests organizational commitment into three dimensions: affective, continuance, and normative commitment. Fatemeh Sadat Ghoreishi(2014), the staff had average

level of job satisfaction and emotional intelligence and others were lower than average, it seems necessary for authorities to explore the reasons for job dissatisfaction to prevent job burnout, depression and developing a sense of helplessness in the staff. It is also recommended to hold educational workshops for the staff especially who are younger than 40 years to promote their emotional intelligence.

H4: There is no impact of emotional intelligence on organizational commitment and Job Satisfaction among Lecturers.

Table 4: Coefficient of Correlation between Emotional Intelligence with Organizational Commitment and Job Satisfaction among Lecturers working in art Colleges

		Emotional Intelligence	Organizational Commitment	Job Satisfaction
Emotional Intelligence	Pearson Correlation	1	0.560**	0.726**
	Sig. (2-tailed)	0.00	0.000	0.000
	N	600	600	600

**Correlation is significant at the 0.01 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

The above table reveals significant and positive correlation between emotional intelligence and organizational commitment (r=0.560, p<0.01) job Satisfaction(r=0.726, p<0.01).

Regression: Emotional Intelligence towards Job Satisfaction and Organizational Commitment.

Table 5: Regression results for emotional Intelligence and Organizational Commitment

Independent variables	β	Sig
Job Satisfaction	0.539**	.000
Organizational Commitment	0.787	.000

Conted...

Dependent Variable : Emotional Intelligence, R2 = 0.500, F = 596.47

** Significant level 0.01, *significant Level 0.05

In regression analyse we investigated the influences of Job Satisfaction and Organizational Commitment influences on Emotional Intelligence. The regression model is significant as a whole (F=596.47: p< 0. 01). The findings shows that as we predicted that emotional intelligence has a significant impact on organizational commitment of Lecturers. So, higher the level of emotional intelligence of a Lecturers, higher will be her/his commitment towards the organization. The result is supported by the studies conducted by Adeyemo (2007),

Koshthegar (2008); Rathi (2009); Mohamadkhani. et.al. (2012); Nikkheslat et al. (2012); Alikhani et al. (2015), who found a positive and significant relationship between emotional intelligence and organizational commitment.

CONCLUSION

Based on analysis and research hypothesis of this study developed a model which investigated the effect of emotional intelligence on job satisfaction and on organizational commitment in Chennai, Tamilnadu. Mayar et.al. (2000) defined emotional intelligence as the ability to perceive, understand, regulate and monitor emotions in the self and others. In simple words, emotional intelligence has the same meaning as self-knowledge, self-awareness, and knowing others.). In Table.5, regression analyse we investigated the influences of Job Satisfaction and Organizational Commitment influences on Emotional Intelligence. The regression model is significant as a whole ($F=596.47$; $p < 0.01$). The findings show that as we predicted that emotional intelligence has a significant impact on organizational commitment of Lecturers. So, higher the level of emotional intelligence of Lecturers, higher will be her/his commitment towards the organization.

In table 4, it reveals significant and positive correlation between emotional intelligence and organizational commitment ($r=0.560$, $p < 0.01$), job Satisfaction ($r=0.726$, $p < 0.01$).

Ealias & George, (2012) it is assured that emotional intelligence related to individual emotional commitment, continued commitment and normative commitment.. Maslow believes that the lowest level needs are physiological needs and safety, and the highest level of needs is self actualization. It could be argued that a person with the ability of emotional intelligence gets to the stage of self actualization. Just as Maslow clearly states, if needs of the lower level are satisfied, higher level needs show off. Therefore, in the job environment, if needs such as payment, job security, respect toward co workers, manager, customers and organization's contract are not satisfied, the higher level of needs (i.e. self-actualization) and attention to oneself would not be satisfied. In an environment, where there are not enough economic growth and facilitation, the employees' lower level needs are not satisfied perfectly and fundamentally. Consequently, higher level needs do not show off and the individuals' needs are left at lower level needs. So, they can never be satisfied with high level of needs (Robbins, 2005)

Ethical Clearance: Taken from Department committee

Source of Funding: Self

Conflict of Interest: No Conflict of Interest

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Landscape and Psychological Well-being: Manori! The Magical Island, A Study on Anita Desai's *Where Shall We Go this Summer?*

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ABSTRACT

Sita the middle-aged wife and mother of five children, the protagonist of *Where shall We Go This Summer?* is pregnant for the fifth time and desirous of an immaculate conception in the reverse, the child not to be born. Sita is so eccentric that she cannot put herself up with the mundane happenings of the modern city, Bombay. Raman, her husband, is a business man and could never understand her way of living. Thinking of the Immaculate Conception she moves to Manori, the magical island where she had her glorious past. Sita's father after independence settles down in Manori and becomes the beloved 'Babaji' of the village by practicing Gandhian principles. People believe that he has a magical power and regarded him with high respect. Like the villagers, Sita also believes that her father possesses magical powers. Now she wants to try with the powers, it might help her in stopping the child from being born. Sita's characterisation presents the individual preferences of a lady who suffocates and struggles frantically against mundane realities of life. Her commotion fills to the brim when she is pregnant for the fifth time and to everybody's astonishment and dismay she decides to go Manori the island. The paper tries to answer the question will the root give her a route?

Keywords: *Psychological well-being, Prenatal Neurosis, Landscape, Island studies,*

INTRODUCTION

"Islands are the Natural workshops of Evolution"

- Richard Dawkins

Anita Desai's novel "*where shall we go this summer?*" excels in portraying Sita and her pre-natal neurosis. The central theme of the novel is Sita's repugnance on her fifth pregnancy and her strong desire of an immaculate conception in the reverse. Sita presents the individual preferences of a lady who suffocates and struggles frantically against mundane realities of life. It is very bare that she is dissatisfied with her husband; she feels that he falls out of her world. Her commotion fills to the brim because of the fifth pregnancy and to everybody's astonishment and dismay she decides to go to Manori, the island where once she lived with her father.

Sita cannot understand or can never get used to any one, this as a problem could have been solved out easily by a supporting spouse. But Raman is unaware rather

unenthusiastic in making her life complacent. Raman is in business and he gets lots of guests visiting them. Sita dislikes this and says that they frighten her.

"They are *nothing*—nothing but appetite and sex. Only food, sex and money matter. Animals."

'I though you liked animals'

'My pet animals – or wild animals in the forest, yes. But these are neither – they are like pariahs you see in the streets, hanging about drains and dustbins, waiting to pounce and kill and eat.'

He shook his head baffled." (WSG 43)

Similarly she cannot go with her own children and the worst is that the children cannot understand her. Menaka the first daughter of the family^[1] is grown up and she frowns at her mother's behaviour. Menaka feels remorseful when her friends tease her that her mother is not normal. Sita is a loving mother and she is proud of her daughter's built. She is almost in tears to see karan's legs scratched. At the same time she could not tolerate^[2] with instances like, her sons playing a wrestling game,

Menaka's unknowing action of plucking the buds and to quote the worst case, Karan's destroying his Plastic structures which he himself created for playing^[3].

Sita looked all the more happy and had shown pride and pleasure in giving birth to the four children. But now, during the fifth time she expresses that she is all the more frightened not only now but she had the same feeling from the first delivery^[4]. The mental picture of the process of hospitalisation and the details of procreative procedures scares her. Sita and Raman have avoided direct confrontation so far, but now that at forty, graying^[5] and ageing makes her loses her self-control and explodes. Sita also waits for someone or something every minute, which can be compared to 'Waiting for Godot' by Samuel Becket, an absurdist play where the prime characters wait for nothing. Sita also waits perpetually but she herself does not know for what she is waiting^[6].

"I'am waiting, she agreed—although for what, she could not tell: for the two halves of this grey egg-world to fall apart and burst into festival fireworks, a woman's seaweed hair or bloodstained feathers?" (WSG 49)

It is Raman who ignites the idea of where shall we go this summer? He puts it out casually and gets the unexpected answer, Manori. She wants to recapture the magic of the island and at the same time she also wanted to keep out of her inconsiderate husband. She could not put it out that she wants to go alone but to her gratification^[7] she finds that the workers of her husband are threatening to go on a strike and he could not accompany her. She says that she is keen on going and withdraws into the magical island^[8].

Sita, as a mother, never understands the needs of her children, and she takes Menaka and Karan with her to the island in search of a bright magic depriving them of a cozy life. The worst part is, she left two more children at home and she thinks about them only when Raman comes to the island. Only at this juncture she asks him about the sons. She can understand very well that the old house of them is in no more a good condition to hold people like her children, from a gratifying apartment^[9], but, she tries to mend them according to the present situation.

Sita never cares for her society. But things take a turn when she marries Raman and her living locale changes to Bombay, a city of activity. She can never

adjust with anyone and is fearful of everyone that they might pounce on her any time^[10]. She never even thinks of looking good,

"Why can't you be just neat and tidy?" he asked despairingly in the beginning, but then learnt that these were the two qualities she had never known, and so she had continued to wear, instinctively, the garb of the male and then the female peacock. Now he said nothing – her dress was the least of his worries." (WSG 120)

Through the course of the novel Sita has no friends and if at all if she talks about or thinks about people other than her family it is about her co-sister or her brother. Nobody feels good about her; she is so distressed that she could not talk common to anyone around. She is almost at tears to common incidents like a small bruise on the boy's knee, Menaka's action of taking of the buds from the plant, crows killing an eagle and so on. She always sits alone and smokes vehemently which make others think that she is waiting for someone. When she comes to Manori, she feels happy that she has recaptured the bliss, but the way she plays in the river bed and treating her children make others pity on her.

Sita's father is a freedom fighter, after independence he settles down in Manori and turns out a hero of Manori. He works hard to fortify the villagers and helps them to be out with their mundane problems. He calls his new house *Jeevan Ashram*, 'the home of the soul'. He plans his time towards social work, prayers and practices Gandhian principles. Sita wants to spend time with him but he is always busy either with his *chelas* or his ever new patients or with his step-sister Rekha who turns out to be a popular divine singer. Sita's mother is a runaway and not dead (as told by Jivan and others) is a cause for her unhappy daughterhood. They believe that she has run away to *Benares* and the cause behind it is unaware of. His father is so busy that she cannot even talk about her mother to him. Sita senses that her father gives an extra parental care to Rekha, her step sister and he denies even the normal care to the other two children.

From the childhood she lives an unnoticed life, and she is happy to lead a life like that. The problem is she never expects or sees anything devious or suspicious during her child hood, except for her father's personal life and her mother's estrangement. She herself is happy to live like a cuckoo singing for its own pleasure unseen by others.

Now she herself is not happy about the island. It had its charm in the olden days, now the island has a soda-water shop, looking at the influence of the city, her face twisted with dejection and disappointment. The scenery of the village is no more pleasant. The men sit idle due to the monsoon, the children are playing with pigs amidst and the women draw out water from a pond which is green with the lots of germs, bacteria and diseases. It is evening where the bright light is gone and the house reveals complete darkness. The stares of Menaka and Karan kindle in her a feeling of despair. Slowly, Moses brings in candles and she goes into her house after twenty years to find only dust, cobwebs and the odours of bats. Even at her father's house Sita feels frustrated and alienated. And this feeling marks the starting point of her journey towards completion.

In Bombay she broods about her life in Manori and in a fit of rage and to her husband's astonishment she says that she would like to go to Manori. But after coming to Manori she realises that the island has lost its charm. At Manori she tries to live peacefully. She makes her children understand nature and wants them to lead an eco-friendly life. But the life becomes very eco-friendly as they could not get a nice meal. Due to the rain, fishermen could not make their livelihood and it is not a thriving time, and this has an effect on their household also. Soon the villagers start coming in to have a look at Babaji's daughter and grandchildren. They bring offerings as they once did to her father. Everyone comes in and praises him for all the good deeds he has done for them. She enjoys the respect and accepts their offerings. In turn, she gives them her cigarettes like her father who use to give them tobacco to chew.

“you are Babaji's daughter”, the old woman said in a Konkani dialect as raw and harsh as wet fishing lines. ‘I brought oil for Babaji once, and coconuts, and he blessed me with a son. So I have brought something for you today.’ (WSG 98)

Now she realises that the Immaculate Conception cannot happen as the ‘magic’ of her father has deserted the village. She is now aware that her idea of escape has grown blunt. As soon as she hears about Raman's arrival, she feels, in a way, relieved. Distanced from her home at Bombay, she finds time to retrospect on her life with Raman, though she is not very happy she identifies a security with him. She feels that the unborn child should be given proper care and attention.

As Sita is abducted by Ravana in Ramayana and is kept as a captive in ‘Srilanka’, Sita goes to Manori and keeps herself out of the reach of Raman her husband. For Sita Manori, the island is the mirror where she looks into her childhood days and compares her today's life with it.

“She saw the island as a piece of magic, a magic mirror – it was so bright, so brilliant to her eyes after the tensions and shadows of her childhood.” (WSG 59)

Distanced from her husband and her home give her time to reflect upon her past which furnishes comprehension of life. Her realisation that her father's miracles will not happen any more in the island makes her return to Bombay to have a safe delivery.

CONCLUSION

Sita is the ultimate negative product of parental rift, homelessness and estrangement. Sita feels out of the world and goes back to Manori to recapture her childhood bliss. Her involvement from the periphery to the centre takes place in the Island. Sita is in Bombay, hates and is furious about the routine trifles. She wants to lead a placid life back in Manori. The lurching truth behind makes her understand that the island has lost its charm and her comprehension of life begins. Her understanding comes to an end as she understands that she is no more just a woman but a mother.

Manori! The Magical Island shows her the realities of life. She wants to escape the frustrations of the city life, ‘zombie’ and she goes to Manori her native island. The island is ‘Utopian’; the result is not rejuvenation but realisation. Manori! The natural workshop has helped Sita to evolve into a normal human being, It makes her comprehend that socialisation cannot be evaded completely.

Ethical Clearance: Taken from Department committee

Source of Funding: Self

Conflict of Interest: No Conflict of Interest

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Conceptual Review of Work Life Balance

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ABSTRACT

Work-life balance is about adjusting work patterns to achieve overall fulfilment. A good work-life balance enables the organisations to thrive and at the same time enables, the employees easily combine work with other aspirations and responsibilities. It is imperative to arrive at the conceptual understanding of the term, work life balance, its early beginning or evolution, transformations and advancement needs to be studied and analyzed. In this study 1 working definitions, characteristics, problems, benefits, dependents, barriers in achieving work life balance were highlighted.

Keywords: Working definitions benefits, problems, characteristics, barriers of work-life balance

INTRODUCTION

Achievement and enjoyment are the front and back of the coin of value in life. Therefore, any employee should balance their career life and personal life. Work-life balance is a concept that supports the efforts of employees to split their time and energy between work and the other important aspects of their lives. Simply we can define work-life balance as the healthy blend of an employee's professional^[1] and personal responsibilities. A positive Work-life balance involves achievement and enjoyment. Work-life balance may be meaningful daily achievement and enjoyment in each of the four quadrants of life- work, family, society and self. The best Work-life balance^[2] varies for an individual over time. Work is an instrumental element and is a means to support a way of life and to create optimal conditions for respect and personal challenges. Thus, the work-life balance is also about managing internal pressure from once own expectations and setting realistic goals, which do not inflict on family responsibilities^[3]. Originally, work was a matter of necessity and survival. Today, it is very rare for a person to stay with a single company in his or her entire working life. Because employees are often willing to leave a company for better opportunities, companies need to find ways not only to hire qualified people, but also to retain them. Hence, better quality of work life to attract and retain the employees becomes essential at this stage^[4]. The organization can provide good quality of work life to their employees when they follow the quality of work life programmes effectively. "The adaptation of quality of work life programmes may

differ to organization to organization depending upon the nature of the work and size of the organization. The management must be keen in selecting and implementing the most appropriate quality of work life programmes which suits their organization^[5]" (Dr. K. Krishna kumar et al.2012).

WORKING DEFINITIONS

Clark (2000) proposed as "Satisfaction and good functioning at work and at home with a minimum of role conflict".

Guest (2001) defined as "those who regularly work more than 48 hours a week will have an imbalance between work and the rest of their life^[6]".

Clutterbuck (2003) states that "Being aware of different demands on time and energy having the ability to make choices in the allocation of time and energy knowing what values to apply to choices making choices".

Vissar and Williams (2006) explained as "the equilibrium between responsibilities at work and responsibilities outside paid work^[7]".

Greenhaus and Allen (2006) proposed as "Work life balance is "the extent to which an individual's effectiveness and satisfaction in work and family roles are compatible with the individual's life priorities".

Swamy (2007) defined work life balance as "a practice that is concerned with providing scope for

employees to balance their work with the responsibilities and interests they have outside work. It enables them to reconcile the competing claims of work and home by meeting their own needs as well as those of their employers^[8]”.

Deery (2008) Defined the concept of WLB is a complex task, as it can be viewed from the meaning of “work”, “life” and “balance”.

Emslie and Hunt (2009) argued that “work–life balance defined as “satisfaction and good functioning at work and at home, with a minimum of role conflict”.

Delecta.P (2011) states that “Work life balance is defined as an individual ability to meet their work commitments as well as other non-work and family commitment^{[9] [10]}.”

Work Life Balance problems are as follows:

- I. Technological up-dating, for example mobile phones, computers and distinction between work life and personal life.
- II. Juggling of, one job to another.
- III. Age of workforce is increasingly diverse.
- IV. Unsatisfactory income.
- V. Work burden
- VI. Most of the parents go for job.
- VII. Hiring of skilled workers.

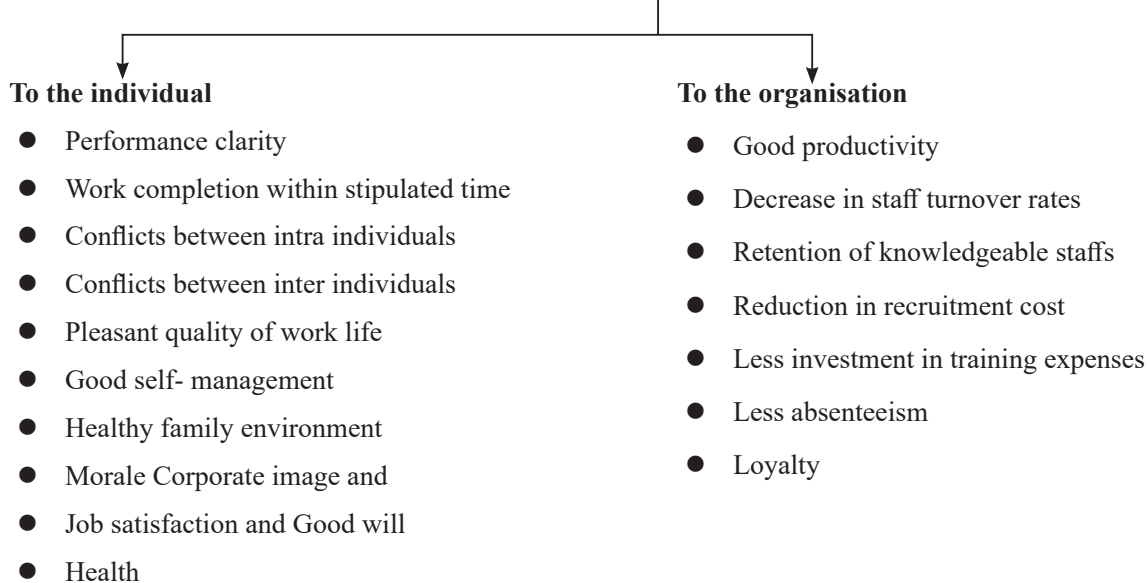
Apart from the above problems the BPO sector faces few more problems such as types of work, working hours, work style etc. their working hours is not based on their home country timings. So, they have to work in the irregular timings. It will give some health issues and don’t have enough time for spent with other work. And also they face health related issues like obesity, frequent head ache, diabetics, weight loss, muscle pain etc. (Dr. K. Krishna kumar et al 2018).

Characteristics of Work Life Balance: Organizational effectiveness becomes, to some extent, the question of management’s ability to motivate its employees. Motivation is one of the prominent factors. Every employer has to implement to get the things done through the others.

- I. Encourage employees
- II. Necessary for business benefits
- III. Accept life changes accordingly
- IV. Decrease sickness and absenteeism
- V. Enhance working relationship
- VI. Attract new employees
- VII. Help to retain staffs
- VIII. Improve morale
- IX. Increase production
- X. Low rate of stress.

Table 1

Benefits of Work Life Balance



Dependents of Work Life Balance:

- I. Flexi time
- II. Job sharing
- III. Compressed work weeks
- IV. telecommuting
- V. For better corporate social responsibility

Barriers in Achieving Work life Balance

- Lack of Superior support
- Consumption of time
- Lack of Support from colleague

Conceptual framework of work life Balance: Work-life balance is about people having a measure of control over when, where and how they work, it is achieved when an individual's right to a fulfilled life inside and outside paid work is accepted and respected as the norm, to the mutual benefit of the individual, business and society. Work-life balance has been described in many different ways, including being judged by one prominent commentator as a complete misnomer because work is, for most of us, actually a very important part of life.

A number of studies have addressed this issue from different perspectives. Greenhaus and Beutell (1985) and Greenhaus et al. (1989) examined the antecedents of conflict between family and work, Goodstein (1994) presented an institutional perspective on organizations' responses to work-family issues. In addition, Campbell and Kennard (1994) have studied the effects of family responsibilities on the work commitment and job performance of women. The work-family issue is even further expanded to address the relationship of business-marriage partners.

CONCLUSION

"Life is nothing but adjustment"- likewise the individual should allocate the time and effort on the basis of the work and life needs. Work life balance of an individual employee, viewed collectively for the total work force of an organisation results into a colossal impact on the qualitative and quantitative organisational performance. Employees who achieve improved work life balance with the assistance of the policies implemented by the employing organisation tend to

be more productive. The effectiveness of work life balance in managing stress and the various performance indicators also not much effect on productivity, more over a proper scheduling must be provided for the betterment of the organisation as well as individual. Then only both (individual and organisation) can survive in the work-life balance scenario.

Ethical Clearance: Taken from Department committee

Source of Funding: Self

Conflict of Interest: No Conflict of Interest

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Wellness of Employees and Engagement in Corporate Scenario

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ABSTRACT

Information technology has revolutionised the way global citizens go about their professional and personal lives. Employees serving in such service sectors need to battle stress as well as odd working hours. Concepts like flexi-time are more theoretical than practical and so is work-life balance. Employees continue to work tirelessly to reach various deadlines and in the process are compelled to align their body clocks to various international time zones. Performance in an era that has inflation and recession staring at companies is not an easy goal to achieve anymore. The implication for the human body are far-reaching. The human body is being battered not just at the physical level but at the mental and spiritual levels too. Companies are increasingly turning their attention to employee wellness programmes as they are now given to understand that wellness also counts in employees' progress. Wellness is fast being recognised as a necessary, helpful and urgent concept. Management are now given to understand that wellness initiatives would not only boost the morale of employees but would help them to maintain a mature approach in tackling challenges and enjoying the work they do. Cluster and random sampling was undertaken to survey 847 respondents serving in Information Technology service organisations at Chennai, Tamilnadu State in southern India. The current research delves into the perceptions about and impact of wellness on employee engagement

Keywords: Employee, Wellness, Engagement, Information Technology, Services.

BACKGROUND OF THE STUDY

The current scenario of Information Technology (IT) in the world's largest democracy is very encouraging^[1]. IT has a role to play in myriad fields (web 1) including health, education, hospitality, research and development, farming and agriculture, communication, weather forecasting, travel, marketing, and space administration. The upcoming emphasis is on artificial intelligence and virtual reality^[2].

NEED FOR THE RESEARCH

The modern day corporate office always bustles with activities, deadlines, negotiations, deals and trans-national projects. IT service provides function round the clock with hardly any breaks and have various shift timings^[3]. Employees in India are susceptible to genetic and other health-related problems. The sole aim seems to earn as much as possible with little or no consideration for health and wellness^[4].

Research on wellness and engagement has been widespread in the west and is only now gaining attention

in Asian countries. There is no integrated health system in India and the availability of doctors is meagre considering the growing populace. Engagement initiatives have mainly addressed issues like compensations, rewards^[5], and fringe benefits. Recent issues that grabbed headlines were quality of work life and work-life balance.

REVIEW OF LITERATURE

Employee Wellness: A reported on the conceptualising^[6] and implementation of a wellbeing plan at a large multi-site establishment, analysing the usefulness of wellbeing offers and its impact on employee wellbeing. The wellbeing plan was oriented towards a spurt on employee appointments^[7], better constituents and wellbeing among diverse groups. Results emphasised some of the difficulties that establishments should be conscious of when accepting employee wellbeing, accounting the for national culture, job grade and prevailing wellbeing levels. The results revealed how organisations^[8] can be assisted by wellbeing plans which integrate components intended to appeal to workers with diverse levels of wellbeing. Wellbeing plan which really caters to employee wants is a necessary step in ensuring that such programme are well received and augmented.

As explored^[9] the result of corporate wellbeing programmes on employees’ performance amongst commercial banks. The study revealed that financial, intellectual, environmental, social and physical wellness programs enhanced employee’s performance in the work organisation. Physical wellness programs are significant to personnel as they keep workers strong and a healthy employee is an advantage to the organisation. It was concluded the employee’s sense a feeling of confidence and enthusiasm when such an environment is facilitated.

A revealed that employees^[10] and their dependents take advantage from support offered by workplace wellness programmes that direct their physical health and emotional happiness. Chronic health forms such as substance violence are some of the distresses that strain the job surroundings and generate absenteeism, accidents and job inefficiency. Individual wellness is the endorsement of the bodily, social, emotional, occupational, religious, and intellectual wellness of employees. This can be facilitated by creating an organisational culture that is favourable to wellness and complete identification of psycho-social health risks. The wellness programs in the organisational fosters a culture and this favours individual employees. The competencies and balance between life and work is also supported.

Employee Engagement: On focussed on the level of employee engagement in telecommunication business. The telecom companies are functioning all the time to gratify their employees. Conversely, the organisation required to be clarified about the demands of the employees, particularly those employees who have been serving for a long time. The employees also should be accountable for the company’s performance. The workforce appeared to be quite fulfilled and pleased in the organisation. The organisations are endeavouring to make the work surroundings more appealing. The study demonstrated that inspiration of the workforce, contribution of employees in decision making, readiness of employees to be occupied in work, skills of workforce and commitment of employees are important for employee engagement in the telecom industry.

As expressed that employee engagement is the level of promise and participation an employee has in the direction of their organisation and its standards. Engagement is an optimistic approach of employee in creating value for the corporation. In engagement, people utilise and express themselves in three ways, namely, physically, cognitively, and psychologically during task performances. Employee engagement is the quantity of employee obligation and level of contribution in the organisational movement and value creation. It will be triumphant only when he is treated with admiration and honour, given support, and resources needed and is given sufficient liberty concerning work. People who work for wealth will become more creative through provision of some bonus and advantage in the form of inspiration. Some of the employee feels displeased due to their unforeseen profession.

METHOD

Information technology services’ employees at Chennai city, capital of Tamil Nadu state, in Southern India were surveyed with the help of a structured questionnaire. The estimated sample size was 826 respondents and the actual sample size was 847 respondents. Cluster sampling was employed. The IT and Tech Parks in Chennai was ascertained (web 4, web 5) and most of the companies were found to be located on Old Mahabalipuram Road / Rajiv Gandhi IT Expressway and Ambattur. Companies were approached in these clusters and permission sought. Respondents were chosen at random from such companies. Respondents participation was voluntary and oral confirmation regarding willingness to participate in survey was solicited before handing over research instrument.

ANALYSIS AND DISCUSSION

Effect of age on perception about wellness and engagement (Table 1) was analysed and it was found that there is no such effect on the variables as p value was not significant.

Table 1: Effect of Age

Effect of Age		Sum of Squares	df	Mean Square	F	p
Wellness	Between Age Groups	225.064	2	112.532	1.098	0.334
	Within Age Groups	86528.761	844	102.522		
	Total	86753.825	846			
Engagement	Between Age Groups	20.422	2	10.211	0.285	0.752
	Within Age Groups	30282.749	844	35.880		
	Total	30303.171	846			

Table 2 indicates a different implication. The effect of cadre on perception about engagement was observed while there was no such effect of cadre on perception about wellness.

Table 2: Effect of Cadre

Effect of Cadre		Sum of Squares	df	Mean Square	F	p
Wellness	Between Cadre Groups	198.266	2	99.133	0.967	0.381
	Within Cadre Groups	86555.559	844	102.554		
	Total	86753.825	846			
Engagement	Between Cadre Groups	392.121	2	196.061	5.532	0.004**
	Within Cadre Groups	29911.050	844	35.440		
	Total	30303.171	846			

** significant at p<0.01

19 scale items relating to wellness (Myers and Sweeney,2014) and 9 scale items relating to were adapted. Consequent to Confirmatory Factor Analysis, the final number of rating scale items for each variable was: Wellness (10), and Engagement (9). Examples of 5-point rating scale items used were: ‘I can express both my good and bad feelings appropriately’ (Wellness), and ‘I am immersed in my work’ (Engagement). The path analysis of structural model is presented in Figure 1 and Table 3.

Table 3: Structural Model Path Analysis

Path			Unstandardised Coefficient	Standardised Coefficient	t	p
WEL1	<---	Employee Wellness	1.058	0.838	29.314	***
WEL2	<---	Employee Wellness	0.865	0.763	24.642	***
WEL4	<---	Employee Wellness	0.981	0.844	29.428	***
WEL8	<---	Employee Wellness	0.988	0.861	30.456	***
WEL10	<---	Employee Wellness	1.014	0.827	28.421	***
WEL11	<---	Employee Wellness	0.492	0.482	14.660	***
WEL12	<---	Employee Wellness	0.815	0.695	23.125	***
WEL13	<---	Employee Wellness	1.052	0.856	29.635	***
WEL14	<---	Employee Wellness	0.991	0.859	30.035	***
WEL16	<---	Employee Wellness	1.000	0.807		
Employee Engagement	<---	Employee Wellness	2.932	0.371	11.154	***

*** p<0.001; WEL – Wellness; *** - Significant at p < 0.001

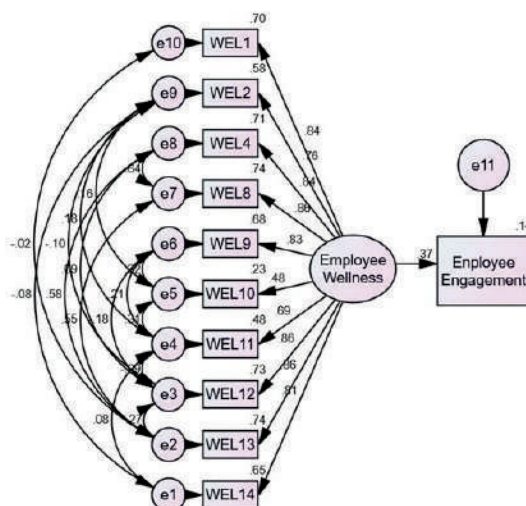


Figure 1: Structural Model Path Analysis with Standardised Coefficients

The analysis and discussion for the hypotheses is presented.

$H_{01.1}$: WEL1 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL1 being 1.058 represents the effect of WEL1 on employee wellness, holding other variables as constant. There will be 1-unit increase in employee wellness, for every 1.058-unit increase in WEL1. Hence, *WEL1 has a positive effect on Employee wellness.*

$H_{01.2}$: WEL2 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL2 being 0.865 represents the effect of WEL2 on employee wellness, holding other variables as constant. The p value is significant at 0.1% level and therefore the null hypothesis $H_{01.2}$ is rejected. There will be 1-unit increase in employee wellness, for every 0.865-unit increase in WEL2. Hence, *WEL2 has a positive effect on Employee wellness.*

$H_{01.3}$: WEL4 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL4 being 0.981 represents the effect of WEL4 on employee wellness, holding other variables as constant. Hence, *WEL4 has a positive effect on Employee wellness.*

$H_{01.4}$: WEL8 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL8 being 0.988 represents the effect of WEL8 on employee wellness, holding other variables as constant. There will be 1-unit increase in employee wellness, for every 0.988-unit increase in WEL8. Hence, *WEL8 has a positive effect on Employee wellness.*

$H_{01.5}$: WEL10 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL10 being 1.014 represents the effect of WEL10 on employee wellness, holding other variables as constant. The p value is significant at 0.1% level and therefore the null hypothesis $H_{01.5}$ is rejected. There will be 1-unit increase in employee wellness, for every 1.014-unit

increase in WEL10. Hence, *WEL10 has a positive effect on Employee wellness.*

$H_{01.6}$: WEL11 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL11 being 0.492 represents the effect of WEL11 on employee wellness, holding other variables as constant. The p value is significant at 0.1% level and therefore the null hypothesis $H_{01.6}$ is rejected. There will be 1-unit increase in employee wellness, for every 0.492-unit increase in WEL11. Hence, *WEL11 has a positive effect on Employee wellness.*

$H_{01.7}$: WEL12 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL12 being 0.815 represents the effect of WEL12 on employee wellness, holding other variables as constant. There will be 1-unit increase in employee wellness, for every 0.815-unit increase in WEL12. Hence, *WEL12 has a positive effect on Employee wellness.*

$H_{01.8}$: WEL13 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL13 being 1.052 represents the effect of WEL13 on employee wellness, holding other variables as constant. There will be 1-unit increase in employee wellness, for every 1.052-unit increase in WEL13. Hence, *WEL13 has a positive effect on Employee wellness.*

$H_{01.9}$: WEL14 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL14 being 0.991 represents the effect of WEL14 on employee wellness, holding other variables as constant. The p value is significant at 0.1% level and therefore the null hypothesis $H_{01.9}$ is rejected. There will be 1-unit increase in employee wellness, for every 0.991-unit increase in WEL14. Hence, *WEL14 has a positive effect on Employee wellness.*

$H_{01.10}$: WEL16 does not have a positive effect on Employee wellness.

It can be seen from Table 3 that the coefficient of WEL16 being 1.0 represents the effect of WEL16 on

employee wellness, holding other variables as constant. The p value is significant at 0.1% level and therefore the null hypothesis $H_{01.10}$ is rejected. There will be 1-unit increase in employee wellness, for every 1-unit increase in WEL16. Hence, *WEL16 has a positive effect on Employee wellness.*

H_{02} : Employee wellness does not have a positive effect on Employee engagement.

It can be seen from Table 3 that the coefficient of employee wellness being 2.932 represents the effect of employee wellness on employee engagement, holding other variables as constant. The p value is significant at 0.1% level and therefore the null hypothesis H_{02} is rejected. There will be 1-unit increase in employee engagement, for every 2.932-unit increase in employee wellness. Hence, *Employee wellness has a positive effect on Employee engagement.*

The structural model fit indices are summarised in Table 4. Good fit was found to exist for the structural model.

Table 4: Structural Model Fit Indices

Model Fit Indices	Structural Model Vales	Acceptable Values #
CMIN/df	2.229	<3
GFI	0.988	>0.9
AGFI	0.971	>0.9
NFI	0.993	>0.9
CFI	0.996	>0.9
RMSEA	0.037	<0.06

#Haier et al., 2009; Hooper et al., 2008; Steiger, 2007; Hu and Bentler, 1999.

CONCLUSION

All wellness factors were found to have a positive effect on employee wellness. Similarly, employee wellness was also found to have a positive effect on employee engagement. There will be 1-unit increase in employee engagement for every 2.932-unit increase in employee wellness.

Companies have not really understood the concept in its entirety. Attempts albeit partial have been made but a holistic and employee-centred wellness program is the need of the hour. Employees experience a gamut

of emotions every day at the workplace and while some situations are fairly well managed there are lot others where people have no clue as to how to tackle such issues. Employee wellness is just gaining attention in India but the fact remains that most of the

Companies have all along stressed only on financial factors as the predominant influencers of job satisfaction and morale. Possession of wealth and resources at the disposal of the employee does not completely account for wellness. Employees are unable to face stress at the work place, family issues, health issues, inter-personal conflicts, low self-esteem and self-confidence, and are mostly trained or skilled in a particular domain. They have not been taught to withstand the vagaries of life and unexpected challenges in the job. Hence, both engagement and wellness programs would immensely benefit the organisation to not just achieve productivity but also to foster a committed and productive workforce.

Organisations today are exploring and seeking more holistic wellness programs that can encompass all elements like Spiritual, Emotional, Social, Environmental, Career, Intellectual, and Physical needs. Flexible work environment (web 7) would foster work-life balance. Flexible work schedules can facilitate higher levels of job contentment, lower absence from work, and lower turnover. Teleworking has become more popular. Flexible schedules enable employees to get more sleep, time for tackling health concerns and an energised workday. Part-time offers could also be considered.

Mere physical health would not suffice. Total well-being is being avidly sought. Mindfulness is a growing trend. It calms the body and helps fight depression and anxiety. The quality and quantity of food intake also needs monitoring. Emotional intelligence needs to be nurtured and spiritual well-being needs to be emphasised.

Employee engagement practices that companies can undertake include those relating to company practices, performance, branding, leadership, Benefits and the work itself. The top engagement opportunities according to the global marketplace are Employee Value Proposition (EVP), senior leadership, enabling infrastructure, rewards and recognition, and career opportunities (Hewitt, 2017).

Ethical Clearance: Taken from Department committee

Source of Funding: Self

Conflict of Interest: No Conflict of Interest

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Prime Factor Random Shuffle Encryption & Decryption (Pfrse/D) Algorithm Based Bio-Medical Image Communications in The IoT for Smart Healthcare Applications

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ABSTRACT

Objective: This paper is to minimize difficulties in medical image transmission over IOT due to the variation of Medical data across the patient population. To provide an effective and intuitive understanding of unique identification of users information; computational performance, reliability, and Flexibility of the system and efficient analysis of large datasets in real time.

Analysis: This paper is used to analyze the proposed PFRSE/D algorithm based image communication methods and compare the performance of secured PFRSE/D with conventional scheme.

Method: The Proposed PFRSE/D Algorithm based system offers two layers of protection, simultaneous encryption and watermarking, which address all issues related to security, privacy, and digital rights management. Then the results demonstrate that the new PFRSE/D technique outperforms JPEG in terms of compression quality and compressed file size while providing increased image quality. To design a novel PFRSE/D compression technique that facilitates real-time, high-quality, and low-size imaging. This is a novel use to address the numerous privacy and security issues associated with transmission of biomedical images over the IoT.

Findings: The finding showed that, results examination aftereffect of reversible information accuracy of 98.9 % various techniques and it takes 16ms using the proposed strategy has delivered a more significant number of information reversible precision than different approach.

Result: This proposed work emphasizes and conveys better precision in regards to acknowledgment from the images when contrasted and other conventional procedures. The results are integrated with PFRSE/D compression, thus forming an integral system, optimized for security and trust with minimal energy consumption which has superior performance of its suitability for next-generation IoT applications.

Keywords: Prime Factor Random Shuffle Encryption & Decryption (PFRSE/D), Biomedical Image

INTRODUCTION

Web of Things makes an organized correspondence state of the interconnected system and stages by attracting both virtual and physical world together. With the methodology of remote propelled human administrations based IoT systems, the transmission of remedial data transforms into an ordinary calendar. Along these lines, it is fundamental to build up a valuable model to ensure the security and trustworthiness of the

patient's accurate data transmitted and got from the IoT condition. However, the use of IoT technology in applications has spurred the maximize of real-time data, which makes the data storage and access more difficult and challenging. In this work, more efficient network communication is achieved for healthcare data.

This objective is to perform utilizing PFRSE/D methods and framework encryption calculations together to cover up advanced data in a picture, and

the critical investigation repossessed from the lot information activated with PRFSE/D. The inspiration driving the PRFSE/D isn't simply shielding data, it is the uncertainty of protected data. There are two essential parts of encryption and watermarking addition and immaterialness. In any case, these two properties are mixing up for each other because it is hard as far as possible while keeping the PRFSE/D nuance of a PRFSE/D framework.

LITERATURE SURVEY

The advancement of Information and Communications Technologies (ICT) is modifying our lives. They incredibly influence the economy [1], the course of action [2] and diverse locales of the overall population. This way, human administrations have generally been exceedingly connected with advancement. This relationship has ended up being more grounded throughout the latest two decades. One of the primary roles behind this is the extension of an extensive variety of devices that can be easily presented in most prosperity centers. In like manner, telemedicine, which was first indicated an extended period back, is at present reality and has been significantly made and this improvement has also extended to other human administrations divisions [3].

Accuracy solution, as it's called, is a term that will be every now and again heard in coming years [4]. It starts with genomics and experiences whatever remains of the omics stages, giving multi-scale information to

examination and elucidation [5] Engineering reproduction arrangements are making pharmaceutical participatory, customized, prescient and preventive for the people groups who have modesty of imparting the restorative detail to the next individual [6] The worldwide increment in populace has simultaneously raised the attention to keep up great wellbeing in a large portion of the people [7]. The issue of most clinicians wherever specialist's offices is that there are various patients for consistently. Like this, they need to sit tight for x-column enlightenment before suggesting the patients coordinate the specialists. This outcome will yield the treatment of patients from the clinicians [8] [9] [10].

Hypothetical examination for non-perfect execution of existing techniques is given and thought about the implementation of shading histogram leveling strategies dependent on the 3-D histogram in RGB shading space. The possible reason for the lighting up or over evening out the impact of the Trapani's calculation by introducing power are broke down the Menotti strategy demonstrates agreeable outcomes for most regular pictures. Notwithstanding, the execution of the Menotti calculation relies on the relationship of shading components.

MATERIALS AND METHOD

In this work, a novel smart healthcare system coding with built-in encryption of data and watermarking the encrypted medical image with a technique is called secure Prime Factor Random Shuffle Encryption & Decryption (PFRSE/D) Algorithmic presented in Figure.1

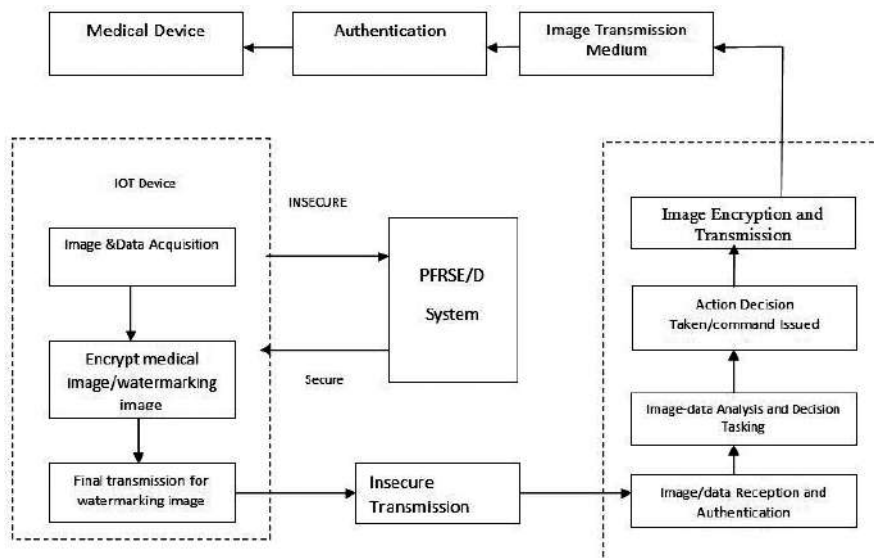
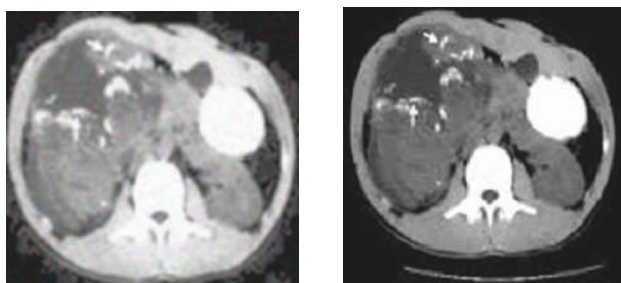


Figure 1: Block diagram for the proposed system

Compared to JPEG, PFRSE/D compression offers better pressure alongside the high feature images and extraordinarily appropriate for continuous data transmission limited situations. The PFRSE/D tends to numerous Digital Rights Management(DRM) issues including privileges of possession, savvy human services framework following of utilization, identification of altering, and confirmation of substance. These savvy human services framework security includes together with consistent execution make the PFRSE/D incorporated tremendously suited for brilliant applications, for example, the IoT based smart social insurance framework.

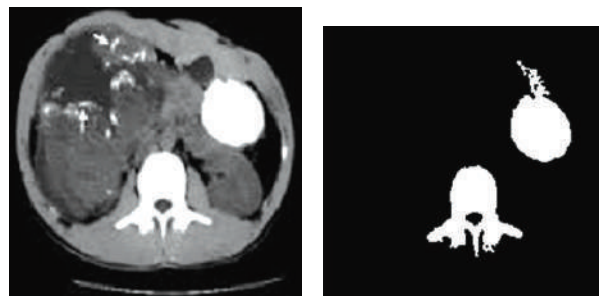
Preprocessing: The proposed filter preprocessing technique makes the histogram estimation of the image. Mainly watermarking the method considers Image Enhancement that provides an accurate color variation in the image processing. Mostly the histogram analysis of a standard model refers to the histogram of pixel intensity, and its values Pre-preparing Techniques Since the majority of the genuine information is noisy, conflicting and fragmented, so preprocessing winds up important. Image preprocessing is one of the Preliminary advances which are exceptionally required to guarantee the high exactness of the resulting steps The CT and MRI heart images usually comprise of a few curious; persistent special and model handling and gear based items. Understanding particular ancient rarities incorporate movement shaft solidifying, metal antique. Others combine halfway volume impact, ring and staircase relics. So it should have been evacuated by pre-preparing strategies before any examining. The improvement exercises likewise used to leave the ancient film rarities, marks and sifting the images. A few denoising approaches have been overviewed and investigated in this area.



2a) Input image 2b) Preprocessed image
Figure 2: Result of Preprocessing

The preprocessing result of the proposed system IoT based data encryption and decryption is shown in above figure 2.

Segmentation: Multi-model sub-space clustering segmentation with multiple sources of information is a way to separate groups of boundaries in the thermal images after preprocessing technique. It is the process of the watermarking the medical data with the high-quality conversion image. To analyze proposed PFRSE/D algorithm based image communication methods and compare the performance of secured PFRSE/D with conventional scheme. To outline a novel PFRSE/D pressure procedure that energizes consistent, continuous, high caliber, and low-measure imaging. This is a novel use to address the different assurance and security issues identified with the transmission of biomedical pictures over the IoT. To coordinate PFRSE/D pressure, hence shaping a fundamental framework, upgraded for security and trust with low vitality utilization which has the effective execution of its appropriateness for cutting-edge IoT applications.



a) Output Of Preprocessing b) Result of segmentation
Figure 3: Segmentation of Proposed system

The segmentation result of the proposed system IoT based data encryption and decryption is shown in above figure 3.

Features Extraction: Highlight Extraction this stage is a necessary stage that uses calculations and procedures to recognize and isolate distinctive needed bits or conditions of a given picture. Exactly when the data to an estimate is too considerable ever to be taken care of potentially, and it is suspected to be very monotonous, by then the data will be changed into a lessened depiction set of features. The essential characters of the element area zone, border, and unpredictability. These are estimated in a scalar. These highlights are characterized as pursues:

Energy: The energy extent of consistency between the pixels extend = [0, 1]. The consistency of the pixel has communicated

$$\text{Energy} = \sum_{i,j=1}^{N-1} (p_{i,j})^2 \dots(6)$$

Energy is an element that estimates the smoothness of the image. Less smooth the district is, the more consistently appropriated Pij and the lower will be the estimation of the precise second minute. Where Pij is the ijth passage of the standardized co-event framework, N is the number of thermal images

Contrast: Contrast is the measure of the distinction in luminance to make value discernable. Range = [0, 1].

$$\text{Contrast} = \sum_{i,j=1}^{N-1} p_{i,j}(i-j)^2 \dots(7)$$

Where N-1 indicates the measurement pixels in the image and Pij denotes the color value.

Standard Deviation: It is a generally used to calculate of changeability or decent variety used as a part of insights. As far as image preparing, it signifies how much variation or “scattering” exists from the normal (mean, or expected value).

$$\text{SD} = \sqrt{\dots(8)}$$

Where Σ means “sum of the function,” x is a value in the images, is the mean of the image and N is the numeral of data points in the picture.

Variance: The variance σ² is an image of variance, that is the squares of the standard deviations, in the values of the input or output images.

$$\sigma^2 = \frac{1}{N} \sum \bar{X}$$

Where the image is vector and is the mean given by 1/N



a) Segmentation Image b) feature extracted Image

Figure 4: Segmentation of Proposed system

The segmentation result of the proposed system IoT based data encryption and decryption is shown in above figure 4.

