



**FACTORS ASSOCIATED WITH MENTAL HEALTH DISORDERS
AMONG ELDERLY WITH DIABETES MELITUS IN INDONESIA
(Further Analysis of Riskesdas 2018)**

FINAL PROJECT

Proposed to obtain a Bachelor of Public Health degree
at Semarang State University

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ABSTRAK

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Faktor-faktor yang Berhubungan dengan Terjadinya Gangguan Kesehatan Mental Emosional pada Pasien Lansia dengan Diabetes Mellitus di Indonesia; Analisis Lebih Lanjut Riskesdas 2018

VI + 78 halaman + 21 tabel + 2 gambar + 6 lampiran

Indonesia berada di peringkat keempat dengan penderita diabetes mellitus terbanyak di dunia. Diabetes mellitus menyebabkan 6% dari semua kematian di Indonesia. Prevalensi diabetes mellitus di Indonesia adalah 5,7% pada 2007, kemudian meningkat 10,9% pada 2018. Gangguan kesehatan mental merupakan komorbid yang paling sering diderita oleh lansia dengan diabetes mellitus dengan prevalensi 28% secara global. Namun, informasi mengenai faktor risiko GME pada penderita diabetes lansia di Indonesia masih kurang. Tujuan dari penelitian ini adalah untuk mengetahui prevalensi dan faktor risiko gangguan kesehatan mental pada lansia penderita diabetes mellitus di Indonesia.

Penelitian ini menggunakan rancangan *cross-sectional* dengan sampel yang ditetapkan sebesar 2818 sampel. Instrumen yang digunakan berupa kuesioner yang digunakan oleh Riskesdas 2018. Analisis data dilakukan secara univariat, dan bivariat menggunakan aplikasi SPSS IBM versi 16.

Prevalensi kasus gangguan kesehatan mental pada lansia dengan diabetes mellitus di Indonesia adalah 19,3%. Faktor-faktor yang berhubungan dengan gangguan kesehatan mental pada lansia dengan diabetes di Indonesia adalah riwayat gangguan kesehatan mental (OR = 2.434, 95% CI 1.707-3.471), perempuan (OR = 1.426, 95% CI 1.122-1.813), domisili (OR = 0.747, 95% CI 0,607-1,183), tingkat pendidikan rendah (OR = 1,926, 95% CI 1,464-2,533), obesitas (OR = 4,567, 95% CI 3,312-6,297), memiliki hipertensi (OR = 1,747, 95% CI 1.416-2.145), menderita PJK (OR = 1.488, 95% CI 1.123-1.973), dan mengalami stroke (OR = 1.755, 95% CI 1.292-2.384).

Lansia dengan diabetes mellitus yang mengalami gangguan kesehatan mental dipengaruhi oleh faktor sosial dan komorbiditas yang dialami. Oleh karena itu diperlukan edukasi *coping* stres kepada lansia dengan gangguan kesehatan mental agar dapat menangani maupun mencegah terjadinya gangguan kesehatan mental terhadap dirinya.

Kata kunci: Gangguan Kesehatan Mental, Diabetes Mellitus, Lansia

ABSTRACT

Rina Sulistiana

Factors Associated with Mental