PRIME FACTOR RANDOM SHUFFLE ENCRYPTION ALGORITHM (PFRSE) ALGORITHM

The image encryption algorithm reads the input image and converts them into the matrix array. For each matrix, the method converts to ASCII and binary. The binaries value is then converted to byte and selects the secret key with the location in the pattern.

Now the method generates the random number to identify the pixel to be encoded. Using the PFRSE algorithm the process creates the mirror pixel set. Finally, the proposed technique substitutes the bytes and shift rows with mix the columns. Generated matrix is then added with the round key to produce the result.

Encryption Algorithm

Encryption Algorithm:

Input: Bio-medical image Pt.

Output: PFRSE encrypted Image Ct.

Start

Bio-medical image

Split image into matrix.

For each matrix value

Read the pixel value from the matrix file

Get ascii value and get binary equivalent

Transform to byte

Select the secret key and choose one location in the string

Generate a random number from the lookup table

Perform mathematical operation

Add the character of the random number to the sequence

Generate mirror string and

End

Stop

PFRSE BASED IMAGE DECRYPTION ALGORITHM

Encryption Algorithm

```

Decoding Algorithm:
Input: Cipher image
Output: Original image
Start
  Read cipher
  For each nipple
    Inverse Substitute keys
    Inverse shift rows
    Inverse Mix Columns
    Check the key and
    Perform mathematical operation
  End
  Bio-medical model.
Stop.
  Decode code sequence and perform the inverse operation
  Transform every byte of the string
  Read Ascii value of the binary string and identify the character.
  End
  Bio-medical image.
Stop.
    
```

The image data decryption algorithm reads the cipher image and converts into nipples. Then for each nipple, the method inverse the substituted keys and reverse the rows and columns. Then the process checks the key and performs the mathematical operation. Then the technique decodes the sequence. The decoded information is then transformed to the byte of string and converts to ASCII to produce the character.

RESULT AND DISCUSSION

The code has been written in MPLAB and tested. In this process have fixed a particular image value for each system and if there is any change in the reading it displays the input image, data hiding, data recovery, update on the internet and sends a message to the server.

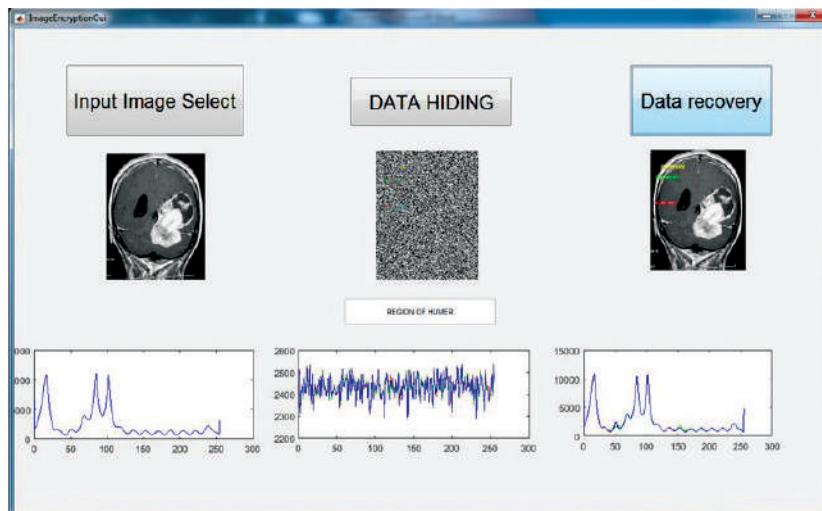


Figure 5: simulation result of the proposed system

In this step, we get the final result of getting the input image to specify the correct person the step we called data recovery. Form the technique using Finally Biomedical image through IOT and software we used in MATLAB.

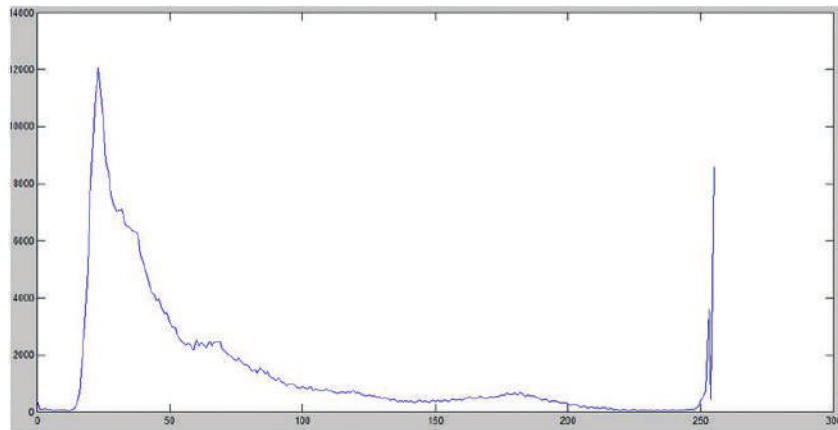


Figure 6: histogram of an Input image

The above Figure 6 shows the histogram motion for the image of the section by utilizing the irregular square choice technique. The x-axis of the histogram speaks to the scope of force (pixel) values while; y-axis speaks to the check (frequency) of these powers esteems that happens in animage.

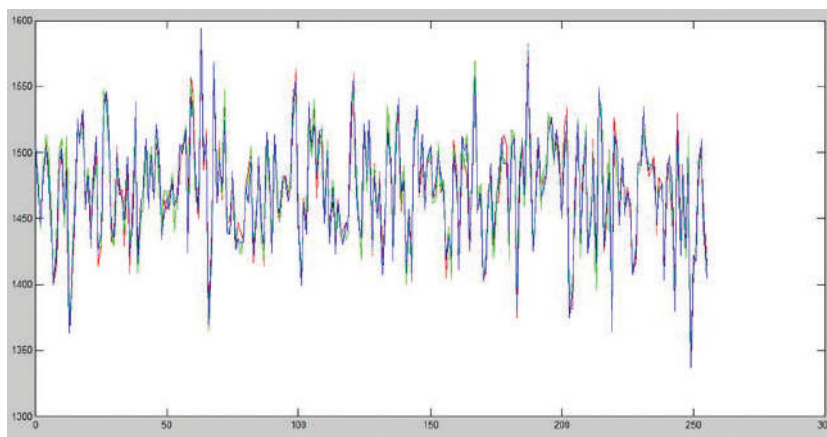


Figure 7: histogram of the encoded image

The above Figure 7 represents the histogram signal for an encrypted image by utilizing irregular square choice technique when contrasted with information image the scrambled image has little clamor. This is on account of while encoding the canister esteems, and the critical shading data is exceptionally very much held and just undesirable receptacle esteem is truncated and considered for sparing storage space.

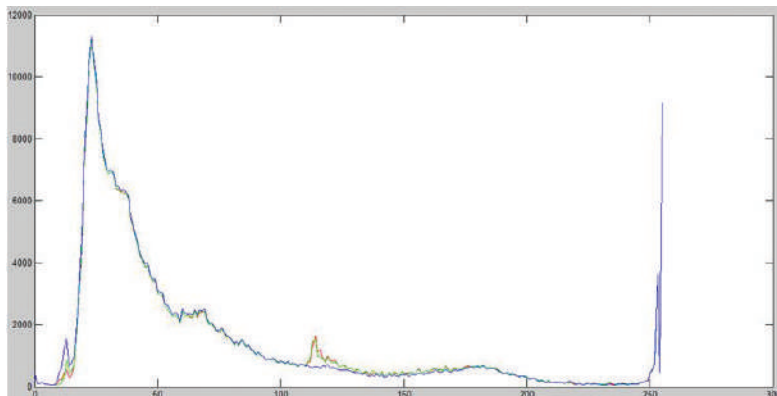


Figure 8: histogram of the decoded image

For image encryption, the info image and encoded image has distinctive histogram diagram appeared in number 7 and figured 8. While unscrambling the information from an encoded image, a similar histogram diagram esteem has gotten in number 8. When contrasted with other customary strategies in the proposed arbitrary square choice framework there will be no information misfortune and blunder.

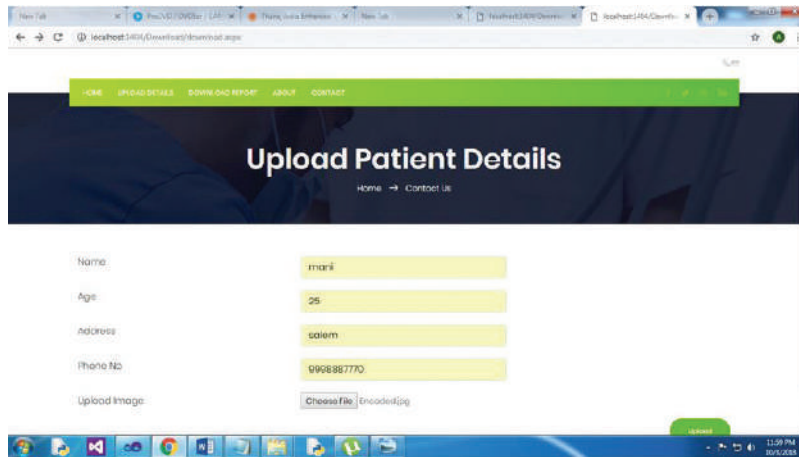


Figure 9: Simulation result of IOT

In this method, we fill current patient details, Name, age, phone image, upload image and upload the details.

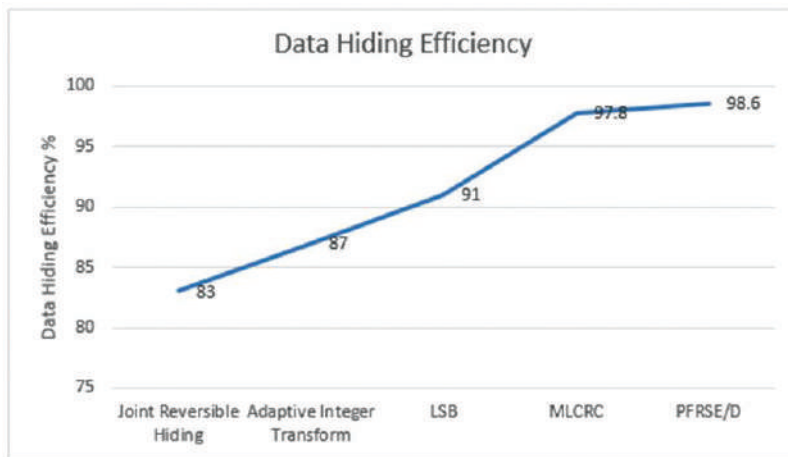


Figure 10: Comparison of data hiding efficiency

Figure 10, demonstrates the examination of information hiding proficiency delivered by various strategies and it indicates plainly that the proposed RBS strategy has given more successful than different techniques.

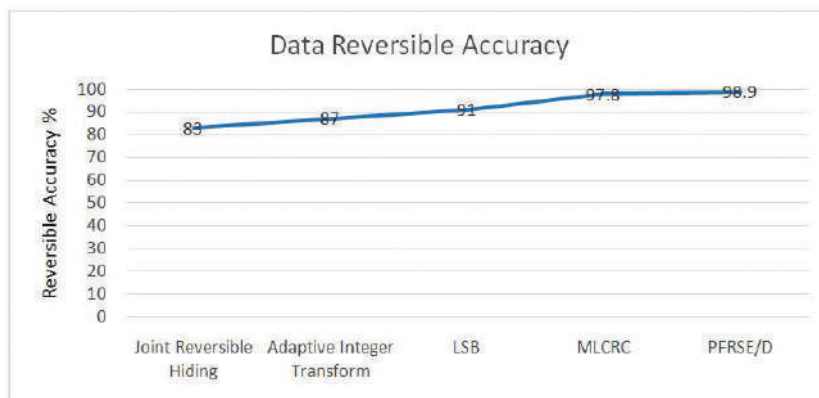


Figure 11: Comparison of reversible data accuracy

Figure 11, demonstrates the examination aftereffect of reversible information exactness of various techniques and it indicates unmistakably that the proposed RBS strategy has delivered a more significant number of information reversible precision than different approach.

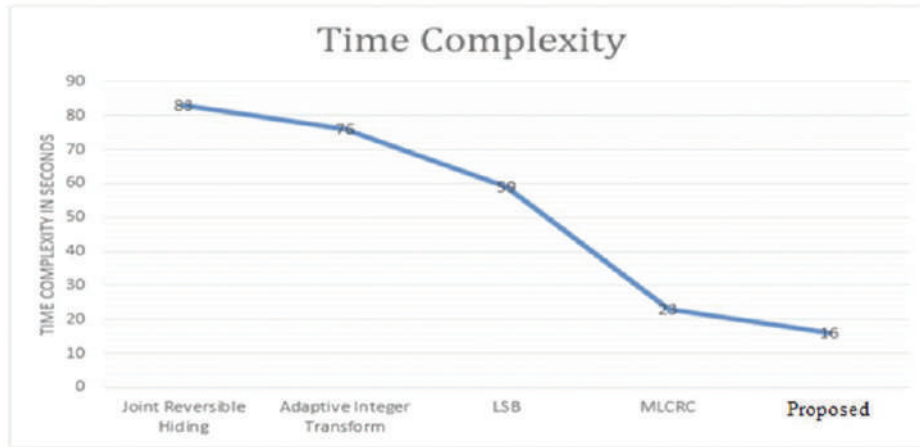


Figure 12: Comparison of Time complexity

Figure 12, exhibits the examination of time unpredictability created by various strategies and it demonstrates unmistakably that the proposed RBS strategy has delivered less time many-sided quality than different techniques. In this module, we look at the execution of the current, and the proposed framework demonstrates inserting rate and recovery exactness of the picture and messages. PSNR is most effectively settled through the mean squared error (MSE).

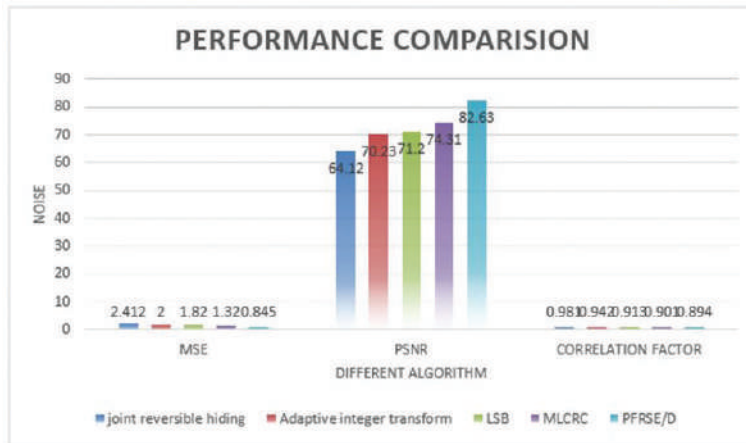


Figure 14: Performance Comparison

The above figure 14 demonstrates the graphical portrayal for assessment measurements like MSE, relationship factor and PSNR acquired for our proposed and existing techniques. From the diagram, our proposed RBS strategy conveys better precision in regards to acknowledgment from the pictures when contrasted and other customary procedures.

CONCLUSION

After extensive regions, the model of animage handling application was planned and executed. Work, wellbeing observing framework configuration depends

on scientist thought that meets to the patients require. According to the thought of regular, this system still being used from their assembling yet it is exceptionally cumbersome to deal with exclusively, and size and cost are likewise more contrasted with the development framework, and furthermore, it takes more than 1 minute for getting the correct outcome. During the first stage of the development, the biomedical User Interface was created. It required careful consideration of the purpose of the program, to sum up, the outcome of this thesis is a simple program that presents possibilities of Mat lab and the biomedical tool.

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Source of Funding: No

Conflict of Interest: No

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A Comprehensive Framework for Network Connectivity: A Study on IOT Networks

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ABSTRACT

Objective: This paper focusses on identifying a comprehensive network connectivity criteria set for IoT, with the advancement of Internet of Things (IoT) in many areas. Since, researchers are looking into network connectivity that will be best incorporated with IoT¹.

Analysis: First round of information gathering was done by examining research and technical papers as well as white papers and technical forums. Subsequent to that, two levels of interactive systematic Delphi rounds were applied to develop a holistic criteria set.

Method: Round one of Delphi was used to get as many indicators as possible for the criteria set from the experts. Round two of Delphi, was to ensure that the experts were in agreement with the combined criteria set from Delphi round one.

Findings: It is strong in finding information of unknown by means of consensus from the experts.

Result: Results obtained showed that experts were in agreement of a criteria set for IoT which can be referred to as a comprehensive network connectivity criteria set. Developers and manufacturers alike can use this as a guide in deciding the appropriate type of connectivity that is needed for their IoT hardware.

Keywords: Network Connectivity, Criteria Set and IoT

INTRODUCTION

A plethora of network connectivity options are available for IoT devices today, such as Wi-Fi, Bluetooth, Zigbee and WiMAX². New network connectivity options are also introduced from time to time. Upgrades are quite apparent in cellular network connectivity due to the exponential growth in innovation. Seamlessness is an important feature for IoT connectivity. Importance of seamlessness in network connectivity can be observed by looking at Alipay in China³. Alipay is a fintech company that allows payments to be made online through mobile phones and integrated payment machines in stores (Alipay, 2017). It has been so successful that substantial amount of the payments in China are done online through Alipay. As the number of network connectivity increases, seamless connectivity of devices becomes crucial. Tillman (2013) estimated that 50 billion devices will be connected to the Internet by the year 2020⁴. Mathematically, it means that the number of connected devices has far exceeded the number of people on this planet and that is not a small figure.

As the number of connected devices grow, the demand for IoT grows as well. Bjorlin (2017) reported that the IoT industry has grown to 2,888 companies and employs approximately 342,000 people⁵. This amount shows that there are many companies engaging into IoT and robust network connectivity is required to handle it (Menon, 2014). Khodadadi, Dastjerdi & Buyya (2016) estimated that in year 2018, there will be more than 30 million IoT devices worldwide with market size to reach astonishing \$1.71bn dollars by year 2020 (The Market Mogul, 2017). Figure 1 shows what The Market Mogul (2017) has stated.

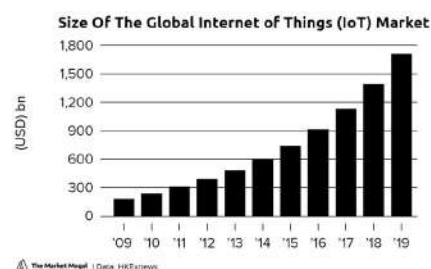


Figure 1: Market Size of Global Internet of Things (IoT) from 2009 until 2019

The gigantic number of IoT devices will keep on expanding and it will require different network connectivity that will work for the devices⁶. Thus, choosing a network connectivity that will work seamlessly with the current or future technology for IoT devices is crucial. Also the chosen network attributes must be holistic for each network connectivity. This includes attributes such as range, latency, reliability, security, frequency protocols, battery life, bandwidth and modulation. Such a criteria set has to be endorsed by experts in order to make it complete. In other words, a comprehensive network connectivity criteria set for IoT can be achieved with careful planning with inputs from experts. The objective of this research is to identify comprehensive network connectivity criteria set for seamless IoT connectivity which is the gap that this study will contribute towards.

LITERATURE REVIEW

Literature shows that a comprehensive criteria set is not yet available. This scenario can be observed by going through DesignSpark (2014) where it gives out only 4 criteria list for each of the network connectivity for IoT. They are standard, frequency, range and data rates with a total of 11 network connectivity discussed. The same can be observed for IBM (2017) as well where it was mentioned that criteria set that should be considered when going for IoT are range, bandwidth, power usage, intermittent connectivity, interoperability and security. DesignSpark (2014) and IBM (2017) shows that they are only considering basic attributes of the network connectivity and does not have a comprehensive criteria set. Serrien (2014) provided more detailed criteria set for network connectivity such as power consumption, radiated power but it is still inadequate to accomplish a comprehensive set⁷. This is because it lacks many aspects such as implementation and costing which makes it unreasonable to become comprehensive.

LinkLabs (2016) on other hand gives quite a comprehensive list for network connectivity for IoT but it is lacking in the criteria set provided. It discussed main network connectivity attributes that are potential for use in IoT. Although LinkLabs (2016) had provided many features for network connectivity, but it is using a fraction of the needed set criteria. Perhaps one of the more comprehensive network connectivity criteria set list is from Karimi and Atkinson (2013) where the author has

provided a total of seven attributes. The author included network types and topology as the attributes which are important attributes that has yet to be provided from previous authors. As for Telenor Connexion (2014), only five attributes were used to deploy IoT solutions into businesses. They are flexibility, scalability, security, reliability and manageability. Flexibility was not discussed in details making it vague attribute. With only few items listed, the set is too small to be accepted as comprehensive⁸. The most recent study can be found by looking at Kondratenko, Kondratenko, and Sidenko (2018) who proposed eight attributes for selecting IoT network connectivity. They are reliability and dependability, safety and security of data transfer, maximum signal range, throughput, data rate, network topologies application, minimum latency and wireless power transfer⁹. The list offers a broader scope when comparing with the previous sources. Even so, some of the items need modification in the terms of use and a much better comprehensive criteria set can still be achieved.

In choosing a suitable IoT platform, IoTIFY (2017) proposed some acceptable attributes. They are scalability, bandwidth, protocol, and security. Some items from the source were not accepted as it talks about cloud criteria selection and platform infrastructure rather than the network connectivity criteria set itself¹⁰.

Blue App (2016) on the other hand, provides only range, data rate, power and security as the criteria for best network connectivity for IoT. Both IoTIFY (2017) and Blue App (2016) does not provide many attributes for a achieve comprehensive criteria set. Lethaby (2017) gave range, throughput, power consumption, network topology, desktop/mobile device compatibility, cost, ease of integration and security as key attributes. The criteria set is good in a sense that it covers from integration part to the characteristics of the network connectivity. Even so, Lethaby (2017) still cannot be accepted as comprehensive as many of the characteristics such as architecture to scale were left uncovered.

Attributes from Al-Sarawi, Anbar, Alieyan, and Alzubaidi (2017) is by far the most comprehensive. It contains twelve attributes with references for each of the criteria. While it is considered quite adequate for its network connectivity criteria set, it is also not complete. This is because attributes such as architecture to scale and maximum message size of the network connectivity are left untouched. Conclusion that can be made from these

studies is that a comprehensive network connectivity criteria set for IoT is still very much desired and is the key research gap that this study is addressing.

METHODOLOGY

Methods used in this study are divided into three main stages. The first stage was getting the information for a comprehensive network connectivity criteria set from research papers, journals, white papers and technical forums. This involved going through all the resources that were related to network connectivity criteria set list for IoT. In the second stage, two rounds of systematic Delphi method were used with one-month interval. During Delphi round one, experts were asked regarding on comprehensive network connectivity criteria set for IoT that they think and believe must be included. The information gained from the Delphi round one were analyzed and acceptable criteria that were not included from the initial research was included.

In Delphi round two, results from Delphi round one were shown to the experts. In this round, experts were asked whether the list is comprehensive enough and whether the criteria set needs modification. This was to ensure that a comprehensive network connectivity criteria set list for IoT is achieved. Results from Delphi round two were analyzed and evaluated and a comprehensive criteria set for IoT was obtained. General workflow of the whole process is shown in Figure 2 below.

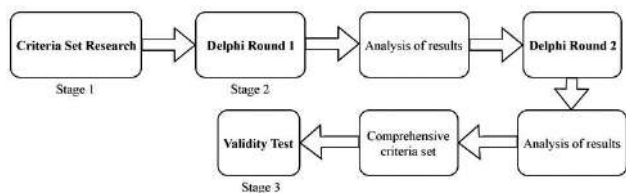


Figure 2: General workflow of methodology

Delphi methodology was chosen because it is a strong and solid way of research in finding information of unknown by means of consensus from the experts. Feedback from rounds of Delphi also will widen knowledge and stimulate new ideas which highly motivates the people involved (Phil, 1971). These feedback process allows the experts to reassess their initial judgement and to modify it if needed making it having less chance for discourse. Besides being educational to the researchers, it is also educational to the experts (Stokes, 1997).

RESULT AND DISCUSSION

From research, 20 network connectivity criteria set for IoT had been identified that will make the criteria set to be complete. Table 1 shows the results from the research. With regards to Delphi methodology, 10 experts were interviewed and the demographic profile of the experts were shown in Table 2. Although there is a variation in the number experts to be included, Reid (1988) notes panel size ranging from 10 to 1685.

Selection of experts also were quite high in standards where one the criteria to be selected require minimum experience of 5 years in network connectivity or IoT profession. The knowledge nomination worksheet of the experts were shown in Table 3. The pool of experts are also quite diverse in a sense that the study benefitted not just from developments’ point of view but managerial point of view as well. This advantage may give the criteria set an added advantage by taking views from multiple areas. An improvement that can be undertake in future is to add more experts to the pool or redo the study again with different experts in order to observe if the criteria set has any changes.

Table 1: Comprehensive Network Connectivity Criteria Set for IoT from research

No.	Criteria Set
1.	Range
2.	Operating Frequency
3.	Data Rate
4.	Number of Users
5.	Topology
6.	Securities
7.	Encryption
8.	Energy/Power Requirement
9.	Current IoT Application
10.	Reliability
11.	Latency
12.	Costs
13.	MTU (Maximum Transmission Unit)
14.	Network Type
15.	Protocol
16.	Operating mode(s)
17.	Channel bandwidth
18.	Modulation Types
19.	Scalability
20.	Signal Penetration into Building

Table 2: Demographic Profile of Experts

Profile		Frequency	Percentage (%)
Gender	Male	9	90
	Female	1	10
Experience	Only in IoT	4	40
	Only in network connectivity	1	10
	IoT and network connectivity	5	50
Position	Manager/Director	2	20
	IoT developer/architect/engineer	4	40
	Network developer/architect/engineer	4	40
Location	Malaysia	10	100

Table 3: Knowledge Nomination Worksheet

Disciplines or Fields	Skills requirement (minimum 2)	Must have requirement
Academic	1. Deep knowledge/experience in network connectivity 2. Deep knowledge/experience in IoT	1. Have been an academicians for at least 5 years
Practitioner	1. Deep knowledge/experience in network connectivity 2. Deep knowledge/experience in IoT	1. Working or owns a company that is related

From Delphi round one, a total of 74 answers were gathered from 10 experts including rejected and selected ones. Figure 3 shows the rates for accepted and rejected opinions’ of experts from Delphi round one. From Figure 3, it shows that 73% of the experts’ opinions are rejected for Delphi second round. This however, is a good indicator that the research has been done properly in getting the comprehensive network connectivity criteria set list.

Acceptance versus rejection of experts’ opinions from Delphi round one

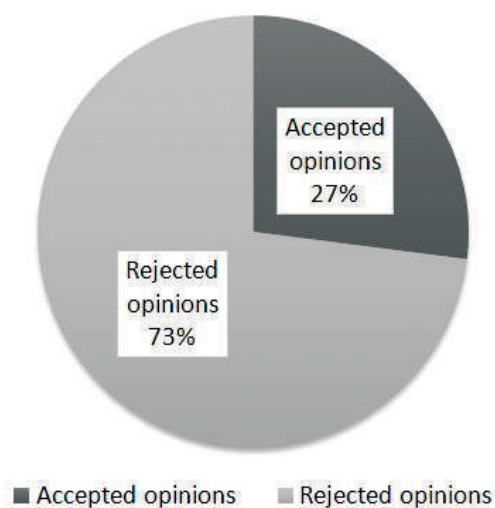


Figure 3: Acceptance versus rejection of experts’ opinions from Delphi round one

Criteria that were accepted are the one that fulfills the attributes of the network connectivity itself. Table 4 shows the accepted criteria set from Delphi round one that has been accepted with its frequency of occurrence from all of the experts. From Table 4, it shows that the highest frequency occurrence is the disaster recovery time.

Table 4: Selected experts’ opinions from Delphi round one

No.	Criteria Set	Frequency	Percentage (%)
1.	Disaster Recovery Time	4	20
2.	Interoperability (continuous ability to send and receive data among the interconnected networks)	1	5
3.	Network’s nature footprint	1	5
4.	Network Numbering and Addressing	1	5
5.	Roaming/Mobility ability	1	5
6.	Flexibility (ability to view, monitor and manage devices)	2	10
7.	Consistency (Response time)	1	5
8.	Failure Rates (Frequency of failures)	2	10
9.	Environmental factors	2	10
10.	Mean Time Between Failure (MTBF)	1	5
11.	Robustness (ability to withstand failures and perturbations)	1	5
12.	Ease of access	2	10
13.	Ease of implementations	1	5
	Total	20	100

While the second highest frequency are flexibility, failure rates, environmental factors and ease of access. A note should be taken that all of these items are included in the second round of Delphi. These 13 items were further discussed in Delphi round two on whether the items should be added or edited. Results for Delphi round two were shown in Table 5. Six attributes were accepted out of thirteen attributes listed from Delphi round one. Many of the attributes were not selected because experts are having disagreement between themselves on whether the attributes should be included or not. Therefore, with the results from Delphi round two, a comprehensive network connectivity criteria set for IoT was obtained and it is shown in Table 6.

Table 5: Accepted criteria set from Delphi round two

No.	Criteria Set	Disagreements Frequency
1.	Interoperability (continuous ability to send and receive data among the interconnected networks)	2
2.	Roaming/Mobility ability	0
3.	Environmental factors	1
4.	Mean Time Between Failure (MTBF)	0
5.	Ease of Access	1
6.	Ease of implementations	1

Table 6: Comprehensive Network Connectivity Criteria Set List for IoT

No.	Criteria Set
1.	Range
2.	Operating Frequency
3.	Data Rate
4.	Number of Users

Conted...

5.	Topology
6.	Securities
7.	Encryption
8.	Energy/Power Requirement
9.	Current IoT Application
10.	Reliability

Conted...

11.	Latency
12.	Costs
13.	MTU (Maximum Transmission Unit)
14.	Network Type
15.	Protocol
16.	Operating mode(s)
17.	Channel bandwidth
18.	Modulation Types
19.	Scalability
20.	Signal Penetration into Building
21.	Interoperability (continuous ability to send and receive data among the interconnected networks)
22.	Roaming/Mobility ability
23.	Environmental factors
24.	Mean Time Between Failure (MTBF)
25.	Ease of Access
26.	Ease of implementations

To ensure the holistically of network connectivity criteria set for IoT, Delphi methodology helps by backing up the prior research that has been done. From the outcome, it can be said that the result has been satisfactory and has achieved sufficient credibility. It shows that the set is comprehensive enough that there no attributes of the network connectivity that is important to IoT has been left out. Further improvement that can be proposed is by finding more experts to redo the Delphi rounds and see if the criteria set remains the same. Another improvement can be proposed is to add more experts to the pools of the experts available. As written by (Weaver, 1971), "Delphi operates on the principle that several heads are better than one...". Therefore, addition of more experts to the pool will certainly makes it better.

CONCLUSION

The availability of a comprehensive network connectivity criteria set for IoT will tremendously help organizations in implementing IoT. With very less resources available for the public to clutch, the criteria set will be an important resources to many. From the results shown, it can be concluded that a comprehensive network connectivity criteria set for IoT has been attained.

Although there might be some areas where the set can be disputed, it will not effect the comprehensiveness

of the criteria set. The criteria set stands strong and sturdy with sufficient satisfactory and credibility that it can be concluded as a comprehensive set.

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An Appraisal of the China's Claims in the South China Sea Territorial Disputes

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ABSTRACT

ABSTRACT

Objective: This paper predominantly aims at evaluating the territorial claims made by China in the South China Sea as to whether or not these claims are in accordance with the contemporary international law. This study is primarily doctrinal and qualitative in nature.

Analysis: China claims almost 90 percent of the South China Sea by arguing that both maritime and land territories in the region were regarded as integral parts of the Chinese nation since centuries ago. In the same vein, other disputing parties also made numerous claims to their respective contiguous parts of the South China Sea. Despite the fact that these nations have been trying to resolve the disputes, tensions among the rival countries have steadily increased.

Method: The authors propose that China has to acquire the sovereignty over land territories in the South China Sea in conformity with the modes of acquisition of state territory under contemporary international law. Then, it can claim maritime boundaries on the basis of the land territory in accordance with the relevant provisions under the United Nations Convention on the Law of the Sea 1982 (UNCLOS 1982).

Findings: The paper greatly contributes to evaluate Chinese territorial claims in resolving the South China Sea territorial disputes.

Result: It is thus proposed that the adjudicative settlement either before the International Court of Justice (ICJ), the *International Tribunal for the Law of the Sea* (ITLOS) or an ad hoc international territorial arbitration would be desirable between or among the parties to deliberate further on the disputes with the view to maintain the international peace and security.

Keywords: State territory, territorial dispute, boundary dispute, South China Sea, international dispute resolution

INTRODUCTION

In the contemporary world, the South China Sea appears to be one of the most controversial areas that triggered several maritime boundary and territorial disputes among various nations in the Southeast Asia. Subject matters of these disputes comprise the Pratas Islands (*Dongsha Qundao*)¹, the Scarborough Shoal (*Huangyan Dao*), the Macclesfield Bank (*Zhongsha Qundao*), the Paracel Islands (*Xisha Qundao*), and some other rocky outcrops, atolls, sandbanks, reefs and numerous submerged features in the South China Sea (US Department of State, 2014).

The disputed areas in the South China Sea are rich in natural resources and consist of world major sea lanes through which multi-trillion dollars worth of goods are transported annually (Fensom, 2016). Therefore, authors intend to evaluate the Chinese sovereign claims in the South China Sea as to whether or not these claims are in accordance with the contemporary international law in the following discourses.

HISTORICAL BACKGROUND OF THE CHINA'S CLAIMS IN THE SOUTH CHINA SEA

In general, the origin of the South China Sea territorial and maritime boundary disputes can be traced

back to 1894 in which the Sino-Japanese War broke out and China lost its territory in Taiwan as well as on the Liaodong peninsula as the Chinese military was defeated by the Japanese (Nish, 1995).

Again, in 1945, the three victorious nations in the World War II convened the Potsdam Conference which declared that: “The terms of the Cairo Declaration shall be carried out and Japanese Sovereignty shall be limited to the islands of Honshu, Hokkaido, Kyushu, Shikoku² and such minor islands as we determine” (Wan, 2005). After the Japanese unconditional surrender in the World War II on 02 September 1945, the Japanese signed the instrument of surrender at Tokyo Bay and accepted the provisions set forth in the declaration issued at Potsdam. In this way, the Cairo Declaration and the Potsdam³ Declaration became part of the conditions for the Japanese surrender (Lohmeyer, 2008).

Eleven-dash line: On 01 December 1947, China - under the rule of the Kuomintang Party - claimed sovereignty over maritime territories in the South China Sea within an Eleven-Dash Line on a map. These Dash Line claims are also referred to as the “Dotted Line,” “U-Shaped Line,” and “Cow’s Tongue” by various commentators⁴.



Fig. 1: Eleven-Dash Line Map

Source: (US Department of State, 2014)

In 1949, the Communist Party came to power in China and renamed country as the People’s Republic of China⁵. The new government ousted the Kuomintang Party from the mainland China. In December 1949, the Kuomintang Party fled to Taiwan and formed a government in exile.

The final peace agreement with Japan could not settle well until 1951 due to the fact that separate governments claiming for China, i.e., the People’s Republic of China (Mainland China) and the Republic of China⁶ (Taiwan) (National Diet Library, 2003).

On 08 September 1951, the Treaty of Peace with Japan (also known as the San Francisco Peace Treaty), signed between Japan and 48 Allied Powers (Lohmeyer, 2008), in which Japan agreed that it not only “renounces all right, title and claim to Formosa⁷ (Taiwan) and the Pescadores (Penghu)” (Article 2 (b) of the San Francisco Peace Treaty) but also “renounces all right, title and claim to the Spratly Islands and to the Paracel Islands” (Article 2 (f) of the San Francisco Peace Treaty). In addition, it further renounces all special rights and interests in China (Article 10 of the San Francisco Peace Treaty).

Nine-dash line: In 1953, the People’s Republic of China removed two of the dashes encompassing the Gulf of Tonkin and reduced it to be the Nine-Dash Line (Brown, 2009). Since then, China had asserted its claims over the disputed territories in the South China Sea on the basis of this Nine-Dash Line claim.



Fig. 2: Nine-Dash Line Map

Source: (United Nations, 2009)

On 04 September 1958, China issued a declaration with regard to its claims on the territorial sea in following words: “The Government of the People’s Republic of China declares: (1) [t]he breadth of the territorial sea of the People’s Republic of China shall be twelve nautical miles⁸. (2) China’s territorial sea along the mainland and its coastal islands takes as its baseline the line composed of the straight lines connecting base-points on the mainland coast and on the outermost of the coastal islands.

Nonetheless, a controversial provision can be found in Article 14 which provides that: “the provisions in this Law shall not affect the rights that the People’s Republic of China has been enjoying ever since the days of the past” (People’s Republic of China, 1998)⁹. It does not specify in which part of the sea China has been enjoying what types of privileges since which days of the past.

Ten-dash line: In June 2013, the SinoMaps¹⁰ Press – the sole Chinese state mapping authority under the State Bureau of Surveying and Mapping – published the latest national map that adds a Tenth-Dash Line to the east of Taiwan as a part of its official sovereignty claim to the disputed territories in the South China Sea (Graham, 2013).



Fig. 3: Ten-Dash Line Map

Source: (US Department of State, 2014)

It is not surprising to see that this Ten-Dash Line claim includes Taiwan again as a subject matter of

China’s claim - apart from maritime features that have mentioned above, i.e., the Pratas Islands, the Scarborough Shoal, the Macclesfield Bank, the Paracel Islands, the Spratly Islands, James Shoal and some other rocky outcrops, atolls, sandbanks, reefs and numerous submerged features in the South China Sea (US Department of State, 2014).

Objections from the neighbouring States: Other neighbouring disputant States (i.e., Brunei, Malaysia, the Philippines and Vietnam) have officially been protesting these Dash Line claims made by China in the South China Sea in various ways including diplomatic means, political means, adjudicative means and sometimes even by way of using force at different point of time. In January 1987, China established a physical presence on Fiery Cross Reef in the Spratly Islands and Vietnam occupied several reefs in response.

Article 5 (a) of Annex I to the Rules of Procedure of the Commission on the Limits of the Continental Shelf, the Chinese Government seriously requests the Commission not to consider the Joint Submission by Malaysia and the Socialist Republic of Viet Nam. The Chinese Government has informed Malaysia and the Socialist Republic of Viet Nam of the above position” (United Nations, 2009). The attached map referred to in this Note Verbale can be seen in the figure 2.

On 14 April 2011, the Chinese Permanent Mission to the UN submitted another Note Verbale to the Secretary-General of the UN by stating that: “China has indisputable sovereignty over the islands in the South China Sea and the adjacent waters, and enjoys sovereign rights and jurisdiction over the relevant waters as well as the seabed and subsoil thereof. China’s sovereignty and related rights and jurisdiction in the South China Sea are supported by abundant historical and legal evidence” (United Nations, 2011). China became more assertive in its claims over the South China Sea on the basis of the historic title through this Note Verbales in 2011.

As the Tribunal had already satisfied that it has jurisdiction to accept the submission made the Philippines, China’s non-participation does not bar the Tribunal from proceeding with the arbitration. Thus, China is bound to comply with the award of the Tribunal in accordance with Article 11, Annex VII of the UNCLOS 1982 which states that: “The award shall be final and without appeal, unless the parties to the dispute have agreed in advance to an appellate procedure.

In response to this arbitral award, China declared that it neither accepts nor recognises the award. To

make the matter worse, China went on to the extent of militarisation of the disputed areas in the South China Sea by deploying surface-to-air missiles on Woody Island, one of the Islands in the Paracel Island chain (Council on Foreign Relations, 2017).

THE APPRAISAL OF THE CHINA'S CLAIMS IN THE SOUTH CHINA SEA

Albeit China has three different Dash-Line claims, i.e., Eleven-Dash Line (1947), Nine-Dash Line (1953) and Ten-Dash Line (2013), it has never provided a proper chart that specifically described its maritime entitlements in the South China Sea as required by the UNCLOS 1982 (Articles 16, 47, 75, 76 (9) and 84 of the UNCLOS 1982).

As it can be seen from the above map, the dotted lines in each of the map are not consistent with one another. The questions arises here is that how a State can claim maritime entitlements on the basis of historic title whereas it does not even know how to draw its own maritime boundaries consistently as its claims vary significantly from time to time.

In addition, Article 15 provides that “the equidistant median line should be drawn from the nearest points on the baselines from which the breadth of the territorial seas of each of the two States is measured if the delimitation of the territorial sea between States with opposite or adjacent coasts could not be done with an agreement between the respective State Parties”.

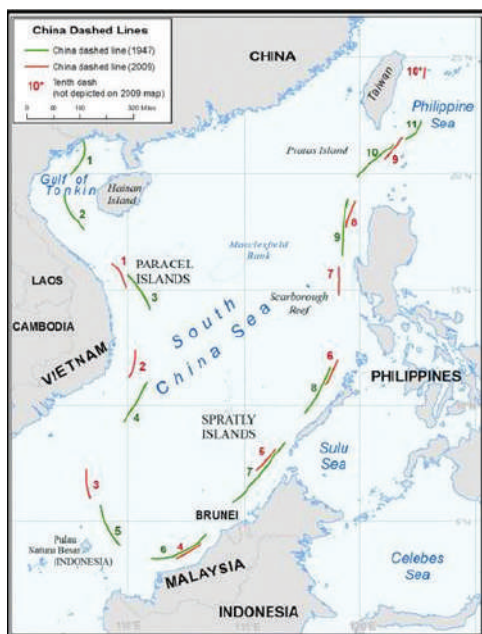


Fig. 4: Dash Lines Map

Source: (US Department of State, 2014)

Until recently, before the emergence of the maritime zones established under the various UNCLOS regimes developed by the United Nations Conferences on the Law of the Sea in 1958 (UNCLOS I), 1960 (UNCLOS II) and 1973-1982 (UNCLOS III), States had been exercising its sovereignty over only narrow water line along their coastal regions and the rest of the sea areas had been regarded as the high seas. It was a widely accepted principle under customary international law that no State can exercise any form of jurisdiction over the high seas.

Land boundary claims: If China is making land boundary claims, China still has to comply with the contemporary international legal principles on the modes of acquisition of state territory. In the past, there was, of course, no unanimous agreement in the international community pertaining to the modes of acquisition of territory. In most part of the world, state territory was merely regarded as the private property of the monarch. Therefore, it is not surprising to see that Grotius and his follower even went on to the application of the concept of acquisition of private property to the acquisition of territory by states (Shaw, 2005).

Besides, a state cannot acquire the territory even by exercising self-defense to repel armed force used against it. This will still be regarded as illegal acquisition of territory due to the involvement of the use of force (Malanczuk, 1997; Hamid, 2011). In the middle of 20th Century, the principle of self-determination was introduced by the UN and, as a result, colonial powers needed to grant independence statehoods to most of the States that were under their subjugation. Accordingly, acquisition of territory by way of subjugation, conquest or annexation was outlawed ever since (Malanczuk, 1997).

Hence, at present, there are only three essential legal concepts in which a State can acquire territory, i.e., occupation, prescription and cession. Besides, accretion is also still a legal mode of acquisition of territory derived due to the geographical changes but not on the basis of any legal notion. Furthermore, there are a few more legal principles upon which the territorial acquisition by a State can be derived, namely, acquiescence, recognition, estoppel, continuity, contiguity, *uti possidesti* and self-determination (Hamid, 2011). The aforesaid contemporary modes and legal principles of acquisition of territory under international law have well been developed by various international arbitrations, tribunals,

the Permanent Court of International Justice (PCIJ) and the ICJ in adjudicating territorial and boundary disputes across the world (Shaw, 2005).

Under the contemporary international law, States are encouraged to resolve “their international disputes by peaceful means in such a manner that international peace and security are not endangered” (Article 2 (3), the UN Charter). Article 33 (1) of the UN Charter obliges the Member States to “seek a solution by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their own choice” in resolving the disputes like in the South China Sea which is likely to endanger the maintenance of international peace and security.

Still the best way to resolve the disputes between or among the parties would be through adjudicative means in which China has to claim each and every disputed area by providing evidences on how it has acquired such territory in the South China Sea. Therefore, it has to satisfy all the requirements of the relevant mode of acquisition of territory for each of these maritime features such as islands, banks, reefs, etc. Only after acquiring the land territory, it will be able to claim maritime boundaries in accordance with the relevant provisions under the UNCLOS 1982.

CONCLUSION

In a nutshell, it can be seen obviously for the above discussions that China’s sovereign claims over disputed areas in the South China Sea have always been regularly varied from time to time and these claims are mostly not in consistence with the contemporary international law. Hence, not a surprise to see persistent objections from neighbouring disputing States to China’s claims at all time. The authors are of the view that, China has to acquire the sovereignty over land territories in the South China Sea in conformity with the modes of acquisition of state territory under contemporary international law. Only then, it can claim maritime boundaries on the basis of the land territory in accordance with the relevant provisions under the UNCLOS 1982.

These maritime boundaries and territorial disputes are likely to continue until and unless these disputes are resolved in one way or another. The parties to the

disputes have already resorted to all available means but their efforts have not been able to bring any tangible result yet. Of course, any armed confrontation among the disputants is not desirable as it would entail grave repercussions to the international peace and security, *inter alia*. Under the auspices of the UN, members are required to resolve disputes among them in peaceful manners as prescribe in Article 2 (3) and Article 33 of the UN Charter. It is thus proposed that the adjudicative settlement either before the ICJ, the ITLOS or an *ad hoc* international territorial arbitration would be desirable between or among the parties to deliberate further on the disputes with the view to maintain the international peace and security.

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Harnessing Business Continuity Management in Malaysian Universities

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ABSTRACT

Objective: This paper is to investigate risk management (RM) practices and contingency approaches (CA) as latent factors which can contribute towards improved business continuity planning (BCP) and business continuity management (BCM), both, resulting in higher levels of university resilience.

Analysis: This paper is used to analyze the data with the application of a bootstrapping technique to decide the significance levels for loadings, and path coefficients.

Method: The structural equation model with SmartPLS was done on 220 respondents of top management of the university e.g. Vice-Chancellor, Senate Boards, Deans of Faculties, Head of Departments, as well as non-academic managers such as Bursar, Registrar, Human Resource Managers, IT Managers, Head of Technical Departments, and Heads of Centres of Excellence. The sampling technique used is cluster sampling in public and private universities around Malaysia.

Findings: The finding showed that 50.6% variation in BCM is explained by BCP ($\beta = 0.528$, $p < 0.01$), along with RM ($\beta = 0.079$, $p > 0.01$) and CA ($\beta = 0.164$, $p > 0.01$). The findings also confirmed that both CA and RM have significant relationships with BCP, by explaining 61.1% variance.

Result: This study emphasises on the needs of the university to include BCP and BCM in their agenda for its strategic management.

Keywords: risk management, contingency approach, business continuity planning, business continuity management, public, private, university

INTRODUCTION

Universities all around the world nowadays are facing a lot of challenges. Currently, Malaysian universities experience declining funding, tough competition from local and overseas universities, intensified Malaysia quality assurance (MQA)^[1] requirements, and change of 14th. election political party. Other educational issues can be traced back from elite to mass education, internationalization and globalization high-dependent on information technology, innovative approaches and university ranking^[2] Owing

to these unavoidable evolvments, inviting quite a number research zooming into university challenges and its precautions and solutions ^[3]. Universities are also investigated in different viewpoints for examples students ^[4], curriculum, assessment, lecturers as well as their leaders^[3] Ghasemy, Hussin, Megat Daud, Md Nor, Ghavifekr, & Kenayathulla.

Sirat found out that Malaysian university lack of talented leaders, due to no proper and systematic procedure to appoint the most capable academician to lead the university. He further contended that the present provision in the Universities and University Colleges Act 1971^[4], in regard to the appointment of a Vice-Chancellor, is not up-to-date and not in line with the aspiration in making universities as independent, trustworthy and autonomous entities. On the contrary of the situation in international scenario that best approach of appointing university leaders by having a strict

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competitive^[5] and scrupulous search. Unfortunately, the common and current practice do not have meritocracy system in promoting the university leaders. The public does not show its trust on university leadership, this is evidenced that Prime Minister, Tun Dr. Mahathir Mohamad⁶ recently announced that National Professor Council which mainly are university Professors and leaders to be dissolved

LITERATURE REVIEW

In dealing with challenges and risks, normally most businesses would prepare for the worst and unexpected event by having business continuity planning (BCP)^[7] and business continuity management (BCM). BCM is a process that enables an organisation to proactively identify and plan to minimize the impact of risks that could affect its objectives, operations and infrastructure. BCM is concerned with improving the sustainability and resilience of a university.

In a similar front, Amran, Manaf, Che Haat Mohd Hassan, have probed into an exploratory study on risk management disclosures in Malaysian annual reproof 100 listed on the Main and second Board of Bursa Malaysia^[8] companies. Previous research associate with risk management in universities are not many especially in Malaysia^[9]. Bajgoric (2014) conducted a study that examined the relationship between business continuity planning and business continuity management. The finding of the study showed a good relationship between BCP and BCM^[10]. On this basis, we formulate the five hypotheses as follows:

H₁: Risk management (RM) has significantly influenced business continuity planning (BCP).

H₂: Risk management (RM) has significantly influenced business continuity management (BCM).

H₃: Contingency Approaches (CA) has significantly influenced business continuity planning (BCP).

H₄: Contingency approaches (CA) has significantly influenced business continuity management (BCM).

H₅: Business continuity planning (BCP) has significantly influenced business continuity management (BCM).

METHODOLOGY

This research design includes a cross-sectional, quantitative, descriptive and causal relationship examination among the variables that relate to BCM. A set of questionnaire was adopted and adapted from Greer. The population are top management in all public and private and university. The questionnaire was first then emailed to the main target population: Vice-Chancellor, Senate Boards, Deans of Faculties, Head of Departments, as well as non-academic managers such as Bursar, Registrar, Human Resource Managers, IT Managers, Head of Technical Departments, Heads of Centres of Excellence etc. They were chosen as these people are the key players in the universities and well-versed in the management. The emails were sent to 967 respondents for three consecutive times. Only nine emails came in, then the researchers administered the questionnaires themselves. A total of 211 out of 250 questionnaires were received (84.4% response rate).

FINDINGS

Demographic analysis: Table 1 presents the details of the type of institution in this research. From the total of 220, 112 respondents work in private institution which represents 50.8%. Meanwhile, 108 respondents (49.2%) work in public university. Next, the designation holds by the respondents. The total of 166 out of 220 respondents which equal to 75.4% are academicians, and 54 respondents (24.6%) work as the administrators. Then, the total number of employees in the institution of the respondents. The most significant percentage is 59.2% was reported for more than 500 employees, 27.7% which the number of employees is less than 300, followed by 300-500 with 13.1%. The awareness of their administration on the concept of BCM in the institution. The results showed that only 113 respondents who are 51.3% of the total respondents stated that the administration in their institution are aware of BCM. On the other hand, 59 of respondents them (26.7%) responded that their administrator is not knowledgeable about BCM, and 20 respondents (22%) are not sure about BCM. However, 19 respondents 8.9% responded that their institution's administrator is not informed about the ISO 22301 BCM standard. Some 86 respondents (39.3%) were not sure whether the administration is aware or not aware of the ISO 22301 BCM standard.

Table 4.1: Demography Profile

No.	Item	Freq	%
1.	Type of institution		
	Private	112	50.8
	Public	108	49.2
2.	Your designation		
	Academic	166	75.4
	Administration	54	24.6
3.	Total Number of Employees (academic & non-academic)		
	Less than 300	61	27.7
	300–500	29	13.1
	More than 500	130	59.2
4.	Does your institution have Quality Management System?		
	ISO 9000 QMS	151	68.6
	ISO 14000 Environment	6	2.6
	ISO 9001: 2008	2	1.0
	Others	61	27.7
5.	Is the administration in your institution aware of the concept of Business Continuity Management (BCM)?		
	Yes	113	51.3
	No	59	26.7
	Not sure	20	22
6.	Is the administration in your institution aware of the ISO 22301 BCM standard?		
	Yes	114	51.8
	No	19	8.9
	Not sure	86	39.3

Assessment of the Measurement Model: Firstly, the measurement model of all constructs was checked for reliability, convergent validity and discriminant validity, prior to testing the hypothesized of the model. Table 2 shows the scores obtained from the analysis of the measurement model. The average variance extracted (AVE) of all constructs exceeded 0.5 (Bagozzi & Yi, 1988) while the composite reliability scores (CR) were all higher than 0.7 (Hair et al., 2013). As such based on the results of factor loadings, AVE, and CR signified that all the reflective items were proven reliable for the measurement model of the study.

Table 4.2: Measurement Model

Construct	Items	Loading	AVE	CR
Risk Management	B1	0.890	0.721	0.911
	B2	0.878		
	B4	0.801		
	B5	0.823		
Contingency Approach	C2	0.823	0.560	0.863
	C4	0.705		
	C5	0.822		
	C6	0.658		
Business Continuity Planning	C7	0.718	0.583	0.893
	D1	0.720		
	D3	0.796		
	D4	0.818		
	D5	0.695		
Business Continuity Management	D6	0.753	0.674	0.950
	D7	0.793		
	E1	0.781		
	E2	0.869		
	E3	0.816		
	E4	0.856		
E5	0.765			
	E6	0.833		

For next subsequent test, we run the discriminant validity test. As recommended by Hair et al., (2017) and Henseler, Ringle, and Sarstedt (2015) the Heterotrait-Monotrait Ratio (HTMT) score are used to assess the discriminant validity between reflective constructs. Whereas, if the HTMT value is below 0.90, discriminant validity has been established between two reflective constructs. As shown in Table 3, all constructs meet this criterion and we conclude that the constructs have discriminant validity.

Table 4.3: Discriminant validity of the constructs

Variable	BCM	BCP	CA	RM
BCM	0.821			
BCP	0.698	0.764		
CA	0.607	0.755	0.748	
RM	0.483	0.591	0.560	0.849

Note: RM=risk management, CA=contingency approach, BCP=Business continuity planning, BCM=business continuity management

Hair et al suggests that the loadings of measured variables should be higher than the cross loadings by at least 0.1 to indicate sufficient discriminant validity. As shown in Table 4 the loadings of all constructs satisfy this criterion. As such we conclude that discriminant validity is achieved.

Table 4.4: Item Cross Loading

Item	RM	CA	BCP	BCM
RM1	0.890	0.485	0.541	0.399
RM2	0.878	0.506	0.589	0.472
RM4	0.801	0.493	0.423	0.428
RM5	0.823	0.408	0.425	0.321
CA2	0.525	0.823	0.633	0.454
CA4	0.379	0.705	0.513	0.397
CA5	0.498	0.822	0.590	0.485
CA6	0.352	0.658	0.521	0.433
CA7	0.328	0.718	0.557	0.495
BCP1	0.603	0.527	0.720	0.520
BCP3	0.386	0.650	0.796	0.625
BCP4	0.516	0.560	0.818	0.590
BCP5	0.438	0.569	0.695	0.409
BCP6	0.463	0.520	0.753	0.545
BCP7	0.301	0.632	0.793	0.486
BCM1	0.525	0.511	0.621	0.781
BCM2	0.366	0.555	0.565	0.869
BCM3	0.440	0.357	0.511	0.816
BCM4	0.326	0.445	0.556	0.856
BCM5	0.212	0.409	0.485	0.765

Note: RM=risk management, CA=contingency approach, BCP=Business continuity planning, BCM=business continuity management

Assessment of the Structural Model: To estimate the structural model, a bootstrapping procedure with 1000

resamples was run to generate the q-values. Figure 1 presents the structural model while Table 4 presents the results of the hypothesis testing. Risk management ($\beta = 0.079$, $p > 0.01$) and contingency approach ($\beta = 0.164$, $p > 0.01$) are not directly related business continuity management.

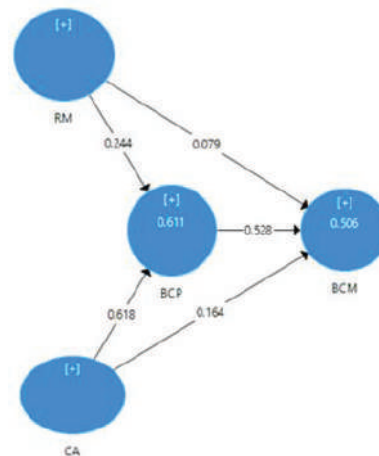


Figure: 1

In the test of hypotheses from the structural model, the dataset was run based on non-parametric bootstrapping procedure (Wetzels, Odekerken-Schröder, & Van Oppen, 2009) with 1,000 replications ($n=220$) to test the significance of regression coefficient. The significance of the paths coefficients was determined based on the t-values of a two-tailed test at 1.96 (significance level = 5%) and 2.58 (significance level =1%): whereas one tailed test was at 1.645 (significance level = 5%) and 2.326 (significance level =1%). The results are presented in Table 5 below:

Table 4.5: Hypotheses testing

Hypothesis	Relationship	Beta	Std Error	t-value	Decision
H ₁	RM -> BCP	0.244	0.056	4.362**	Supported
H ₂	RM -> BCM	0.079	0.072	1.092	Not supported
H ₃	CA -> BCP	0.618	0.041	14.967**	Supported
H ₄	CA -> BCM	0.164	0.093	1.758	Not supported
H ₅	BCP -> BCM	0.528	0.123	4.294**	Supported

Note: * $p < 0.05$ (two-tailed); ** $p < 0.05$ (one-tailed); *** $p < 0.01$ (two-tailed)

By referring to the above results, three out of five independent variables were found positively influence the dependent variables. The highest impact was exhibited by contingency approach -> business continuity planning ($\beta = 0.618$, $p < 0.01$), followed by risk management -> business continuity planning ($\beta = 0.244$, $p < 0.01$), and business continuity planning ->

business continuity management ($\beta = 0.528$, $p < 0.01$). We conclude that H1, H3 and H5 are supported and H2 and H4 are not supported.

Table 6 and 7 show that, there was a significant difference in score between the two groups of university by, BCP with $t(218) = -2.858$, $p < .05$, two-tailed with public university ($M = 4.7918$, $SD = 0.7932$) scoring

higher than private university (M = 4.452, SD = 0.8583). The magnitude of the differences in the means (mean difference = -0.3398, 95% CI: -0.5743 to -0.1053). BCM with $t(218) = -2.986$, $p < .05$, two-tailed with Public (M = 5.1897, SD = 0.8996) scoring higher than Private university (M = 4.8046, SD = 0.8915). The magnitude of the differences in the means (mean difference = -0.3852, 95% CI: -0.6396 to -0.1307).

Table 4.6: Group Statistics

	Private University			Public University		
	N	Mean	Std. Dv.	N	Mean	Std. Dv.
Score on BCP	119	4.452	0.8583	101	4.7918	0.7932
Score on BCM	119	4.8046	0.8915	101	5.1897	0.8996

Table 4.7: Independent sample t-test

	Levene's Test		t-test for Equality of Means						
	F	Sig.	t	df	Sig (2-tailed)	Mean Diff	Std Error Diff	95% Conf Interval of the Difference	
								Lower	Upper
BCP Equal variances assumed	.313	.576	-2.852	218	.005	-.33979	.11913	-.57478	-.10481
Equal variances not assumed			-2.858	217.864	.005	-.33979	.11889	-.57430	-.10529
BCM Equal variances assumed	.015	.903	-2.987	218	.003	-.38516	.12895	-.63951	-.13081
Equal variances not assumed			-2.986	217.289	.003	-.38516	.12898	-.63958	-.13074

DISCUSSIONS

This paper is to address the problem of business continuity management in various academic unit in Malaysia university. This paper is consistent with Husin et al., 2018; Bakar, et al., 2017; and Bajgoric, 2014 study. This research has found out that RM and CA have significantly influenced BCP in Malaysia university and BCP alone has greatly affect BCM in Malaysian universities. RM and CA are not directly related BCM. BCP is the precursor to BCM.

Presently none of the universities in the country; national public & private and foreign, have any kind of BCM policy or plans to enact and implement this evolving global continuity paradigm. Nearly, two thirds of all universities in Australia, England, New Zealand and North America have already put in place an active BCM regime and the rest are following suit, with formalized plans to institute one in the next three years.

From the empirical perspectives, both measurement and structural models of the analysis have proven to be

credible in predicting the relationships between RM and CA towards BCP as well as the relationship between BCP and BCM in Malaysian universities. This anticipated outcome is theoretically justified and validated by the institutional theory, especially situations are related to sustainable business practices. The adoption of BCM is highly expected to enhance the university quality. Thus, increase the public's confidence and trust in university.

CONCLUSION

Business continuity planning and business continuity management are vital in Malaysian university. We recommend that the top management to develop ISO 22301 BCM standard-centric environment to be used as a guide in all Malaysian universities as the demography profile showed only 51.2 percent are aware of its existence. Awareness on BCM and training programmes should also be more frequently held. The number of certified BCM professional is much needed to improve university resilience, complimenting the national education developmental agenda, set forth by the government in its

national education blueprint 2013-2025. This is in-line with the government's National Education Blueprint 2015 and its PSPTN Transformation Agenda.

Suggestions for future research: This research has carried out a study on two important factors: risk management and contingency approach that influence business continuity planning. Business continuity planning greatly affects business continuity management. Future research is suggested to expand the factors from the stakeholders' perspective, such as competitive edge and innovation. Besides that, further research could also expand the number of respondents with different demographic backgrounds and their interest and concern towards business continuity management in order to understand clearly pertaining to university sustainability and resilience.

Ethical Clearance: Taken from Department

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Employment of Refugees: A Malaysian Perspective

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ABSTRACT

Objective: This paper aims at identifying some challenges of the employment of refugees in enhancing the Malaysian economic growth.

Analysis: The employment of refugees can be challenging to engage for the stakeholders if there is no efficient and proper legal framework to govern the human resources practices for this aspect as there is no legislation dealing with the employment of refugees in Malaysia.

Method: In order to increase the productivity, the method used in existing refugees in the country can contribute as active work in the local workforce and thereby generate revenue for the government.

Findings: It also explores whether developing a legal framework in order to allow and enforce the employment of refugees in Malaysia would be feasible. This study is primarily doctrinal and qualitative in nature.

Result: The paper significantly contribute to some of the key focus areas in the Eleventh Malaysia Plan (2016-2020) such as improving labour productivity in the local economy, generating revenue for the government and promote human rights. Malaysia should create a legal framework for the employment of refugees to boost its fast booming economy.

Keywords: *Refugees, asylum seekers, foreign workers, migrant workers, employment*

INTRODUCTION

The world experiences the worst refugee crisis after the World War II, which results to 86% of refugees being displaced in developing countries. The number of people forced to seek refuge increased every year, due to unavoidable reasons like natural disasters, or even worst; human rights violations, conflicts, or persecution. Governments worldwide have started to be awakened by current events but unfortunately only a few are willing to accept and offer helping hands to the unfortunate refugees. The citizens, on the other hand, tend to show compassion quicker than their governments

Article 1 of the 1951 Convention defines refugees under the Status of Refugees section. Fundamentally, there are two major categories; ‘quota’ refugees, also known as ‘programme’ refugees, are people who are part of organised program and delivered to the UK. The second one is ‘spontaneous’ refugees, or also known as asylum seekers. In the UK, accepted refugees are given the same social and economic rights as the citizens. The only different is that they are given a UN passport instead

that allow them to go to any countries except the country they are originally from. Thus, a number of refugees tend to apply and naturalise to be British citizens ^[1]

There are 145 State are Parties to the 1951 Convention whereas 142 States are Parties to both 1951 Convention and the 1967 Protocol. Cambodia and the Philippines are the only ASEAN countries that are Parties to the 1967 Protocol ^[2]. This potentially results to the protective Malaysia’s policy on refugees, specifically regarding education (refugees are not allowed to attend Malaysian schools), employment (refugees are not allowed to work legally), healthcare (only recognised refugees have access to public health services), arrest, and detention. Nonetheless, during 2015-2016, the government had considered and made public announcement of the plan to provide temporary work permits for Rohingya refugees^[3]

Essentially, access to legal and safe employment is among fundamental human right which is applicable to everyone, asylum seekers and refugees included. Through this access, one have the potential to gain their basic survival needs which then may support their

family, community, and even the country they live in. In addition, the fulfilment of this right allows them to realise their social, cultural, economic, political, and civil rights, thus resulting them to feel valued and useful^[4]

Immigrants in Malaysia, which include 2.1 million registered immigrants and more than 1 million of undocumented immigrants by 2013, have continuously showed that they have enormous role in supporting economic development. Immigrant workers are recorded to be one of the key sources of labour-intensive and low-skilled occupations including agriculture, construction, and manufacturing. According to studies, Malaysia's GDP could be increased by 1.1% through 10% net increase in low-skilled immigrant workers, and this could result to more job creation and wages increment for Malaysians in general^[5]

In this paper, the authors also attempt to show that this reflux of refugees in Malaysia can be a blessing than a menace. Malaysia has already hosting a tremendous number of refugees. Thus, it is prudent to take this as an opportunity to fill the gap in the labour market. It would be very constructive for the society and, of course, the refugees as well.

FUNDAMENTAL PRINCIPLES OF INTERNATIONAL REFUGEE LAWS

International refugee law¹ is defined as “a set of rules and procedures that aims to protect, first, persons seeking asylum from persecution, and second those (whose status is already recognised as refugees)”. It is “designed only to provide a back-up source of protection to seriously at-risk persons. Its purpose is not to displace the primary rule that individuals should look to their state of nationality for protection, but simply to provide a safety net in the event where a state fails to meet its basic protective responsibilities”^[6]

The 1951 Convention is established based on the principle of non-refoulement as stated in Article 33. According to this Article², everyone has the right not to be deported to a country they may be sentenced to persecution, regardless they are State Parties of the 1951 Convention or not. Principle of non-refoulement is considered as a principle of customary international law, and in this Convention, it covers the fundamental rights of refugees as found in Articles 14 up to 30^[8] According to Article 33 of the 1951 Convention, “No Contracting

State shall expel or return (“refouler”) a refugee in any manner whatsoever to the frontiers of territories where his life or freedom would be threatened on account of his race, religion, nationality, membership of a particular social group or political opinion”.

Three major areas are emphasised by the Convention and Protocol combined:

- (1) “The basic refugee definition, along with terms for cessation of, and exclusion from, refugee status
- (2) The legal status of refugees in their country of asylum, their rights and obligations, including the right to be protected against forcible return, or *refoulement*, to a territory where their lives or freedom would be threatened
- (3) States' obligations, including cooperating with the UNHCR in the exercise of its functions and facilitating its duty of supervising the application of the Convention” .

According to Articles 2 to 34, majority of the Articles in the 1951 Convention must be implemented by all agreeing States towards anyone that falls under the refugee definition found in the Protocol. A huge number of States have agreed to both the Convention and the Protocol as both treaties are the cornerstone to the international refugee protection system⁸ (UNHCR, 2014).

REFUGEES AND THE RIGHT TO WORK

The right to work and access to labour market is extremely essential for refugees to allow them to secure dignity, restore their livelihood, be independent, and to contribute to their host country. The 1951 Convention in its Articles 17 to 19 expresses the opportunities of self-employment, wage-earning employment, and employment in liberal sectors^[7]

‘Lawfully staying’ refugees are generally given access to work in the host territory. Many authors describe ‘lawfully staying’ refugee as a person recognised as refugee by the national authorities. States usually emphasise the uncertainty of an asylum seeker, whether the person ultimately be a refugee and then a long-term resident, and that their access to work may affect the economic migration negatively

MALAYSIAN POSITION

According to Mallow, one hundred forty five countries have become parties to the 1951 Convention, yet Malaysia has neither ratified the 1951 Convention nor the 1967 Protocol¹⁰. Malaysia is urged to re-evaluate its assessment on this issue (Mallow, 2017). Despite the continuously growing number of foreign workers, authorities have not managed to fix the national immigration policy.

The principle of non-refoulement is described as: “No Contracting State shall expel or return (‘refouler’) a refugee in any manner whatsoever to the frontiers of territories where his life or freedom would be threatened on account of his race, religion, nationality, membership of a particular social group or political opinion”^[9]. This principle is widely recognised as principle of customary international law which means it is applicable to all nations irrespective of its membership to the 1951 Convention^[10]

Meanwhile, sections 6 and 51 of the Immigration Act 1959/63 are used against illegal migrants. Article 6 describes the boundaries of legal entry, where any person who failed to do so will be strictly punished. Article 51 expresses the offence as ‘unlawful entry or presence in the country’ or persons who overstay in the country. Migrant workers have no authority in determining their length or status of their stay as they rely heavily on their employers on that. Migrant workers have no refugee protection provisions to protect them and they are governed under the Malaysian immigration legislation instead.

REFUGEES AND ILLEGAL IMMIGRANTS: A NECESSARY DISTINCTION

The 1951 Convention and its 1967 Protocol are the beginning for any inquest into the definition of a refugee. It is specified by the 1951 Convention that a person is qualified to be a refugee if (1) the person has already been considered a refugee under prior treaty arrangements or (2) the person is outside the country of his nationality (or not having a nationality) and is unable or unwilling to avail himself of the protection of that country due to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership in a particular social group or political opinion. The latter are frequently referred to as the “inclusion” clauses. If one fails to fall or be qualified under the former, it does not defeat the probability of qualifying under the latter.

PROBLEMS AND CHALLENGES FOR REFUGEES WITHOUT THE RIGHT OF EMPLOYMENT

No special protection or procedures are provided by the Malaysian immigration law for refugees and asylum seekers. Consequently, the ‘refugee’ status is non-existent in Malaysian law and, no special rights are granted to persons who have been recognised by the UNHCR. Therefore, as other undocumented migrants, refugees and asylum seekers are in the same way subject to the Immigration Act 1959/63 as if they have entered or remained in Malaysia unlawfully, exposing them to imprisonment, whipping, detainment and removal. However, at national level, a basic de facto status may be enjoyed by those refugees who have attained recognition from the UNHCR, despite lack of formal recognition and protection. This recognition gives refugee status in international law, and very little special exemption from Malaysian immigration law enforcement. (International Federation for Human Rights, 2008).

In Malaysia, refugees and asylum seekers are not given the right to legal employment. They are forced to work in jobs that are unfavourable by the local population batter terms as 3D jobs (i.e., dirty, dangerous and difficult). This also led to their exploitation by the employers, paying them very little or no salaries at all (Yunus, 2017). Lack of legal employment also leads to social exclusion. It is defined as the feeling of not belonging and exclusion from the mainstream’ and resulting in an entirely ‘urban problem’ (Phillimore, 2006).

UNDERSTANDING THE IMPORTANCE OF THE RIGHT TO WORK IN THE MALAYSIAN CONTEXT

The UDHR and many other international human rights instruments acknowledge that the right to work is given to all as a fundamental human rights principle. The right to be engaged in productive employment should be enjoyed by all. The right to work is greatly connected to economic freedom, to property and a minimum standard of living. It is evident that employment is instrumental to people’s social status, independence, recognition and offering them with an income. Therefore, it is submitted in this paper that employment of refugees is not only beneficial for the refugees themselves, but also it is instrumental to the society as well as Malaysian economy.

For the refugees: It is significant for refugees to be given the right to work. Their dignity and self-respect are enhanced as shown by many studies. It also provides them with satisfaction, hope, and re-establishment of their sense of self-worth. Integration is another benefit provided by employment, and offers a unique chance for “positive socialisation and for the development of resourcefulness”. Better financial self-sufficiency comes with income and independence and decreases economic deprivation, specifically in poor housing.

For the society: Access to legal employment for refugees can have a positive impact to the host society too, as the considerable proportions of refugees are of working ages between 18 to 59. Gaps in the labour market can be filled by the refugees’ expertise and knowledge. It is vital to be noted that if refugees ultimately return to their country of origin, same benefits will be applied.

If the right is not given to asylum seekers and refugees, there will be a high chance that they will either depend on state support and assistance or will be engaged in informal employment. Member States consider both outcomes undesirable. Employment is a vital component of integration that facilitates social contacts between the members of the host states and refugees, resulting in the recognition that integration is a two-way process.

For the economy: Over the past decades, Malaysia has been able to acquire outstanding achievements, including promotion of inclusive growth and eradication of extreme poverty. By 2020, Malaysia has the ambition to become a high-income nation that goes beyond simply attaining a per capita GDP threshold. As it is pointed out by the Eleventh Malaysia Plan, the aim is to accomplish a sustainable and inclusive growth path over time reflecting greater productivity. It can only materialise if it is ensured that all the resources are accessible to the future generation such as productive opportunities and education. It is necessary to also realise their ambitions and if Malaysian economy is competitive globally and resource-sustainable (Moreno, 2016).

First and foremost, the refugees’ right to work with a regulated scheme would address law and order, security and criminal activities in the labour market will be curbed as the legitimate concerns of the government. Working closely with the UNHCR with a government-administered registration system, would offer the government with an essential verifiable identity

documentation and important biometric data, as to who is in Malaysia. Third, allowing refugees to work legally in Malaysia also provide them with a dignified lifestyle and improve their protection mainly for vulnerable women and children.

CONCLUSION

Essentially, access to legal and safe employment is among fundamental human rights which applicable to everyone, including refugees and asylum seekers. Through this access, one have the potential to gain their basic survival needs which then may support their family, community, and even the country they live in. In addition, the fulfilment of this right allows them to realise their social, cultural, economic, political, and civil rights, thus resulting them to feel valued, and useful.

Even though Malaysia is not a signatory to the 1951 Convention, it has already hosted a considerable number of refugees and tremendously contributed to the refugees. Not being a party to the Convention has unfairly affected Malaysia’s reputation, a country that already has done so much for hosting and protecting refugees.

On the matter of refugee’s employment, it is recommended that Malaysia should make use of this refugee’s influx into its advantage by creating a win-win situation for both, i.e. for itself and refugees. As highlighted above, Malaysia should create a legal framework for the employment of refugees to boost its fast booming economy.

Ethical Clearance: Taken from Department

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The Entrepreneurial Traits as Moderating Variable in the Relationship between Academic Performance and Entrepreneurial Orientation of University Students: A Study in Indonesia Higher Education Context

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ABSTRACT

Objective: This research aimed to exam the role of entrepreneurial traits as moderating variable on relationship between students' academic performance and entrepreneurial orientation. This research was conducted university students.

Analysis: The data were drawn from 250 students through survey using questionnaires. There were four universities participated in the survey. The results of survey were analyzed using hierarchical regression analysis to answer the proposed hypotheses.

Method: Regression Analysis is technique which is used to see the significance of independent variables toward dependent variable. So that, added one variable that indicating interaction.

Findings: The finding of the research found that students' academic performance significantly affected on entrepreneurial orientation of the students. Meanwhile, the students entrepreneurial traits significantly influenced on entrepreneurial orientation. Implications of the finding were also discussed in the paper.

Result: Testing of moderating effect demonstrated that entrepreneurial traits significantly moderated relationship between students' academic performance and entrepreneurial orientation.

Keywords: *Entrepreneurial orientation, entrepreneurial traits, academic performance*

INTRODUCTION

The issues of entrepreneurship in has been interesting discussion for scholars since last two decades¹. The role of entrepreneurship in a nations can be seen from its impact on creating new job opportunities which in turn might reduce unemployment rate. Entrepreneurship is source of innovation and creativity that pushes the one country's economy development and growth (UNCTAD, 2004). Entrepreneurship has been identified as the best solution to reduce unemployment and poverty among the youths, especially higher education graduated who can not find jobs² (Brownhilder 2014). It can be argued that university or higher education institutions could be a starting point to choose the next career afterward for graduated. This issue appears to be essential and important since the chances to find jobs is getting decrease, moreover the job opportunities is becoming more limited for job seeker due to slowly economic growth.

Gorman and Hanion³ (1997) highlights the need of research into what makes an entrepreneur and how the characteristic can be developed through educational systems. Therefore entrepreneurial orientation has been studied extensively with numerous research instruments for some examples, Autio et al. (2001), Engle et al (2010), Louw et al. (1997), Pruett et al. (2009), Reynolds et al. (1994), Segal et al. (2005), Shane (1992) and van Eeden⁴ et al. (2005).

Lumpkin⁵ and Dess (1996) further clarified the definitions issue of entrepreneurship in their 1996 seminal work by making distinction between entrepreneurship and entrepreneurial orientation. They suggested that entrepreneurial orientation⁶ (EO) represents entrepreneurial processes that address the question of how new ventures are undertaken, whereas the term entrepreneurship refers to the content of entrepreneurial decisions by addressing what is undertaken. Prior research findings⁷ related to psychological traits have

been empirical evidence, for example McClelland (1961) claimed that much of the discussion in entrepreneurship has been concentrated on the individual. (Carland Jr. and Carland 1997: 34) The individual traits plays important role in entrepreneurship, (Bulut, et al. 2010: 560) In addition, Dollinger⁸ (1995) argued that every individual's psychological, sociological and demographic characteristics have an effect on a person's abilities to be an entrepreneur. His research is aimed at providing additional insights and understanding to the relationship between psychological traits and entrepreneurial orientation. Investigation psychological traits as antecedent entrepreneurial intention is still continuing until now.

The dimensions of EO⁹ might be identified from various perspectives: autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness. These dimensions represent distinct constructs that may vary independently of each other in a given context. In prior research studies, achievement need, tolerance for ambiguity, risk taking and locus of control have been found to correlate with intention to be entrepreneur¹⁰ (Ahmed, 1985; Begley & Boyd, 1987; Bonnett & Furnham, 1991). Regarding the multidimensional concept of performance we have to point out that its link with EO may depend upon the indicators used to assess performance (Lumpkin and Dess, 1997). The students' GPA might be affected by various factors, such as personal factors, family background, and teaching-learning process. Role of entrepreneurial traits can not be avoided in fostering entrepreneurship in a nation. It has been long debate among academicians to prove whether the entrepreneurs are born or educated. Therefore, the recent research takes into account effect of entrepreneurial traits (i.e. self-confidence, innovativeness, risk taking) that is surmised to strengthen entrepreneurial orientation.

REVIEW OF THE LITERATURE

Entrepreneurial orientation: Entrepreneurial orientation (EO) refers to a strategy making process which guides firms developing constant innovations, adopt a proactive posture in the market and undertake risky investments

(Zahra, 1993; Covin and Slevin, 1989; Stam and Elfring, 2008). It captures various practices, activities and processes that help someone to behave entrepreneurially. According to Covin and Slevin(1989) EO is primarily described with the dimensions of innovativeness, proactiveness, and risk-taking, and Miller, (1983) said that EO consists of three core dimensions: innovativeness, pro-activeness, and risk-taking.

Innovativeness reveals a firm's proclivity supporting new ideas, experimentation and creativity which lead to modification and development of new products, services or technological processes (Lechner and Gudmundsson, 2014; Lumpkin and Dess, 1996; Vij and Bedi, 2012). Pro-activeness means a firm's desire to be in constant motion to be ahead of its competition. Risk-taking refers to the firm's ability to make decisions in light of complex, uncertain circumstances. Wiklund and Shepherd (2005) mentioned that risk taking behaviors can come in the form of investing in a new venture or technology where the probability of success is unknowable or very small.

Academic Performance of Students: In term of academic performance in college, grade point average (GPA) is commonly used as an indicator student performance and achievement to evaluate student persistence (McGrath & Braunstain, 1997; Tross, Happer, Osher, &Kneidinger,2000). GPA is calculated at the end of each term a student is enrolled, the GPA earned during the first semester tends to be better indicator of academic performance than other variable (Allen, 1999; McGrath & Braunstain, 1997). Pascarella and Terezeni (1991) argued that GPA is frequently cited as major indicator of academic performance. The value of using GPA as a measure of academic achievement has been highlighted as GPA has been found to be a significant predictor of persistence and serve as one indication of the degree to which students have responded to the institutional environment (Tinto,1993).

Regarding the multidimensional concept of performance we have to point out that its link with EO may depend upon the indicators used to assess performance (Lumpkin and Dess, 1997). The empirical literature reports a high diversity of performance indicators (Combs et al., 2005; Venkatraman and Ramanujam, 1986); a common distinction is between financial and non-financial measures. In this study, In this article, we use non-financial measures of Academic performance (Murphy and Callaway, 2004, Murphy et

al., 1996 and Gupta and Govindarajan, 1984). It's widely accepted in literature that Entrepreneurial Orientation is positively linked to firm performances (e.g. O'Shea, Allen, Chevalier and Roche, 2005). While, There are many factors that affect GPA that we do not control for, such as personal factors (abilities, learning strategies, and homework), family situation (parental involvement, siblings, and living situation) and school factors (peers, school size, and teaching methods other than EE).

H1: Students' academic performance positively and significantly affects on entrepreneurial orientation

Entrepreneurial Traits: Entrepreneurship is known to be highly influential on the development of economies (Audretsch and Keilbach, 2004). Halil and Hasan (2010) already mention in their research as individuals differ in entrepreneurial awareness, regions and countries as well have different entrepreneurial development levels. Mueller (2002) also claimed that creation of new ventures and entrepreneurial activity depends upon the availability of prospective entrepreneurs who possess personality traits combined with personal circumstances which are likely to lead them to forming a new venture. Self-confidence refers to a person's perceived ability to tackle situations successfully without leaning on others and to have a positive self evaluation. In the words of Basavanna (1975) self confidence refers to an individual's perceived ability to act effectively in a situation to overcome obstacles and to get thing go all right. Taking calculated risk is the latest approach in entrepreneurship. Risk taking can lead both success and failure. Thus, entrepreneurs should calculate risks of their actions before they take them, evaluate advantages and disadvantages of risk taking in all stages of entrepreneurship. Entrepreneurs tolerate risks more than other people. Tolerating risks is a major trait for entrepreneurs to succeed.

There are significant relationships between biographical characteristic (such as gender, race and age) and environmental factor (such as education and family environment) and certain entrepreneurial characteristics of undergraduate students. In case of gender significant relationships are evident for risk taking, the use of outside resource person, technical knowledge and money sense. According to Frese (2009), need for achievement, locus of control (self-efficacy), innovativeness, risk taking are important personality attributes whereas education, experience, mental ability and knowledge are important human capital attributes for entrepreneurial orientation (Frese, 2009: 459)

H2: Entrepreneurial traits positively and significantly affects on entrepreneurial orientation

H3: Impact of students' academic performance on entrepreneurial orientation is significantly moderated by entrepreneurial traits.

RESEARCH METHODOLOGY

Data were obtained from university students in West Sumatra Province Indonesia. There are four universities participated in the current study. A total of 300 questionnaires were distributed to the universities. Participants were involved in voluntarily basis and responses were treated with confidentiality. In total, 250 were returned, comprising a response rate 83%. All variables were measured using items which have been utilized in previous studies with 5 point Likert scale. The Entrepreneurial intentions questionnaire was adopted from Linan and Chen (2009). Entrepreneurial traits were measured by using questionnaires taken from Taatila & Down (2015). Academic performance was adopted from Adedipe (1985). All items consists of five point Likert-scales ranging from '1' meaning 'strongly disagree' to '5' meaning 'strongly agree'. All constructs demonstrated good reliability. The psychometric properties of scales are reported in Table 1.

Table 1: The Psychometric Properties of Scales

Variable	1	2	3	Cronbach Alpha	Mean	SD
Academic Performance (1)	-			.822	3.82	.45
Entrepreneurial traits (2)	.338**	-		.791	3.76	.58
Entrepreneurial Orientation (3)	.332**	.452*	-	.867	3.63	.63

REGRESSION ANALYSIS

Regression Analysis is technique is used to see the significance of independent variables toward dependent variable. This research is also aimed to see the impact

of moderating variable (Entrepreneurial Traits) toward relationship between Academic performance to Entrepreneurial Orientation, so that author added one variable that indicating the interaction.

Table 2: F-test for overall model

R	R-Square	F	Significant
0.397	0.158	6.002	0.01

Source: proceed from questionnaires by using SPSS 22 in 2018

Test aims to know the impact of independent variables (include moderating variable) in overall toward dependent variable. The result indicates that overall independent variables have impact on dependent variable.

Table 3: Regression Analysis

Variable ^a	Entrepreneurial Intention		
	Model 1	Model 2	Model 3
Step 1: Main Effect Academic Performance Academic Performance (AP)	.136**	.112*	.182**
Step 2: Main Effect of Entrepreneurial Traits Entrepreneurial Traits (ET)		.224**	.141*
Step 3: Interaction Academic Performanc x Entrepreneurial Traits (AP*ET)			.311**
Overall F	1.162	2.677**	6.002**
R ²	.021	.065	.158
F Change		4.281**	8.062**
R ² Change		.062	.094

Note: N = 250. Entries are standardized regression coefficients. ^a Variables are standardize.

* p ≤ .05. ** p ≤ .01

In order to test the interaction effects of academic performance and personality traits, regression analysis was conducted with three steps (Table 3). Then, the standardized independent variables were entered into the equation in three steps. Step 1, regression equations were computed by entering independent variable in the regression analysis, then step 2, it was followed by moderator variable. Finally, interaction effect of independent variable and moderator variable was computed in step 3 (see table 2). In the step 2, regression showed the incremental variance accounted for by interaction effect of academic performance and entrepreneurial traits was significant for entrepreneurial intention (Δ F=8.06, p ≤ .01). The results supported that academic performance significantly influenced on entrepreneurial orientation. Entrepreneurial traits are found significantly influence on entrepreneurial orientation. The finding also supports that entrepreneurial traits significantly moderate relationship between academic performance and entrepreneurial orientation.

DISCUSSION

The Influence of Academic Performance on Entrepreneurial Orientation: The result of this research found that there is significant effect of academic performance on entrepreneurial orientation. It means practically the entrepreneurship Academic Performance shows its impact of the students willingness and propensity to be entrepreneur.

According to Rauch et al., (2009) which suggests that the correlation between entrepreneurial orientation and performance is significant, although only moderately strong. Upon further investigation, it becomes clear very quickly that the relationship between entrepreneurial orientation and performance is not a straightforward, positive relationship. Entrepreneurial performance can be fostering by supporting good academic capacity included mastery knowledge related to entrepreneurship. Based on characteristic respondent, majority of the students with GPA range between 3-3.5. Those are high range of GPA would can be strengthen students’ entrepreneurial orientation.

The Influence of Entrepreneurial traits on Entrepreneurial Orientation: This result of the study found that the entrepreneurial traits effects positively effect on entrepreneurial orientation. It means, by having entrepreneurial traits/ personality of entrepreneurship will strengthen student willingness to be entrepreneur. The conditional factors are becoming the main points for this Du Toit and Motlatla (2000) mention in their research that although one should accept that there are probably specific personality traits, deep-seated urges and even genetic factors that predispose people to become entrepreneurs.

This research result supported the previous studies result. According to Frese (2009), need for achievement, locus of control (self-efficacy), innovativeness, risk taking are important personality attributes whereas education, experience, mental ability and knowledge are important human capital attributes for entrepreneurial orientation (Frese, 2009: 459)

Researchers focusing on the individual approach of the entrepreneurship mostly keep their focus on psychological, demographic and personal traits. This approach states that entrepreneurs have specific values, attitudes and needs. This would mean that psychology, personal characteristics and a person's experiences determine entrepreneurship. According to the individual approach, people with certain characteristics such as internal locus of control and need to be independent are more likely to become entrepreneurs in the future. (Bulut, et al. 2010: 560) In addition, Dollinger (1995) claimed that every individual's psychological, sociological and demographic characteristics have an effect on a person's abilities to be an entrepreneur. The psychological factors can be argued as source of entrepreneurship power (Dollinger 1995)

The Influence of Entrepreneurial Traits moderate relation between Academic Performance and Entrepreneurial Orientation in student Andalas University: This study's result found that the academic performance and entrepreneurial traits effects positively and significantly on entrepreneurial orientation. The study limits on risk taking and self confidence. This result found that the two things above combine with the higher GPA are really impacts on students entrepreneurial orientation. Higher GPA with the entrepreneurial traits is the perfect combination to effect the entrepreneurial orientation. Students who have higher GPA with the

entrepreneurial traits tend to be more confidence with their decision, that make them comfortable to take the high risk decision.

The result is supported by the views of Schwarz et al. (2009) who found that the intention to start a business was influenced by students' attitudes. According to Ferreira et al. (2012) that need for achievement, self-confidence affect entrepreneurial intention among students.

CONCLUSION

This research uses variable of academic performance, entrepreneurial traits as independent variables and entrepreneurial orientation as dependent variable. The research observation used questionnaires that distributed to 250 higher educational students in West Sumatra Province, Indonesia. Academic Performance significantly influence on student's Entrepreneurial Orientation. This result supports the hypothesis (H₁) constructed. This result explains the higher academic performance of students, the more students demonstrate entrepreneurial orientation. Entrepreneurial Traits have positive and significant influences toward student's Entrepreneurial Orientation. This result supports the hypothesis (H₂). The student with strong traits in self-confidence, innovativeness, and risk taking will be strengthen orientation to be entrepreneur after graduating from universities.

There are a few limitations being discovered during the process of conducting research. The limitations merely provide platforms for future studies, thus do not divert the significance of the findings. The samples were limited on higher educational institutions, meanwhile opportunity to entrepreneur can be happen for vocational institutions. The downside of the non-probability sampling method is that an unknown proportion of the entire population was not sampled. This entails that the sample may or may not represent the entire population accurately. Therefore, the results of the research cannot be used in generalizations pertaining to the entire population.

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Health Related Quality of Life in Life Hemodialysis Patients : A Single Center Study

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ABSTRACT

Objective: This study were to identify the many factors (gender, age, education level, employment, accessibility, income, history of disease, dialysis duration, caregiver, nutrition) that might influence QoL scores on hemodialysis patients.

Analysis: The quality of life (QoL) has become a recognized outcome in studies of the treatment for patients with undergoing hemodialysis (HD).

Method: This study used a cross-sectional design and was conducted in Hemodialysis Unit of dr. Soetomo Hospital on September-October 2016. The subj of this study were 59 HD patients with HD therapy >3 months (twice a week) and used the SF-36 forms covering 8 domains of QoL, into physical composite summary (PCS), mental composite summary (MCS) and total score.

Findings: the mean age was 44.3(±11.3), 52.5% were male. Most of participants were graduate from senior high school (54.2%), have nondiabetes mellitus history(91.5%), has spouse as caregiver (61%). The mean albumin scores were 3.8(±0.26). The total score mean was 65±20.1, PCS was 58.8(±19.6), MCS was 71.5(±29.4). There were significant correlation between age with RE and GH domain (s= -0.283;r=0.291), education level with PF domain(s=0.327), HD duration with BP, VT, and SF domain (s=0.278, 0.272 and 0.309 consecutively), nutrition with GH and VT domain (s=0.420;r=0.582) and significant comparison between history of disease with PF domain (P<0.006).

Result: Factors affecting some QoL domain in HD patients were age, education level, history of disease, HD duration, and nutrition. Adequate management of these factors can increase patient outcomes.

Keywords: Hemodialysis, quality of life, Adequate management, treatment, patients

INTRODUCTION

World Health Organization defined health as State complete physical, mental and social well-being and not merely the absence of disease or infirmity ^[1]. NKF/K/DOQI (2002) state that chronic kidney disease is a worldwide public health problem. In the United States, there is a rising incidence and prevalence of kidney failure, with poor outcome and high cost. Some of study shows the prevalence of earlier stages of chronic kidney disease are higher. Irreversible retrograde of renal function that lead to end-stage renal disease (ESRD). Hemodialysis (HD) is one of therapy needed for ESRD patients. Based on United States Renal Data system Annual Data Report 2015, Incidence case on ESRD was

reported by the end of 2013 in the US were 117,162, the incidence rate was 363 per million/year ^[2]. Prevalence of HD patients in Indonesia had increased 9396 cases in 2013 to 11689 cases in 2014, and the incident also increased 15128 cases in 2013 to 17193 cases in 2014 ^[3].

Successful renal replacement therapy leads to good quality of life (QoL). HRQOL can be used to evaluate the impact of illness, quality of healthcare, and analysis of cost effectiveness with HRQOL ^[4]. Patients perception can be described with HRQOL about their own function status and the impact of the medical condition on their daily lives ^[4]. Increased mortality and complication are associated with decreased HRQOL in HD patients. There are several factors related to QoL in

hemodialysis patients, such as body mass index, serum albumin, hemoglobin, dietary intake, HD duration, age, and ethnicity [5].

However, these studies did not evaluate the comprehensive factors affected with QoL. Thus, the aim of this study was to identify the many factors (gender, age, education level, employment, accessibility, income, history of the disease, dialysis duration, caregiver, and nutrition) that might affect the QoL scores among on hemodialysis patients using Short Form 36 (SF 36) surveys.

EXPERIMENTAL METHOD

This cross-sectional study was conducted in Hemodialysis Unit of dr. Soetomo Hospital on September- October 2016. We studied 59 of 152 HD patients who had Hemodialysis therapy >3 months (twice a week). This study using primary data with sample size calculated by 95% Confidence level and 0.10 of precision.

The sample was obtained by simple random sampling and interviewed to the eligible respondents (primary data) using SF 36 surveys, it's a generic core of Kidney Disease Quality of Life Short-Form (KDQOL-SF™) [6]. SF 36 consist of 36 items that cover 8 domains of QOL. These eight scales can be aggregated into two summary measures: the Physical Composite Summary (PCS) and Mental Composite Summary (MCS), a total score of QoL also assessed. PCS comprises the scale of physical function (PF), role limitations due to physical health problems (RP), bodily pain (BP), and general health perceptions (GH). MCS comprises the scale of social function (SF), role limitations due to emotional (RE), and general mental health perceptions (MH). Furthermore, gender, age, education level, employment, accessibility, income, history of disease, dialysis duration, caregiver and nutrition also assessed independent variable.

Nutrition assessed based on levels of albumin. Gender was categorized by female and male, age was ratio data type, education level was categorized with elementary, junior high school, senior high school and college, history of disease was categorized with diabetes mellitus (DM) and nondiabetes mellitus (nonDM) and other variable were ratio data type.

Respondents signed informed consent prior to data collection. Data were analyzed using comparison and correlation tests such as Pearson's, Spearman's, Independent t-test and Willcoxon Mann-Whitney test. Dependent variable with normal distribution was analyzed with Independent t-test for comparison and Pearson's test for correlation. The others of dependent variable were assessed with Spearman's test and Willcoxon Mann-Whitney test.

RESULTS AND DISCUSSION

A total of 59 HD patients with the mean age was 44.3 (±11.3), 52.5% were male. The mean duration of dialysis was 43.27±31.85 months. Most of the respondents, 54.2% were senior high school, 67.8 % were unemployed, a mean income was IDR 2.783.898 (± IDR 1.975.440), accessibility respondents to the hospital was 13.37 (±14.6) kilometers and the most frequent history disease 91.5 % was Non Diabetes Mellitus (Non DM), the caregiver 61% was spouse. The mean value of albumin were 3.8 (±0.26). Average of QoL are showed below (table 1).

Table 1:v Quality of Life (QoL) of Hemodialysis Respondents

SF 36	Score mean* ± SD
Total score of SF 36	65 ± 20.1
Physical Component Summary (PCS)	58.8 ± 19.6
Physical functioning (PF)	59.9 ± 27.6
Role limitations – physical (RP)	49.6 ± 38.7
Bodily pain (BP)	71.7 ± 28.7
General health perceptions (GH)	53.9 ± 15
Mental Component Summary (MCS)	71.5 ± 29.4
Vitality, energy or fatigue (VT)	72.4 ± 67.7
Social functioning (SF)	81.5 ± 27.7
Role limitations - emotional (RE)	78.9 ± 86.1
General mental health (MH)	53.1 ± 23.3
* The score range 0-100, with higher score indicating better QoL	

The mean scores of PCS were 58.8 and MCS were 71.5. Additionally, there was not significant comparison between gender and history of disease and not significant correlation between age, education level, employment, accessibility, income, dialysis duration, caregiver, and nutrition with total score, PCS and MCS (table 2).

Table 2: Factors related to total score of QoL, Physical Component Summary (PCS) and Mental Component Summary (MCS)

Variable	P value		
	Total Score	*PCS	MCS
Gender	0.439	0.768	0.785
Age	0.414	0.432	0.160
Education level	0.980	0.336	0.436
Employment	0.586	0.839	0.662
Accessibility	0.381	0.940	0.842
Income	0.933	0.324	0.686
History of disease	0.211	0.086	0.446
Dialysis duration	0.092	0.095	0.597
Caregiver	0.484	0.898	0.584

Conted...

Nutrition	0.058	0.234	0.061
PCS: Physical Component Summary; MCS: Mental Component Summary			

Statistically, there were comparison and correlation between RE, SF, GH, PF, BP, and VT domains. Age was significantly correlated to RE ($s = -0.283$). In addition, age also was correlated to GH ($r=0.291$). Education level was a significantly correlated to PF ($s=0.327$). History of disease also significantly compared with PF ($p=0.006$) with mean rank for non DM was 31.86 and DM was 9.90. Duration of HD (in month) was significantly correlate between BP ($s=0.278$), VT ($s=0.272$), SF ($s=0.309$). Enhancement of HD duration could increase BP, VT and SF scores. Albumin level was a significantly correlate between GH ($r=0.420$) and also VT ($s=0.582$) (Table 3).

Table 3: Factors related 8 domain of QoL

Variable	P value							
	PF	RP	BP	GH	VT	SF	RE	MH
Comparison Test								
Gender	0.148	0.284	0.753	0.498	0.437	0.842	0.245	0.217
History of disease	0.006	0.336	0.463	0.396	0.412	0.306	0.132	0.085
Correlation test								
Age	0.794	0.078	0.685	0.025	0.390	0.912	0.030	0.121
Education level	0.01	0.303	0.463	0.170	0.662	0.686	0.91	0.169
Employment	0.721	0.995	0.578	0.239	0.581	0.683	0.958	0.188
Accessibility	0.746	0.066	0.579	0.858	0.301	0.225	0.593	0.117
Income	0.721	0.995	0.578	0.336	0.581	0.683	0.958	0.118
Dialysis duration	0.231	0.278	0.033	0.555	0.037	0.017	0.618	0.999
Caregiver	0.490	0.566	0.360	0.271	0.207	0.654	0.985	0.289
Nutrition	0.230	0.874	0.249	0.05	0.000	0.637	0.522	0.205
<i>PCS: Physical Component Summary; PF: Physical functioning; RP: Role limitations – physical; BP: Bodily pain; GH: General health perceptions; VT: Vitality, energy or fatigue; SF: Social functioning; RE: Role limitations – emotional; MH: General mental health</i>								

The QoL scores measured among the studied patients were converted into percent scores, with higher scores indicating better QoL [7]. The mean total score of QoL were 65.

In this study, age had a correlation with RE domain in negative coefficient correlation. That showed the older age in patient related to the lower RE score. Thus, weaker and negative coefficient correlation were revealed with age, more limited role due to an emotional problem. Limited role due to an emotional problem caused the

severity of illness. Research showed patient's age and increasing the severity of illness are score strongly correlate ($r = 0.93$, $P=0.0001$) [8]. Age also correlate with GH domain in positive coefficient correlation. It showed that increasing age can improve a spirit of life, satisfaction of life and have a good perception of their health too. Research showed that age correlates strongly with the satisfaction of life score (SMLS) [9].

PF domain of QoL had significant correlation with education level and had a positive correlation, that meant

respondents with higher education had better PF domain of QoL. Higgins, Lavin and Metcalfe (2008) state that education is an important social determinant of health, education can affect health in different stages of the life cycle. In older people physical functioning, education level have a greater impact on mental health (van Oort, van Lenthe and Mackenbach, 2004). Other studies also showed that education level had significantly affected in all HRQoL dimension ^[10].

The result of this study indicated that history of disease was associated with PF domain. Percentage of the history of disease for nonDM was 91.5%. Additionally, hypertension and other factor included in nonDM category. Hypertension was the most recognized cause of ESRD, followed by diabetes ^[8]. Hypertension and diabetes mellitus were risk factor of CKD. Thus, impairment in functioning and well-being may be due to conditions that cause chronic kidney disease (such as diabetes or hypertension) or complications of decreased GFR. In this study showed respondents with nonDM had better PF score than DM.

As duration of HD had a significantly correlation BP, VT, and SF. The longer duration of HD can increase the score of BP (reduced pain intensity), VT (more vitality and spirited), SF (good social lives). Other study showed duration of HD was associated with QoL especially bodily pain ^[11].

Albumin level (nutrition) was a significant correlation between GH and VT domain. That showed good nutrition give a good perception about general health and could make patient happier and spirited. Albumin level was one of nutrition measurement in Hemodialysis patients. Based on NKF-K/DOQI guideline, one of the most important markers of protein-energy malnutrition (PEM) in patients with chronic kidney disease was serum albumin concentration, even when only slightly less than 4.0 g/dL. Albumin level also independently associated with QoL ^[7].

CONCLUSION

We conclude from our study that factor affecting some QoL domain in HD patients were age, education level, history of disease, duration of HD, and nutrition. Adequate management of these factors can increase patient outcomes. One of primary goals of renal

replacement therapy was improving patient's QoL. Multi-center research is needed to evaluate HD patient's QoL and comprehensive factors that affected HD patient's QoL in Indonesia.

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Career Transformation among Orang Asli: Are They Ready?

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ABSTRACT

Objective: This study, in general, addresses the willingness and readiness of the Orang Asli community in Kg Ulu Tual, Kuala Lipis, Pahang to cope with the career transformation due to the decreasing of the forest products which is also their source of income. Respondents for this study were Orang Asli (indigenous people) living in this village.

Analysis: To obtain the relevant information, questionnaires were distributed to 44 adults among the Orang Asli participants who voluntarily agreed to be involved in the study.

Method: The sampling method used was convenient sampling. All the data obtained in this study was usable for further analysis. For data analysis purposes, descriptive analysis was used to answer the research questions.

Findings: The study found that majority of the Orang Asli adults in the village are ready to venture into a new career and is ready to undergo the trainings that are to be provided.

Result: The results of this study can provide an understanding of the readiness of the Orang Asli community towards a more holistic career transformation and at the same time it benefits the relevant authorities in their efforts in planning for the training programs and making proper preparation to launch a career transformation program among Orang Asli community.

Keywords: *Orang Asli, forest products, deforestation, alternative career*

INTRODUCTION

The indigenous people are believed to be the earliest community that has resided in Malaysia's land (Kardooni et al., 2014). In Malaysia^[1], these indigenous people are better known as the Orang Asli community as they have been very inclined to their forests and their souls are very close to nature (Kardooni et al., 2014; Gomes, 2004). Their lives depend entirely on forest resources; for economic and social purposes as well as for spiritual and ritual purposes. In fact, they are very knowledgeable about jungles, lakes and rivers. They are also very expert in vegetation, from the value of the vegetation as food, medicine, decorations until the use of vegetation as a tool for survival in their daily livelihood. Likewise, they are more knowledgeable about the animals in the forest. They know where to hunt and where to avoid themselves from being hunted by predators.

Forests provide them with a source of livelihood because from forests they collect forest vegetation and also hunt animals to sustain their lives^[2] (Nur Fadilah, 2018; Kardooni et al., 2014). The majority of the forest

resources are for their own use and the rest are sold if there is any request from the outsiders. Other than collecting the forest products and hunting, some of them are also farmers and often the type of agriculture practiced is traditional agriculture^[3] (Mohd Tajuddin Abdullah et al., 2016; Kardooni et al., 2014).

The Background of Study: In Kg Ulu Tual, Kuala Lipis, Pahang, the majority of the Orang Asli community here are from the Semai tribe. There are more than 300 villagers with as many as 140 houses. There is still no electricity and clean water supply here.

They are quite lucky to have received some changes and developments. The houses provided by the government are well maintained with relatively clean surroundings. There is an educational building called Cenwaey Penaney Community^[4] Education Center (Tunas Pintar) which is quite comfortable and provides library facilities and teaching classes in addition to classes provided by schools. Praise is forwarded to Tok Batins in Kg Ulu Tual who have been the catalyst for the change. However, even though the change occurred,

their dependence on forests as a source of livelihood for their subsistence is still undeniable. Almost all of the villagers are still in and out the jungle for forest products especially for their own needs and families^[5]. A very small number of them have permanent jobs like being teachers at the education center in their village, being guides, farmers or fishermen (Tok Batin Harun, 2017). Thus, this study aims to investigate their willingness and readiness to venture into other kinds of jobs realizing the fact that the forests that they are depending too much for their source of income can no longer promise them with the yields as before.

LITERATURE

Orang Asli And Forest Resources: Historically, natural forest resources are a very important source in the life of the Orang Asli communities^[6] (Kardooni et al., 2014). The use of forest resources among the Orang Asli is closely related to the traditional knowledge inherited from their ancestors. Traditional knowledge is defined as knowledge or belief about the relationship between the source of life with their environment^[7] (Kai et al., 2014). Due to their traditional knowledge and their close relationship with nature, research involving the Orang Asli community has gained attention from independent researchers, academicians, students, researchers from government and non-governmental organizations as well as volunteers (Er Ah Choy et al., 2010). Researchers try to comprehend the secret of the Orang Asli community because of their uniqueness, especially their high dependence on forests and nature.

The environment, especially the forests, is also quite capable of giving the pattern and meaning to the Orang Asli community in their socio-cultural life. They really follow and abide the laws and traditional customs inherited from their ancestors, including their daily economic affairs^[8], religions, beliefs and rituals, arts and culture, social systems and their daily behaviors and practices (Mohd Tajuddin Abdullah et al., 2016). Most of their way of life is largely influenced by the wilderness and its inhabitants^[9]. Yet with the ever-increasing influence of modernization throughout the world and Malaysia is no exception, thus forests are increasingly being destroyed for development purposes. This certainly has a profound effect on the Orang Asli community. When the forest area is diminished, it reduces its natural resources. Certainly in the future

their careers as forest product seekers and hunters are no longer guaranteed.

In recent times, the situation has slowly changed with the decreasing number of forests and the Orang Asli can no longer be entirely dependent on forest resources as their economic source^[10] (Tok Batin Harun, 2017). The forest resources is no longer in abundance like before. If the Orang Asli community still relies solely on jungle resources, they will face with life crisis in the next 20-30 years. This is because of the widespread consumption of forest resources or products and the widespread activities of forest clearing and pollution for modernization and developments, which has reduced the number of plants that can be picked and animals that can be hunted.

Recognizing the fact that forest resources are getting diminished, the Orang Asli community can no longer be really dependent on forest resources as their economic sources. Thus, this article will then discuss the readiness of the Orang Asli community in facing the career transformation.

METHODOLOGY

Questionnaires were distributed to youths in telematches and knowledge transfer event organized by Universiti Malaysia Terengganu and Pejabat Daerah Hulu Terengganu held on 13-14 September 2017 at Kg Ulu Tual, Kuala Lipis. Since this study was about the willingness to change career among indigenous people (Orang Asli), the respondents were youths and adults aged 17 years and above. The sampling technique used was convenient sampling because questionnaires were distributed to any youths and adults who volunteered to become respondents to this study during that knowledge transfer activity on how to make banana chips at their village. The questionnaires were returned at the end of the event in the evening before the event ended.

FINDINGS AND DISCUSSION

The findings of this study are based on the information provided by the Orang Asli community in Kg Ulu Tual, Kuala Lipis, Pahang.

Respondents' Profile: Below is the profile of the Orang Asli respondents from Kg. Ulu Tual, Kuala Lipis, Pahang.

Table 1: Respondents’ profile

Demographic info		Frequency (n=44)	Percent (%)
Sex	Male	24	54.5
	Female	20	45.5
Age	17 years	4	9.1
	18 years	8	18.2
	20 years	4	9.1
	22 years	4	9.1
	23 years	4	9.1
	24 years	12	27.3
	34 years	4	9.1
	41 years	4	9.1
Tribe	Semai	44	100
Marital status	Single	16	36.4
	Married	28	63.6
Education Level	Primary school	44	100
Occupation	farmer/forest harvester/ fisherman/hunter	44	100
Residence	Own house	28	63.6
	Parents’ house	16	36.4
Number of households	3 persons	16	36.4
	4 persons	4	9.1
	8 persons	4	9.1
	10 persons	20	45.5
Monthly family income	Less than RM 1000	44	100

Most of the respondents involved in this study were men (54.5%) while women respondents were 45.5%. In terms of age, most respondents were 24 years old (27.3%), followed by 18-year-old respondents (18.2%). While the rest were 17 years old, 20 years, 22 years, 23 years, 34 years and 41 years old. The majority of respondents were married (63.6%) and those who were still single were 36.4%.

Uses of Forest Resources: Interestingly, in this study the respondents also revealed that the forest products they acquired are for their own use and not for trading. While only 16 percent of respondents stated that they use forest products for their own use as well as for sale. However, referring to Table 1, it shows that all respondents earn less than RM1,000.00, therefore, it is concluded that the sale of forest products is not that significant.

Table 2: The Usage of forest products

Question	Answer	Frequency	Percent
Are you making use of forest products available at your surrounding?	Yes	44	100
Are they for your own use or to be sold?	Own use	37	84
	Own use and to be sold	7	16

Awareness of the Decrease of Forest Products: Table 3 shows that the Orang Asli community of Kg Ulu Tual is aware of the decreasing of forest products in their area day by day. Information obtained from an interview with Tok Batin Harun also supports that the Orang Asli community is aware that forest products are getting reduced. They are also aware that among the reasons for the lack of forest products are illegal harvesting and illegal hunting not only by locals but also by collectors from the neighbouring countries like Thailand and Myanmar (Tok Batin Harun, 2017).

Table 3: The awareness on the decreasing of the forest products

Question	Answer	Frequency	Percent
Are you aware that the forest products are decreasing in amount?	Yes	44	100

Willingness to Engage in Forest Conservation Effort

Table 4: Willingness to involve in forest conservation efforts

Question	Answer	Frequency	Percent
Are you willing to protect our forest and natural environment around you	Yes	44	100

The findings of this research also found that one hundred percent of the respondents involved in this research are ready to give their unwavering commitment to defend their natural environment around their area. They have always taken most of their forest products for their own use and they have also played their part

in preserving the forest they live in (Nur Fadilah, 2018). The findings of this study as shown in Table 2 revealed that they use forest products for their own use. This has further reinstated the fact that the Orang Asli are not the greedy type and they are not the ones who are responsible for deforestation and destruction of the forest.

The findings are consistent with Ramle Abdullah's research twenty-five years ago. In his study in 1993, he found that the Orang Asli community collected forest products or resources for self-sufficiency and this study also shows that until now the Orang Asli community has only taken forest products mostly for their own use. This gives the impression that the Orang Asli community is very concerned about the conservation of forest resources from being over-harvested (Nur Fadilah, 2018).

As recognized by previous researchers as well as information disclosed in the recent articles, journals and books about Orang Asli and their lives, most of Orang Asli community is not a destructor of nature. It is not surprising when Tok Batin Harun (2017) stating. They really appreciate the nature and are willing to defend the forest around them.

Readiness to Venture into New Careers: As shown in Table 5, 100% of respondents in this study stated that they are willing to do farming, rearing animals and also engaging in other jobs when forest products are diminishing or extinct. This is not surprising because the life of the Orang Asli community here in Kg. Ulu Tual is quite modern with the forward thinking. Even some of them have been involved with rubber plantation and vegetable farms. Some of them also embrace in the work of bringing children to school (drivers), vegetable sellers and also involve with Kampung Ulu Tual community education center (Tok Batin Harun, 2017). When asked further about the potential jobs that they are willing to venture into, many of them chose to be a nature guide as their alternative career.

Table 5: Willingness to Venture into New Career

Question	Answer	Frequency	Percent
With the decreasing of the forest products, are you ready to be a modern farmer, rearing animals or involve in other kind of jobs?	Yes	44	100

Willingness to Join Training Program: In view of Orang Asli community that is highly related to natural forests, it is assumed that they will reluctant to involve in jobs other than the jobs that are related to forests. While the other 16% are not ready to go for training but are ready to engage in new careers.

Table 6: Willingness to Join Training Program

Question	Answer	Frequency	Percent
Are you ready to join any training program provided by government or non-government agencies?	Yes	37	84
	No	7	16

It is not easy for the Orang Asli community to venture into a new environment. Hence, the efforts of some government and non-governmental organizations to welcome and encourage Orang Asli to work in the villages, in the suburbs and in the city are something that should be viewed as positive efforts because the Orang Asli people who live in Malaysia are also Malaysian citizens who are entitled to enjoy the benefits of modernization but in their own way.

For the Orang Asli community to embrace and involve in something new, training and education as well as exposure are very important to ensure that the efforts made by government and non-government agencies will produce good outcome and results as anticipated. Based on this research, it is predicted that the Orang Asli community in Kg Ulu Tual will not face major or complicated problem when they venture into new careers as majority of the respondents have expressed their willingness to undergo any training programs that are going to be provided for them.

CONCLUSION

Forests and the Orang Asli community are two inseparable objects. Their way of life, nutrition, clothing, culture, beliefs and customs and manners are predominantly related to forests. They make the forest as the source of sustenance for them to continue their survival and may also partially make the forests as their economic source or income.

Butet, a volunteer in Indonesia who is actively involved in helping the Orang Asli community to improve the standard of living through education in Indonesia, stated that the Orang Asli community is

quite stubborn and not that easy to be influenced by modernization (Polly Christensen, 2014). They still want to continue protecting what they have and what they go through, especially their way of life. However, with the increasing deforestation for agricultural activities such as for oil palm and rubber plantations, the Orang Asli community needs to look forward and think of other alternative jobs for their sources of income. They can not be continually dependent on natural forest resources for their subsistence or for their main source of income. Seeing the reality of today's world, the Orang Asli community needs to be prepared to venture into a new career and no longer rely heavily on forest harvesting and hunting. For them to engage in a new career, they need training to help them to be familiar with the tasks and know what to expect from their new job.

The findings also revealed that the Orang Asli community is willing to participate in the training that are being proposed to them in order to help them succeed in their alternative careers. Despite the fact that they are still making the forest as a major source of income, they are willing to try and turn to other careers other than being collectors of forest products and hunters. This is something that can be proud of and would make the government's efforts to improve the status and quality of life of the Orang Asli community much easier and would be close to a reality.

Ethical Clearance: Taken from Department

Source of Funding: Nil

Conflict of Interest: No

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Characterization of Single Layer ZnO thin Films Prepared by Sol-gel Spin Coating Technique at Different Concentration

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ABSTRACT

Objective: This paper is used to demonstrate the preparation of the ZnO films on indium tin oxide (ITO) glass. This work also demonstrates a low cost, environment friendly and well abandoned material for photovoltaic device applications.

Analysis: We report the sol gel concentration effects on the morphological, structural and optical properties of ZnO thin film prepared on ITO substrates by sol gel spin coating method.

Method: The n-ZnO thin films have been successfully fabricated on the ITO glass by sol gel spin coating method with different sol-gel concentration of 1~10%.

Findings: The ZnO thin films were found by spin coating on ITO substrate using a sol-gel containing zinc acetate dehydrate, 2-propanol and ethanolamine. The coverage of ZnO films was maintained by controlling the spinning speed and coating time during the spin coating process.

Result: Combining results from AFM, XRD, and UV-Vis, we conclude that 5% of ZnO concentration gives the best result in terms of morphological, structural and optical properties. The formation of ZnO hexagonal wurtzite structure showed the average transmittance in the visible region of all films is almost 80%. The calculated band gap energy of ZnO thin films were between 3.60 eV to 3.85 eV. The thickness and average grain size of ZnO thin films were found to be around 8~15 nm and 90~150 nm respectively.

Keywords: Zinc oxide, sol-gel, spin coating

INTRODUCTION

Zinc oxide (ZnO) is an interesting material for solar cell application due to its wide theoretical band gap energy of 3.37 eV^[1]. ZnO, having a large exciton binding energy of 60 meV^[2] at room temperature have unique properties such as abundant, nontoxic, low cost and chemically stable at room temperature. ZnO is an n-type semiconductor which means electron as the majority carriers with an electron mobility of 2000 cm²/Vs at 80 K^[3]. The n-type ZnO acts as an electron transporter and window layer in the photovoltaic cell. ZnO is considered as an excellent candidate for electronic material due to its electrical and luminescent properties, strong absorption in the ultra-violet (UV) region and high transparency in the visible region^[4,5]. ZnO can be fabricated by several techniques such as radio frequency (RF) magnetron

sputtering^[6,7], electron-beam evaporation^[8], pulsed laser deposition (PLD)^[9] and chemical vapor deposition (CVD)^[10]. These methods have been used to fabricate ZnO thin films with a high quality of the crystalline structure. However, these methods are expensive and require a complicated operation such as high temperature or vacuum system. Therefore, another technique with a low cost is widely used to fabricate the ZnO layer such as electrochemical deposition and sol-gel spin coating.

K. Ikhyun *et al.* studied the effect of different sol concentrations on the properties of nanocrystalline ZnO thin films by sol-gel spin-coating. The result shows that the thickness of the ZnO thin films was depend on the sol concentration and increased from 50 to 600 nm with increasing sol concentration. Similar research has been conducted by M.Dutta *et*

al. The result shows that the band gap energy value increases from 3.27 eV to 3.3 eV when the sol-gel concentration increased from 0.03 M to 0.1 M. In addition, the structural and optical properties of ZnO thin films grown on glass substrates using the sol-gel spin-coating method have been found to be influenced by the precursor concentrations as reported.

Here, we demonstrate the preparation of the ZnO films on indium tin oxide (ITO) glass. The sol-gel were prepared at various concentration followed by a spin coating method for construction of the ZnO thin films and report the effects of the sol-gel concentration towards the properties of the ZnO thin films on pre-cleaned ITO glass. The optical, structural and morphology characterizations for ZnO thin films were carried out by UV-Vis spectroscopy, X-ray diffraction (XRD) and atomic force microscopy (AFM).

Experimental Section: Zinc acetate dehydrate, $Zn(C_4H_6O_4) \cdot 2H_2O$ was used as a precursor while 2-propanol, $CH_3CH(OH)CH_3$ and ethanolamine, $NH_2CH_2CH_2OH$ were used as a solvent and stabilizer respectively for the sol-gel preparation. All the material used for sol-gel preparation was purchased from EMD Milipore Corporation. Zinc acetate dehydrate (1.0975 g) was first dissolved in 50 ml of 2-propanol and then 0.3024 ml of ethanolamine were added. The molar ratio of ethanolamine to zinc acetate dehydrate was maintained at 1.0 and the concentration of zinc acetate dehydrate was 0.1 M (10 %). The solution was stirred at 70°C for 1 hour and the obtained clear solution was allowed to cool to room temperature. The sol-gel was diluted to three concentration which are 5 %, 3 % and 1% by adding 10 ml, 23.33 ml and 90 ml of 2-propanol respectively. Then, the sol-gel was aged for 24 hours to obtain a clear and homogeneous solution of ZnO. The ITO glass purchased from (Lianyungang Liaison Quartz Co. Ltd) with a dimension of 2 cm (length) x 1 cm (width) was used as a substrate and prior to the deposition, the ITO glass was immersed in acetone for 2 minutes and then rinsed with distilled water before polarized with +2 mA/cm² current in NaOH solution for 1 minute. Prior to deposition of zinc oxide, the pre-cleaned ITO glass was covered with a Kapton tape to separate the coated and uncoated area. The deposition area for zinc oxide was 1cm x 1 cm. The sol-gel solution was dropped onto the surface of ITO glass which was rotated at 2000 rpm for 15 sec using spin coater at room temperature. Then,

the single layer of the thin films was dried at 100°C for 20 min on a hot plate. Structural characterization was carried out by X-ray Diffractometer (XRD BRUKER D2 PHASER), operated at 30kV and 10mA using Cu K α radiation (wavelength of $K\alpha_1=1.5406\text{\AA}$) that linked with DIFFRAC. SUITE EVA Software. The optical UV-Vis absorbance, reflectance and transmittance spectra were recorded by using PERKIN ELMER LAMBDA 35 UV-Vis Spectroscopy in the wavelength range from 200 nm to 1000 nm. The surface morphology of thin films was studied using SII Atomic Force Microscope linked with SPA400 Soundproof Housing and SPI 3800N Probe Station using a scan size of 3 μ m to 5 μ m.

RESULTS AND DISCUSSION

Morphological properties of ZnO thin films on ITO glass at different sol-gel concentration

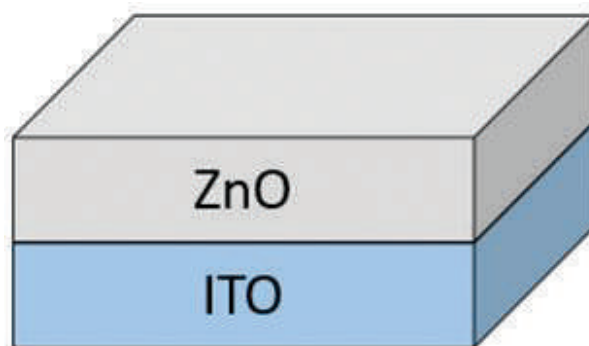


Fig 1: a) Schematic illustration of cell configuration of the ZnO thin films on ITO glass

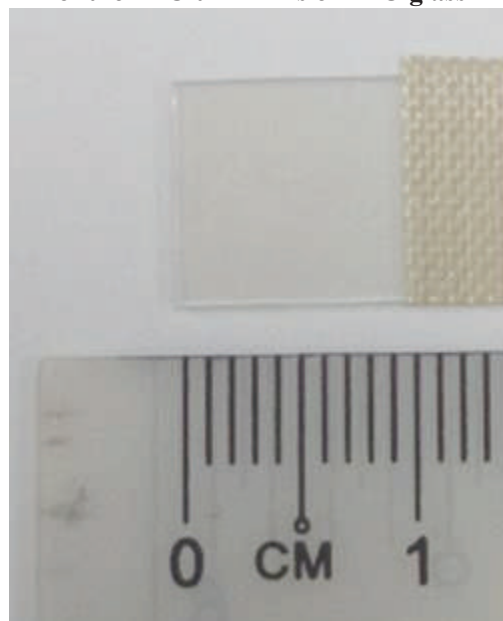


Fig 1: (b) Actual image of the transparent ZnO thin films on ITO glass

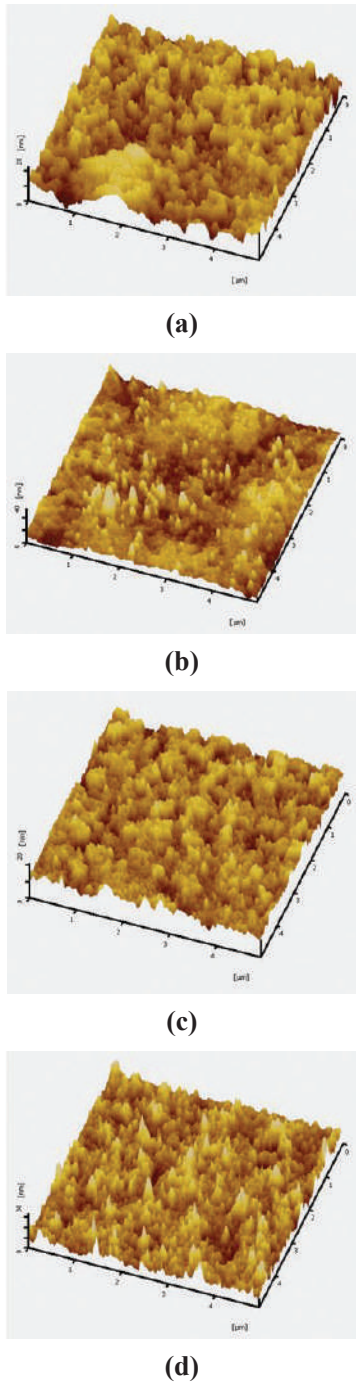


Fig 2: The AFM images of ZnO thin films on ITO glass at various sol-gel concentration in 3D view ; (a) 1%, (b) 3%, (c) 5% and (d) 10 %

Fig 1(a) shows the schematic illustration of the cell configuration of ZnO thin films on ITO glass. The physical appearance of ZnO thin films on ITO glass is shown in **Fig 1(b)**. ZnO thin films was found to be existed as a transparent thin film. The surface morphology of the ZnO thin films was further examined by AFM. **Fig 2** and **Fig 3** show the 3D view of surface morphology and the plan view of the AFM images of ZnO thin films on

ITO glass at various sol-gel concentrations. From **Fig 2(a-d)**, the ZnO thin films exhibited the mountain-chain-like structures irrespective of the sol gel concentration. The mountain-chain-like structures of the ZnO thin films prepared at different sol concentrations has speculated to be due to the effects of either the slow cooling after the post baking or the presence of ethanolamine . The average grain size found to be increased from 90 to 150 nm as the sol gel concentration changed from 3% to 5% as shown in **Fig 2(b,c)**. However, the grain size of ZnO became smaller when the sol gel concentration is increased to 10%. The grain size obtained at 5% sol-gel concentration exhibited the largest grain size with slightly coarse structure as shown in **Fig 3(c)**. It may be observed from the AFM micrographs that there is mixed structures of the films in which some particles are in nano size and some are in micro size due to different sol gel concentration.

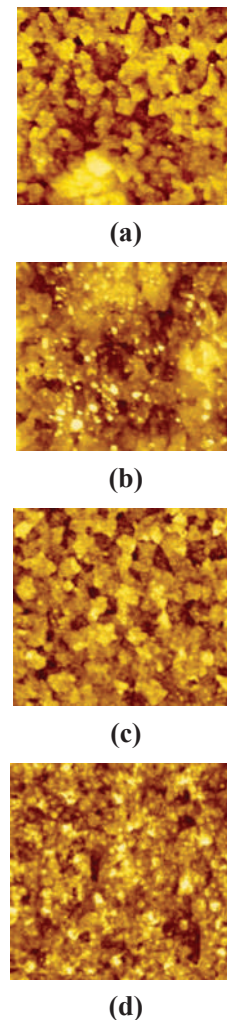


Fig. 3 : The AFM images of ZnO thin films on ITO glass at various sol-gel concentration in plan view ; (a) 1%, (b) 3%, (c) 5% and (d) 10 %

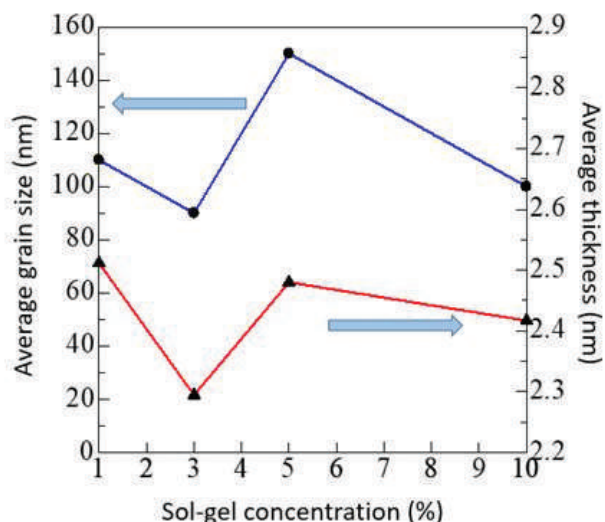


Fig. 4 : The average grain size and surface roughness of the ZnO thin films on ITO glass against the sol-gel concentration

Table 1: The correlation between the sol-gel concentration with the average grain size, surface roughness and average thickness of the ZnO thin films

Sol-gel concentration (%)	Average grain size (nm)	Surface roughness (nm)	Average thickness (nm)
1%	110	2.89	8.51
3%	90	2.27	17.65
5%	150	2.80	14.57
10%	100	2.62	15.47

Fig 4 shows the relationship between average grain size and surface roughness of the ZnO thin films on ITO glass with various sol-gel concentrations. The ZnO grain size is directly proportional with the ZnO film thickness. The surface roughness of ZnO thin films increases as

the average grain size increase. The thickness of ZnO thin films obtained from this study was around 8 to 15 nm. The summary of the correlation between the sol-gel concentration with the average grain size, surface roughness and average thickness of the ZnO thin films are explained in Table 1.

Structural properties of ZnO thin films on ITO glass at different sol-gel concentration

X-ray diffraction (XRD) analysis was carried out to examine the orientation and crystal structure of the ZnO thin films. The fundamental of XRD was based on Debye-Scherrer equation :

$$D = K\lambda/(\beta \cos \theta_B) \quad \dots(1)$$

where D is the crystallite size, λ is the wavelength of X-radiation, β is the full width at half maximum (FWHM) of the highest intensity peak, θ_B is the diffraction angle in radian and K is the Scherer's constant of the order of unity for usual crystal.

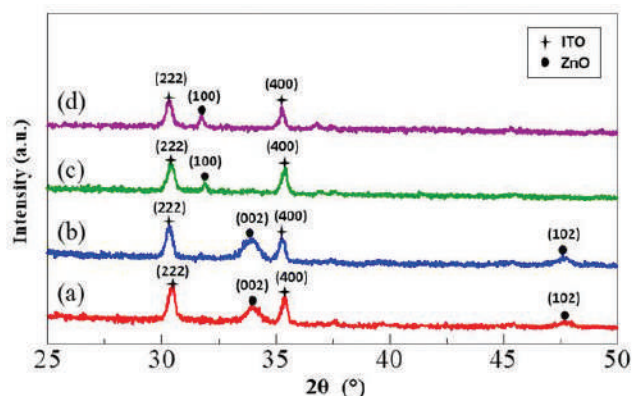


Fig. 5: XRD spectra of the ZnO thin films on ITO glass at different sol-gel concentration (a) 10%, (b) 5%, (c) 3% and (d) 1 %

Table 2: XRD analysis data of the ZnO thin films on ITO glass at different sol-gel concentration

Sol-gel concentration (%)	Phase	Lattice constant (Å)	Diffraction angle, 2θ (°)	hkl	Interplanar spacing, d (Å)
10%	ZnO	Hexagonal a = 3.2498 c = 5.2066	34.42	002	2.603
			47.54	102	1.911
5%	ZnO	Hexagonal a = 3.2498 c = 5.2066	34.42	002	2.603
			47.54	102	1.911
3%	ZnO	Hexagonal a = 3.2498 c = 5.2066	31.77	100	2.814
1%	ZnO	Hexagonal a = 3.2498 c = 5.2066	31.77	100	2.814

Fig 5 and **Table 2** show the XRD patterns and XRD data analysis for the ZnO thin films on ITO glass at different sol-gel concentrations from 1% to 10%. The ZnO peaks were seen in the XRD patterns which proved the presence of the ZnO thin films. The ZnO thin films at 5% and 10% concentration revealed one main diffraction peak, which was indexed to (002) at diffraction peaks of 34.41°. Higher intensity of diffraction peak (002) with 5% compared to 10% sol-gel concentration. A minor peak of ZnO (102) is also detected in the XRD pattern at a diffraction angle of 47.54°. The ZnO orientation was corresponding to hexagonal wurtzite structure of ZnO pattern (PDF 00-036-1451) with a lattice constant of $a = 3.2498 \text{ \AA}$ and $c = 5.2066 \text{ \AA}$. The value of crystal lattice constant of a and c remains constant for all sol-gel concentration, indicates that no changes on the hexagonal wurtzite structure of ZnO crystals. At the lower concentration of 3% and 1%, the orientation of (002) and (102) were not detected. A new orientation of ZnO (100) was formed with a low intensity at the diffraction angle of 31.77°. The result shows that at concentration lower than 3%, only one orientation of ZnO is formed due to the low composition of ZnO.

Optical properties of ZnO thin films on ITO glass at different sol-gel concentration

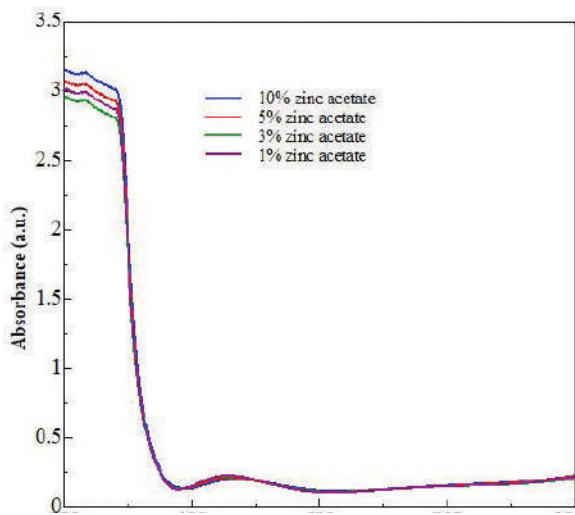


Fig. 6: UV-Vis absorption spectra of the ZnO thin films on ITO glass at different sol-gel concentration

The optical absorbance and transmittance of ZnO thin films as a function of sol-gel concentration was studied. **Fig 6** and **Fig 7** show the UV-Vis absorption and transmittance spectra of ZnO thin films on ITO at different sol-gel concentration, respectively. The absorption edges show the transformation from

absorption to transmittance regions from lower wavelength to a higher wavelength starting at 380nm. A sharp absorption curve is observed in the ultraviolet region and the exciton absorption is at 380 nm indicate the presence of ZnO, shown in **Fig 6**. The ZnO thin films spin coated at a low concentration below 3% showed lower absorption while at higher concentration of 5% and 10%, higher absorption is observed. As can be seen from **Fig 7**, all ZnO thin films at different concentration were highly transparent in the visible range of 380–700 nm with a transmittance almost 80.

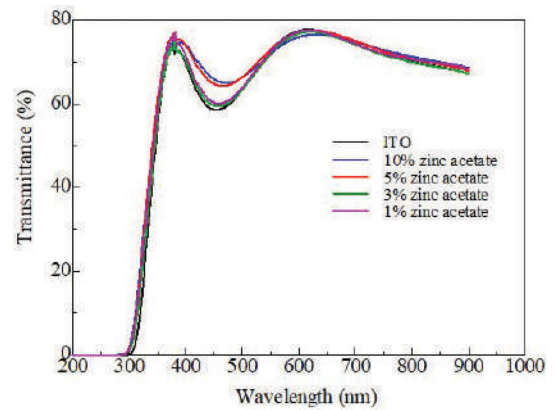


Fig. 7: UV-Vis transmittance spectra of the ZnO thin films on ITO glass at different sol-gel concentration

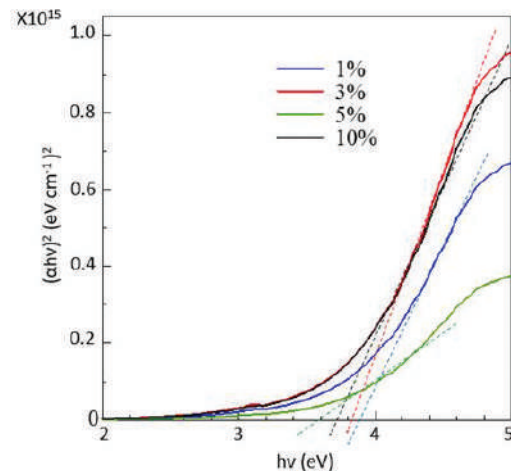


Fig. 8: Corresponding $(\alpha hv)^2$ versus $h\nu$ plot of ZnO films grown on ITO glass at different sol-gel concentration

The fundamental of UV-Vis absorption is related to the equation of Tauc's relation:

$$\alpha hv = A(hv - E_g)^n \quad \dots(2)$$

where α is the absorption coefficient, $h\nu$ is the photon energy, E_g the optical band-gap energy and A is a constant. n is equal to 2 for indirect band gap semiconductor and

1/2 for a direct band-gap semiconductor. The band gap energy was obtained by extrapolation method from the $(\alpha h\nu)^2$ versus $h\nu$ curve as shown in **Figure 3**. The band gap energies of ZnO thin films at 1%, 3%, 5% and 10% sol-gel concentration are 3.85 eV, 3.82 eV, 3.60 eV and 3.65 eV respectively. As the calculated band gap energy value of ZnO thin films is more than the theoretical value, this might be due to the thermal stress effects that produced in ZnO thin film.

CONCLUSION

The n-ZnO thin films have been successfully fabricated on the ITO glass by sol gel spin coating method with different sol-gel concentration. The ZnO thin films were prepared by spin coating on ITO substrate using a sol-gel containing zinc acetate dehydrate, 2-propanol and ethanolamine. The coverage of ZnO films was maintained by controlling the spinning speed and coating time during the spin coating process. The results obtained from AFM showed that 5% concentration of sol-gel gives the best grain structure with the highest intensity of ZnO (002) supported by XRD result. UV-Vis absorption spectra proved the existence of ZnO with a high absorption at absorption edge of 380nm and average transmittance was almost 80%. The value of band gap energy obtained from this study is from 3.60 eV to 3.85 eV. The thickness of the ZnO films was found to be around 8 to 15 nm while the average grain size was 90 to 150 nm. Combining results from AFM, XRD, and UV-Vis, we conclude that 5% of ZnO concentration gives the best result in terms of morphological, structural and optical properties. Although further improvement is needed, these results show the importance of the crystalline structure of the ZnO films to the improvement of the photovoltaic device performance. This would be useful to enhance the optical and electrical properties of films as the ZnO particles have high mobility.

Ethical Clearance: Taken from Department

Source of Funding: Fundamental Research Grant Scheme (FRGS) from Ministry of Higher Education (MOE) Malaysia

Conflict of Interest: No

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Knowledge, Attitude and Practise of Prophet Muhammad (PBUH) Dietary and Medicine among Pharmacy Students in Malaysia

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ABSTRACT

Objective: Prophet Muhammad (PBUH) dietary and medicine has been widely advertised and also commonly practised among Malaysians especially among the Muslim. The campaign on Prophet Muhammad (PBUH) dietary and medicine has aimed to increase awareness among the public, but the awareness among the pharmacy students remain unknown.

Analysis: This study was conducted at one university in north state of Malaysia. The protocol of study had been approved by the university Research Ethic Committee.

Method: In this paper, method is based on the questionnaire which consists of various levels of the students. This was a cross sectional study to assess the level of student's knowledge, attitude and practise toward Prophet Muhammad (PBUH) dietary and medicine.

Findings: A total of 138 pharmacy students from Faculty of Pharmacy were invited to participate in this study. The number of students that aware of Prophet Muhammad (PBUH) dietary and medicine practices (Mean Rank = 71.34, n=138) were significantly higher than those to unaware group of respondents.

Result: The majority (73.1%) of the respondents claimed that they practised the Prophet Muhammad (PBUH) dietary and medicine with various reasons. However, the existing knowledge from the informal education on Prophet Muhammad (PBUH) dietary and medicine is not sufficient to give high impact on student's attitude and practise.

Keywords: Knowledge, Prophet Muhammad (PBUH), practices, Malaysia and medicine

INTRODUCTION

Modernisation in Malaysia has been extended into many sectors including food industry, information technology and medicine. Nonetheless, the lifestyle and eating habits among Malaysians are influenced by local cultures (Fournier, Tibère, Laporte, Mognard & Poulain 2016)[1]. Malaysia as a multi-racial country has a lot of custom and tradition especial in dietary and

medicine. In Malaysia, the complexity of the social cultural and ethnicity may contribute to the diversity of dietary and medicine practices. Although different ethnics have their own custom and tradition, Prophet Muhammad (PBUH) dietary and medicine are widely practised among Malaysians especially Muslims[2]. In Islam, Prophet Muhammad (PBUH) was the last Messenger and prophet sent by Allah to guide humanity to the right way[3] (Al Quran). The Muslims will follow His words, actions, recommendation and prohibition. There are also guidelines on medical treatments, prescriptions of diseases, prevention, health promotion and spiritual aspects that were recommended by Prophet Muhammad[4] (PBUH) (Al-Rumkhania, Al-Razganb & Al-Farisbet 2016). Generally, the Prophet Muhammad (PBUH) dietary is known as Sunnah food or Sunnah diet[5] (Ishak et al. 2013).

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Pharmacists are drug information providers and have important responsibility in developing Malaysian healthcare setting[6] (Elnaem et al. 2018). Pharmacy students are involved directly in health care system after graduation. In their curriculum, students are exposed with modern drugs and alternative medicines. Although pharmacy students will be well-equipped with the knowledge on good practice in maintaining health, the level of student’s knowledge, attitude and practise toward Prophet Muhammad[7] [8] (PBUH) dietary and medicine are unclear. There was a study on Sunnah diet’s perception among youth at International Islamic University Malaysia (IIUM) which covered multi-discipline such as engineering, medicine, dentistry and nursing (Ishak et al. 2013). Thus, this study aimed to assess the level of knowledge about Prophet Muhammad[9] (PBUH) dietary and medicine, specifically among pharmacy students. We also determined the student’s information seeking method and their practise on Prophet Muhammad (PBUH) dietary[10] and medicine.

METHODOLOGY

This study was conducted at Universiti Teknologi MARA Pulau Pinang, Bertam campus, Malaysia. A total of 138 of first year pharmacy students were invited to participate in this study. The protocol of study had been approved by the university Research Ethic Committee.

A set of questionnaire was constructed based on Che Lamin et a. (2017) and content validated. The questionnaire consisted three sections: i) demographic data, ii) student’s awareness and their practise and attitude toward Prophet Muhammad (PBUH) dietary and medicine, iii) knowledge of definition on Quran, Sunnah and Prophetic medicine and scientific facts of the Prophet Muhammad (PBUH) dietary and medicine.

RESULT AND DISCUSSION

There were 138 respondents in this study. There were 33 (23.9%) males and 105 (76.1%) female students. The first year students aged 18 years old.

In Malaysia, *Sekolah Menengah Kebangsaan Agama* (SMKA) is an Islamic background school while *Sekolah Menengah Kebangsaan* (SMK) is an ordinary types of secondary school. Figure 1 illustrates the association between the student’s education background

and their awareness on Prophet Muhammad (PBUH) dietary and medicine. Majority of students were aware of Prophet Muhammad (PBUH) dietary and medicine regardless their background of school. A Mann-Whitney U test indicated that the academic background of the participants that claimed they are aware of Prophet Muhammad (PBUH) dietary and medicine practices (Mean Rank = 71.34, n=138) were significantly higher than those of the unaware group of respondents (Mean Rank = 55.44, n=138), $U = 751, z = -1.627$, (corrected for ties), $p = 0.104$. There was no significantly different between academic background of the aware groups and unaware groups of the Prophet Muhammad (PBUH) dietary and medicine practices. The effect of this associated can be described as “week” with $r = 0.14$.

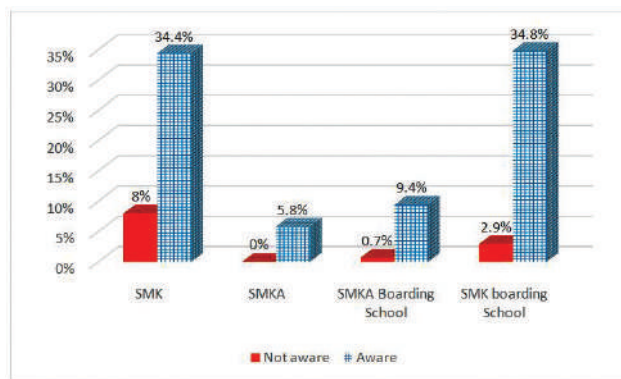


Fig. 1: Previous student’s education background and their awareness on Prophet Muhammad (PBUH) dietary and medicine

Figure 2 shows the relative popularity of each type of information sources of Prophet Muhammad (PBUH) on dietary and medicine. The respondents were allowed to give the answers more than one answers. There were three tops of information sources: parents (85.5%), school (85.5%) and religious forum or preach (85.8%). Book and mass media such as television and internet contributed as source of information around 60.1% and 54.4% respectively. Our finding was similar to a previous study (Che Lamin et al. 2017) where parents and school were the most popular source of information on the Prophet Muhammad Dietary and medicine. Different finding by Ishak et al. (2013), indicated that majority of the students in International Islamic University of Malaysia (IIUM) gained the information about Sunnah diet from the Holy Quran. This was because Islamic environment was enlivened at IIUM where the students always bring and recite the Quran.

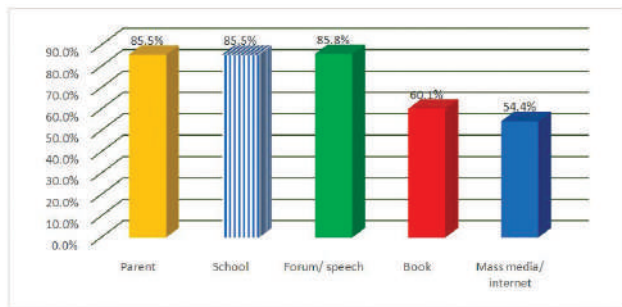


Fig. 2: the choices of information sources type of Prophet Muhammad (PBUH) on dietary and medicine

We also identified five reluctant reasons of Prophet Muhammad (PBUH) dietary and medicine (Figure 3). Thirty-six (26.1%) of the respondents were not practising Prophet Muhammad (PBUH) dietary and medicine. The majority (61.1%) of the respondents indicated that Sunnah food was not their diet habit since childhood. Equal percentage (41.7%) respectively claimed that they do not know the Sunnah food and they were satisfying with their health level. A small portion of respondents (13.8%) mentioned that Sunnah food does not suit with their appetite and the food was hardly found in the market. Ishak et al. (2013) also justified the reasons for not choosing Sunnah diet including the fact that the Sunnah food is scarce, costly, and it is less tasty.

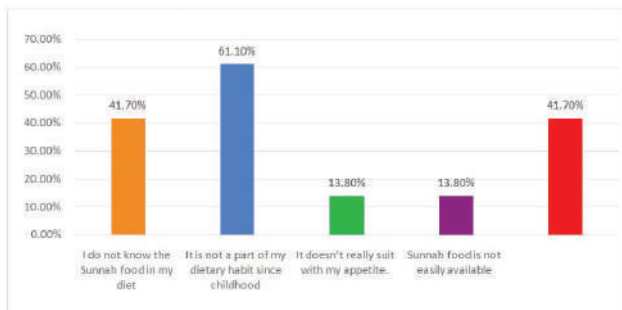


Figure 3: The total sample of reason of not practising the Prophet Muhammad in the respondent's diet and medicine practices

On the other hand, there were 102 students (73.9%) claimed that they were complying with Prophet Muhammad (PBUH) dietary and medicine. Figure 4 shows that 99% of students that practise the Prophet Muhammad (PBUH) dietary and medicine have a positive belief of Sunnah food, helping to improve their health level. This was found similar with a previous study, all students realized that Sunnah diet can enhance their health level (Ishak et al. 2013). Besides, 97% of them were advised to comply with Prophet

Muhammad (PBUH) dietary and medicine. While 92% of the respondents indicated that Sunnah food fitted their appetite and 87.3% of respondents mentioned that they could easily have the Sunnah food. Finally, the respondents that indicated the Sunnah food was their diet habits since childhood was 68.6%.

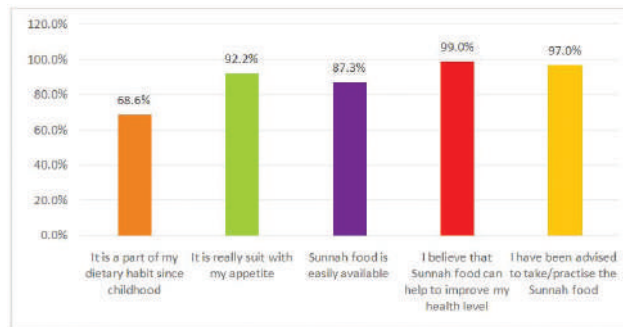


Fig. 4: The total sample of five reason of practising the Prophet Muhammad in the respondent's diet and medicine

Basically, Sunnah diet is synonym with Arabic diet rather than Malaysian. Figure 5 shows the frequency of practising the Prophet Muhammad (PBUH) dietary and medicine. Majority of the students (44.9%) only practise of the Prophet Muhammad (PBUH) in dietary and medicine practices when they felt they wanted to or based on the feasibility. The same trend also was observed by Che Lamin et al. (2017). Only 17.4% of the respondents had included the Prophet Muhammad (PBUH) as daily practice. About 18.1% of the respondents took two or three times of the Prophet Muhammad (PBUH) in their dietary and medicine practices. While 8% and 1.4% of the respondents practised of the Prophet Muhammad (PBUH) in their dietary and medicine practices once a week and once a month respectively. Ishak et al (2013) also stated that the students preferred to consumed Sunnah diet such as date during Ramadhan, the fasting month. Besides, our findings were agreeable with Ayatollahi (1992) where the consumption of food, diet patterns and the customs of parties are driven by the culture of a society.

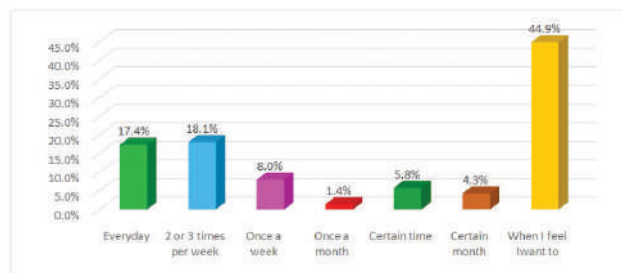


Fig. 5: Frequency of practising the Prophet Muhammad (PBUH) dietary and medicine

Majority of the students were unable to identify the definition of the Prophetic Medicine according to Al-Quran and Sunnah (Figure 6). There are about 34.8% of the respondents who only got 1 correct answers out of 5 questions and 3.6% who got zero mark. Only 0.7% of respondents were successfully answered all the questions correctly.

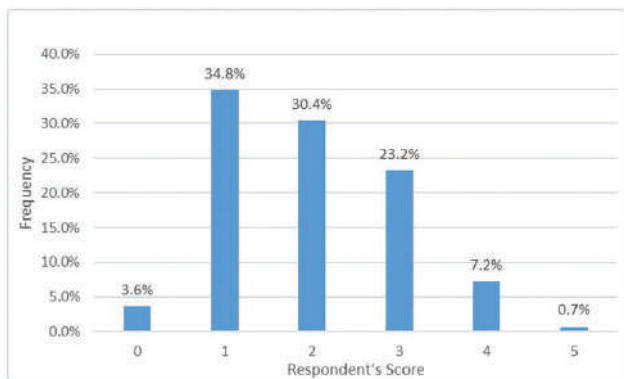


Fig. 6: The score of student’s knowledge on basic definition of Prophetic Medicine according to Al-Quran and Sunnah

Besides that, the assessment of the scientific evidence perspective (table 1), shows that 60% of the students have weak knowledge and 40% have satisfactory level. None of the students were able to score good and excellent score.

Table 1: Knowledge score of scientific perspective of the Prophet Muhammad Dietary and medicine

Level score of scientific evidence perspective	Percentage of students
Weak (1 to 10 corrects answers)	60%
Satisfactory (11 to 20 corrects answers)	40%
Good (21 to 30 corrects answers)	0%
Excellent (31 to 41 corrects answers)	0%

A bivariate Pearson’s correlation coefficient (*r*) was calculated for the knowledge of respondents on definition of Prophetic Medicine in term of Islamic perspective and scientific evidence perspective. The bivariate correlation (table 2), between these two variables was positive but weak, $r(136) = 0.218, p < 0.05$. The student’s knowledge on the definition of Prophetic medicine in term of Islamic perspective was proportionate with their knowledge.

Table 2: Pearson’s correlation between

Variables	Scientific evidence perspective	Definition of Prophetic medicine
Definition of Prophetic Medicine	0.218*	1
Scientific evidence perspective	1	0.218*

N=138, * significant value $p < 0.05$.

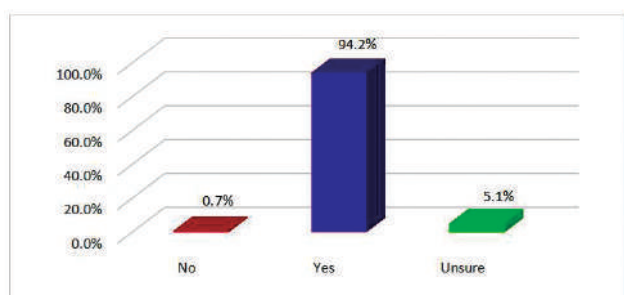


Fig. 7: Respondent’s opinion on the benefit of Prophet Muhammad (PBUH) dietary and medicine

Student’s perception on the Prophet Muhammad (PBUH) dietary and medicine also had been determined. Up to 94.2% of the respondents were agreed that the Prophet Muhammad (PBUH) dietary and medicine could be beneficial to everyone. Only 0.7% of the respondents disagreed on that. Meanwhile, 5.1% of the respondents indicated that they were unsure about the suitability of the Prophet Muhammad (PBUH) dietary and medicine to everybody. According to Lange, Heilbron, & Kok

(2018), knowledge affects the perception and also is an essential for perceptual decision-making. In our findings, the respondent’s perception on the benefit of Prophet Muhammad (PBUH) dietary and medicine might be affected by their education background, belief and experience in life.

CONCLUSION

Student’s knowledge, attitude and practise towards the Prophet Muhammad (PBUH) dietary and medicine has been influence by many factors. Informal education such as parental guide and mass media has contributed to limited level of knowledge and attitude to practise the Prophet Muhammad (PBUH) dietary and medicine. Students may have a good perception on the Prophet Muhammad (PBUH) dietary and medicine but it is not reflecting their practise which may be due to lack of knowledge in this area. Further investigation is suggested for better understanding of this behavioural because there could be many other influencing factors.

Ethical Clearance: Taken from Department

Source of Funding: grant from the Asian Institute of Finance

Conflict of Interest: No

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ISO/IEC 27001 Implementation in SMEs: Investigation on Management of Information Assets

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ABSTRACT

Objective: The main reason of this study was to generate knowledge and improve understanding amongst practitioners and academics. This paper examines the extent to which SMEs have implemented physical, policy as well as logical controls in place to curb security threats as a preventive control.

Analysis: Data was gathered through surveys and to achieve more reliable responses, questionnaires were distributed and collected personally by hand. ISMS provide a systematic approach to manage sensitive data in terms of maintaining its confidentiality, integrity and authentication.

Method: This study is based on both quantitative and qualitative tests method or measurement which determines IEC/ISO27001 practices amongst SMEs. ISO/IEC27000 family of standards provides clear guidelines to medium and large organizations on how to keep their information assets secure.

Findings: A total of 100 surveys were sent administered by hand across six enterprises which were equally represented by four sectors i.e. Business Process Outsourcing (BPO), telecommunications, software and hardware vendors. Respondents were data handlers that had at least five years of working experience. All 100 responses were collected by hand, giving this study a response rate of 100%.

Result: Results reveal that 98% of the respondents agreed that ISMS has a significant relationship with recommended industry best practices. Majority of firm ISMS initiatives are on voluntary basis.

Keywords: ISO/IEC27001, Information assets, Confidentiality, Integrity, Authentication, Information Security Management Systems (ISMS)

INTRODUCTION

In most organizations security is often an afterthought. In some rare cases, organizations adopt best practices and implement certain processes that clearly comply with best practices to improve their customer goodwill^[1]. ISO/IEC27001 that emphasizes requirements for Information Security Management Systems (ISMS) is one such example. It may for some others seen as a passive work

procedure that negatively impact performance of workers with little or no empathy that the information asset is a significant commodity^[2] (H. Kong, S. Jung, I. Lee, and Seung-Jun Yeon, 2015). The reason for compromise of information asset security is largely due to this lack of empathy by handlers of these information assets. Table 1 shows the cost type; proven scenarios associated with data vulnerabilities and cost relationships^[3]. Table 2 highlights nature of information assets.^[4]

Table 1: Information asset cost

Cost Type	Proven Scenarios	Cost Relationships
Financial loss	Service interruption	Direct and indirect
Resumption cost	Prevent and mitigate breach	Direct
Productivity cost	Diversion of staff, redundant work to amend entries, correction entries	Direct
Reputational cost	Customer confidence due to negative media publicity	Direct and indirect
Privacy breach cost	Remediate data breach of data	Direct
Legal cost	Negligence or breach of contract	Direct
Relationship cost	Loss of trust by local and foreign business partners	Direct and indirect

Table 2: Nature of information assets

Primary assets	Secondary assets
Information in transit	Hardware Software Network Personnel
Information at rest	Site Organization structure

According to Jeremiah Grossman, the founder of White Hat, recognizes that industries are able to categorize security vulnerabilities when they encounter, however when it comes to the process of remediation and fixes^[5], there solutioning are not being addressed in timely manner. This goes back to the reason of traditional solutions have been widely ineffective. It is simply because the focus was more towards the tools and consultancies. Besides, most of these methods lacks in complexity of data and they are expensive^[6]. Subsequently, companies need better approach to not only able to trigger the security vulnerabilities but also ensuring the security level is high and mitigation plans are in place from any risk.

In return, numerous employees regularly make a conscious choice to violate security policies for the reason they want to further their work or increase their own productivity^[7] (J. Predd, S.L. Pfleeger, J. Hunker and C. Bulford). In a similar study, researchers found that fear of penalty stimulate employees to obey security policies in an organization. On the contrary, Miller and Doyle (1987) stated that corporations that attain greater work presentation are those who adopt Information Security that ties their organization’s goals^[8]. Information Security can have diverse purposes in an organization, thus management should ensure that the organization utilizes the securities effectiveness to suit and organization objectives^{[9][10]}.

Information Assets (IAs): Information assets (IAs) are identified by various definitions. From the survey of definitions listed in Table 3 a summary of key attributes that reflect information assets are as follows:

Table 3: Standard definitions for information assets

No.	Source of definition	Web Link/URL	Summary		Key Points
1.	WhatIs	https://whatistechtarget.com/definition/information-assets	A body of knowledge that is organized and managed as a single entity.	i.	Value increases with direct relationship to the number of information assets handlers
				ii.	Value tends to depreciate over time

- IAs must represent a value to the firm
- IAs value increases linear to the number of information assets handlers
- IAs value can depreciate over time
- IAs cost money, skills, time, resources to be acquired and to be reacquired
- Once permanently lost IAs will incur legal, reputational or financial repercussions
- IAs should have data classification on its importance
- IAs should be maintained in a consistent and cooperative manner
- IAs are a source of reference for multiple business functions

What Is stated that information asset is a body of knowledge that is organized and managed as single entity. It should have financial value in which the value increases as a direct relationship with the number of people who are able to make use of it. In other words, the value should increase as the number of information assets handlers increase. Not just that, there will be financial value associated it just like the physical assets of an organization. It may be less quantifiable but the importance can outweigh the physical assets.

It can be a simple monthly update to a complex development project ROI dashboard that is being updated weekly. It differs from one entity to another on defining their information asset. Each organization may have different information that they feel is a vaults towards them. Queensland Government Chief Information Office gave definition of information asset to be an identifiable collection of data stored in any manner and recognized as having value for the purpose of enabling an agency to perform its business functions thereby satisfying a recognized agency requirement. The information asset will become the source of reference for multiple business functions with value.

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2.	Simplifiable	https://simplifiable.com/new/information-asset	A body of information that has financial value to an organization.		Improves revenue or reduce future costs by having it
3.	The National Archives	http://www.nationalarchives.gov.uk/documents/information-assets-management/information-assets-factsheet.pdf	A body of information defined and managed as a single unit so it can be understood, shared, protected and exploited efficiently. Information assets have recognizable and manageable value, risk, content and lifecycles.	i.	It gives value to the organization
				ii.	Costs money to reacquire it
				iii.	Legal, reputational or financial repercussions if couldn't produce it on request
				iv.	There should be a risk associated with it
				v.	Group of information should have a specific content
				vi.	It has manageable lifecycle
				vii.	Disposal should have rules
4.	Cambridge Dictionary	https://dictionary.cambridge.org/dictionary/english/information-asset	A piece of information, such an employee record, a customer list, or a financial report, that is valuable to a company or organization		It has a value to the organization
5.	University of Tasmania	http://www.utas.edu.au/it/records/information-asset-register	A body of information defined and managed as a single unit so it can be understood, shared, protected and exploited effectively. Information assets have recognizable and manageable value, risk, content and lifecycles.	i.	It has value, risk, content and lifecycle associated with it
				ii.	It is a strategic assets of an organization
				iii.	Handlers of information must be liable person
6.	Yourwindow	http://www.yourwindow.to/information-security/gl_informationasset.htm	An Information Asset is a definable piece of information, stored in any manner, which is recognized as 'valuable' to the organization.	i.	It has value to the organization
				ii.	It is not easily replaceable without cost, skill, time, resources or a combination
				iii.	They form a part of organization's identity
				iv.	It should have data classification on its importance
7.	Information Asset Development	http://www.information-assetdevelopment.com/what.html	An Information Asset is organized Information that is valuable and easily accessible to those who need it. Information Assets comprise a wide range of corporate product, service and process information.	i.	Must be maintained in consistent and cooperative manner
				ii.	Value increases according to the information it aggregates
				iii.	Value increases according to the number of handlers

Conted...

8.	Queensland Government Chief Information Office	https://www.qgcio.qld.gov.au/publications/qgcio-glossary/information-asset-definition	An identifiable collection of data stored in any manner and recognized as having value for the purpose of enabling an agency to perform its business functions thereby satisfying a recognized agency requirement.	i.	Source of reference for multiple business functions
				ii.	It has value to the organization

Study Objectives and Research Questions: Information security is crucial for maintaining data integrity. With poorly administered security systems data availability, integrity and confidentiality becomes a problem. main objective of this paper is to understand how much SMEs exercise focus on controls of information assets and keep their data secure without breach or compromise with reference to ISMS and IEC/ISO27001. Specific research questions that this paper aims to address are as follows:

- To what extent were data handlers of information assets aware of IEC/ISO27001?
- To what extent have SMEs implemented IEC/ISO27001 as best practice?
- What are problems that are related to IEC/ISO27001 implementation?
- Does the implementation of ISMS lead to greater IEC/ISO27001 compliance?
- Has IEC/ISO27001 been introduced and if so to what extent?

METHODOLOGY

This was is an exploratory study with main reason of this study was to generate knowledge and improve

understanding amongst practitioners and academics. This study is based on both quantitative and qualitative tests or measurement which determines IEC/ISO27001 practices amongst SMEs. Data was gathered through surveys and to achieve more reliable responses, questionnaires were distributed and collected personally by hand.

DISCUSSIONS AND FINDINGS

A total of 100 surveys were sent administered by hand across six enterprises which were equally represented by four sectors i.e. Business Process Outsourcing (BPO), telecommunications, software and hardware vendors. Respondents were data handlers that had at least five years of working experience. All 100 responses were collected by hand, giving this study a response rate of 100%.

IEC/ISO 27001 Awareness: Table 4 below shows the years the awareness among information asset handlers. 61 % of data handlers were not aware IEC/ISO 270001 compared to only 39% who were aware. This clearly indicates that there awareness as a whole was low and it was not impacted by the years of work experience.

Table 4: IEC/ISO27001 awareness

Level of awareness	Working Experience	Frequency	Cumulative Percent
Aware	5-6 years	12	39
	5-7 years	16	
	> 8 years	11	
Not Aware	5-6 years	18	61
	5-7 years	24	
	> 8 years	19	
	Total	100	

Antecedents of IEC/ISO27001: Respondents were asked to rank factors that leading towards the implementation of IEC/ISO27001. Specific reasons that were listed included: 1) keeping information assets secure, 2) improving customer/client trust, 3) minimizing information audit failure, 4) compliance control standards, 5) process sustainability and 6) others.

Table 5: Antecedents of IEC/ISO27001 implementation

Performance Evaluation	Contributing Factors	Rank	Aggregate	Percent
		<i>r</i>	<i>n</i>	%
Most important	Keeping information assets secure	6	180	30
2 nd important	Improve customer/client trust	5	100	20
3 rd important	Minimizing information audit failure	4	80	20
4 th important	Compliance control standards	3	54	18
5 th important	Process sustainability	2	20	10
Least important	Others	1	2	2
			436	100

The most important factor was assigned 6 points, followed by 2nd most important value with 5 points and so on. Table 5 shows the overall ranking of the reasons that contributed to the antecedents of IEC/ISO27001 implementation.

Problems related to ISMS Implementation: Table 6 below, shows overall ranking of the further issues faced for the deployment of ISMS. The most important factor was assigned 4 points, followed by 3 points for the 2nd most important factor and so on. Below were the results for overall ranking.

Table 6: Problems for ISMS implementation

Performance Evaluation	Problems	Rank	Aggregate	Percent
		<i>r</i>	<i>n</i>	%
Most important	Productivity cost/loss	4	180	45
2 nd important	Realignment of processes	3	66	22
3 rd important	Industry recognition	2	36	18
4 th important	Management support for best practices	1	15	15
			297	100

Hypothesis Testing: Table 7 summarizes key hypotheses that were formulated to facilitate this study.

Table 7: Hypothesis

Hypothesis 1	IEC/ISO27001 is significant for information asset controls
Hypothesis 2	Regulatory requirement has a significant relationship towards IEC/ISO27001 implementation
Hypothesis 3	IEC/ISO27001 significantly reduces personnel productivity among data handlers
Hypothesis 4	Implementation of ISMS has a significant relationship with recommended industry best practices

In this hypothesis, the objective is to find out whether the implementation of IEC/ISO27001 will improve information asset controls significantly. The questions that were developed to support the hypothesis are:

Hypothesis 1 - Implementation of IEC/ISO27001 is significant for improved information asset controls

- Do you think information asset controls are necessary?

Table 8: Response to necessity of information asset controls

		Frequency	Percent
Valid	Yes	67	67%
	No	33	33%

- Do you think information asset controls will yield benefits to the firm?

Table 9: Response to information asset controls yielding benefits

		Frequency	Percent
Valid	Yes	88	88%
	No	12	12%

- ISMS and IEC/ISO27001 should be standard practice.

Table 10: Response to ISMS and IEC/ISO27001 as standard practice

		Frequency	Percent
Valid	Yes	85	85%
	No	15	15%

67% of the respondents agree that information asset controls are necessary. 85% of the respondents agree ISMS and IEC/ISO27001 should be and only 15% disagree. In this context, the hypothesis that IEC/ISO27001 is significant for improved information asset controls can be accepted.

Hypothesis 2–Regulatory requirement has a significant relationship towards IEC/ISO27001 implementation

Out of 100 respondents, 89% agree that regulatory requirement has a significant relationship towards IEC/

ISO27001 implementation. Therefore, this hypothesis can be accepted as well.

Table 11: Regulatory requirement has a significant relationship towards IEC/ISO27001

		Frequency	Percent
Valid	Yes	89	89%
	No	11	11%

Hypothesis 3 – IEC/ISO27001 significantly reduces personnel productivity among data handlers

Hypothesis 3 can be stated in the null and alternate as follows:

H_{10} : IEC/ISO27001 does not reduce productivity significantly. Statistically expressed: H_{10} is $\mu_b = \mu_a$, where μ_b is productivity before the implementation and μ_a , is productivity after implementation.

H_{1A} : IEC/ISO27001 reduces productivity significantly. Statistically expressed: H_{1A} is $\mu_b > \mu_a$ or $\mu_b < \mu_a$

A *t*-test was done to compare differences in the means for two groups. A *t*-test will indicate if the implementation of IEC/ISO27001 has a positive effect on minimizing productivity. The result of the *t*-test done is shown in Table 12. The difference in the means of 3.87 and 2.08 with standard deviation of 1.582 and 0.743 for before and after implementation is significant. The null hypothesis is rejected as the *t* value falls outside of the region. Therefore, the alternate hypothesis is supported i.e. $\mu_b > \mu_a$.

Table 12: Response to reducing personnel productivity of data handlers

		Mean	N	Std Deviation	Std. Error Mean
Pair 1	Before implementation of IEC/ISO27001, productivity has significantly reduced	3.87	100	1.582	.095
	After implementation of IEC/ISO27001, productivity has significantly reduced	2.08	100	.743	0.05

Hypothesis 4–Implementation of ISMS has a significant relationship with recommended industry best practices

Table 13: ISMS and relationship with recommended industry best practices

		Frequency	Percent
Valid	Yes	98	98%
	No	2	2%

Results reveal that 98% of the respondents agreed that ISMS has a significant relationship with recommended industry best practices. As such this hypothesis was accepted.

CONCLUSION

Information assets and implementation of ISMS and IEC/ISO27001 is still in its infant stage among most SMEs. Based on the data collected we realize that most firm are still lacking behind in terms of implementing ISMS and IEC/ISO27001. Majority of firm ISMS initiatives are on voluntary basis. Regulatory enforcement is needed to be the catalyst that will mandate promotion and exhaustive use of IEC/ISO27001 in managing better controls of information assets. Future research should explore what factors can induce the implementation of ISMS and IEC/ISO27001 as best practice and improve productivity threshold at the same time. Although Sarbanes Oxley and HIPAA standards have been widely implemented only large firms have the manpower and processes in place to execute them well.

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Occupational Stress: An Analysis of the Causes

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ABSTRACT

Objective: This paper seeks to deliberate on the causes of occupational stress with reference to unmanageable workload, job insecurity, sexual harassment, workplace discrimination and employer's unlawful conduct.

Analysis: Excessive or unmanageable demands, insufficient support from co-workers and unsatisfactory working conditions may affect staff-motivation and productiveness. The main thing is to analyse that, the long-term stress or traumatic events at work may have affect the workers physically and psychologically.

Method: Job uncertainty due to impending retrenchment, restructuring or management changes and hostile work environment could also give rise to occupational stress. Occupational stress often results in high dissatisfaction among the employees in terms of job mobility, burnout and poor work performance and less effective interpersonal relations at work.

Findings: In the event of breach of this duty by the employer, apart from alleging constructive dismissal, the employee may be able to recover compensation for non-pecuniary loss such as mental distress or the effect of the dismissal on employee's reputation or the chances of finding other employment.

Result: The employer may also expose himself to a civil claim for negligence or a failure to provide a safe place of work. These causes of actions relate in deed to occupational or workplace stress, discussed in this article.

Keywords: *Stress, Occupational, Causes*

INTRODUCTION OF OCCUPATIONAL STRESS

The occupational stress in the present globalised world has fraught a tremendous concern to the employees and other stakeholders of organisations. This is a sombre dilemma in many organisations around the world and its impact can be substantial. Occupational stress can be defined as the gap between work-demands and individual-ability to fulfil those demands. The underlying cause of stress include lack of resources and equipment, heavy work schedule such as working late or overtime, under-staffing, increased workload and responsibility^[1]. Occupational stress often results in high dissatisfaction among the employees in terms of job mobility, burnout, and poor work performance.

Occupational Stress: The Causes: There are many working conditions or stressors that a worker may encounter at the workplace on a daily basis which will have an effect on his or her physical and/or emotional well-being. Excessive workload or work demand, stressful deadlines, long working hours, insufficient number of staff, lack of support from co-workers and supervisors, annoying co-workers, angry customers and hazardous working conditions are, among others, some of the circumstances that may contribute to occupational stress. It can also be triggered by job uncertainty such as impending retrenchment, restructuring or management changes and hostile work environment. It is an accepted fact that prolonged job-related stress can drastically affect the physical health of a worker^[2].

Further, there is a significant relationship between stress and job performance. Stress is the common denominator for depleting work performance and productivity^[4]. Persistent tardiness, absenteeism or leaving the office earlier than the scheduled working hours will seriously affect the employer's productivity, profits and reputation^[3].

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An employee who absents himself from the workplace on a scheduled workday will inevitably disrupt the employer's work schedules, aside from affecting the employer's customer commitments, among others. To minimise the work disruption due to the slack caused by an absent employee, a regular worker would in normal circumstances assume the added workload. For example, in *Damien Thanam Divean v CSC (M) Sdn Bhd*, the claimant, a Customer Support Analyst who was expected to attend to customer phone calls, was frequently late to work and this affected the company's ability to answer calls in a prompt and timely manner which in turn affected the company's business and reputation^[5].

Unmanageable workloads: Pressure at the workplace is unavoidable due to the demands of the contemporary work environment. Setting goals which put pressure on staff to achieve their best can lead to positive results. However, setting unrealistic expectation, giving unmanageable workload, setting deadlines, setting super-ambitious goals without adequate staff, equipment and resources to carry out the work undoubtedly can have a negative impact on the worker's self-esteem, motivation, and productivity^[7]. The key performance indicators (KPI) imposed on an employee to gauge performance which is unrealistic or unreasonable will give rise to unnecessary stress level amongst the workers in the workplace. An employee who failed to meet the KPI would be deemed to have performed poorly and that may form a basis for disciplinary action^[6].

It is noteworthy that an employer may, depending on terms of the contract, not bound to retain an employee whose performance is unsatisfactory. It is equally important to note that an employer cannot dismiss such a worker without first informing him where he is slacking and giving adequate time to remedy it. As Sir John Donaldson aptly stated in *S James v Waltham Holy Cross UDC*: '[a]n employer should be very slow to dismiss [an employee] upon the ground that the employee is incapable of performing the work which he is employed to do^[8].

The requirement to pre-warn and afford adequate time for improvement however does not apply to a skilled and professional employee where a certain standard is implied and hence expected of him in the running of the everyday business. When he or she has demonstrated his or her incompetence or inability and thus performing short of the skill or professional capability expected of

him or her, the employer is not bound to retain him or her and thus, may be justified in terminating his or her services without prior warning, depending on the factual matrix of the case^[9].

Job insecurity: A vast majority of workers build their lives around their jobs. They might have made a substantial contribution, achieved a high rank in the organisation, have enjoyed various benefits from being a long time employee in service and might have planned their future in the expectation that they would continue in employment. Loss of employment due to genuine redundancy in the organisation can be a distressing experience that inflicts severe economic hardship on the affected worker, which can shatter his or her life as it has both financial repercussion and psychological effects. The aggrieved worker will be deprived of his or her major source of income and may possibly suffer long term unemployment. The effect would be more apparent on workers who had been in a long time service involving only specific skills, which may be of little use to other potential employers^[10].

Besides the economic loss, any dismissal from employment is likely to affect the reputation and standing of a person. The higher the status and responsibility an employee enjoyed, the greater the effect of his dismissal. To make things worse, if the dismissal has been effected in a high-handed manner, it may have real prospect of humiliation and embarrassment. There may be feelings of life dissatisfaction, lack of self-esteem, lack of personal control and general psychological depression, and other stress related illness such as hypertension, cardiac disorders, and gastric ulcers, among others, which increase with continued unemployment.

Sexual Harassment: Employment occupies a central role in a working person's life by providing for the basic necessities of life besides a sense of identity and self-worth. Repeated unwelcome sexual comments, looks or physical contact, among others are examples of sexual conducts which are imposed on, and is unsolicited or unreciprocated by the recipient. Pulling victim's bra straps and touching her buttocks, touching victim while making sexual remarks, slapping victim's buttocks. Sexual harassment affects the victim physiologically where the aggrieved worker may experience emotional trauma, anxiety, nervousness, depression and feelings of low self-esteem which may lead to absenteeism, malingering and other negative consequences. Further, it also affects

the employee's morale and job performance, such as experiencing difficulty in concentrating on her job.

In *Mohd Ridzwan Bin Abdul Razak v Asmah Binti Hj Mohd Nor*, the appellant was alleged to have uttered vulgar and sexually explicit rude remarks at the respondent. The High Court accepted the psychiatrist's findings that the respondent suffered from major depression caused by the sexual harassment. Suriyadi Halim Omar FCJ, delivering the judgment of the Federal Court, stated:

Sexual harassment is a very serious misconduct and in whatever form it takes, cannot be tolerated by anyone. In whatever form it comes, it lowers the dignity and respect of the person who is harassed, let alone affecting his or her mental and emotional well-being. Perpetrators who go unpunished, will continue intimidating, humiliating and traumatising the victims thus resulting, at least, in an unhealthy working environment.

Workplace Discrimination: Discrimination means a comparative unfair treatment of a person on grounds such as race, gender, disability, age and religious belief. Discrimination based on the above reasons can lead to a lowered self-esteem, lack of self-confidence, mental distress, anxiety and depression and when translated to the workplace, it can result in lower productivity and a rapid drop in morale and job satisfaction. The International Labour Organisation (ILO) considers discrimination as 'a differential and less favourable treatment of certain individuals' because of any characteristics such as sex, race and religion, 'regardless of their ability to fulfill the requirements of the job'. The United Nations Universal Declaration of Human Rights 1948 provides that all human beings are born free and equal in dignity and rights. Gender discrimination takes place when women, for example, are treated less favourably or suffer detrimental treatment at the workplace as a result of unreasonable differential treatment between men and women.

In Malaysia, although there is no specific legislation regulating workplace discrimination, the gender discrimination claims can be construed and rationalised pursuant to section 20(1) of the Industrial Relations Act 1967. Dismissal tainted with unfair motives, having the element of discrimination, victimisation, capricious or *mala fide* actions that are incorporated under unfair labour practices would come within the scope of the said section.

Employer's wrongful conduct: The employer and employee relationship must be one of complete confidence and trust. The employer may not, without reasonable and proper cause, conduct himself or herself in a manner calculated or likely to destroy or seriously damage the relationship of confidence and trust. It imposes a duty on the employer to treat the workers fairly and reasonably during employment and where dismissal is inevitable, it should be carried out in a justifiable manner. It is further implied from the above implied term that the employee would be treated in such a manner as to enable him or her to retain his or her dignity and status.

The wrongful conduct of the employer can take place in a number of forms and may arise when the employer harasses or humiliates the employee particularly in front of junior staff, victimising or targeting particular members of staff, falsely accusing an employee of misconduct such as theft or of being incapable of carrying out his or her job, a fundamental demotion involving reduced responsibilities and/or positioning within the corporate hierarchy where his newly assigned position involves a substantial reduction in salary, bonus, benefits, status, responsibilities, authority or a combination of any of them, making a significant change in the employee's job location at short notice and forced resignation, etc.

Accusing an employee of theft without adequate supporting evidence or unjustifiably undermining the supervisor's authority in the presence of other employees. Any form of victimisation of the employee, whether arbitrary, perverse or baseless actions by the management that are unnecessarily harsh or is not just or fair, or other *mala fide* action on the part of the management, may warrant court interference.

Sometimes an employer may, in order to get rid of an employee, resort to making the life of the employee miserable, short of any major breach of contract. By reason of the employer's conduct, the employee may opt to resign, thus relieving the employer from compensating the employee for unfair dismissal or with a retrenchment payment. In *Wood v WM Car Services Ltd* Browne-Wilkinson J reprimanded such practice. His Lordship stated that:

Any employer who wishes to get rid of an employee or alter the terms of his employment without becoming liable either to pay compensation for unfair dismissal or

a redundancy payment have had to resort to methods of 'squeezing out' an employee stopping short of any major breach of the contract, such an employer attempting to make the employee's life so uncomfortable that he resigns or accepts the revised terms. Such an employer, having behaved in a totally unreasonable manner, then claims that he has not repudiated the contract and therefore that the employee has no statutory right to claim either a redundancy payment or compensation for unfair dismissal.

CONCLUSION

Employer must ensure that the workers are treated fairly and that work assignments are reasonable and commensurate with the position and the capability of the worker to discharge.

Dismissal tainted with unfair motives, having the element of discrimination, victimisation, capricious or *mala fide* actions that are incorporated under unfair labour practices would come within the scope of the unfair dismissal under the Industrial Relations Act 1967. It is worth noting that an employer has a duty to ensure that the environment at the workplace is safe and conducive free from threats, intimidation and violence. In the event of breach of this duty by the employer, apart from alleging constructive dismissal, the employee may be able to recover compensation for non-pecuniary loss such as mental distress or the effect of the dismissal on employee's reputation or the chances of finding other employment. The employer may also expose himself to a civil claim for negligence or a failure to provide a safe place of work. These causes of actions relate in deed to occupational or workplace stress, discussed in this article.

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Redefining Training Motivation: Determining the Booster Effect of Training Motivation on Training Effectiveness Using The Malaysian Sample

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ABSTRACT

Objective: The objective of this article is to discuss the redefinition of training motivation into essential training motivation (ETM) and its effect on learning and job performance.

Analysis: Data were collected from 281 academic staff in a large public university in Malaysia. Training motivation is highlighted as a booster to stimulate training effectiveness in organization however, the determination of training motivation was vague because it was referred as various terms.

Method: This research used a quantitative approach and self-report survey; it also used prediction study because it is the most suitable design to achieve the research objective.

Findings: Findings show that training motivation can be redefined as ETM and can predict learning performance to a large effect and job performance to a medium effect. Hence, to differentiate between the valuable and the useless training, the level of ETM can be determined.

Result: Human resource development researchers and practitioners are suggested to predict training effectiveness by determining the level of ETM.

Keywords: *human resource development, employee training, training effectiveness, training motivation, Malaysia*

INTRODUCTION

Formal training is organized for developing and managing quality human resources. Ironically, D. L. Kirkpatrick and J. D. Kirkpatrick argue that training is useless if it cannot be proven that there is no improvement in trainees' learning; meanwhile, Holton argue that job performance is the most important criteria of training effectiveness because this is the main objective of sending employees for formal training. Interestingly, training motivation can be useful to predict training effectiveness because it is highlighted as the most important precursor for effective training. Hence, training motivation should be able to predict both learning and job performance.

Nevertheless, there is a need to redefining training motivation since there are many types of training motivation as discussed by previous researchers. Fortunately, Bauer et al. have determined that only the motivation to learn and motivation to transfer are the most influential types of training motivation; however,

they argue that empirical study that combines both types of training motivation as a measure of training motivation within a single study has never been done previously. Therefore, the objective of this research is to redefining training motivation into essential training motivation (ETM) by combining the motivation to learn and motivation to transfer, as well as to test its prediction effect on training effectiveness measures including learning and job performance. Specifically, this research will focuses on academic staff in a large public university in Malaysia. Significantly, findings of this research can be used to predict training effectiveness in organizations especially in public sector to develop and manage quality human resources.

LITERATURE REVIEW

Commonly, learning and job performance are essential measurements of training effectiveness; these measurements have been given considerable attention by previous researchers. A large number of training

effectiveness models have highlighted the importance of measuring learning performance including those suggested by Kraiger, Ford and Salas^[1], Holton, and D. L. Kirkpatrick and J. D. Kirkpatrick . Holton and D. L. Kirkpatrick and J. D. Kirkpatrick argue that it is impossible to prove that training can affect job performance if it is not proven that trainees have learned in training^[2]. Meanwhile, using psychology discipline, Kraiger et al. argue that learning is the most important measurement to assess training effectiveness^[3] because it can distinguish between training program that can or cannot affect changes in trainees specifically through cognitive, skill, and affective development. Hence, Siti Fardaniah^[4] has developed an instrument to measure learning performance using the components suggested by Kraiger^[5] et al.

Further, most of training effectiveness model has included job performance as another important measurement for training^[6] effectiveness including those models by Baldwin and Ford , Holton , and D. L. Kirkpatrick^[7] and J. D. Kirkpatrick . This is because they argue that the main purpose of organizing training is to improve job performance; hence, the increase in job performance should be measured to prove the effectiveness of training. Siti Fardaniah^[8] has also developed instrument to measure the effect of training on job performance.

On the other hand, contemporary models of training effectiveness including those suggested by Colquitt^[9], LePine and Noe, Holton , and Siti Fardaniah have

suggested that training motivation as the most influential factor that stimulate training effectiveness. However, previous researchers including Alvarez et al., Rowold, and Gegenfurtner, Festner, Gallenberger, Lehtinen and Gruber argue that there are various types of training motivation including pre-training motivation, post-training motivation, motivation to learn, motivation to transfer, motivation to participate in training, autonomous training motivation, controlled training motivation, etc.

Fortunately^[10], Bauer et al. used three theories of motivation including the self-determination theory, expectancy theory, and the expectancy-value model to determine the most influential types of training motivation; findings indicated that there are only two types of training motivation that has large effect on various measurement of training effectiveness including the motivation to learn and motivation to transfer. Meanwhile, Siti Fardaniah has developed instrument to measure motivation to learn and transfer; she also used an integrative literature review to determine the effect of these types of training motivation on learning and job performance (see Table 1).

Based on the literature review, it is hypothesized that essential training motivation (ETM) is comprise of motivation to learn and transfer; and ETM can predict learning and job performance to a large effect size. This is demonstrated in Figure 1. Additionally, ETM is defined as the willingness of the learner to put effort into his/her job performance by learning from training and use the skills and knowledge obtained in training.

Table 1: Effects of the different dimensions of ETM on learning and job performance

Dimension of ETM	Effects of different dimensions of ETM on learning and job performance	
	Learning performance	Job performance
Motivation to learn	$r = .63$ and $\beta = .67$ (Tracey et al., 2001) $\beta = .44$ (Bell & Ford, 2007) $r = .758$, $\beta = .561$ (Tziner et al., 2007) $R^2 = .43$ (Chen & Chih, 2012)	$r = .608$, $\beta = .376$ (Tziner et al., 2007)
Motivation to transfer	-	$\beta = .712$ (Pilati & Borges-Andrade, 2008) $\beta = .49$ (Liebermann & Hoffmann, 2008) $r = .55$ and $\beta = .48$ (Axtell et al., 1997)

Notes: All figures are significant at least at 0.05 level of significant, ETM = essential training motivation
 Source: Adapted from Siti Fardaniah (2013, p. 95-97)

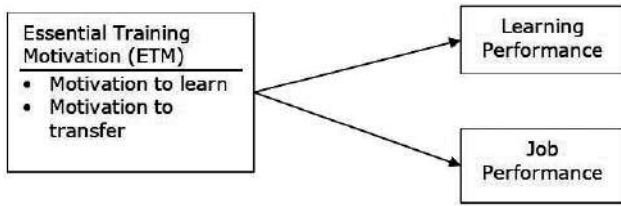


Figure 1: Hypothesized research framework for the prediction effect of ETM

METHODOLOGY

This research used a quantitative approach and self-report survey; it also used prediction study because it is the most suitable design to achieve the research objective. Data for this research were based on secondary data collected in the year of 2011 using survey from a population of academic staff in a large public university in Malaysia that participated in one of 17 general training program organized by the university’s Academic Development Center (ADC). In sum, only 281 academic staffs were willing and chosen to participate in this study using a stratified simple random sampling method; as suggested by Buxbaum , more than 50% participants in each training were included. The total of sample is sufficient to determine mediation effect as analyzed by G-Power software.

Instruments used in this research were developed by Siti Fardaniah. Data for motivation to learn and transfer were collected during training; meanwhile, data for learning and job performance were collected after the completion of training. This is to reduce common method bias as suggested by P. M. Podsakoff, MacKenzie, Lee, and N. P. Podsakoff (2003). Sample

question for motivation to learn was “I am trying to learn as much as I can from this training program”, motivation to transfer was “I will try to think about how to apply the skills that I have learned in this training”, learning performance was “I have the capability to perform the skills taught in this training”, and job performance was “My job performance has improved as a result of applying the skills emphasized in this training”. Data were then analyzed using SPSS and SEM-AMOS.

FINDINGS AND DISCUSSION

Findings indicated that ETM can be redefined as the motivation to learn and transfer in training; it also had a large effect on learning performance and medium effect on job performance. Ironically, findings indicated that learning performance did not significantly affect job performance although it has a significant relationship.

Figure 2 shows the structural model for the hypothesized research framework. Meanwhile, Table 2 shows the sufficient and significant value of AVE, construct reliability, correlation, and squared correlation between each variable. The structural model had passed construct validity test including the discriminant, nomological, and convergent validity as suggested by Hair, Black, Babin and Anderson . The structural model also has acceptable model fit; $\chi^2(60) = 109.67$ with $p = .000$, $\chi^2/df = 1.823$, $GFI = .942$, $CFI = .978$, $TLI = .971$, and $RMSEA = .054$ with $PCLOSE = .311$. This has shown that training motivation can be redefined as ETM that comprise of motivation to learn and transfer. Meanwhile, all the ETM, learning performance and job performance has significant correlation.

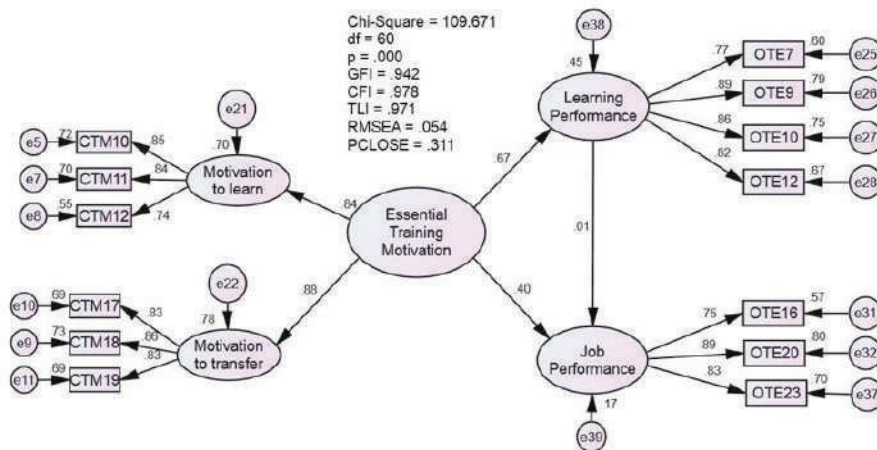


Figure 2: Structural model for the hypothesized research framework

Notes: All regression weights, covariance and variances are significant at .0001 level of significant

Table 2: Average variance extracted (AVE), construct reliability (CR), correlation, and squared correlation among variables

AVE	CR		ETM	LP	JP
.740	.851	ETM	-	.67	.41
.703	.902	LP	.4489	-	.28
.690	.864	JP	.1681	.0784	.1369

Notes: Values above the diagonal are correlation as produced by SEM. Values below the diagonal are squared correlation. All correlations are significant at .0001 level of significant

ETM = essential training motivation, LP = learning performance, JP = job performance

Most of the research findings are consistent with previous researches. Firstly, findings indicated that training motivation can be redefined as ETM that comprise of motivation to learn ($\beta = .84$) and motivation to transfer ($\beta = .88$). This is consistent with findings by Bauer et al. that found motivation to learn and motivation to transfer are the most influential types of training motivation. Hence, hypothesis 1 is fully supported.

Secondly, findings indicated that ETM had a large effect ($\beta = .67$) and can explain 45% variance in learning performance. This is consistent with previous research, such as by Tracey, Hinkin, Tannenbaum and Mathieu, Bell and Ford, and Tziner, Fisher, Senior and Weisberg that found a large effect of training motivation on learning performance; meanwhile, Chen and Chih found that training motivation can explain 43% variance in learning performance.

Nonetheless, findings indicated that ETM had a medium effect ($\beta = .40$) and can explain 17% variance in job performance. This is inconsistent with previous research; in which, Previous researchers including Axtell, Maitlis and Yearta, Pilati and Borges-Andrade, and Liebermann and Hoffmann found that training motivation had a large effect on job performance. Hence, hypothesis 2 is partially supported. The inconsistent findings might be explained by the fact that both learning and job performance should be considered as different dimension of training effectiveness. In addition, findings also indicated that learning performance did not significantly affect job performance ($\beta = .01, p = .895$), this has revealed new findings.

For example, Pilati and Borges-Andrade did not include learning performance but only tested the effect of training motivation on job performance. Meanwhile, Liebermann and Hoffmann included learning and job performance and found that training motivation affect both measurement of training effectiveness with different strength effects. Additionally, Axtell et al. also include both learning (referred as skill acquired) and job performance measures; however, they found that training motivation had significant correlation with learning performance but only affect job performance. This demonstrated that both learning and job performance are not different levels but different dimension of training effectiveness; this is consistent with suggestion by Bersin and Siti Fardaniah. Hence, it is demonstrated that training might have large effect on learning performance but medium effect on job performance.

CONCLUSION

The purpose of this article was to redefine the various types of training motivation into ETM (essential training motivation) and hypothesized it to have large effect on training effectiveness. Findings indicated that ETM can comprise of motivation to learn and motivation to transfer and had a large effect on learning performance and medium effect on job performance. Hence, it can be seen that training motivation had a booster effect on training effectiveness. Therefore, human resource development researchers and practitioners are suggested to predict training effectiveness by determining the level of ETM. In addition, Cannon-Bowers, Salas, Tannenbaum and Mathieu, and Siti Fardaniah had investigated factors that can stimulate ETM and training effectiveness; hence, these factors can be used to stimulate ETM to improve training effectiveness.

Additionally, consistent with debates by Bersin and Siti Fardaniah, learning performance and job performance should not be considered as different levels of training effectiveness but different dimensions of training effectiveness. Hence, to determine training effectiveness, both measurements should be included. Consistently, Aguinis and Kraiger suggest that training effectiveness should be evaluated by determining the impact of training on individual, followed by team, organization, and society performance. Hence, Siti Fardaniah, Abu Daud and Zaki had developed an instrument to measure it by considering the learning, job,

and attitudinal performance as appropriate dimensions; this can be used to determine training effectiveness on individual level.

Ethical Clearance: Taken from Department

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Conflict of Interest: No

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Critical Discourse Analysis of Political Economics of Media Coverage on Sabdaraja on the Succession in Yogyakarta Empire by Kedaulatan Rakyat Daily Newspaper, Yogyakarta, Editions of May 2015

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ABSTRACT

Objective: This research aimed to reveal how the local newspaper constructed the controversy of *Sabdaraja* on the succession and to expose the economic-political interest of the printed media in exposing internal polemic of Yogyakarta Empire.

Analysis: This research is a critical discourse analysis on the controversy of *Sabdaraja* in Sultan empire in Yogyakarta exposed by local newspaper namely: Kedaulatan Rakyat daily newspaper. The data were collected by using media text analysis technique combined with in-depth interviews.

Method: It used critical paradigm with Norman Fairclough's research method of critical discourse analysis. The selection of this type of qualitative research in the preparation was due to some reasons: it focussed on the words (not on the numbers), the authors were in this study as the main instruments.

Findings: By using discourse, it was found that the *Sabdaraja* were related to power dominance. It was also seen that there was an additional discourse which was actually the result of alignment of the dominant interests. Economic factors were more prominent and overcame other pressing factors such as politics and culture.

Result: Results of the research showed that *Kedaulatan Rakyat* daily newspaper did not stand firmly. It tended to lean to one of the camps, namely:the sultan's, by accommodating the opposite discourse. *Kedaulatan Rakyat* identified itself to be the supporting group of *Sabdaraja*. The way the media exposed the succession polemic showed the vulnerability of media independence.

Keywords: *political economy of media, discourse analysis, Sabdaraja*

INTRODUCTION

Basically, media system is related to the prevailing social political system in the country where they operate. Political and economic (or market) control has always been a significant factor affecting media operations. While the interests of both politics and market are prioritized very much^[1]. The mass media have roles not only as the power-controlling force but also as an economically, politically and even culturally influential force. Their expanding commercial expansion has placed media institutions as a calculated political force.

"... By receiving the title GKR^[2] Pembayun is ordered by the Sultan to sit on *Watu Gilang*. In other words GKR Pembayun was chosen to be a candidate

to substitute the Sultan and at the same time became princess crown^[3]."(Source: *Kedaulatan Rakyat*, March 16, 2015," Receiving Title, GKR Mangkubumi Saton*Watu Gilang*")

In this study, researchers will only use two analyses on the theory of political economy of the media that are commodification and structure. Researchers deliberately raised the theories on the assumption that the formation of media discourses on the polemic of *Sabdaraja*^[4] ^[5] become the dominant class struggle in order to create hegemony in the editorial space.

Problem Formulation: From the above explanation, problems in this study can be formulated as follows:

1. At the text level, how is the practice in discoursing the reality of polemic on *Sabdaraja* on the succession^[6] of the throne in Yogyakarta empire by *Kedaulatan Rakyat* daily newspaper to raise commodification of the content?
2. At the producer level, how do the editors create a space of negotiation in the process of producing texts on the polemic on *Sabdaraja* on the succession of the throne in Yogyakarta empire^[7] to raise commodification of media workers?
3. At the consumer level, how can *Kedaulatan Rakyat*^[8] be wanted and become the guidance of the local people of Yogyakarta regarding the discourse on *Sabdaraja* on the succession of the throne in Yogyakarta empire to raise commodification of the audience?

AIMS OF THE STUDY

1. To investigate the existence of political economy practice of media in commodification of content seen in discoursing the polemic on *Sabdaraja* reconstructed^[9] by *Kedaulatan Rakyat*.
2. To investigate the practice of media political economy that is the commodification of media workers when the editors and journalists of *Kedaulatan Rakyat* create a space of negotiation in the production process of text news on the polemic of *Sabdaraja* in Yogyakarta empire.
3. To investigate the existence of media political economy practice that is the commodification of media workers toward consumers of *Kedaulatan Rakyat* readers who use this newspaper as a guiding information on the polemic of *Sabdaraja*.

Benefits of the Study

- a. Providing an understanding of discourse analysis as one of the research forms used to examine the process of discourse creation.
- b. Providing an understanding of the discourse management process as a construction of media reality in its effectiveness to strengthen the theory of media reality construction.
- c. Providing an understanding of the discourse related to the polemic of *Sabdaraja* Kraton Yogyakarta and an ability to describe the social reality that happened.

- d. Understanding the editor's perspective of *Kedaulatan Rakyat* daily newspaper in making a discourse as one form of information media that influences aspects of news quality and reality changes that occur.

LITERARY REVIEW

The main focus in this study is to analyze the construction of media reality on the content of each news text on the polemic of *Sabdaraja*. In this study, researchers describe the theory of messages contained in the study of communication science.

Littlejohn points out the notion of theory as "Any attempt to explain or represent a phenomenon is a theory. As discussed in the next chapter, a theory is someone's conceptualization of an observed set of events." (Littlejohn, 1982: 2)

Political Economy of Media: In the process of understanding the relationship between logic and ideology, mass media and the political economy of the media fall into the category of political economy perspective. In media studies, the economic perspective of media politics is part of a critical perspective other than cultural studies (Mohammadi, 1990: 15).

This is reinforced by the Human Rights Act no. 39/1999, Article 23 Paragraph 2 which states:

"Everyone is free to have, issue, and disseminate the opinion of one's conscience orally or written through the printed media and electronic media by paying attention to religious values, ethics, order, public interest, and the integrity of the nation."

This is then also reinforced by the Press Law No. 40/1999 which states "freedom of the press is a citizen's right."

The critical political economy analysis consists of three criteria: first, capitalist society becomes the dominating class group. Secondly, the media is seen as part of the ideology in which the classes within society engage in battle but it is in the context of the media itself. The efforts to understand the relational process between ideology, mass media and the political economy of the media are included in the category of political economy perspective.

The three frameworks of Mosco (2010) in the political economy of the media are commodification,

spatialization, and structure. However, in this study, researchers only describe and the commodification and structure.

Commodification: Commodification is the process of transforming use values into exchange values. It is about the process of transforming goods and services along with their useful value to be a commodity with market value. The transformation process ranges from usage to exchange rate. In the mass media it always involves the media crew, readers, markets, and the state with each own interest.

RESEARCH METHOD

This research was conducted by using the critical paradigm. Guba and Lincoln (2005) define social science as a process that critically seeks to uncover the real structure behind the illusion and false needs expressed in the material world, with the aim of helping to form a social consciousness in order to improve and change the conditions of human life.

The methodological aspects are dialogical and dialectical. It means that ethical values and moral choices are an integral part of the research. Researchers view themselves as transformative intellectual.

Research with critical discourse analysis method was considered more qualified if it paid more attention to the historical, social, cultural, economic, and political context of the texts studied, in this case it is "*Sabdaraja Kraton Yogyakarta dalam Ekonomi Politik Media*" (Study of Critical Discourse Analysis on *Sabdaraja* of Yogyakarta empire in *Kedaulatan Rakyat*, Edition May - July 2015).

RESULTS OF THE STUDY

Kedaulatan Rakyat divided the reader segmentation into 3 categories of age, education, and occupation. The readers of 10-14 years, 15-19, 30-39, 40- 49, and 50 years of age and over were 4.95%, 13.96%, 34.45%, 23.20%, 14.19%, and 9.46% respectively.

Identity is viewed in how the identity of journalists, audiences, and news participants is displayed and depicted in the text. Fairclough explains how journalists place and identify themselves toward the problems or social groups involved.

The producers of the text on the news of Special Region of Yogyakarta were the journalist and its media

institution that is *Kedaulatan Rakyat*. Here, media audiences were readers of *Kedaulatan Rakyat*. While the public participants were the parties mentioned in the news on the succession of the king of the Palace of Sultan HB X, GKR Pembayun, *hisrayi dalem* and *sedherek dalem*.

"King Sri Sultan Hamengkubuwono (HB X) re-issued *Sabdaraja onwage* (5/5) at Siti Hinggil of Yogyakarta Palace"

In Javanese philosophy there is cosmological balance, namely: harmonization between the work of human thought and the command of God. *Sabdaraja* should not cause a polemic or a political battleground of parties that has a particular interest. Tradition should not be the reason to reject *Sabdaraja* leading to succession. Tradition and *Sabdaraja* should not be contrasted but they should be balanced.

CONCLUSION

The results of the text analysis by researchers show that the Sultan was seen to be a single actor who has legitimacy (power). His decision to change the name of his eldest daughter's title into GKR Mangkubumi making her to be the Throne Princess is called *Dhawuhraja*. It was allegedly as a political action of the Sultan on promoting the future queen.

Besides presenting a pro discourse to the *Dhawuhraja*, *Kedaulatan Rakyat* also raised a contra discourse. It could be considered as a counter argument to what the Sultan had been concerned about the succession in his empire. It was done by displaying the discourse to criticize *Dhawuhraja* against tradition and by discoursing that anyone who is Throne Prince and holds the title of Mangkubumi will not necessarily ascend the throne.

The results of analysis on a number of texts on the news page show that, the news on *Sabdaraja* in *Kedaulatan Rakyat* indeed was used as a tool to achieve goals on the economic interests of *Kedaulatan Rakyat*.

The text analysis in this study was related to commodification of content which is proved by the use of national pages as a privilege for the sponsors who seem to support *Sabdaraja*.

- **Practices of Discourse Analysis on Producer:** In spite of that, the local media seek to be an independent media like its jargon “voice of conscience of the people” and carries the principles of the Pancasila Press. The editors still try to take advantage of local wisdom. For example, in some news texts, *Kedaulatan Rakyat* likes using Javanese language. In producing news texts, they also consider the content of news as part of socio-cultural factors. It is proven to be used by editor in news as an effort to influence local people in constructing reality.
- **Practices of Discourses Analysis on Consumers:** In this research, the respondents were divided into 3 groups, namely: the proponents of *Sabdaraja*, the opponents of them, and people who claim themselves to be neutral in the case. Some of the respondents gave almost similar opinions, which is, by using *Kedaulatan Rakyat* as the source of information they follow the polemic on *Sabdaraja*. But there were respondents who read it because they intended to do it.

The results of the research show that the commodification of the audience seen in consumer analysis on *Sabdaraja* news was used to influence or affect the reader. It had the agenda of directing the readers to support the future queen.

Indirectly the news read by consumers of *Kedaulatan Rakyat* was used as a tool to lead audiences to dig information on *Sabdaraja* from *Kedaulatan Rakyat*. Furthermore, *Kedaulatan Rakyat* tried to make its media as a superior and factual media in reporting the case. People were guided to choose *Kedaulatan Rakyat* as the source of information so as to greatly rise media circulation.

- **Sociocultural Analysis:** In addressing these conditions, the readers of *Kedaulatan Rakyat* reacted against the Sultan’s venerable interest, *Sabdaraja*. Prototype of the discourse of *Sabdaraja* on the succession showed the alignment of the Sultan.

In addition to this, the opinions of the culturalists whose statement seemed to support and justify the Sultan’s move, frequently appeared in *Kedaulatan Rakyat* and were repeated in other editions.

IMPLICATION

In accordance with the title “*Sabdaraja dalam Ekonomi Politik Media (Analisis Wacana Kritis Pemberitaan Sabdaraja Terkait Sukses Penerus Tahta Raja Kraton Pada SKH Kedaulatan Rakyat Edisi Mei-Juli 2015)*”, this research has implications for the political economy theory in the media.

Theoretical Review (Economy and Politics): The political economy of the media is an approach that focuses on its media ideology on the economic power that directs the research’s attention to empirical analysis of the ownership structure and mechanism of the forces of the media market. According to this review, media institutions should be assessed as part of an economic system that is also closely linked to the political system.

In addition to media ownership factors, the choice of resource persons was due to the closeness of between *Kedaulatan Rakyat* and the Palace. *Kedaulatan Rakyat* tried to influence its readers in understanding the content of its news in accordance with the Sultan’s desire because it supported the idea of the succession by a queen.

PRACTICES

The results of the analysis show that news text on *Kedaulatan Rakyat* was inconsistent and had more sensation elements than the polemic issues discussed by various circles in Yogyakarta. Based on this research, it is seen that imbalance the message contained in the news text was imbalanced. It only focused on and formulated the message in accordance with goals to be achieved, namely: inviting the people of Yogyakarta to support the idea of the succession by a queen. The strong ideology led to a tendency to support one of the camps.

Thus, the results show that the political economy of the media greatly affected the content of the news based on the construction done in the editorial desk before the news was printed. The opposition could find a way to reach reconciliation by means of dialogue between the two camps.

CONCLUSIONS

1. **For Media and Practitioners (of *Kedaulatan Rakyat*):** The biggest advantage of media is to be the bridge for policy makers, ideology

owners, and information owners. However, the media has a tough challenge to correctly interpret policy, ideology, and information. Of course, it is legitimate for the media to make their news attractive so as to get many readers and to make profit.

It should also be underlined that the media must be aware of the ability to mobilize audiences so as not to provide information and let everything up to the audience, especially information that has been arranged by the editor to be the media agenda. It will also have more implications if it has carefully been planned. Apart from the closeness and history factors, *Kedaulatan Rakyat* should be a pioneer media in voicing what is right and what is wrong as well as to be the media that can be followed by other media to dare to open the truth of an issue.

Ethical Clearance: Taken from Department

Source of Funding: NII

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Examining the Innovative Minds of Takaful Consumers: The Case of Malaysia

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ABSTRACT

Objective: This study aims to examine the factors that will affect Malaysian consumers to participate in Takaful.

Analysis: Out of the 600 questionnaires that were sent to consumers in greater Malaysia i.e. Kuala Lumpur and Selangor, we received 503 questionnaires. The sample is randomly selected from the known population. The total of 35 questions are constructed to know the determinants to choose new products by the respondents.

Method: New product adoption theory is used in developing the questionnaire. In this, questions are organised into seven groups, namely, (a) cost vs. benefit, (b) accessibility, availability and service quality, (c) product features, (d) reputation of the company, (e) attributes of agent, (f) marketing and promotion and (g) social and religious factors. The data collected from respondents were subjected to exploratory factor analysis based on Principal Component Analysis (PCA) through varimax rotation. This was performed in order to reduce the data to a manageable size.

Findings: The findings show that, three predictors out seven predictors significantly contributed to the model and these are social and religious factors, product features, and marketing and promotion.

Result: It can be said that, marketing, social and religion and product features are the most important and dominant factors that can influence Malaysian consumers to adopt and participate in Takaful products. Takaful operators should enhance their marketing strategy and simplify the product features to capture the untouched market.

Keywords: *Takaful, Affecting Factors, Consumers and Malaysia*

INTRODUCTION

Takaful is a social and ethical insurance based on the principles of *Ta'āwun* (cooperation)^[1] and *Tabarru* (donation) where the risk is shared collectively by members of a policy. The concept of Takaful is providing financial assistance to the participants on a basis of mutual assistance, brotherhood and solidarity if the participants face misfortune. Takaful^[2] operation begins with the formation of contract where a person chooses to become a participant and to mutually help each other, specifically when any of the participants faces a defined loss. The participants^[3] have to set aside certain portion of money to a common fund as a contribution. Instead of heavily depending on commercial factors per se, Takaful celebrates mutual co-operation^[4] socially and legally between the participants.

Phase I (from 1984 to 1992): The Takaful Act 1984 or TA 1984 was legislated and became the main reference for regulatory law of Takaful. Among others, TA 1984 was essential provided for (i) the Takaful business and the registration of the Takaful operators; (ii) the roles^[5] of Shari'ah Committees; and (iii) the Shari'ah compliance nature^[6] of the various business operations under the Takaful operators.

Phase II (from 1993 to 2000): during this phase, the regulators allowed the introduction of competition by allowing the establishment of another Takaful operator. Such competition is vital to flourish in Malaysian industry^[7].

Phase III (from 2001 to 2010): The Financial Sector Masterplan or FSMP was introduced in 2001.

Specifically referring to the Takaful industry^[8], FSMP's objective is to enhance the capacity of Takaful operators by strengthening the legal^[9], Shari'ah and regulatory framework for the entire Takaful industry.

LITERATURE REVIEW

The primary focus of this literature review is a detail analysis of Takaful in Malaysia and other countries. The data is taken from credible researchers and the research findings are recent and quite relevant to the subject at hand. The research is based on two different aspects of Takaful industry; one aspect is the demand side of Malaysian Takaful market and the other assesses the knowledge, awareness, ethicality of agents, accounting, and underwriting^[10], etc. of Takaful industry.

Kasim et al. (2016), states that Takaful is based on Islamic ethics and hence, it excludes the practice of interest, uncertainty and gambling from Takaful. These elements are prohibited not only from the teachings of Islam, but also from other religions such as Christianity, Judaism Hinduism, Sikhism, and Buddhism. They added that Takaful is fit for everyone irrespective of faith, and it is a product based on cooperative nature with mutual help and harmony.

RESEARCH METHODOLOGY

New product adoption theory is used in developing the questionnaire. Both primary and secondary data have been used. Primary data are collected by survey questionnaires from consumers in Malaysia. Secondary data that was used in this research includes articles, books and internet resources.

FINDINGS

The Perception of Consumers on Takaful: Innovation plays a significant role for the success of the operators because Takaful is offering attractive benefits compared to conventional insurance. Among the consumers 67.22% said that Takaful is an innovative product and 26.61% said that somewhat Takaful is innovative whereas only 6.16% said that it is not innovative.

Looking forward to the future, the Takaful industry needs to maintain their relevancy and strive to move

towards sustainability. While learning from the experiences of conventional insurances, innovations need to be considered by the stakeholders of the Takaful industry. Not only looking into the advancement of current technology, innovations in Takaful industry can be versatile and flexible.

Mean values of Respondents' Innovative Mind: Table 2 shows the percent of the respondents' innovative mind. To explore the innovative mind of the respondents, a five-point Likert-scale is used ranging from 1=strongly disagreed to 5= strongly agreed, and ten questions are asked. The questions are constructed to examine the innovative attitude of the respondents, and all the mean values are more than 3.4.

Mean Values of Factors in Choosing New Products

Cost vs Benefit: Table 3 shows the mean values of the determinants to choose new products. The total of 35 questions are constructed to know the determinants to choose new products by the respondents. These questions are organized into seven groups, namely, (a) cost vs. benefit, (b) accessibility, availability and service quality, (c) product features, (d) reputation of the company, (e) attribute of agent, (f) marketing and promotion.

Accessibility, Availability and Service quality: Table 4 shows the mean values of the determinants to choose new products. The five questions are constructed for accessibility, availability and service quality. Moreover, the best mean value in the accessibility, availability and service quality is 4.2 for three statements "I like to get easy access to the service e.g.: availability of branches.

Product features: Table 5 shows the mean values of the determinants to choose new products. The five questions are constructed for product features. "I want clear illustrations on the benefits of the products" and lowest is 4 for two statements "I choose the product that is well known in the market and I choose the product if I get the same benefits as my existing plan". All the mean values better than good.

Reputation of the company: Table 6 shows the mean values of the determinants to choose new products. The five questions are constructed for the reputation of the company. Moreover, the best mean value in the reputation of the company is 4.1 for three statements "I choose the product based on its brand, I choose the product if it is ethical and I choose the product if the company is active in the corporate social responsibility".

Attributes of agents: Table 7 shows the mean values of the determinants to choose new products. The five questions are constructed for the attributes of agents. Moreover, the best mean value in the attributes of agents. is 4.2 for all the statements. Therefore, it can be concluded that all the mean values are very good.

Marketing and Promotion: Table 8 shows the mean values of the determinants to choose new products. The five questions are constructed for marketing and promotion. Moreover, the best mean value in the marketing and promotion. is 4.0 for “I choose the product if the brochures provide clear, attractive and reliable information” and lowest is 3.6 for three statements “I choose the product if the advertisement is everywhere (e.g.: e-advertising, television and radio, I choose the product if the product is promoted through agent and I choose the product if the product is offered through the company’s branch”.

Social and Religious Factors: Table 9 shows the mean values of the determinants to choose new products. The five questions are constructed for social and religious factors. Moreover, the best mean value in the social and religious factors is 4.0 for “I choose the product because it is ethical and fair” and lowest is 3.1 for “My employer chooses the product for me”.

FACTOR ANALYSIS

The data collected from respondents were subjected to exploratory factor analysis based on Principal Component Analysis.

To determine the cut-off point, the researcher follows Kaiser’s (1960) recommendation that factors with eigenvalue of one or more should be retained in order to avoid negative reliability.

Reliability Result: Following the construct validity test as presented above, the eight factors produced during the principal components analysis were further tested for reliability using Cronbach’s alpha (α). All factors (innovation, agent, marketing, cost, product, reputation, social, and accessibility) have demonstrated high internal consistency with α greater than 0.7 in most cases.

Table 10: Reliability Statistics

S. No.	Variable	Cronbach’s Alpha
1.	Innovation	.811

Conted...

2.	Agent	.916
3.	Marketing	.830
4.	Cost	.795
5.	Product	.880
6.	Reputation	.820
7.	Social	.751
8.	Accessibility	.698

Pearson Correlation: Another analysis here is correlation analysis to show the relationship between the variables used in this study. As shown in the below table, the relationship between the variables ranged from 0.289 to 0.870, suggesting that there are moderate to strong relationships between the variables used for this study.

Note: correlation of ± 0.1 is weak, ± 0.3 is moderate, and ± 0.5 is strong

DISCUSSION ON FINDINGS

Three predictors out of seven predictors have contributed positively and significantly to the innovative mind and these are social and religious factors, product features, and marketing and promotion.

Since the external factors were constructed according to the new product diffusion theory, the findings of this research are in line with its theoretical expectations, as well as with the findings of prior researchers of Takaful and insurance.

According to Abideen & Saleem (2011) and Salleh et al. (2013), marketing can influence the participant’s behavior towards the product. Arifin et al. (2014), investigate whether product services influence on the customers to engage with Takaful.

CONCLUSION

The study has been conducted based on 503 respondents which consist of 224 males (44.5%) and 279 females (55.5%). To explore the innovative mind of the respondents ten questions are asked. The questions are constructed to examine the innovative attitude of the respondents, and all the mean values are more than 3.40. The total of 35 questions are constructed to know the determinants to choose new products by the

respondents. In addition to this, factor analysis has been done. Moreover, the Kaiser-Meyer-Olkin (KMO) which measures sample adequacy is excellent (0.932), and none of the Anti-image correlation is less than 0.500, suggesting that multi-collinearity assumption has been satisfied. In terms of reliability, following the construct validity test as presented, the eight factors produced during the principal components analysis were further tested for reliability using Cronbach's alpha (α).

It can be said that, marketing, social and religion and product features are the most important and dominant factors that can influence Malaysian consumers to adopt and participate in Takaful products. Takaful operators should enhance their marketing strategy and simplify the product features to capture the untouched market. In addition to this, religion is the most important factor that changes the mind of the consumer. Takaful operators should create the awareness among Malaysian consumers regarding Takaful products to penetrate the market.

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Feasibility of Introducing Takaful (Islamic Insurance) in India from the perspective of Islamic Finance Experts

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ABSTRACT

Objective: India as the second largest Muslim populated country has no practice with Takaful. This triggers the researchers to identify why Takaful has not been introduced in India. The main objective of this study is to scrutinize the perception and acceptability of Islamic finance experts to introducing Takaful in India.

Analysis: The total 18 interviews have been conducted and all of them are male. Out of 18 interviewees, 12 are conducted through face to face interviews, and the remaining interview sessions were done either by phone calls or emails.

Method: A combination of convenient sampling and purposive sampling method is used for selecting the Islamic finance experts as the respondents. Interview technique is the solely method used to collect the findings for this research.

Findings: Four questions were asked to know the opinions of Islamic finance experts on the viability of Takaful in India. They are related to (Q1) possibility of introducing Takaful soon, (Q2) benefits of offering Takaful, (Q3) challenges to offer Takaful and (Q4) essential steps to be taken to start offering Takaful.

Result: Regarding viability of Takaful, most of them share the positive view on this matter. In terms of operation, hybrid Wakalah-Mudarabah is the best suitable model for both general and family Takaful products.

Keywords: Feasibility, Takaful, Insurance, Islamic Finance Experts & India

INTRODUCTION

Human beings possess limited knowledge and cannot forecast or predict the future with hundred percent^[1] certainty. In addition, they have limited capacity to avoid unfortunate events. By nature, they are born with limited ability and capacity to control any future incident, which means they are perpetually exposed to risks. Within the context of insurance, risk is a danger or unfavourable exposure to misfortune. Health deterioration, accidents, natural disaster, and economic loss are examples of risk.

^[2]Group Symposium, Resolution 42 of Al-Rajhi Bank-Saudi Arabia, Resolution of National Fatwa Committee of Malaysia 1972, Resolution of Dewan Syariah Nasional Indonesia 2001 and Resolution of Fiqh Council^{[9][10]} of Muslim World League 1978. From the assorted boards and investigations from the religious scholars on the conventional insurance, the alternative

way of this which is acceptable and lawful under Shari'ah is Takaful. The practice of the conventional insurance contract contains major elements of interest, uncertainty and gambling which invalidates the conventional insurance contract.

This paper is organized in five sections. Section two is devoted for literature review. Section three discusses about research methodology and section four deliberates the findings and last section concludes the paper.

LITERATURE REVIEW

This part deliberates^[3] the utmost pertinent findings of previous researchers in the area of Takaful (Islamic insurance). Ali et. al (2014), discuss the issue of applying *Tabarru* concept^[4] in Takaful and the issue of underwriting surplus of *Tabarru* fund. They have raised the Shari'ah issues because the concept of *Tabarru* is not

based on the pure donation^[5]. In Takaful, the participants make the *Tabarru* with the expectation that their financial loss will be compensated if they meet any misfortune^[6] according to the terms and conditions of the Takaful contract. Also, the amount of *Tabarru* is specified based on the underwriting^[7] process, whereby, the participants who are facing higher risk are supposed to make a higher amount of *Tabarru* contribution. Thus, voluntary contribution nature of *Tabarru* has been changed to compulsory nature of the contribution. Consequently^[8], it makes the contract bilateral.

RESEARCH METHODOLOGY

The objective of this research is to explore the perceptions of Islamic finance experts towards the viability of introducing

Profile of Islamic Finance Experts: The total number of interviewees is 18 and all of them are male. In terms

of age range, four are between 25 to 30 years, three are between 31 to 35 years, one is from 36 to 40 years, three 41 to 45 years, two 51 to 60 years and the rest (four) are between 61 to 65 years. In the case of material status, one is single, one is divorced and the rest are married. Interviewees consist of 12 master degree holders, five PhD holders and one Mufti. Among the master degree holders, one of them has three master’s degree and one is also Mufti.

FINDINGS

Four questions were asked to know the opinions of Islamic finance experts on the viability of Takaful in India. They are related to (Q1) possibility of introducing Takaful soon, (Q2) benefits of offering Takaful, (Q3) challenges to offer Takaful and (Q4) essential steps to be taken to start offering Takaful.

Table 1: Feasibility of Takaful in India

Possibility of introducing Takaful in near future	Islamic Finance Experts																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Feasible	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√		√
Not Feasible soon				√													√	
Huge size of Muslims	√					√			√	√		√			√			
Name “Takaful” is a barrier				√													√	

Feasibility of Takaful in India: When the interviewees are asked whether Takaful can be offered in near future, the majority (16 interviewees) believe that it can be done. Among the interviewees who think that Takaful can be introduced within the foreseeable future mention some of the reasons why it is possible. Six interviewees believe that huge size of Muslim population in India invites for introducing Takaful. It might be due to the fact that India has the second highest Muslim population in the world. However, there is no Takaful in India and so Muslims are helpless except to participate in insurance which is prohibited in Islam.

Table 2: Benefits of Offering Takaful

Benefits of offering Takaful	Islamic Finance Experts																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Benefit to the community	√		√	√		√			√	√					√	√	√	√
Economic development		√	√				√		√			√	√	√	√		√	

Benefits of Offering Takaful: The major benefits of offering Takaful are benefit to the community and contribution towards the economic development. The first one is it will be beneficial to the Indian community as a whole (10 Interviewees). IFE 3 mentions:

Essential steps to be taken: The interviewees mentioned six essential steps to start Takaful. They are creating awareness through education (16 interviewees), regulation (16 interviewees), enforcement of Shari’ah governance (7 interviewees), preparation by the operators (IFE 1, IFE 4 & IFE 11), support from other Islamic financial market players (IFE 16) and learning experience from other countries (IFE 18).

Among the interviewees who mention that education is the essential steps, IFE 15 explain as follows:

“There should be some seminars, talks or workshops opened to the public to create the awareness and important of education in their lives. In addition, there should be more budget allocated for education to help the students who are in need. The youth are the leaders of the future and hence, education must the first thing to be emphasised on”. (IFE 15)

In the current situation, due to poverty, the youth start working without going to school. Parents cannot afford to send their children to school and there is lack of having the basic necessity such as food, clothing and shelter. Poor people’s kids are brought up without proper education.

The second essential step is lobbying the regulatory body (16 interviewees) because it might be due to the fact that in India, Insurance Regulatory and Development Authority of India (IRDAI) is a supervisory body for insurance. Without the support and approval from this regulatory body, Takaful cannot be offered in India. It is because Takaful has additional restrictions such as approval of the product from Shari’ah board and investment choice and it has unique nature since the contracts in insurance and Takaful are not the same.

The third essential step is related to Shari’ah governance. Seven interviewees believe good Shari’ah

governance will be essential since it can mould the operators to operate in line with Shari’ah.

“Shari’ah governance should be established in Takaful and it should be the foremost step. The ultimate aim of having Takaful is to eliminate Shari’ah non-compliant practices and to minimise the unethical issues as much as possible. Once the practice is in line with Shari’ah, automatically unethical issues will not exist anymore”. (IFE 9)

The role of Shari’ah governance in Takaful is essential because it is not only responsible for the product approval but also for ensuring the whole process of Takaful practices is in line with Shari’ah. They can monitor the approval of the contents of advertisement in the pamphlet to ensure that the potential policy holders are not misled and there is no misunderstanding towards the Takaful operators.

The fourth essential point is that the operators need to prepare themselves before offering the Takaful products (IFE 1, IFE 4 & IFE 11).

Finally, it is important for India to learn experience from other countries which offered Takaful products (IFE 18). According to IFE 18, non-Muslim countries like Thailand does not have the centralised Shari’ah board and hence the individual operators need to take initiative to have their own Shari’ah committee members to get the approval of the products and to ensure that the operating activities are in line with Shari’ah.

It can be summarised that Takaful is viable based on the opinions of Islamic finance experts. After discussing the interview results for the viability of Takaful, the next section explains specially on their opinions for choice of Takaful model and products to suit within the Indian context.

Operational Aspect of Takaful

Table 5: Operational aspect of Takaful

Choices of Takaful Models.	Islamic Finance Experts																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
(a) General Takaful																			
Pure Wakalah Model					√						√								
Pure Mudarabah	√					√					√					√			

Conted...

Hybrid Wakalah-Mudarabah Model	√	√	√	√		√		√	√	√	√	√	√	√	√	√	√	√
Wakalah Waqf Model	√		√		√	√	√			√	√		√	√	√	√	√	√
Family Takaful																		
Cooperative (Taa'wuni) Model	√		√		√	√				√								
Pure Wakalah Model											√							
Modified Wakalah Model		√	√								√		√	√				
Pure Mudarabah						√					√	√					√	
Modified Mudarabah Model	√		√			√					√		√	√				
Hybrid Wakalah-Mudarabah Model		√	√	√		√		√	√	√	√	√	√	√	√	√	√	√
Waqf Model			√		√	√					√			√	√	√	√	√
No command on model since the industrial player can decide.							√											√

General Takaful: Currently, there are four Takaful models used almost all over the world. The Islamic finance experts are further asked which model is the best suit for general Takaful in the Indian context. In the case of general Takaful products, the best suitable model is hybrid wakalah-mudarabah model (voted by 15 interviewees), followed by wakalah waqf model (13 interviewees), pure mudarabah model (4 interviewees) and pure wakalah Model (2 interviewees).

(voted by 13 interviewees), waqf model (8 interviewees), modified mudarabah model (6 interviewees), modified wakalah model (5 interviewees), cooperative model (5 interviewees), pure mudarabah model (4 interviewees), pure wakalah model (1 interviewees) and two interviewees are silent on this issue.

Family Takaful: Similar question is asked for the family Takaful products, hybrid wakalah-mudarabah model

With regard to *Waqf* model, India is a rich country with *Waqf* assets and hence, these assets are fully utilised, it will be beneficial to the poor Muslims.

Table 6: Suggested products to be offered first

Suggested products to be offered first	Islamic Finance Experts																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
General Takaful products	√	√	√	√	√	√		√	√		√	√		√	√		√	
Family Takaful products			√	√					√	√	√	√	√	√	√	√	√	√
No command							√											

Suggested products to be offered first: In the case of the products, eight interviewees think that both general and family products should be offered at the same time. However, five interviewees think that general Takaful products should be offered first, before family Takaful. Four interviewees think that family Takaful should be offered first. One interviewee (IFE 7) does not disclose his opinion.

profitable. So, to diversify the risk, it is better to offer both products.

CONCLUSION

In addition, since it is the new products for India, it is difficult to estimate exactly which product will be

The paper has provided the interview results from the Islamic finance experts. Their views are important because once Takaful is offered, the operators must get the approval to offer the products and they have adequate experienced in Islamic finance. Regarding viability of Takaful, most of them share the positive view on this

matter. The interviewees mentioned six essential steps to start Takaful. They are creating awareness through education, legal support, enforcement of Shari'ah governance, preparation by the operators, backing from other Islamic financial market players and learning experience from other countries. In terms of operation, Hybrid Wakalah-Mudarabah Model is mostly preferred by the interviewees over the other Takaful models. However, in the case of products, both general and family Takaful products are suggested to be offered overall.

Ethical Clearance: Taken from Department

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Planning Process Development of Cultivation Fishery based Minapolitan in Malang District

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ABSTRACT

Objective: This paper aims to describe and analyze the process of development planning of minapolitan area based cultivation fishery in Malang.

Analysis: Analysis show the mechanisms and stages as part of a regional development plan has been implemented in stages through the village planning forums, district planning forums, coordination meeting, which is an innovation of Marine and Fishery Agency in Malang, agencies forum and regency planning forum.

Method: Planning paradigm that used through the top down, bottom-up and participatory approach. This study uses a qualitative approach. The data obtained were tested for validity with triangulation techniques, and then analyzed with an interactive analysis model.

Findings: In this paper, the involvement of stakeholders in the process of planning the development of Minapolitan Area Based on Aquaculture in Malang Regency have been carried out according to existing regulations, where based on the findings of the researcher. The discussion will be limited to the involvement of Malang Regent, Malang Regency DPRD and Non-Governmental Organizations (NGOs) to be more focused and focused.

Result: Involvement of stakeholders (Regent, Parliament and NGOs) still minimal and not optimal yet, resulting a stagnation in the development of minapolitan area based cultivation fishery in Malang Regency.

Keywords: *planning, cultivation fishery based minapolitan, mechanisms, stakeholders.*

INTRODUCTION

The paradigm embodied in decentralization and regional autonomy, led to fundamental changes in governance relations, where there was an increase in authority and autonomy handed over to regional governments, one of which was in the field of maritime affairs and fisheries. This policy change will certainly be followed by changes in economic development, which originally focused on regional development. Minapolitan^[1] Concept Based on Aquaculture from the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia, emerged as a concept of fisheries development based on regional economic management with the driving force of fisheries cultivation, which is expected to be the main strategy, as a manifestation of governance towards the paradigm of good governance. This concept aims to accelerate the development of regions with fisheries as the main drivers in improving the welfare of the Indonesian people^[2].

Since 2010, Malang Regency^[3] has been designated as a minapolitan area by the KKP which was followed by the Malang Regent Decree concerning the establishment of a development location for aquaculture-based minapolitan areas. Empirically, until now there has been no significant progress in the development of the region. Even though the time span is 3 years, not a short time for an implementation of regional development priorities, there should already be an embryo to become a minapolitan area, according to Sumarsono (2011, p. 54), which is a fishing city that grows and develops due to the running of the business system fisheries that are able to serve, encourage, attract and control regional economic development activities^[4].

Development of Minapolitan Area Based on Aquaculture in Malang Regency^[5] is a multi-sector development program involving multi-stakeholders, and is a harmonious blend of top-down planning, bottom-up

planning and participatory approaches. Initially carried out based on the top-down planning paradigm, this was indicated by the determination of the location of aquaculture-based minapolitan with the Malang Regent Decree, but as its development became a regional development priority program, it became a bottom-up planning and participatory involving the community.

This paper aims to discuss and analyze 2 (two) main things related to the Minapolitan Area Development Planning Process Based on Aquaculture in Malang Regency, namely the mechanism and stages of the planning process and the involvement of stakeholders (Bupati, DPRD and NGOs)^[6].

LITERATURE REVIEW

The Planning Process for the Development of Minapolitan^[7] Areas Based on Aquaculture in Malang Regency can be understood through a mechanism and stages in the planning process, as well as the involvement of relevant stakeholders. Planning plays a very important role in our development and life, it can be explained by the opinion of Abe (2005, p. 31) which states that planning is nothing but a systematic arrangement of steps (actions), which will be done in the future, based on careful consideration of potential and external factors, and interested parties in order to achieve a specific goal. This is in accordance with the opinions of Conyers^[8] and Hills (1984) cited by Kuncoro (2012, p. 50) that planning is a continuous process that includes decisions or choices of various alternative use of resources to achieve certain goals in the future coming.

There are various types of planning according to Widodo (2006, pp. 42-45), namely: (1) based on the time period, planning^[9] is divided into three, namely long, medium and short term planning; (2) based on the flow of information, there is a centralized planning that is controlled by the center and decentralized^[10] planning, the implementation process of the plan from below; (3) based on its nature, namely planning with command and planning with stimuli; (4) based on the dimensions of the approach, development planning consists of macro planning, sectoral planning, regional planning and micro planning. Meanwhile, according to Faludi (1973, p. 3), there are two types of planning, namely procedural planning and substantive planning. Substantive planning makes it easy for planners to understand all things related to what is planned, while procedural planning makes it

easier for planners to understand the position and ways to complete the task.

According to Riyadi and Bratakusumah (2004, p. 7), regional development planning is a development planning process that is intended to make changes towards a better development direction for a community, government, and environment in a particular area / region, by utilizing or utilizing various available resources, and must have a comprehensive, complete orientation, but still adhere to the principle of priority. Whereas in PP No. 8 of 2008 concerning Stages, Procedures for Preparation, Control and Evaluation of the Implementation of Regional Development Plans, the definition of regional development planning is a process of preparing the stages of activities involving various stakeholders in it, in order to utilize and allocate existing resources in order to improve welfare social in an area / regional environment within a certain period. In general Riyadi and Bratakusumah (2004, pp. 15-38) suggested factors that can influence the success rate of a regional development planning program, among others are environmental factors, human resource planning factors, system factors used, scientific and technological development factors and funding factors. The stages in the regional development planning process, including one of them in the development of aquaculture-based minapolitan areas, must be based on Law No. 25 of 2004 concerning the National Development Planning System. SPPN is carried out in stages through the implementation of development planning meetings (musrenbang), which are carried out starting from the village / kelurahan, kecamatan, kabupaten, provincial and central / national levels. In the explanation section of the Act, it is stated that in SPPN includes five approaches in the entire planning sequence, namely (1) Politics; (2) technocratic; (3) Participatory; (4) Top-Down; and (5) Bottom-Up (Kuncoro, 2012, p. 53)

This is clarified by the opinion of Nurcholis, et al (2009, p. 23) that a forum used to carry out participatory planning is known as the musrenbang technical term (development planning deliberation). Musrenbang starts from the lowest level of government unit, namely the village / kelurahan level, then hierarchically, upwards, namely the kecamatan level, district / city, provincial level and finally the central level. Musrenbang implementation is one of the efforts to attract community participation in development planning, explained by

Sumaryadi (2010, p. 54), that community participation in development planning essentially includes participation in the selection of alternative objectives to be achieved in activities that can be intangible, suggestions, responses and determination of choices, all delivered at the meeting.

According to Grimble, et al (1995) in Abdulkarim, et al (2007, p. 10), stakeholder or stakeholder analysis is the identification of the stakeholders of a project, an assessment of their interests and ways that influence the risk and truth of the project, and is used to evaluate the development of stakeholder capacity.

RESEARCH METHODS

This study uses a qualitative approach, data obtained from informants covering the DPRD, Bappeda, DKP Malang Regency, Sekcam Bendungan, Village Heads and Sumurup Village Secretary, Sumurup Village community and NGOs, coupled with observation and documentation. The data obtained were tested for validity with triangulation techniques, then analyzed with an interactive analysis model developed by Miles and Huberman (2009, pp. 16-20), which consisted of data reduction, data presentation, and drawing conclusions and verification.

DISCUSSION

Mechanisms and Stages in the Development Planning Process for Minapolitan Areas Based on Aquaculture in Malang Regency: The mechanisms and stages in the Minapolitan Area Development Planning Process Based on Aquaculture in Malang Regency are the regional development planning mechanism and carried out through a stage of activities or forums, known as development planning meetings (musrenbang).

Based on the above flow, all activities in the Minapolitan Area Development Planning Process Based on Aquaculture in Malang Regency have been carried out through the mechanism and stages of the planning process, which starts from the village level by organizing village musrenbang and this is where the process of community aspiration is carried out, then it will be used as material proposal at the subdistrict level musrenbang. The planning mechanism goes through the musrenbangdes stage in accordance with the participatory planning approach, where the

implementation involves all stakeholders (stakeholders) or related with development. According to Abe (2005, p. 88), participatory planning is planning which involves the interests of the people and in the process involves the people. So it can be understood that community involvement can only be carried out, if the community has the willingness to participate from the beginning of the process until the formulation of results.

The next stage of regional development planning is the subdistrict musrenbang, where the implementation is almost the same as the musrenbangdes. The activities in the kecamatan musrenbang are to accommodate proposals from villages, then classify and categorize according to the functions and Regional Work Unit (SKPD). There is a new breakthrough carried out by the DKP of Malang Regency in this planning stage and mechanism, namely by conducting coordination meetings involving relevant stakeholders to discuss various kinds of proposals regarding the aquaculture-based minapolitan program. This activity was carried out prior to the implementation of the SKPD Forum and invited stakeholders such as DPRD Dapil Bendungan, government elements from Bendungan and Sumurup Villages, NGOs, chairmen of Gapokdakan or Pokdakan and Sumurup Village community leaders, resulting in several agreements that will be brought and escorted together at the Forum SKPD and Musrenbang Malang Regency. In a planning process, in fact this is not usually done, there are rarely SKPDs that want to coordinate the planning of sustainability and assume that the results of the kecamatan-level musrenbang are sufficient. The DKP of Malang Regency continued coordination because based on the previous year's experience and seeing the proposed programs and activities in 2013 from the results of the Musrenbang in Bendungan Subdistrict, not much has been related to the development of aquaculture-based minapolitan areas, both physical and non-physical. This shows that the DKP of Malang Regency has a good commitment as a leading sector in the development process of the Minapolitan area based on aquaculture.

Based on the description above, it is known that the Minapolitan Area Development Planning Process Based on Aquaculture in Malang Regency has been carried out through the mechanism and stages of regional development planning namely musrenbang which is carried out by involving community participation, but at the budgeting stage it is still often defeated by various political interests,

both by SKPD and DPRD. Participatory planning in the musrenbang forum can indeed attract the aspirations of the community in supporting the development planning process of the Minapolitan area based on aquaculture in Malang Regency, but have not been able to optimally accommodate the aspirations of the community into regional development policies in the APBD.

Stakeholder Involvement (Bupati, DPRD and NGOs):

In this paper, the involvement of stakeholders in the process of planning the development of Minapolitan Area Based on Aquaculture in Malang Regency, the discussion will be limited to the involvement of Malang Regent, Malang Regency DPRD and Non-Governmental Organizations (NGOs) to be more focused and focused. The development planning process cannot be separated from stakeholder involvement, as well as in the development planning process of the Minapolitan area based on aquaculture in Malang Regency which includes all parties, both individually, community, and organizations that are involved directly or indirectly and benefit from or otherwise the process of developing the aquaculture-based minapolitan. This is according to previous research conducted by Muchlisin, et al (2012 p. 69), explaining that in the Minapolitan concept the coordination and synergy of various stakeholders involved is the key to the success of the Minapolitan program.

According to Abdulkarim, et al. (2007, p. 6), that stakeholder decisions are influenced by their respective involvement and interests, which is a function of their power, legitimacy and interests, which will be a feature of primary stakeholders, secondary stakeholders. and not a stakeholder (non-stakeholder).

Based on the opinion of Boonstra (2006, p. 43), there are 3 attributes possessed by stakeholders, namely strength, legitimacy, and interests and produce 8 types of stakeholders, namely Dormant, Discretionary, Demanding, Dominant, Dangerous, Dependent, Definitive, and Non-stakeholder . Based on this stakeholder typology can be categorized into several types of stakeholders, which are related in the development planning process of minapolitan areas based on aquaculture in Malang Regency, namely:

1. Definitive stakeholders, namely Malang Regent and Malang Regency DPRD. This type of definitive stakeholder is the key to the success of the development process of the Minapolitan area

based on aquaculture in Malang Regency because it has the power, legitimacy, and interests.

2. Dependent Stakeholders, namely Bappeda, DKP Malang Regency, along with several related SKPDs, and NGOs. Where Bappeda, DKP Malang Regency NGOs and SKPD are directly related to the Minapolitan Development Planning Process Based on Aquaculture including stakeholder typologies that have legitimacy and urgency, but do not have power.

The involvement of the Malang Regent, is high in terms of its interests and legitimacy, but is very low in the use of force to overcome and mobilize all its power to create success in the development of Minapolitan Area Based on Aquaculture in Malang Regency. The DPRD is high in matters of interest, but is still minimal in the use of its strength and legitimacy. As for NGOs, they do not have power, but have interests and legitimacy and assume that this is not something that is important to pay attention to. The main control of stakeholder involvement in determining the success of the Minapolitan Area Development Planning Process Based on Aquaculture in Malang Regency actually exists in the Malang Regent who can use all of his strengths, interests and legitimacy, but until now the involvement and is still minimal and not optimal, while the DPRD and NGOs are only supportive. This has become an estuary for the existing problems so that the Development of Minapolitan Area Based on Aquaculture in Malang Regency is still stagnant and not yet running in accordance with the existing plans.

CONCLUSION

Mechanisms and stages in the Minapolitan Area Development Planning Process Based on Aquaculture in Malang Regency have been carried out according to existing regulations, where based on the findings of the researcher there is a new breakthrough made by the Malang Regency DKP as a form of moral responsibility, namely holding a coordination meeting after the musrenbang level sub-district, to gather all stakeholders related to proposals regarding minapolitan activities and programs based on the Minapolitan Master Plan and Renstra Based on Aquaculture in Malang Regency. The involvement of Malang Regent, Malang Regency DPRD and NGOs is still minimal and not optimal in using the strengths, interests, and legitimacy they have to overcome existing problems and mobilize other supporting stakeholders.

All matters relating to regional development planning should involve community participation, so that there is responsibility from the community in its implementation. Malang Regent as the key role holder in development in Malang Regency, with the support of Malang Regency DPRD and NGOs, must take the initiative to be willing and able to work together together actively involved in the Development Process of Minapolitan-Based Aquaculture Development Planning so as to realize success in development with the ultimate goal of improving the welfare of the people in Malang Regency.

Ethical Clearance: Taken from Department

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Motivation Factors of Internet-Supported Learning Environment (ISLE) among Malaysian University Students

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ABSTRACT

Objective: Internet-supported learning environment (ISLE) is necessary for students in higher institutions in order to be able to learn efficiently in a class. The study investigated the importance of applying ISLE among Malaysian university.

Analysis: There were 120 questionnaires were managed to complete and return the questionnaires. All the data that were obtained from the respondents had been analyzed by using the Statistical Package for Social Science (SPSS) version 17.0. This is one of the most compatible software that can be used to key in and analyze the data gathered.

Method: In this, motivation level in learning techniques was used. This method uses four ISLE motivation factors which included technology, effort, persistence and task choice.

Findings: The finding showed that all the four ISLE motivation factors have a significant value on student motivation level in accepting technology in their learning. ISLE helps students to learn the courses more efficiently.

Result: ISLE has benefited students in their learning especially in increasing their motivation level. Compared to classroom learning environments, ISLE are relatively less structured, student focused, and process oriented.

Keywords: Motivation factors, Internet, Learning, statistical, Students, Internet-supported learning environment (ISLE), Learning motivation, 21st century education, Technology, E-learning

INTRODUCTION

In the era of technology, people access the internet to find and share information, communicate^[1], and exchange ideas with other internet users. Internet seems to provide a potential effective approach in the learning environment. Even though it is possible to teach without the internet access but in this era of modernization where the technology developed rapidly, it is hard to deny the importance of technology in our learning environment. The use of technology in our learning has changed the landscape of education field in 21st century. It forms the new student approaches to learning, teaching approach to teach and how educators interact with^[2]students

(Hargadon, 2009). Despite of the advancement of internet and computer in learning, the use of traditional learning is still valid (Lokie, 2011).

The existence of Internet-Supported Learning Environment (ISLE) in the education system has become the major shift in the education system. During the present century, Computer Based Learning^[3] (CBL) and Instructional Technology have made a substantial contribution to the education especially in Higher Education and both are part of ISLE (Barger & Byrd, 2011; Bekele, 2010; Kuo, Hwang, Chen, & Chen, 2012). ISLE promises to become even more pervasive in the next phase. In fact, the ISLE^[4] is a process where students have the access to a global software

and non-local, and this connection produces several important advantages. Researchers have also highlighted that positive benefits automatically happen in a collaborative learning environment when an instructional technology is used in learning process^[5]. (Hwang, Chu, Lin, & Tsai, 2011; Lazakidou & Retalis, 2010; Schellens & Valcke, 2006). Particularly, it can raise students' interest and motivation to learn all the subjects offered through e-learning (Keller, 2008).

The finding of the study implicates the importance of applying ISLE among Malaysian^[6] university students to understand the acceptance of technology whether it is in line with the major shift in the education system in 21st century. Bekele (2010) gave the clear explanation on the overall motivational impacts of ISLE^[7] in Higher Education. ISLE was presumed to support students' motivation in many courses. In some cases, ISLE is more effective than the traditional method. To address^[8] this concern, the present study intends to identify how motivation factors of ISLE been measured on the students' motivation level in learning.

LITERATURE REVIEW

Sources of Motivation in Using Internet Supported Learning Environment (ISLE): The utilization of technology especially the computer and internet access have a tremendous effect on the whole aspects of people's lives. In this era of globalization, internet existence is regarded as a gift to the world of education and making the educator task easier. The whole world seems to be an electronic village where everyone can communicate with each other. Focusing on the motivation aspect, the use of technology to support the learning environment plays important roles as the students' motivation is a major issue faced by educators in the field^[9]. According to Pintrich & Schunk (2002), motivation is one of the crucial factors for a productive learning and it also affects the acquisition and demonstration^[10] of higher-order thinking skill. Therefore, it is very important for the educators to examine the overall motivational factors influences of Internet Supported Learning Environment (ISLE) in Higher Education. This would bring a better understanding of how and to what extent ISLE impacted the phenomena.

According to Bekele (2010) and Menchaca (2008), motivation and achievement were positively related in

ISLE. ISLE students also have a mandatory requirement to perform well as students in traditional classrooms. In addition, motivation enables students to facilitate the achievement and demonstration of thinking skills (Stes, 2011). Malaysian society lives in the era of globalization and they rely heavily on the use of science and technology in all aspects of life and the use of creative elements are very important in everyday living. The impact of globalization and development of information technology demands some changes in the education system.

The previous researches on ISLE in Higher Education have considered technology, persistence, and effort and task choice as the motivation factors. As stated by Bekele (2010), these four factors give a positive impact in motivating them to learn the subject taught in Higher Education. First motivation factor is the technology which includes the aspect of technology attributes and user (student) skills, experiences, or views. This factor is one of the main factors that affects the student's motivation level. The usage of the internet technology such as Google, World Wide Web, e-mail and other technologies will help to link the information resources for effective communication and visualize problems and solutions at their finger tip. Other than that, by using an online database of project-based instructional unit modeling will also supports learning within the context of classroom and diverse needs of learners including the use of adaptive and assertive technologies. Furthermore, the use of technology will maximize students' learning in analyzing and evaluating the issues as well as consistently helps to facilitates interdisciplinary learning and address global issues. Bekele (2010) stated that students who perceived technology as easy and friendly would use them consistently and their motivation in learning would increase.

According to Bekele (2010), persistence is also one of the most significant factors that will affect the motivation of student in ISLE. By using a technology in learning, student tends to attend the class to do the online exercise rather than skipping them and they will be attracting to the notes that are attached with animation and video. Apart from that, they tend to spend time to study when their teachers use an instructional technology in their learning and teaching. Indirectly, it will increase students' motivation level. It is supported by Kim (2012), that learning process is easily continued when students feel motivated. This showed how the use of the ISLE can affect their persistence and motivate them to learn.

The third motivation factor is effort. Bekele (2010), in his study also describes student’s effort in ISLE as one of major motivation factor. Students are motivated by their own effort when they consistently use an internet to find their assignment references and they are willing to spend more time to finish their online assignment. Beside that, students also willing to participate in the class when the teacher use the online games as part of revision. It shows that when there is a goal, we will be motivated and put a great effort towards it.

The last factor of motivation in ISLE is task choice. The student will choose the task that will motivate them towards their goal. Technology will help them completed their task easier as the technology allows them to read the tutorials anywhere and ease of using it to complete their task will affect their behavior intention (Yi & Hwang, 2003; Ying, 2008). Apart from that, they have many options to choose from the online exercises and get faster feedback from the online exercises. By using the technology tools they also will have the opportunity to create their notes and exercises very fast and easy. Bekele (2010), believed that with the appropriate task choice, the student will be motivated in using technology in their learning environment.

METHODOLOGY

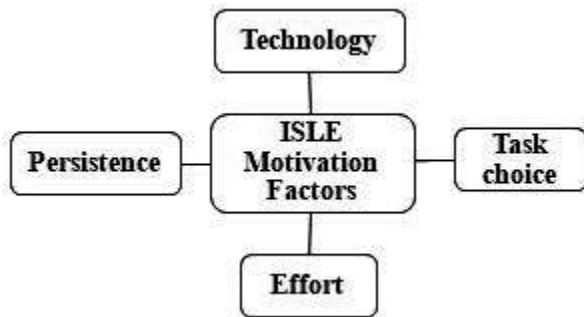


Figure 1: Factors of ISLE motivation (Bekele, 2010)

(a) Conceptual framework: A conceptual framework referred to an analytical instrument with numerous variations and contexts. A conceptual framework is used to design and create the conceptual differences to form ideas. The conceptual framework for this case study is shown in *figure 1*.

(b) Participant: The population of this case study was second year undergraduate students from one of the universities in Malaysia. There were 120 questionnaires were managed to complete and return the questionnaires. The sample was 40 undergraduate students who experienced e-learning system in their learning with the duration of fourteen (14) weeks and they were having face-to-face and online learning interaction.

(c) Instrument: The questionnaire was adapted from Innovation Components Configuration Map by Javeri & Persichitte (2007). The amended questionnaire comprises of three sections. The first section was about the demographic of the respondents. The second section was about the motivation factors in using ISLE. Second section was then divided into 4 categories; technology factor, task choices, effort and persistence. Each category has 5 items and it comprises of 4-degree Likert Scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). The third section was students’ motivation level. This section has 20 questions and responded on 4-degree Likert Scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree). All the data that were obtained from the respondents had been analyzed by using the Statistical Package for Social Science (SPSS) version 17.0. This is one of the most compatible software that can be used to key in and analyze the data gathered. The descriptive statistics had been used to determine the mean and standard deviation of each statement of motivation factors in using ISLE in section two and Pearson correlation had been used to find the relationship between ISLE motivation factors and students’ motivation level in section three.

RESULTS AND DISCUSSION

The present study aimed to examine the motivation factors of ISLE among Malaysian university students in terms of technology (T), effort (E), persistence (P) and task choice (TC). Motivation factors of ISLE were analyzed in terms of mean, standard deviation, minimum and maximum and its correlation. The results are summarized in Table 1.0 and Table 1.1 as follows.

(a) The Overall ISLE Motivation Factors; Technology Factor (T), Effort Factor (E), Persistence Factor (P), Task Choice Factor (TC)**Table 1: The Overall ISLE Motivation Factors; Technology Factor (T), Effort Factor (E), Persistence Factor (P), Task Choice Factor (TC)**

ISLE Motivation Factors	N	Min	Max	Mean	Std. Deviation
T	40	2	4	3.28	.470
E	40	2	4	3.21	.354
P	40	2	4	3.14	.433
TC	40	3	4	3.54	.298

Table 1 showed that all the students agreed that all the four motivation factors of ISLE affected their learning process. The highest mean of the motivation factors was TC (M = 3.54, SD = .298). It means task choice was the highest motivation factor in ISLE. It was followed by T (M=3.28, SD = .470) and E (M = 3.21, SD = .354). The lowest mean was P (M = 3.14, SD = .433). In this study, the ISLE motivation factors had been proven to give an impact on the level of students' motivation level whenever they learn the courses in the university. It was showed in the finding result that most of the students were agreed with all the motivation factors which include of technology, task choice, persistence and effort factors. It can be seen through the mean and standard deviation of the overall motivation factors as shown in table 1.0.

*(b) The relationship between motivation factors and the students' motivation level***Table 2: Relationship between Overall ISLE Motivation Factors (OMF) and the Students' Motivation Level (ML) in ISLE**

		ML	OMF
ML	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	40	
OMF	Pearson Correlation	.364*	1
	Sig. (2-tailed)	.021	
	N	40	40

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2 showed that there's a significant value between overall motivation factors and the students' performance ($r=.364$, $p < .021$). It implied that motivation factors of ISLE gave an impact on the students' motivation level when they learned in ISLE.

As presumed, ISLE supported student motivation to learn in various courses.

In some cases, ISLE was more effective as traditional learning. Students may learn fast because the accessibility of the internet helps the students a lot in answering the questions and at the same time they can get feedback faster when they do any online exercises. Indirectly, it will also make the students motivated to answer the questions. Although ISLE is not totally guaranteed the students to complete the tasks, but it is proven that student's perception and motivation towards learning in ISLE changes after they experience the task using technology tools including the computer and the internet. It has been highlighted in the Technology Acceptance Model (TAM) and Attention, Relevance, Confidence, and Satisfaction Model (ARCS) (Liu, Liao, and Pratt, 2009; Keller, 2008; Keller, 2010; Jason, Kevin, Leslie, & Kimberly, 2008). It was discussed in TAM that student's perception will determine their willingness to complete the task in ISLE (Liu, Liao, and Pratt, 2009). Since the computer and the internet help them to learn fast and it is also friendly user, it makes students' motivation to increase which can be seen through their persistence and effort to learn the subject or completing the online tasks. When students have a positive attitude towards the system, they tend to apply the system regularly and intensively and may have a positive plan towards using the system (Shih, Shing, & Chien, 2011).

CONCLUSION

This present study recommended that motivation factors must also emphasize on the supports. These denote technology leadership and support provided by

faculty or tutors, administrators, and peers. Technology leadership provides logistics crucial for success. Presumably, support factors directly affect and are affected by success and technology and course factors. Within the supports factor the result will be more effective in finding the motivation level in ISLE. It can be concluded that ISLE has benefited students in their learning especially in increasing their motivation level. Compared to classroom learning environments, ISLE are relatively less structured, student focused, and process oriented. Consequently, adequate level of student motivation is a key to success. In addition, students may enroll for more online courses if they get satisfied with their first encounter with ISLE. That is partly why previous studies considered motivation among the success measures in ISLE in Higher Education.

Ethical Clearance: Taken from Department

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Performance Analysis of Machine Learning Based Classifiers for the Diagnosis of Lung Cancer & Comparison

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ABSTRACT

Objective: In this paper, diagnosing in premature stages a detection system has been designed which contains the following digital image processing techniques.

Analysis: Lung cancer is the most injurious form of cancer which affects the human. Lung cancer has quickly increased in western part of the country among the world. Various feature combinations are given as the input to the KNN and ANN classifiers.

Method: First, dermoscopy image of lung is taken, and it is subjected to the pre-processing step for noise removal and post-processing step for image enhancement. Then the processed image undergoes image segmentation using Otsu method & Morphological processing. Second, features are extracted using feature extraction technique –GLCM, and FOS.

Findings: KNN classifier is used to classify the data set into two classes. ANN classifier is used to classify the data set based on the number of layers. Performance is analyzed based on the accuracy of the learning classifier output.

Result: The proposed system defines an effective way to detect the lung lesion more accurately and faster by segmenting the lesions images.

Keywords: Lung Cancer, Otsu, Morphological, Feature extraction, KNN, and ANN.

INTRODUCTION

The early detection of lung cancer can be helpful to save the human life. Fortunately, lung cancers are rare in children. Somasundaram and Kalavathi [2011] proposed a skull stripping algorithm using Chan-Vese ACM^[1]. The method is fully automatic and middle slice was used for computation. The method is very effective for extracting the lung region in T1 and T2 weighted images^[2]. This method makes use of the binary form of the lung MR image to process. This binary image is used to develop active contour. Segonne et al. [2004] used hybrid edge based method^[3] using watershed algorithm to develop initial mask of lung. A deformable structure is developed based on global features of the image. The algorithm is referred to as Hybrid Watershed Algorithm (HWA)^[4]. The accuracy is analyzed using atlas based methods. Rex et al. [2004] developed an accurate meta algorithm for stripping skull region. Four different algorithms are executed and a combined result

is generated. Each algorithm works best for different anatomic locations^[5]. A Boolean logic is used to combine the result of different algorithms. Computational complexity and computation time increases due to the use of many numbers of algorithms. Balan et al. [2012] developed a smart histogram^[6] based method for efficiently skull stripping T1-weighted lung image. Initially background is removed from the image. Double thresholding^[7] is used to separate various regions in lung image. Rough binary classification is used to select the regions. Mathematical morphology was incorporated to remove regions by obtaining a lung mask and this method was not dependent on parameter^[8] tuning. Tasi et al. [1995] used accumulated histogram from all slices of lung image volume separate cerebrum from skull and soft tissues^[9]. This implicitly removes background noise using background threshold.

Thresholding is a simple method used for the segmentation of lung image. The threshold value is

determined by analyzing the histogram of the image^[10] Pham et al [2000]. Lee et al [1998] developed an adaptive model of thresholding based on pixel wise connection of path. The threshold value changes dynamically and disconnected regions are obtained. Markov Random Field (MRF) is an effective statistical model for lung image segmentation Held et al [1997]. Zhang et al [2001] developed conditional probability distributions to encode spatial information. Wu and Chung [2007] developed a compound MRF model. This work combined label information and boundary level information to elevate accuracy of segmentation. Conditional Random Fields (CRF) uses probabilistic distribution framework to model original pixel values and pixel labels Sutton and McCallum [2012]. The accuracy of CRF depends on the statistical distribution of pixels.

Least Square Transformation (LST) is applied to conventional Probabilistic Neural Network (PNN) by Georgiadis et al. [2015] for the classification of meningioma, glioma and metastasis.

The main aim of the proposed method is to detect & classify the lung tissue, it is a cancer lung or not by using, ANN & KNN classifier. Improve the accuracy of lung classification. Then performances are analysis based on the output of classifiers.

PROPOSED METHOD

In the proposed lung cancer detection and classification system, Data base images are taken as input images. Fig.1 illustrates the block illustration of lung cancer detection and classification.

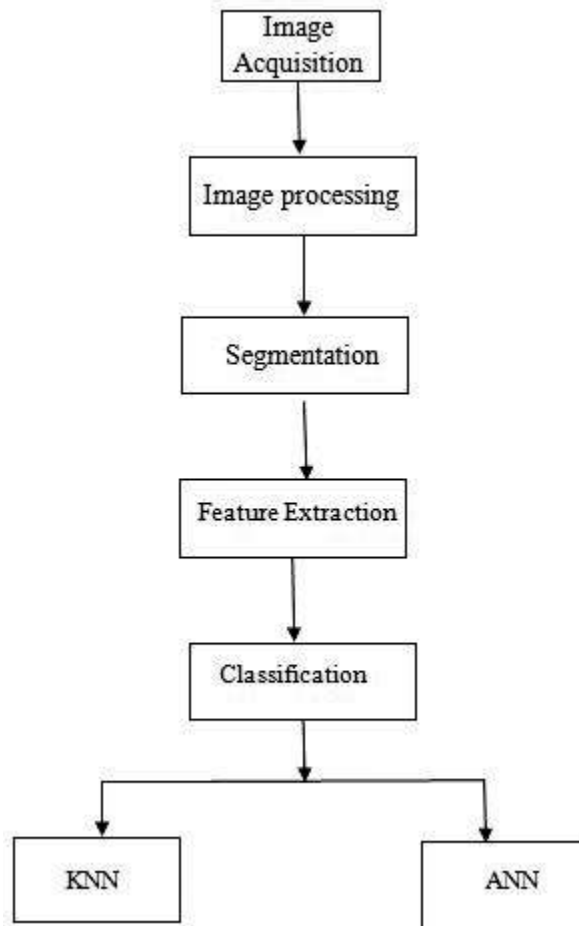


Figure 1: Proposed Architecture

The design of a system for lung cancer detection and classification based on Image Processing techniques include the following stages:

Image processing: The acquired database images is always in digital format which is subjected to various Digital Image Processing Techniques. Usually, the image

is composed of noises. These noises reduce the accuracy of classifiers output. To avoid that, images are subjected to pre-processing techniques. Image Processing consists of following procedures:

- First, the image is resized to 180x180 pixels.
- Second, Gamma correction can repeatedly enhance the image contrast.
- Then color (RGB) image is converted to gray scale image using mat lab command.

Median filter: For smoothing image from noise median filtering is used. Median filtering is used for denoising. In the median filter, the operation will be performed on non-linear function In order to improve the result of future process & to preserve the edges of input image this type of filtering is done.

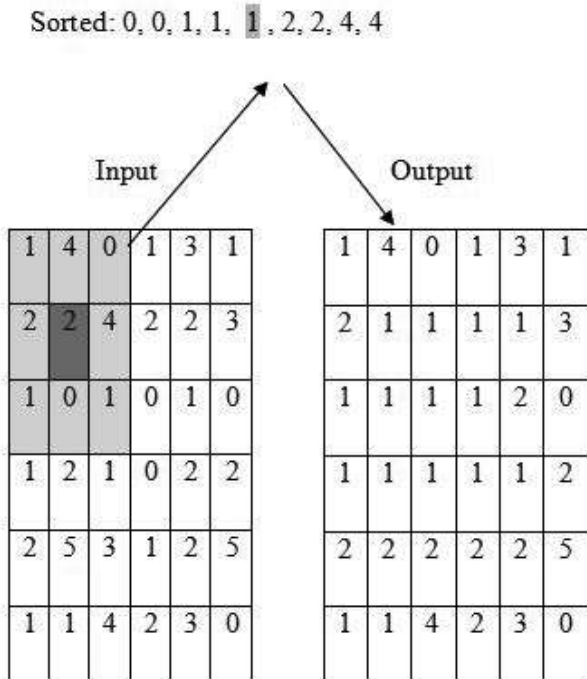


Figure 2: Median filter process

Fig.2 shows that the median filtering process. In that 3x3 window is placed over an image and replace each pixel by sorted median values. The right side cell contains the median filtered values. For example the input values are 1, 4, 0, 2, 2, 4, 1, 0, 1 then this value are sorted as 0, 0, 1, 1, 1, 2, 2, 4, 4. Finally sorted median value of this is 1. Such that each input values are replaced by a median value which is available in output.

Segmentation: Segmentation plays a major role in the detection of lung cancer through digital image

processing, which maximizes the accuracy of further steps. Before segmenting a cancer affected area, we must consider the size, lesion shapes, color, and textures of the input image. It refers to the partitioning an image into two or more put out of joint regions that are unique on some property. There are two important things which deal with this paper. They are given below,

- Otsu’s method
- Morphological processing

Otsu’s method: In order to separate an object (region of interest) from background, an optimal thresholding is used which is called Otsu’s method. This method partitions the image into two classes based on differentiating analysis. In this paper, gray scale image is taken for segmentation which leads to an effective separation of the image into two classes. The output of segmented image contains two intensity values (0, 1). Normally, background pixel value is 0 but sometimes background area pixel value is 1 because some properties of objects are similar to the background. To avoid that problem, morphological process is done. The main aim of segmentation stage is to extract the lesion area from the healthy lung images. For example in a given gray scale image, represented in L gray levels {0,1,2,...L}, this method divide the gray scale image pixel values into two classes $S_0 = \{0, 1, 2, \dots, t\}$ & $S_1 = \{t+1, t+2, \dots, L-1\}$. Consider the number of pixels in the gray level image is , where n is the total number pixels in an image. The probability of occurrence of gray scale image formula is given by [1]:

$$p_i = n_i/n \quad \dots(1)$$

Morphological processing

Erosion: The basic operation of erosion on a binary image is to erode away the boundaries of foreground pixels. This will shrink the area of foreground pixels and larger the holes within that area. This type of operator needs two types of data as input. First is the image which is going to be eroded. The second is a set of coordinate points known as a structuring element. SE used here is disk, and the radius of disk is 4. Structuring element determines the fixed effect of the erosion of the input image. To calculate the erosion of a binary image by this structuring element, we must consider each foreground pixels in the input image. Structuring element covers up the input image pixels so that the coordinates of input pixels coincides at the center of the structuring element.

Erosion can also be used to remove small unwanted bright spots in images. Finally, get fully segmented images of lung cancer.

Feature extraction: To diagnose lung lesion automatically, we will follow feature extraction process. There are two feature extraction processes to be considered. They are FOS and GLCM.

GLCM Features: Feature extraction is done by using Gray Level Co-occurrence Matrix. The gray level co-occurrence matrices represent spatial distribution and gray levels dependency within a local area. There are many texture features available, but here only four features are used. They are Energy, Contrast, Correlation, and Homogeneity.

Energy: It is the sum of squared GLCM elements. This statistic is also called as Uniformity or Angular second moment. It measures pixel pair duplication, which is called as textural uniformity. It detects disorders in textures. Energy reaches a maximum value equal to one. Energy has a normalized range. The GLCM of a less homogeneous image will have a large number of small entries. A feature which measures the overall probability of having distinctive gray scale patterns in the image, defined as

$$\text{Energy} = \sum_{i=0}^{N_p-1} \sum_{j=0}^{N_p-1} p^2(i, j) \quad \dots(2)$$

Contrast: It measures the local variations in the gray-level co-occurrence matrix of the image. This statistic measures the spatial occurrence of an image and is difference moment of GLCM. It measures the quantity of local deviation present in the image. It is defined as

$$\text{Contrast} = \sum_{i=0}^{N_p-1} \sum_{j=0}^{N_p-1} (i - j)^2 p(i, j) \quad \dots(3)$$

Correlation: It measures the joint probability occurrence of the specified pixel pairs in the GLCM matrix. Correlation that takes out how correlated a reference pixel to its neighbor over an image, defined as

$$\text{Correlation} = \sum_{i=0}^{N_p-1} \sum_{j=0}^{N_p-1} \frac{(i - \mu)(j - \mu)p(i, j)}{\sigma_i \sigma_j} \quad \dots(4)$$

Homogeneity: It is the measure of closeness of GLCM distribution elements to the GLCM diagonal elements. This method is also called as Inverse Difference Moment. It measures image homogeneity as it presumes

larger values for minor gray value differences in couple elements. It has the maximum value when all elements in the image are same. It is defined as

$$\text{Homogeneity} = \sum_{i=0}^{N_p-1} \sum_{j=0}^{N_p-1} \frac{p(i, j)}{1 + |i - j|} \quad \dots(5)$$

Histogram-based (statistical) features: Mean, standard deviation, skewness, kurtosis, and entropy are called as a color feature. Entropy gives the quantity of information of the image that is desired for image compression. These features are extracted using Color Moment (CM) descriptor. Statistical features equations are given as

$$\text{Mean: } \mu_i = \frac{1}{N} \sum_{j=1}^N f_{ij} \quad \dots(6)$$

$$\text{SD: } \sigma_i = \left(\frac{1}{N} \sum_{j=1}^N (f_{ij} - \mu_i)^2 \right)^{\frac{1}{2}} \quad \dots(7)$$

$$\text{Skewness: } \gamma_i = \left(\frac{1}{N} \sum_{j=1}^N (f_{ij} - \mu_i)^3 \right)^{\frac{1}{3}} \quad \dots(8)$$

$$\text{Kurtosis: } \delta_i = \left(\frac{1}{N} \sum_{j=1}^N (f_{ij} - \mu_i)^4 \right)^{\frac{1}{4}} \quad \dots(9)$$

$$\text{Entropy: } \epsilon_i = - \sum_{j=1}^N (f_{ij} * \log f_{ij}) \quad \dots(10)$$

Where N is the total number of pixels in the image and f_{ij} is the intensity value of the i^{th} color element of the j^{th} image pixel. $\mu_i, \sigma_i, \gamma_i, \delta_i, \epsilon_i$ denotes the mean, standard deviation, and skewness, Kurtosis, entropy of each channel of an image.

Classification methods

KNN Classifier: An instance-based learning method called the K-Nearest Neighbor or K-NN algorithm has been used in many applications in areas such as statistical pattern recognition, image processing. In this paper, two classes KNN classifier is used for classifying lung images into cancerous or non-cancerous. In order to perform the classification process, take 60 lung images which contain 30 cancerous and 30 non-cancerous images. KNN classifier output is displayed in a confusion matrix of 3x3. Various combinations of features are combined and given to the classifier. From the classifier result, we find the accuracy of the image.

ANN Classifier: A classifier classifies the given datasets into cancerous and non-cancerous. Here a computer based classifier implemented in MATLAB software is used for classification purpose. Figure 3 shows that,

there are 13 features, the classifier network consists of 13 inputs. Number of hidden neurons taken is 4 and one output neuron. Then the feature selection method is used to minimize the number of input features. Finally the

input feature taken for this classifier is 9. The activation function used is tan sigmoid function. The output of the network is 0 or 1. Zero indicates a non-cancerous or benign condition and one indicates Cancerous condition.

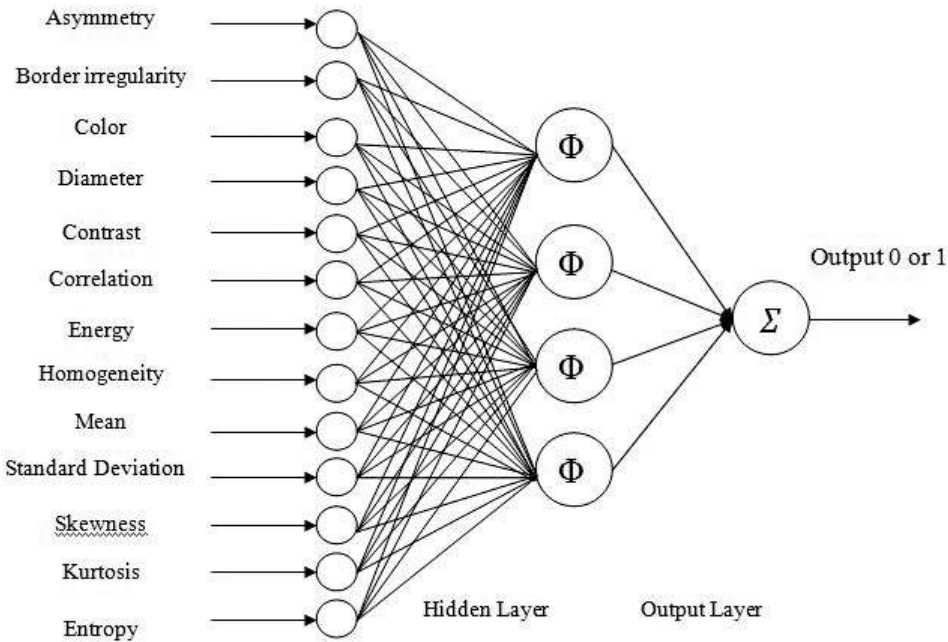


Figure 3: Artificial Neural Network

EXPERIMENTAL RESULTS AND DISCUSSIONS

In fig. 4 same operations will be followed. The input image is resized as 180x180 images, and then gamma correction is done with the gamma value of 2. The color image is converted to gray scale image, and top-hat transform is applied to extract the hair particles. Noise removed image is given to the unsharp masking

to sharpening the image. Noise removed image is subjected to the Otsu method to segment the image into two classes, and then erosion operator is used to removing the white pixel in foreground areas. Finally, the object is separate from the foreground. The Fractal & Hausdorff dimensions plot are drawn based on the box count & number of blocks in the input image. The decision is taken based on the features extracted from the segmented image.

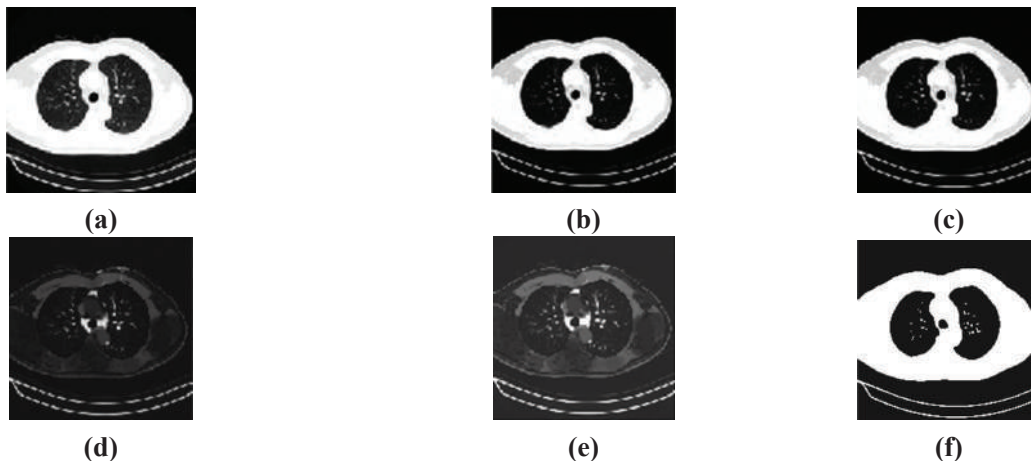


Figure 4: Experimental result of lung tumor image (a)MRI image of tumor affected lung (b)Gamma correction image (c)Gray scale image (d)Median filter image (e)Contrast Adjusted image (f) Segmented tumor

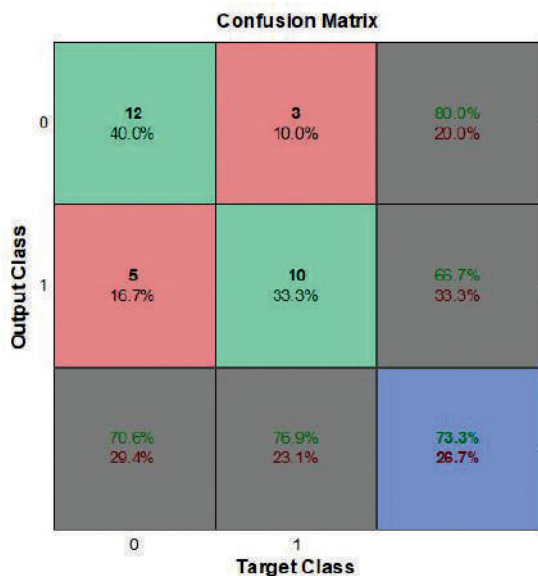
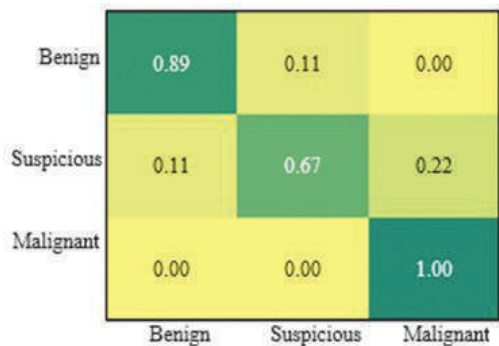


Figure 5: confusion matrix of KNN classifier based on GLCM & FOS feature combination

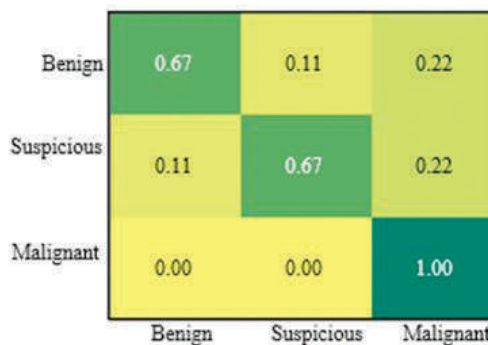
Fig.5 shows that the KNN classifier output from Matlab software. Classify the lung image is cancer and non-cancer based on their features, for that 30 cancer and 30 non-cancer images are taken. From this matrix 30 (100%) cancer images are correctly identified by the GLCM + FOS feature combination.



GLCM



FOS



GLCM+FOS

Figure 6: confusion matrix of ANN classifier based on GLCM & FOS feature combination

COMPARISONS

There are two classifiers which can be used to classify the lung image dataset. KNN & ANN classifier is used to classify the dataset into two classes. Table.1 shows that the comparisons of classifier accuracy and error. From this table we can finalize that the ANN classifier gives the best result.

Table 1: Comparisons of classifier accuracy and error values

Classifier	KNN	ANN
Accuracy (%)	93.7	95.3
Error (%)	6.3	4.7

CONCLUSION

Performance analysis of learning based classifier is proposed for the diagnosis of lung cancer. It proves that this is the best method for diagnosis of lung cancer. The image of lung cancer is taken, and it is subjected to various pre-processing techniques for noise and image enhancement. The cancerous region is separated from the healthy lung by the method of Otsu segmentation. The features of the segmented region are extracted and based on the features images are classified as Cancerous or Non-cancerous using KNN classifier and Benign, Suspicious, Malignant using ANN classifier. The proposed system defines an effective way to detect the lung lesion more accurately and faster by segmenting the lesions images. Moreover, it has got good accuracy and higher levels of quality images. All the above processes are done in Matlab software. From the experimental result, the KNN classifier, ANN classifier accuracy will be 93.7% & 95.3% based on the features.

Ethical Clearance: Taken from Department

Source of Funding: Nil

Conflict of Interest: No

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A Study on Customer Satisfaction of Banking Services with Reference to State Bank of India in Chengalpattu Branch

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ABSTRACT

Objective: The Indian economy is emerging as one of the strongest economy of the world with the GDP growth of more than 8% ever year. The strongest banking which can have a significant role in supporting economic development through efficient financial services. Actually meaning of bank is not specifies clearly in any regulation or act.

Analysis: In India, different people have different type of meaning for bank. Objectives of the study, To study the level of customer satisfaction on bank service with preference to state bank of India, Chengalpattu.

Method: Methodology of the study, The primary data were collected with the help of the structured questionnaires. Secondary data are collected from the various magazines, websites and service branches. For getting primary data, a questionnaire is constructed and distributed to the respondents.

Findings: Findings of the study, The majority 60.7% respondents are male segments, followed by 39.3% are belongs to female category and the majority 60.7% of the respondents are individual's category, followed by 25.0% of the respondents are company category. Suggestions of the study, the banks are suggested that though overall banking services is useful it will improve only if customers satisfaction concept is concerned more. Thus banks must concentrate further on customer satisfaction and improve bank service. Bank decreases additional charges while using internet banking, mobile banking and core banking.

Result: Conclude this study, the nationalization of major commercial banks led to 'Mass banking' which in turn increase the number of customers. The increased in number of customers automatically led to deterioration in quality of customer services.

Keywords: Customer, satisfaction, chi-square test

INTRODUCTION

The strongest banking which can have a significant role in supporting economic development through efficient financial services. Banking sector plays a vital role in growth and development of Indian economy. After liberalization the banking industry in India undergone major changes. The process of liberalization and globalization has strongly influenced the Indian banking sector. A stable and efficient banking sector is an essential precondition to increase the economic level of a country.

Banking Sector performs three primary functions in economy, the operation of the payment system, the mobilization of savings and the allocation of saving to investment products. The Government has taken various steps in this sector in a basic priority and this service sector has been changed according to the need of present days.

Origin of Bank: It is generally said that the word "Bank" has been originated from Italy^[1]. In the middle of 12th century there was a great financial crisis in Italy due to war. To meet the war expenses, the government of that period forced subscribed loan on citizens^[2] of the country at the interest of 5% per annum. Such loans were known as 'Compare', 'minto' etc. The most common name was "Monte". In Germany the word 'Monte' was named as 'Bank'^[3] or 'Banke'.

Meaning of Bank: Actually meaning of bank is not specifies clearly^[4] in any regulation or act. In India, different people have different type of meaning for bank. Normal salary earner, it means that it is a saving institution, for current account holder or businessman bank as a financial institutions and many other, bank is not for profit making, it creates saving^[5] activity to salary earner.

Definitions of Bank: Indian Banking Regulation act 1949 section 5 (1) (b) of the banking Regulation Act 1949 Banking^[6] is defined as “ Accepting for the purpose of the landing of investment of deposits of money from public repayable on demand or other wise and withdraw able by cheques, draft, order or otherwise^[7].”

History of Bank: Ancient Rome perfected^[8] the administrative aspect of banking and saw greater regulation of financial institutions and financial practice^[9]s. Charging interest on loans and paying interest on deposits became more highly developed and competitive. The development of Roman banks was limited, however, by the Roman^[10] preference for cash transactions. During the reign of the Roman emperor Gallienus (260-268 AD), there was a temporary breakdown of the Roman banking system after the banks rejected the flakes of copper produced by his mints. With the ascent of Christianity, banking became subject to additional restrictions, as the charging of interest was seen as immoral. After the fall of Rome, banking was abandoned in Western Europe and did not revive until the time of the causal.

Banking after Independence in India

Third Phase: 1991-2002 Economic Reforms: The Indian economic development takes place in the realistic world from 1991 “Liberalization, Privatization and Globalization” policy. As per “LPG” policy all restriction on the Indian economy was totally dissolved and the soundest phase for the Indian banking system adopt over here. This also changed the scenario of the macroeconomic world. The budget policy and suggestion provided by shri Dr Man Mohan Singh and the Governor of Reserve Bank of India. As per the guideline the segments for development is having various problem and so the importance of public sector cannot be ignored. The country is flooded with foreign banks and their ATM stations. Efforts are being put to give a satisfactory service to customers. Phone banking and net banking is introduced. The entire system became more convenient and swift.

Functions of Commercial Bank

Acceptance of Deposits: An important function of commercial banks is to attract deposit from the public. Those people who have cash account and want their

safety; they deposit that amount of banks. Commercial banks accept deposits every class and source and takers possibility to repay the deposit in the same currency whenever they are demanded by depositors.

Lending: Another function of commercial banks is to make loans and advance out of the deposit receive in various forms. Bank Apply the accumulated public deposits to productive uses by way of loans and advances, overdraft and cash credits against approved securities.

Investments: Now-a-days commercial banks are also involved in Investment. Generally investment means long term and medium term investments.

Corporate Governance: Banks not only accept and deploy large amount of uncollateralized public funds in fiduciary capacity, but they also leverage such funds through credit creation. Banks are also important for smooth functioning of the payment system. Profit motive cannot be the sole criterion for business decisions. The focus, therefore, should be on enhancing and fortifying operation of the principles of sound Corporate Governance.

NEED OF THE STUDY

The study was conducted to know the customer satisfaction regarding service provided by state bank of India for the customers. The study totally revolves around the opinions and feedback from the users. An opinion survey with the help of questionnaire was conducted to know the users view on the services provided by state bank of India, Chengalpattu.

Statement of the Problem: State bank of India in Chengalpattu is not providing services properly to their customers especially opening of new account, delay in getting withdrawal money, lending of housing loan Hence the researcher has taken the problem that the consumers are satisfied or dissatisfied with the services of the state bank of India in Chengalpattu. Customers of state bank of India face many problems in getting the services like ATM operation for depositing and withdrawing money. The process of educational to the students gets delayed for a long time. The prompt payer of loan is not given the concession which is available in the bank like waiver of 0.5% for regular re-payer of loan.

Objectives of the Study

- To study the level of customer satisfaction on bank service with preference to state bank of India, Chengalpattu.
- To estimate the performance of state bank of India based on the service provided.
- To suggest the strategies for the bank to improve the level of customer satisfaction
- To determine the customer-Bank interactions towards satisfaction.
- To know the variety of different services offered by the state bank of India.

RESEARCH METHODOLOGY

Since the primary objective of the study is to identify the consumer satisfaction, it was decided to use descriptive research design. The purpose of this research is description of the state of affairs, as it exists at present. The necessary data for analysis were collected mainly with the help of the primary sources. To know the basic idea and concepts regarding the consumer attitude and behavior, the secondary data were used.

The primary data were collected with the help of the structured questionnaires. Secondary data are collected from the various magazines, websites and service branches. For getting primary data, a questionnaire is constructed and distributed to the respondents.

The respondents are of different types of customer and the data were collected with several significances and analyzed with the help of various statistical tools like percentage analyzed, graphical representations.

Sample Selection: The researcher has selected the sample to the maximum no. of 56. Since the population is infinite, the samples are selected for the study as convenient to the research process. It has been decided on the basis of simple random and convenient sampling techniques and that too according to the availability of the users at state bank of India in Chengalpattu.

Sources of Data: Primary data were collected from the customers using SBI service to find the level of their satisfaction. It was collected with the aid of formal questionnaire, with personal

Limitations of the Study: The following are the limitations that are encountered by the researcher during the period of the research work and that too affected the research process in very many dimensions: There may be a bias in collecting the primary data from the customers, The study is limited 56 Respondents. The study is conducted only in Chengalpattu town and some of the respondents were not interested to mention the actual data.

ANALYSIS AND INTERPRETATION OF DATA

Table 1: Primary data

Particulars	Respondents	Percent
Individual	34	60.7
Firm	4	7.1
Company	14	25.0
Others	4	7.1
Total	56	100.0

Source: primary data

Interpretation: From the above table reveals that 60.7% of the respondent’s customer status was individuals, 7.1% of the respondents have a firm as customer status, 25.0% of the respondent’s customer status was company and 7.1% of the respondents have other customer status.

Table 2: Occupation wise sample respondents

Particulars	Respondents	Percent
Business	16	28.6
Govt. service	2	3.6
Private service	9	16.1
Farmer	18	32.1
Student	7	12.5
Others	4	7.1
Total	56	100.0

Source: primary data

Interpretation: The above table shows that out of the total customer satisfaction 56, 28.6% of they are doing business, 3.6% of them are govt. service, 16.1% of them are private service, 32.1% of them are farmer, 12.5% of them are student,7.1% of the respondents are doing some other occupation.

Annual income wise sample respondents**Table 3: Annual income-wise respondents**

Particulars	Respondents	Percent
Upto 100000	38	67.9
100001-300000	15	26.8
300001-500000	1	1.8
500001-1000000	2	3.6
Total	56	100.0

Source: primary data

Interpretation: From the above table, it was found that 67.9% of the respondents belongs to the income level of up to Rs 1,00, 000 , 26.8% of the respondents belongs to the income level between Rs 1,00,001 – 3,00,000, 1.8% of the respondents belongs to the income level income between Rs 3,00,001 – 5,00,000 and remaining 3.6% of the respondents belongs to the income level of Rs5,00,001- 10,00,000. It is crystal clear from the above data that an overwhelming majority (67.9%) of sample respondents annual income (in Rs) level below Rs 1,00,000.

Mobile banking, e-banking and other latest technologies providing in the bank sample respondents**Table 4: Bank sample respondents**

Particulars	Respondents	Percent
Very good	15	26.8
Good	27	48.2
Satisfactory	12	21.4
Poor	2	3.6
Total	56	100.0

Source: primary data

Interpretation: From the above table reveals that 26.8% of the respondents were very good level, 48.2% of the respondents good,21.4% of the respondents satisfactory and remaining 3.6% of the respondents poor on mobile banking, e-banking and latest technologies.

Hypothesis

Ho1: There is no significant relationship between age-group and satisfied with the operation of your account in this branch.

There is no significant relationship between age-group and satisfied with the operation of your account in this branch is given in table

Table 5: Satisfied with the operation of your account in this branch

Particulars	Satisfied with the operation of your account in this branch				Total	
	Very good	Good	Satisfactory	Poor		
Age-group	Below 25	12	11	6	0	29
	25-35	2	8	4	0	14
	36-45	0	3	2	2	7
	Above 46	0	4	2	0	6
Total		14	26	14	2	56

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22.840 ^a	9	.007

Source: primary data

Since P value (0.007) is less than 0.05, the null hypothesis is rejected at 5 percent level of significance. Hence, concluded that there is significant relationship between age-group and satisfied with the operation of your account in this branch.

Hypothesis

Ho2: There is no significant relationship between occupations and satisfied with the operation of your account in this branch.

There is no significant relationship between occupations and satisfied with the operation of your account in this branch is given in table

Table 6: Satisfied with the operation of your account in this branch

Particulars		Satisfied with the operation of your account in this branch				Total
		Very good	Good	Satisfactory	Poor	
Occupation	Business	7	9	0	0	16
	Govt. service	0	0	2	0	2
	Private service	2	5	2	0	9
	Farmer	2	11	3	2	18
	Student	3	1	3	0	7
	Others	0	0	4	0	4
Total		14	26	14	2	56

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	34.875 ^a	15	.003

Since P value (0.003) is less than 0.05, the null hypothesis is rejected at 5 percent level of significance. Hence, concluded that there is significant relationship between occupations and satisfied with the operation of your account in this branch.

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

Summary of findings

1. The majority 60.7% respondents are male segments, followed by 39.3% are belongs to female category.
2. The majority 60.7% of the respondents are individual’s category, followed by 25.0% of the respondents are company category.
3. The majority 32.1% of the respondents are farmer, followed by 28.6% of the respondents are doing business.
4. The majority 67.9% of the respondents belongs to the income level of up to Rs 1,00,000, followed by 26.8% of the respondents belongs to the income level between Rs 1,00,001 to 3,00,000.

5. Ho3 the age-group and satisfied with the operation of your account in this branch is rejected.

SUGGESTIONS

The suggestions are offered by the researcher for improving customer’s satisfaction and providing service the research findings and also from the interactions the researcher had with the respondent’s customers. Banks must ensure to their customers that their service is competitive. Thus the banks are suggested that though overall banking services is useful it will improve only if customers satisfaction concept is concerned more. Thus banks must concentrate further on customer satisfaction and improve bank service. Bank decreases additional charges while using internet banking, mobile banking and core banking. The banks would increase the use of internet banking as these offer the benefits namely convenience to the customers and reduction of cost of operation to the banks. Internet banking can increase the comfort level for transacting. To attract their customers to use online banking, banks should reduce the charges levied for online transactions.

CONCLUSION

A sample of 56 was collected were convenience sampling was used to analyze the data with percentage analysis and chi-square test. The researcher’s aim throughout the study has been to examine how far the customers are satisfied with the banking services offered by state bank of India in Chengalpattu branch. Customers are the most important of overall banking services. The success and failure of any banking services depends upon how far they satisfy the expectations of their customers. Banks are an important social organization rendering various financial services to its customers. Realizing the importance of customer’s service in banks, recommendations are made by various committees to improve the services quality of banks. The nationalization of major commercial banks led to ‘Mass banking’ which in turn increase the number of customers. The increased in number of customers automatically led to deterioration in quality of customer services.

Ethical Clearance: Taken from Department

Source of Funding: Nil

Conflict of Interest: No

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The Level and Dimensions of Resilience of Trainee Teachers at Teacher Education Institute of Malaysia

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ABSTRACT

Resilience is one of the important aspects that can improve a person's ability to handle stress and adapt to a situation. Resilience brings many advantages, especially for the students at the Teacher Education Institute (TEI) and the Higher Education Institutions (HEI) in particular to improve academic achievement and personal skills. However, there were not many studies done on resilience in Malaysia. This research is conducted to identify the resilience level and dimension among trainee teachers and their differences based on gender. The respondents consist of 172 semester eight students and this study uses purposive random sampling. This study used the Dispositional Resilience Scale Questionnaires to answer the research questions. The results showed that the overall mean score of resilience is at high level. Apart from that, the findings also showed that respondents have moderate level of dimension of control and challenge than the dimensions of commitment which is at moderate level. The findings also found that there were significant differences according to gender. This study has implications on the teacher training and also teaching and learning methods practiced in the TEI in order to develop the attitude of perseverance among future teachers towards the quality of novice teachers.

Keywords: Resilience, Stress, Trainee teachers, Novice teachers

INTRODUCTION

The concept of resilience was introduced and developed from the existential Theory of Personality¹. In the field of psychological research, resilience is often associated with the attitude of someone who is able to compete and survive in a stressful situation or in an unpleasant situation. In the dictionary, it defines resilience as able to face challenges. Therefore, it is difficult to define and provide the corresponding term of the 'hardiness' in the context of the study in Malaysia. Personality or resilience is divided into three dimensions namely (1) an individual's commitment towards his goal of his life and work or what he does in his life, (2)

having the ability to sense or control of the belief that he can control what happens in his lives, and also having a perception that change occurs as a positive challenge and as an opportunity for him to grow rather than taking it as a threat. Determination helps in building the perception, interpreting and building the skills required by an individual to resolve a pressured or complicated situation in order to be successful². This construct helps an individual to deal or confront with the tensed or complicated situation and also to protect them from the bad effects³. One of the positive psychology areas that are frequently studied by foreign researchers was found that determination can help an individual to see or assess a situation or event in his life as something that is less stressful if the individual has a high determination personality.

In summary, persistence is a personality that allows an individual who is under pressure to feel committed rather than isolated, to have the ability or greater power control than the powerless and the weak and to see change as a challenge rather than consider it a threat to remain in good health¹.

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Conceptually, persistence is a difference between the individual's development from the start of his life and his stable over time though it may change under certain levels⁴.

Several existing studies only related to persistence as one of the characteristics that help trainee teachers, particularly during the ongoing evaluation process and during their teaching practices. Persistence factor is also related with the stress experienced by trainee teachers. The study was done and found that the factors that affect stress experienced by trainee teachers is that they have less experience as teachers, problems in choosing teaching methods and choosing appropriate teaching aids, problems of providing teaching induction, clerical work and other non-teaching duties⁵. Study showed that trainee teachers who have positive attitudes and who are interested in the teaching profession is highly motivated to achieve success in their careers. They also show better performances during their teaching practice than those who are not interested and have low motivation⁶.

In Malaysia, teachers nowadays face the greatest challenge in meeting the different learning needs of a diverse group of student. Thus teachers need to recognize and realize the individual learning mode of all their students and to motivate them so as to maximize the learning progress and the achievements of these students⁷. Action research is a way to improve teachers teaching. The key challenges were found to be lack of research culture in schools, which have led to a series of other challenges, and teacher's lack of confidence due to limited scaffolding received in acquiring research-based knowledge and skills⁸.

METHODOLOGY

This is a quantitative study using survey method where a set of questionnaire was used to collect the data. The data obtained were analyzed using the SPSS version 22.0 software. The mean score and t-test were used to test the hypotheses in the study. The sample of this study consisted of 172 semester eight trainee teachers from one of the Teachers' Education Institute (TEI) in Malaysia. Random sampling was used to obtain sufficient data for the purpose of data analysis and to answer the research questions. A set of questionnaire, Dispositional Resilience Scale (DRS)⁹⁻¹⁰ contains 15 items with four levels of measurement that is incorrect (0); Slightly

correct (1); True (2); and, very correct (3) has been used. The alpha coefficient of this instrument is .76 and .83⁹. The degree of resilience in the instrument is divided into three categories: (1) Low (mean score between 0 and 1.00); (2) Simple (mean score between 1.01 and 2.00); and (3) High (min score between 2.01 and 3.00). This category is designed and adapted according to the scale recommended by some statistical experts¹¹⁻¹⁵.

RESULTS AND DISCUSSION

The Resilience Level of Trainee Teachers: The mean of the research sample is 2.10 which were in high category (2.01-3.00). Generally, the level of resilience in the high category is quite satisfactory but the value was still considered low in this category compared to the highest value of 3.00. This high level of resilience indicated that these trainee teachers are able to achieve good and excellent results. There are many studies that have been conducted in the west about the resilience level and their relationship with the academic achievement of the students. The study done by researchers stated that there is a relationship between the resilience levels with academic achievement of the undergraduate students¹⁶. In this study, the researchers also found that the dimension of commitment, in terms of resilience, played the most important role in determining the academic achievement of students. The results of this study also suggested that students with high dimension of comment, resilience in particular, more likely to achieve better academic results.

According to researcher⁴, since late 1980s, researchers had identified one type of attitudes and skills that can improve the students' performance, morale and health which caused by stressful situations, which is known as the resilience. The findings of the previous studies also suggested that this enhanced attitude of resilience is able to control or help to reduce the stress level experienced by college students, especially through regular training of resilience¹⁷.

The Malaysia education system has changed aligned with the Malaysian Education Development Plan (PPPM) and this change also includes the teaching and learning method and the format of the examination¹⁸. This is because previously, the education in Malaysia is more on examination-oriented which has been identified as one of the contributors to stress among students¹⁹⁻²⁰.

The Degree of Consistency According to the Dimension of Persistency: The mean score of the three dimensions in this questionnaire is 2.10. This shows that the level of resilience amongst the trainee teachers of *Raja Melewar* Campus is at a high level. The score for each dimension of resilience in this questionnaire has been calculated using the SPSS software 22.0. However, based on the mean score shown in Table 1, the dimension of control is the highest mean score of 2.26 compared to the mean score for the dimension of challenge which is 2.07 and the mean score for the dimension of commitment is 1.97. This analysis shows that in terms of dimensions of resilience, dimensions of control are the highest dimensions among the respondents followed by the dimensions of the challenge and on the contrary the dimensions of commitment are at a moderate level. This high score of resilience can help trainee teachers in the teacher education institute to avoid the feelings of burn-out due to the extensive workload and examination in which the teacher education institute has been practicing continuous evaluation system. This is in line with the study found that resilience is negatively related with ‘burn-out’ for professionals, especially in the field of mental health and education²¹⁻²².

Apart from that, this high level of resilience also can help trainees to manage their time and to develop their own potential and also adapt to the challenges and also to build good relationships with lecturers and colleagues. This is supported by a study which stated that resilience helped in managing and improving performance, leadership, morals, and health²³⁻²⁴. Individuals with high level of persistence, use frequent adjustment strategies (e.g. active and problem-based strategies), and use less of non-adaptive strategies (e.g. avoidance)^{25,22}. Furthermore, those who have better and wider socialized skills in the society enabled them to face the challenges in their job requirement and they are reported to have a higher level of support than their supervisors and supervisors²⁶.

Table 1: Mean Score of the Dimension of Resilience among the Trainee Teachers

Dimension Level	Frequency	Mean
Commitment	172	1.97 (Intermediate)
Control	172	2.26 (High)
Challenge	172	2.07 (High)
Overall	172	2.10 (High)

Differences in the Level of Resilience Based on Gender: The t-test in Table 1 showed that there was a significant difference in the level of resilience among the respondents’ gender, $t(172) = 1.273, p = .004 (p < 0.05)$. This means that the male and female trainee teachers have different levels of resilience (Table 2). The findings of this study were supported by the research which stated that there was a significant effect of gender on the level of resilience in the dimensions of control and dimensions of challenges, but not in the dimensions of commitment²⁷. In addition, this study also found that there was also a significant effect on school’s climate and also resilience. The effect of gender and the school climate is also important in the formation of resilience except for the dimension of commitment. This suggests that there is a significant impact between the school’s gender and gender in which both rely on one another to explain the influence of dimensions of control and the dimensions of the challenge towards resilience among adolescents.

Resilience also affects the development of one’s career. The study found that the resilience emerged and became one of the most important traits that relate to the job tolerance, performance and pressures that he will be excelled in the very challenging job²⁸. Furthermore, in terms of social relationships, the other study found that there was a significant relationship between the bond of safe relations and the resilience with creativity²⁹. On the other hand, there is a significant negative relationship between the bonds of an insecure relationship with creativity. If this defect exists in social skills for a stable relationship, it will lead to long-term problems such as denial of friends, the achievement level at schools and other social problems.

In addition, in terms of health, the study found that there was an effect between the levels of stress and gender toward resilience especially in the dimensions of commitment and the dimensions of control over good health. Men who were less stress showed less physical and psychology symptoms which related to dimension of commitment and dimension of control, but this was not related to women. There is also a relationship between resilience, gender and stress on health among teenagers³⁰. Studies done on gender differences and resilience that affecting career development and individual health have shown that training on these attitudes of resilience has to be carried out so that those concerned will have high level of persistence for physical and mental well-being.

Table 2: The t-Test of Level of Resilience Based on Gender

Dependent Variable	Group	N	Mean	t	Sig.
Level of Resilience	Male	65	29.86	1.273	0.004*
	Female	107	32.49		

*significant < 0.05

CONCLUSION

Many studies in the west have proven that resilience can influence academic achievement and also stress levels. Resilience can also help to establish healthy personality and to ensure mental well-being. The study done at teacher education institute also found that the differences level of resilience among gender could affect their academic achievement and their ability to self-adjust with campus life. However, the students at teacher education institute also showed that they have high level of resilience and this is in line with their outstanding academic achievements. Teaching and learning methods practiced in the teacher training institute are likely to be the one of the contributing factors to the development of resilience among these trainee teachers. It is recommended that a program or training in the effort to develop and further instill resilience should be planned and implemented at the teacher education institutes level so that it can help trainee teachers in preparing themselves for the real atmosphere in schools as novice teachers and hence to achieve the objectives of the Malaysian Education Development Plan (PPPM) and Vision 2020.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

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Transformation the Role of Government in Solid Waste Management in Malaysia through Local Agenda 21 (LA21)

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ABSTRACT

Sustainable development agenda for local authorities have become the national agenda. The local authorities must be prepared to meet the challenge, particularly in relation to growing urbanization within the context of sustainability of solid waste management. This paper describes the result from the survey among local authorities in Malaysia regarding of solid waste management. A survey was conducted to gauge the thoughts decision makers of local authorities in Malaysia with regard to the concept of sustainable development and Local Agenda 21. This paper examines the transformation of the role of the local government in solid waste management in Malaysia using ecological modernization theory. The survey among local authorities in Malaysia shows that solid waste management has a low priority within the local authorities causing mismanagement of existing resources and a lack of formal planning. Consequently, there is lack of expertise, inadequate equipment and untrained staff with minimal education in waste management. Despite these shortcomings the local authorities require technical and financial resources in order to improved solid waste management in Malaysia. In fact, inadequate support from decision-makers of local authorities raises the question whether smaller or less advanced local authorities will have the capacity and capability to assume new roles to meet the new challenges.

Keywords: Ecological modernization, Solid waste, Local authority, Sustainability, Malaysia

INTRODUCTION

The Solid Waste Management (SWM) in Malaysia problems are caused by various factors¹, which have an impact on the development of effective solid waste management system in Malaysia. Institutional constraints are among these problems. Even though several agencies such as the state Department of solid waste management and Municipal Councils are involved in waste management, they often have no clear functions in relation to waste management and there is no single agency designated to coordinate their projects and activities. The lack of coordination among the relevant agencies often results in duplication of efforts in waste management, wasting of resources, and unsustainability of overall waste management programs. The waste

management problem has a complex nature with a range of important dimensions such as multiplicity of the types of waste generated in the system, complex spatial pattern of waste arising, the necessity to transport waste long distances for processing, a variety of emissions from waste collection, transporting and treatment to the environment, and the almost unpredictable and localized character of impacts of these emissions on humans and ecosystems¹⁵. Malaysia faces with a problem dealing with waste management. The reason for the problems in waste management is that there is not only an increase in the rate of waste production, but also characteristics of the waste today are far different from what they were a few years ago. These demands need special attention for collection, treatment and disposal.

THEORETICAL FRAMEWORK

Ecological Modernization “has become the dominant discourse of sustainable development” amongst environmental policymakers², creating “a way of thinking about how to move beyond the conflict

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relationship that it assumed to exist between the economy and environment”¹⁰. Therefore, ecological modernization refers to a series of institutional, operational, economic, governance, social and political shifts that are set in motion by environmental driver. These drives push new social arrangements, a new discourse, new scientific and technical developments, and a shift in responsibilities and interests between public and private sectors, between governments and their citizens, between civil society and other economic actors, and between the formal and informal sectors and arrangements within a wide range of disciplines¹¹.

METHODOLOGY

This research method is explanatory, research population is employee relating to finance reporting as much as 109 persons, data collecting technique through observation using questionnaire research instrument and literature study. Statistic test tool use multiple linier regression and hypothesis test by t-test. The survey was conducted to gain some information and perception regarding solid waste management among the local authorities in Malaysia. As many as 12 decision makers of local authorities in Malaysia were chosen as key respondents through interview sessions.

Of the respondents 11 were males and 1 female, a ratio which generally represents the unequal distribution of men and women at the level of decision making in local authorities. The interviews survey served to evaluate and examine policy of Solid Waste Management among the local authorities in Malaysia. Interview survey could provide the opportunities for a more detailed investigation amongst the municipal councils, while gathering data for general evaluation. There were 12 officers among the local authorities in Malaysia who were interviewed through the survey.

RESULTS AND DISCUSSION

Environmental Awareness among Local Authorities in Malaysia: According to the survey, as indicated in Table 1, most respondents were less knowledgeable about complex conceptual issues about sustainable development. 58.3% of respondents did not understand the concept of sustainable development, whereas a 66.6% of respondents had never heard of the concept of sustainability. This could be related to the inaccessibility to knowledge necessary to shape their opinions, resulting from inadequate infrastructure and resources for service delivery and planning and conflicts arising from development priorities.

Table 1: Knowledge of Sustainability of Solid Waste Management

Question	Proposition of Answers			Total
	Yes	No	Not Sure	
Do you understand the concept of sustainability?	41.6%	58.3%	0	100%
Have you ever heard the concept of sustainability?	25%	66.6%	8.3%	100%
Do you understand the concept of Local Agenda 21 (LA21)?	25%	75%	0	100%

Table 2: Behaviour for Environmental Awareness Reason among Decision Makers of Local Authorities

Question	Proposition of Answers			Total
	Yes	No	Not Sure	
Do you utilize used paper for printing and photocopying?	25%	66.6%	8.4%	100%
Do you aware of litters?	50%	41.6%	8.4%	100%
Do you use greening guidebook personally?	16.6%	75%	8.4%	100%
Do you buy or use green product?	41.6%	50%	8.4%	100%
Do you participate in recycling campaigns?	58.3%	33.3%	8.4%	100%

The findings in the table highlight the critical importance placed on National Agenda 21 campaigns with more than 50% of the respondents participating in environmental campaigns. Within the government sector,

raising awareness should focus on the local government, who is responsible for proper municipal solid waste management. In this respect, the national government shall inform the top administrators of local government the

national policies on sustainable solid waste management including waste recycling program which is one of the national agenda to implement 3Rs (Reduce, Reuse and Recycle) activities in their localities. The objective of ecological modernization theory is to increasing the efficiency of material use through waste minimization and recycling. These efficiency improvements need to occur at the both macro and micro-economic levels through structural economic change and changes in infrastructure and technology, and through the adoption for new technologies and techniques. Clean technologies that integrate environmental factors into the design and application of products and processes progressively replace technologies synonymous with end-of-pipe pollution control and tackle pollution problems at source. Therefore, the national government should guide the local government to implement recycling program and organize public, businesses, NGOs and other relevant stakeholders to promote 3Rs activities for sustainability solid waste management. Involvement from different actors such as NGOs, academics, consultants provides legitimacy, opens inflexible bureaucracies, brings in new ideas, and increases provider willingness to innovate¹³.

The Concept of Local Agenda 21 Plan and the Transformation of the Role of Local Governments:

Agenda 21 is a comprehensive plan adopted as the framework for achieving sustainable development in the 21st century at the Earth Summit in Rio de Janeiro in 1992. Chapter 28 of Agenda 21 proposes Local Agenda 21 (LA21). LA21 is a decentralized initiative that focuses on the role of local governments in the implementation of sustainability programs within a country. The implementation of Local Agenda 21 (LA21) seen as an opportunity to include people in planning for sustainability at local level. The study argues that the Local Agenda 21 address the institutional dimension of ecological modernization theory which is the important of the role government to deliver sustainable policy and development. This section examines the Local Agenda 21 and the role of local government to deliver sustainability of solid waste management in Malaysia. In the case of Malaysia, the government response to the implementation of Agenda 21 is reflected in the Seventh Malaysia Plan (1996-2000), which provides an in-depth treatment of the issues of concern identified

in the Agenda (7th Malaysian Plan 2000). Local Agenda 21 initiative specifically recognized the role of governments, as 'the level of governance closet to the people' and communities in delivering sustainable development policy¹⁶.

The survey shows that about 75% of the respondents do not understand the concept of Local Agenda 21, whereas only 25% understand the concept (Table 1). The survey also shows that most departments of local authorities were still in the early stage of planning for Local Agenda 21. All but one is at the level of 'not yet decided to produce an action plan'. The one that has given some attention to producing an action plan is Department of licensing, Urban and social services, but details have not been decided. However, the preparation of action plans by all departments is generally slow. It is suggested that the reason for this is the legitimacy of Local Agenda completion of planning activities of Local Agenda 21 pilot project at national level. This pilot project has been initiated but is yet to be completed. The result of the pilot project will serve as a guideline to all local authorities in the country.

From the findings it was concluded that most decision-makers in local authorities were less knowledgeable about complex issues of sustainable development and were expressing low concern with regard to behavior or value for environmental awareness, this highlights the essential point of the preparedness and their contribution in meeting the challenge of sustainable development. Local authority staff should be made available to be sent for retraining in aspects related to solid waste management and their specialized jobs to keep them abreast of the latest developments. Hence, this would be suggesting that general training activities among the decision makers in order to enhance the capacity building. (Table 3) As a result from the fact that most departments of local authorities are still at the level of not having decided to produce an action plan of Local Agenda 21 planning, the above suggestions for training would also encourage the formulation of local action of Agenda 21. Further they have to work in a long- term, open and integrated fashion, in order to enable the innovation capacity building for the economic sphere⁶.

Table 3: Capacity Building Activities for Local Authorities Decision Makers¹⁶

Format of Training	Objectives	Goals
National conference	<ul style="list-style-type: none"> ● To assess the country’s issue and situation ● To raise environmental political awareness 	<ul style="list-style-type: none"> ● To develop national legislation and policy for the ‘emergency’ adoption of Agenda 21’
Technical meeting/ workshops	<ul style="list-style-type: none"> ● To draft technical documents for political endorsement and follow up 	<ul style="list-style-type: none"> ● To develop plans and procedures for Local Agenda 21 management.
Inter-district/state workshops	<ul style="list-style-type: none"> ● To raise awareness ● To standardize locally relevant approaches ● To consolidate experience ● To clarify needs and draft projects for political endorsement 	<ul style="list-style-type: none"> ● To strengthen institutional and human resources for the management.
Technical meeting	<ul style="list-style-type: none"> ● To identify relevant message and appropriate audiences and media 	<ul style="list-style-type: none"> ● To develop programs for public education, awareness and community participation
Workshops	<ul style="list-style-type: none"> ● To draft plans of local action for political endorsement and follow up ● To plan for community mobilization 	<ul style="list-style-type: none"> ● To develop programs for public education, awareness and community participation
Technical meetings/ workshop at country and inter country levels	<ul style="list-style-type: none"> ● To identify available indicators ● To facilitate networking ● To identify sources and systems ● To make compatible parallel system 	<ul style="list-style-type: none"> ● To promote the collection, analysis and dissemination of information related to ‘global’ actions

Issues and Problem Dealing with Solid Waste Management in Malaysia⁸: The study found that the policy on the appropriate development of closed landfill sites, long-term monitoring of pollution generated from landfill sites and strict enforcement of pollution from active landfill sites owned by local councils are not clearly defined and adhered to. Despite the degradation of valuable land resources and creation of long-term environmental and human health problems, uncontrolled open dumping is still prevalent in most developing countries⁵ which indeed desperately need an immediate action due to the associated harmful impacts. Moreover, in South and Southeast Asia, more than 90% of all landfills are non-engineered disposal facilities.

Waste experts comment; The landfill required a proper set-up—a carefully selected location and soil which is of clay-like texture that has minimum permeability to prevent underground water contamination. On the other hand, the landfill should also be properly engineered in accordance with geological and hydro geological requirements”.

However, during this study it was observed that human resources and expertise in waste management was lacking in most of local authorities in Malaysia. There have not enough staff to implement sustainability method for solid waste management in their local area. Therefore, the number of expertise staff and training in waste management within the local authorities needs to be increased if waste management plans are to be implemented in the future. According to the survey, solid waste management requires large financial resources. In Malaysia, the expenditure for managing solid waste is around 40 to 50 percent for larger councils and more than 50 percent for smaller councils. Since solid waste management was not one of the priority tasks for most local councils until recently, its financial management was relatively inefficient.

From the survey found that the major issues and problems in managing solid waste management in Malaysia are due to inadequate resources and absence

of national level policy and guidelines for allocation of resources for SWM. Under ecological modernization theory, the state is seen in a variety of roles and capacities for example as the enabler for markets that help produce the technological advances via competition. In some cases, the state seen as an institution that is incapable of addressing critical local, national and global environmental problems. A more recent development in the ecological modernization literature has been the emergence of civil society as a key agent of change³. Thus, the national government should encourage more investment by industry and private company involve in solid waste management. In terms of engaging economic imperatives, the idea is to harness market forces and steer them in a direction that encourage eco-efficiency. This start with internalising the externalities of environmental damage (e.g. making the polluter pay for the damage done) but moves on the creating substantive incentives for both consumers and investors to support greener firms^{4,9,10,2}. In this new green market, a healthy environment is seen as essential for a healthy economy.

CONCLUSION

The survey among local authorities in Malaysia shows that solid waste management has a low priority within the local authorities causing mismanagement of existing resources and a lack of formal planning. Consequently, there is lack of expertise, inadequate equipment and untrained staff with minimal education in waste management. Despite these shortcomings, the local authorities require technical and financial resources in order to improved solid waste management in Malaysia. In fact, inadequate support from decision-makers of local authorities raises the question whether smaller or less advanced local authorities will have the capacity and capability to assume new roles to meet the new challenges. There also seems to be problems with translating excellent policies at the national level into actions on the ground. Thus, National policy of solid waste management in Malaysia is not successful to deliver sustainability agenda. In the context of Solid Waste Management, analyzing sustainability of solid waste is a complex task but an important agenda in order to achieve national policy goals. The ability of its proponents to achieve real and positive impacts on social and environmental conditions will also require the practice of democratic values, cooperation of

stakeholders and implementation of supportive national government framework for sustainable development.

Ethical Clearance: Nil

Source of Funding: Self

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Religious Integration among Counselling Practicum Students

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ABSTRACT

This paper attempts to explore the level of religious integration in counselling practicum among practicum students in public university. 173 practicum students from three public universities were involved in this study and questionnaires were sent by post to the selected sample. Descriptive analysis (percentage, mean and standard deviation) and inferential (t-test) was used to analyze the data. Research finding shows that the religious integration among counselling practicum students are moderate. Based on the findings of the study, the recommendations made are standard training and constant exposure on the integration of religious understanding in the practice of counselling should be established to improve the competency level of spirituality and religiosity among counselling practicum students.

Keywords: Religious integration, Counselling, Practicum

INTRODUCTION

The term ‘Religious Counselling’ in general refers to the counselling services using religious approach both in terms of philosophy, goals, processes, procedures and problem-solving approach². The *ACA Code of Ethics* also obligates counselors as:

“They must learn during their professional education to respect the importance of spirituality and religion in the lives of clients and how to incorporate that respect in their practice”.

It is pertinent to identify relevant issues and concerns that surround the fundamental propositions of value systems, spirituality, morality, and use of religion⁶. Religion should be included in the counselling process, because it act as a guidance for client to forsee their problems in life¹⁵. Secondly, religion plays major influence in determining client’s cultural identity²³.

Thirdly, religion is one of the component in multicultural setting¹⁸. And finally, religion can assist exploration and problem solving in the counselling process⁸. Religious and spiritual is also seen as a key component that affects clients in terms of physical, social, emotional and intellectual²². As asserts as follows:

Culture is where religion happens; religion is located within human culture. Religion has emerged within the cultural phase of evolution. What does religion do—what is it for?—in the cultural realm? It is a primary force for the organization of consciousness and therefore for the worldviews and values and decisions that drive culture. Religion is above all concerned with what the natural world can become—its possibilities. Religion’s adaptive success in strengthening individual psyches and mobilizing group spirit flows from its vision of what the world can become¹¹.

Therefore, religion should be included as one of the components evaluated in the counselling process as other aspects such as physical, social, emotional and intellectual.

In United States for example, in the field of counselling, religious and spiritual issues are often avoided⁸. Most of the counselling theories that were used today are more focused on the behaviour and cognitive

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aspect without any indicator of religions or spiritual in it²¹. The transition of acceptance to the spirituality element has begun since the separation of Alfred Adler and Sigmund Freud¹⁷.

LITERATURE REVIEW

Recently, spirituality has received increased attention in the counselling field since 1990 when a conference on this issue was held in 1995 which resulted of ninth components of counsellor competencies on the integration of this type of counselling, and both spirituality and religion have been acknowledged as important aspects of multiculturalism¹⁵. The role of spiritual and religious beliefs is mentioned throughout the Standards of the Council for Accreditation of Counseling and Related Educational Programs (CACREP), and guidelines for working with spiritual issues within various cultural paradigms are emerging. In addition, the American Counseling Association's *Code of Ethics and Standards of Practice* now includes religion as a component of human diversity, and spiritual concerns are included as a V-code in the *Diagnostic and Statistical Manual of Mental Disorders*⁶.

The results of their study also showed counsellors inclined to engage in that aspect and they view it as a minor issue in people's lives²⁹. Most counsellors have their own views about religion, but they are not so keen to discuss this with the client¹². These factors are likely to occur due to lack of religious elements in their clinical training. A study conducted found that the majority of counselling or counselling psychology programs do not contain or contain few subjects related to religion¹³. The findings also stated that as a whole, the counselor is not very conversant with religious issues raised by the client. Only 45.3 percent of counselors who participated in this study stated that religious or spiritual element is essential or very important in counseling programs. Religious is not seen as something negative in counselling eventhough most of the curriculum only exposed limited knowledge on this issue.

Counsellors are also practically not prepared to utilize the spiritual and religious elements in their practice because they did not receive adequate formal training in spiritual and religious aspects. Based on a survey conducted by CACREP found that less than 25 percent of the programs offered have courses related to spiritual and religious aspects. The majority of programs

offered also do not have the relevant supervisory aspects³. Therefore, they proposed a complete course-related aspects of spiritual and religious counselling should be developed, enhanced and given emphasis so that counsellors have adequate exposure on this issues. This study attempts to explore the level of integration of religious understanding among counselling practicum students in public universities.

STATEMENT OF PROBLEMS

Religious and spiritual aspect has not been seen as one important aspect of cultural diversity. Review have been made to show that only four universities that offer courses related to religion and it also focused on Islam. Although there are subjects such as multicultural counselling and ethnic relations, but the question arises, are these subjects contain competent spiritual and religious aspects, and whether the knowledge and training acquired during the program of study is sufficient to enable them to integrate an understanding of religion in handling counseling session. A counsellor can be considered unethical if they practice counselling services outside the realm of competence as stated in the ACA Code of Ethics 2005 under the professional responsibility (c.2.a)¹. The Code of ethics from Malaysia Counselling Association¹⁴ also states that counsellors should provide counselling services in your area of expertise with did not cross-border expertise based on education, training and supervised experience. Therefore, studies related to the integration of Religious Understanding in counselling practice in Malaysia are very limited.

OBJECTIVES

The specific objectives are as follows:

1. To describe the level of integration of religious understanding among counselling practicum students
2. To identify whether there are differences based on gender in the integration of religious understanding.

METHODOLOGY

The researcher employed a survey method to conduct test and answer the questions and hypotheses

of the study. This method was selected because it has the ability to describe the issues and problems in a variety of perspectives that involve attitudes, opinions, beliefs, feelings, behaviors and perceptions¹⁰. This research involves a form of nominal, ordinal and interval data. Descriptive statistics such as mean, percentage, standard deviation and inferential statistics will be used to analyze and explain the questions and hypotheses of the study.

The subjects for this study consisted of 173 counselling practicum students from three public universities. The type of sampling chosen was purposive sampling. The instrument used in this study was a questionnaire consisting of two parts. Part A is the items intended for respondents' demographic information. In this section also included a closed question on the suitability of the course taken in terms of to know whether the respondents' opinion of the respondents felt that the course or program of study counselling once they follow the institutions of higher learning sufficient to enable them to integrate an understanding of religion in their counselling practice. Part B consists of questionnaire on The Integration of Religious Understanding in counseling practice. This questionnaire has 31 items with a five-point scale developed by the researchers based on previous literature review. From the reliability analysis using Cronbach Alpha model shows that the questionnaire has high reliability which is .97. Data obtained from the questionnaires were analyzed using descriptive analysis (means and percentages) and inferential analysis (t-test) to describe the findings. Overall, the data were analyzed using SPSS version 20.

RESULTS AND DISCUSSION

The highest proportion of 173 respondents is Malay and Muslim. The majority of respondents are 24 years old. Detailed as shown in Table 1.

Table 1: Demographic Distribution of Respondents

Demography	Category	Frequencies	Percentage
Age	23 years	18	10.4
	24 years	119	68.8
	25 years	25	14.5
	26 years	7	4.0
	27 years	2	1.2
	28 years	1	0.6
	29 years	1	0.6

Conted...

Gender	Male	36	20.8
	Female	137	79.2
Race	Malay	159	91.9
	Chinese	8	4.6
	Indian	3	1.7
	Indigenous	3	1.2
	Sabah and Sarawak	1	0.6
	Others		
Religions	Islam	159	91.9
	Hindu	3	1.7
	Buddha	7	4.0
	Christian	5	2.4

The mean for the integration of religious understanding is the average level is 3.45 with a standard deviation of 0.83. Items with the highest mean was for item 5, which discusses religious values (e.g.: patient, forgive yourself and others, responsible) deemed appropriate by the issue or problem brought by the client. These items mean score is 4.23 with a standard deviation of .84. Items that showed the second highest mean is item 22 which discuss those things happened for a reason with the mean value and standard deviation 4.17 and .92. Items that showed the third highest mean score was item 19 (suggested prayer or prayer as a means to achieve peace) with a mean standard deviation of 4.06 and 1.00. Next item with the lowest mean value (M = 2:27, SD = 1.14) was item 15 which talk about religion even if the client professes different religions. Items that showed the second lowest mean score (M = 2.72, SD = 1.17) was item 30 (the use of the text of religious scriptures as a reference in client problems). Items that have a third lower mean scores is item 1, (M = 2.77, SD = 1:42), which began counseling sessions with a prayer organized by the religion you belong to, if the client belong to that religion.

To answer the second research question, the results showed no significant differences in scores between men (M = 3:39, SD = 0.71) and women (M = 3:46, SD = 0.77); $t(173) = 0.60$, $p > .05$. Consequently, the null hypothesis is accepted for demographic factors.

Table 2: Results of t-Tests Based on Gender Differences

t-Test		M	SP	t	df	p
Gender	Male	3.39	.71	.53	171	.60
	Female	3.46	.76			

The findings indicated that the integration of religious understanding in counseling practicum students is moderate. This indicates practicum trainees include religious beliefs, religious and faith-based intervention in the process of counseling moderately. This shows that the majority of counsellors integrate implicit understanding that religious beliefs and religious values apply indirectly when conducting counselling sessions. There is distinguished differences between implicit and explicit integration to incorporate beliefs, values and interventions based on the teachings of the counseling process²³. Implicit integration occurs when a counsellor indirectly initiates discussion about faith and religious values in counselling.

The explicit integration is a more open approach to integrate an understanding of religion. It is where counsellor directly and systematically discussing religion and faith-based interventions applied as prayer, worship and read scripture in the counselling process. The approach implicitly and explicitly conceptualized as a continuum between the two ends²³. Some counsellors tend to integrate an understanding of religion implicit, partly explicit and partially integrate between implicit and explicit. One example of methods of integration between the two continuum occurs when a counsellor discuss issues brought by the client in a religious perspective, but not systematically applying interventions such religious worship or prayer as an alternative client efforts to address the problem.

The counsellors take the initiative to introduce a religious element in counselling sessions conducted by discussing the positive values of religion as intolerant, forgiving oneself and others and take responsibility in their actions. It is stated that even though there are numerous religions in the world, the moral principles and values are similar towards the betterment and spiritual well-being of its adherents²⁰.

Empirical evidence through research that has been conducted shows that spiritual values help clients the ability to address the problem, help healing the mental and physical well-being of the client as well as encouraging the client lives¹⁷.

In addition, the values held by counsellors influence every phase of the counselling process is carried out starting from the philosophy and theory of personality, strategy evaluation, the goal of the session, the selection

of techniques and interventions, and evaluation of counseling sessions⁴. Next, the client is also influenced by the values held by counsellors⁵. The proper approach employed by counsellor in order to insert religious values in the counselling process is minimal explicit approach²⁰.

It occurs when firstly; counsellor is conscious and clearly understood the values of religious belief. Secondly, they will not affect clients well being eventhough there are disagreement among them. Thirdly, counsellor informs client that their belief will affect their life in terms of physical, emotional and spiritual. Finally, the counsellor assists the client to access resources and religious values to help clients towards the development and reach their life goals. This method can be used to avoid the uneasiness the counselors felt that religion is an unethical approach in the counseling process²⁰.

CONCLUSION

This study is expected to be a catalyst for more research related to religious understanding that integration has provided counselling services to the community in Malaysia will be more efficient and effective when integrated spiritual and religious issues in the practice of multicultural counseling. This is no doubt due to religious and spiritual factors play an important role in the formation of a client living culture. And hopefully if both aspects are taken into account in helping clients address the problems and issues faced by the more holistic approach will provide a shift towards a more positive note in the client's life. Both of these domains should be given equal attention by counsellors to offer counseling services provided will give the desired results and will improve the quality of counselling services.

RECOMMENDATIONS

1. Based on the results of the study, the following recommendations are given to improve the integration of understanding religious and spiritual competence among registered counsellor in Malaysia: Exposure given to the counsellor either through courses or programs organized by responsible parties such as higher education institutions that offer counseling programs, Malaysian Counselling Association (PERKAMA International) and the Board of Counselors.

2. Further research should also be conducted to obtain more information about spiritual counsellor competencies and determine what other factors affecting the level of integration of religious understanding among counsellors.
3. Referral sources should be increased to enable the counselor to obtain information and knowledge related to the integration of religious understanding and competence in the practice of spiritual counselling.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

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Mediating Effect of Enterprise Risk Management on Quality Communication and Performance of Malaysian Public Higher Educational Institution: A Conceptual Framework

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ABSTRACT

Enterprise Risk Management (ERM) was introduced many years ago and currently implemented by many countries as well as organizations due to positive impact, especially in their performance. Besides, it is an approach that is useful to help organization in order to manage the risks for better outcome. In Malaysia, it was first implemented around ten years ago and the organizations are recommended to use it as a tool or basis to recover any potential risks. ERM is believed as an effective technique to manage the risk and is fast becoming the best practice standard. Therefore, the factors that influence ERM implementation in organization should be taken into consideration. Hence, the aim of this paper is to construct a conceptual framework that describes the relationship between quality communication and organizational performance. This relationship will mediate by ERM implementation. The area of this paper will be focus on Malaysian Public Higher Educational Institution (IPTA), which are 20 institutions that listed under Ministry of Higher Education (MOHE).

Keywords: *Enterprise risk management, Quality communication, Knowledge management, Performance, Educational institution, Malaysia*

INTRODUCTION

Higher education is recognized for pioneering and leading trends, exploring new knowledge, promoting new ideas, and transforming innovation that can be turned successfully and practically to business, industry and community. However, it is far behind business and industry in developing and implementing a practical and sustainable enterprise risk management (ERM). The National Association of College and University Business Officers (NACUBO) released a report on managing risk in higher education in 2003 that encouraged higher education leaders to implement an advance effective risk management programs³².

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In 2007, three leading higher education associations which are The University Risk Management and Insurance Association (URMIA), the Association of Governing Boards of Universities and Colleges (AGB) and the National Association of College and University Business Officers (NACUBO), have strongly recommended for an institutions of higher education to go beyond the mere discussion of ERM and start implementing it on their campuses. This is because, risks also occur at higher education institutions and they should consider risks as part of their strategic planning process³. Furthermore, ERM can be beneficial for universities in addressing key areas of risk that being faced by universities and manage the risks that lead to achieving the universities' key performance indicators^{11,32}. Thus, it can minimize the consequences of unfavorable events and will motivate the decision-making process to ensure specified organizational performances are met³⁴.

In Netherland, higher education institutions still do not routinely have an integrated policy related to risk management¹¹. In Malaysia, the introduction of University

Good Governance Index (UGGI) in 2011 requiring public universities to implement an organized risk management for it to get the autonomy status. Currently, in 2018, the last six of 20 public universities in Malaysia have finally been granted the autonomy status by Education Ministry. Before this, 14 public universities already have obtained their respective autonomous status¹⁹. However, operating in new environment after being awarded the autonomous status; these universities will be competing intensely in higher education market, which resulting in greater exposure to multi-dimensional risks²⁰.

The multi-dimensional risks involves uncertainty about future government funding, increasing number of post-graduate students, and the pursuit for high ranks in world university ranking, intense competition in getting quality of international students, and global competition. This provides a great challenge for the universities to explore a framework of risk management and organizational performance that is workable within these universities. Despite the existence of a rich literature in the fields of risk management, there is little written about risk management practices in relation to the provision of higher education³².

However, risk management as a formal part of the decision-making processes within companies is traceable during late of 1940 and early 1950⁸. This traditional risk management was practiced in “silo” approach in which risks are often handled individually without acknowledging the interrelationship of each risk. Meanwhile, ERM is about optimizing the process with which risks are taken¹⁶.

Apart from that, in 1990, organizations have started suffering spectacular losses often from risks that they never should have taken in the first place. Many companies throughout the world faced big losses in 1990s. For instance, Orange County (November 1994) lost \$1.7 billion, Barings Bank (February 1995) lost \$1.5 billion, Daiwa Bank (September 1995) lost \$1.1 billion and Sumitomo Corp (June 1996) was lost \$1.8 billion^{12,35}.

Therefore, nowadays, organizations across the world are applying ERM concept to deal with risks rationally and effectively^{9,18,27-28}. ERM is the series of process of risk identification, assessment and prioritization to handle uncertainties that arise in organization development. As a result, the performance measurement of an organization

has gained significant interest amongst both academics and practitioners²⁸.

Thus, most organizations would make sure that the performance measurement is done systematically and thoroughly²³. This is because organizations strive to sustain and improve performance in order to attract investment from the investors and maintain good relationship with their stakeholders. Previous study concur and suggested that in order to increase market share and attract investors, it is crucial for the organization to perform well and have a good track record of business performance²¹. However, today’s business environment has made it more difficult as risk has become the major factor in every business plans and decisions. Therefore, many organizations and stakeholders are showing more interest in risk management¹³.

Besides, a general argument that organizations employing the ERM will improve organizational performance has received a rising support¹⁰. The underpinning theory that supports this research is knowledge management theory. Knowledge management theory supports this research based on the fact that the implementation of ERM will help an organization to improve the performance as well as maximize shareholder value^{17,22}. Since no study has been carried out to address the extent of ERM implementation in higher education, particularly in Malaysia’s public autonomous universities status, this research gap must be filled.

This paper aims to propose a framework that contributes to a better understanding of ERM implementation by investigating the extent of implementation of ERM among Malaysian Public Higher Educational Institution. Thus, this paper will focused on the quality communication that extracted from Knowledge Management theory. Based on this, the objectives of this paper are as follows:

- (a) To examine the extent of ERM implementation among Malaysian Public Higher Educational Institution.
- (b) To establish the relationship between quality communication and organizational performance.
- (c) To investigate the mediating effect of ERM implementation on quality communication and organizational performance.

LITERATURE VIEW

Enterprise Risk Management (ERM): ERM is most frequently defined with reference to the 2004 guidance document Enterprise Risk Management-Integrated Framework published by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) although there have been various definitions of ERM^{5,8,15}. ERM is defined as⁶:

“A process, effected by an entity’s board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives”.

An evaluation of the various ERM definitions indicates that they share three important characteristics, in that ERM should be¹:

- (a) **Integrated:** ERM must span all the lines of business.
- (b) **Comprehensive/inclusive:** ERM must comprise all types of risk.
- (c) **Strategic:** ERM must Concorde with the overall business strategy and objectives of the organization.

Enterprise Risk Management (ERM) is one of the approaches that goes far beyond the silo-based view of risk¹⁰. It is a holistic approach in identifying possible risks that a firm would encounter and selecting appropriate responses that matches enterprise’s risk appetite.

Quality Communication and Organizational Performance: Communication may be defined as the giving, receiving or exchange of information, opinions or ideas by writing, speech or visual means or any combination of the three so that the material communicated is completely understood by everyone concerned³¹. Meanwhile, quality or effective communication is a process by which sender of message, received feedback from receiver in intended²⁴.

It was found that the effective communication helps in improving operational efficiency thus improving firm performance. The study recommended that organizations should develop effective communication strategies since

it will facilitate passing of information both within and outside the organization thus improving performance⁴.

The previous study was able to ascertain that effective communication have major role to play in organizational performance. Recognizing the causes of firm performance is important especially in the perspective of the current global crises because it helps an organization to identify those factors that should be given priority attention in order to improve the firm performance².

Besides, it was found that there was a significant relationship between effective communication and firm performance. Thus, it means that effective and efficient communication results in better overall firm performance. Meanwhile, ineffective communication leads to loss of meaning or understanding which in turn leads to mistakes. Success of an organization is a reflection of the effectiveness of its communication¹³.

Hypothesis 1: There is a positive relationship between quality communication and organizational performance

Quality Communication and Enterprise Risk Management: Knowledge sharing and effective communication depends on the overlap and amalgamation of knowledge bases among people³⁰. The flow of information for risk knowledge in an ERM context needs communication capacity between the different groups in risk management³³.

Knowledge sharing has an important influence on ERM implementation, and this goes even further²⁷. A lack of risk knowledge sharing can create issues in the ERM processes and the controls may not be enough. The search for reasons outside an isolated area or unit is important in order to get better answers. Lack of knowledge access can create failures. Weak communication can provide insufficient knowledge of the operation, poor assessments of the lessons learned and poor understanding of the present and forecasts based on risk knowledge. This lack of knowledge can be created because of interruptions in the flow of information, which is a component of the risk management work that is complemented and used properly by the expert²⁵.

The effective communication among groups can contribute towards the ERM implementation³⁶. Furthermore, effective communication plays a critical role in enabling the flow of risk information in a firm

which will enhance the ERM implementation in firms. Thus, the consequences of limited communication among groups can be a barrier to overcome for the holistic view that ERM needs to have⁷.

Hypothesis 2: There is a mediating effect of Enterprise Risk Management implementation on quality communication and organizational performance.

A PROPOSED FRAMEWORK

This paper will examine the extent of ERM implementation among Malaysian Public Higher Educational Institution.

Based on the literatures there are eight factors that were identified under Knowledge Management theory that contribute towards the extent of ERM implementation in an organization. These eight factors include quality communication. Therefore, this paper examined the relationship between quality communication and organizational performance and also the mediating effect of Enterprise Risk Management on this relationship.

The proposed framework for the research is shown in Figure 1.

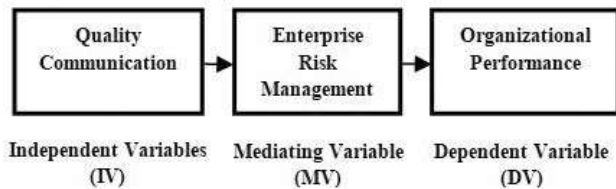


Figure 1: Conceptual Framework

CONCLUSION

In conclusion, this paper attempts to propose a framework by explaining the mediating effect of ERM implementation on knowledge management theory in Malaysian Public Higher Educational Institution. This paper suggested one of a factor under Knowledge Management theory that influences the extent of ERM implementation which is quality communication and this in turn affect the performance of the organizations. There are two hypotheses that have been developed under the proposed framework and need to be tested empirically. This paper is intended to contribute to the existing body of knowledge in the ERM area. This paper also will provide an insight to relevant government agencies to

formulate new policies or strategies on matters pertaining to Enterprise Risk Management in Malaysia. Since this is a conceptual paper, it is subjected to some limitations surrounding similar conceptual academic works.

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Medical Diagnosis Based on IOT using Arduino

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ABSTRACT

In this paper the Internet of Things using arduino has a great impact on healthcare sector. The doctor and patient communicate with each other. The doctor can access the patient's pulse rate and temperature values through the web page and the message is sent to the patient. The patient can know the condition of normal/abnormal. If patient condition was abnormal immediately precautions have to be taken^[1]. It mainly focuses on healthcare Sensors used in the IOT such as temperature and Pulse rate Sensor.

Keywords: Internet of Things, arduino, Pulse Rate, Temperature Sensor.

INTRODUCTION

Internet of Things (IOT) has a great impact on today's world to incorporate several technologies and communication solutions. Smart health monitoring system is based on improving quality of human life and wireless sensors are placed on the body of patients in order to monitor their health condition.

The sensor gives us data like body temperature and pulse rate of a person. The data can be retrieved when an authorized persons requests for the same^[2]. The data gets on a web page and the result is obtained in a graphical format. To the arduino sensors and Ethernet cable network were connected to function the retain mobility for monitoring the patient. Smart Health monitoring system performs various measurable factors of the patient in hospital using the Internet of Things. Smart health monitoring system is based on the Internet of Things, the patient data sends to the cloud server stores on the particular channel. The data on the channel shows in the graph format even the data can be gets on the mobile app and the doctor can be gets it monitoring purpose anywhere in the place, even can alert the doctors signal goes down to particular level of the corresponding patient.

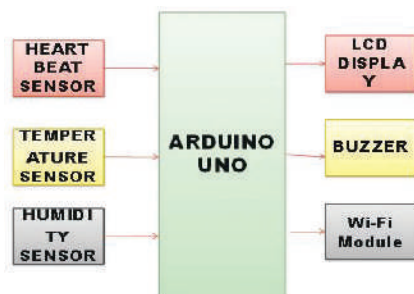


Fig. 1: Architecture of Smart Health monitoring System by using Arduino

PROSPECTIVE AND LITERATURE WORK

The following are the requirements for performing health monitoring system

Arduino: Arduino board gives digital and analog input/output pins can be interfaced and also to other circuits. To load the programs from computer to arduino board we use USB to function serial communication interface.

Breadboard: A Breadboard is used in learning of electronic devices used in connecting the components.

Pulse Rate Sensor: Pulse Rate Sensor sends the light signal on the finger then the blood circulation on the finger is not constant with respect to time sensor. It uses the infrared lights on the tissue, amplified signal displayed on the monitoring signal.

Temperature Sensor: It reads the temperature from the temperature sensor and plugging the output pin directly into an analog input.

Centigrade Temperature = $[(\text{analog voltage in mv} - 500)]/10$.

Thing Speak: Thing Speak channel used to update the data on the channel and even can be downloading on the mobile application to monitor the current status of the application.

IMPLEMENTATION AND IT'S RESULTS

In the present world, Health monitoring is the major problem due to lack of proper smart health monitoring

system. There are lots of IOT devices now a day to monitor the health of patient over internet^[4]. Health experts are taking advantage of these smart devices to help the patients. With tons of new healthcare technology start-ups, IOT is rapidly revolutionizing the health care industry.

In this paper, smart health monitoring system records the patient pulse rate and body temperature. It also sends an SMS alert whenever the patient condition was abnormal. The Sensor are recorded on Things Speak and google sheets so that patient health can be monitored from anywhere in the world via internet. A panic will also be attached so that patient can press it on emergency to send SMS to their relatives.

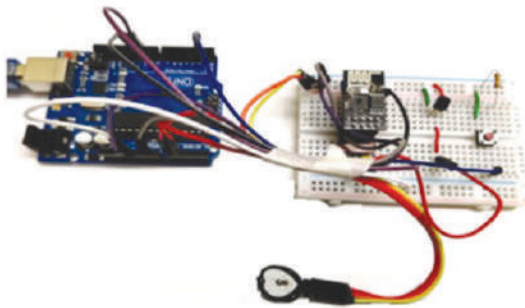


Fig. 2: Patient Health Monitoring System based on IOT using Arduino

LM35 represents a linear temperature sensor. Its output is proportional to the temperature in degree Celsius. The temperature ranges from -55° C to 150° C. The output voltage varies by 10mv in every rise or fall in temperature. It can be operated from 5V as well as 3.3 V power supply.

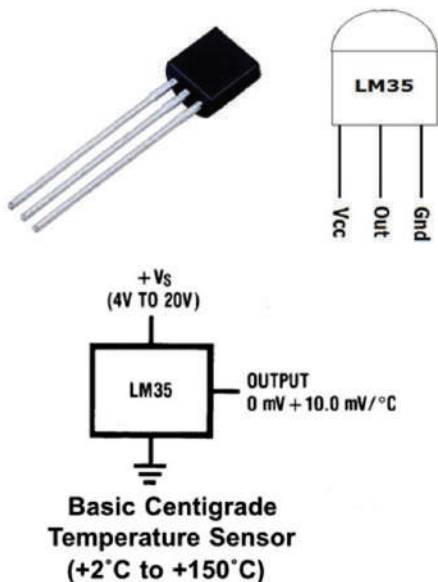


Fig. 3: LM35 Temperature Sensor

Pulse Rate sensor designed for plug-and-play sensor for Arduino. It includes an open source monitoring app that graphs your pulse in real time. The front of the sensor is covered with heart shape logo. On the front you see a small round hole where LED shines from the back^[5]. There is a small square just under the LED. The square is an ambient light sensor. The LED shines light into finger print and sensor reads the amount of light that bounces back. This is how it calculates the heart rate.

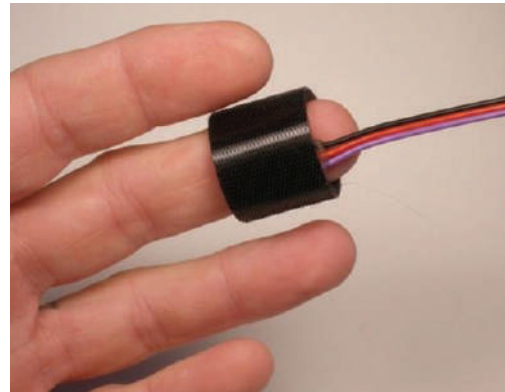


Fig. 4: Pulse rate Sensor

Code for Arduino to create a Temperature Sensor

int SensorPin=0 //the analog pin is connected to 3.3V or 5V power supply

void setup () // this function runs when you turn your arduino board and connected to the computer by using cable.

```
{
  Serial. begin (); //the result on the monitor
}
```

```
Void loop () // to run and run over again
```

```
{
  int reading=analogRead (SensorPin)
```

```
// Voltage reading from temperature sensor
```

```
float      temperature=[(voltage0.5)*100Serial.
print(temperature);
```

```
Serial.println (“temperature in centigrade”);
```

```
// prints the temperature in Centigrade.
```

```
delay (1000); // waiting for 1000 ms
```

```
}
```



Fig. 5: Graphs of sensor Output

CONCLUSION

In this paper the Internet of Things is slowly influencing on healthcare sector includes both the doctor and patient. The doctor can access the patient's pulse rate and body temperature values through the webpage and message is sent to the patient. It mainly focused on health sensors such as Temperature and pulse rate sensor.

In future we can add GPS in IOT patient health monitoring system using Arduino UNO. You will find out the location of the patient by using GPS. In this way the doctor can find out the location of the patient in case they have to take precautions.

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Conflict of Interest: Nil

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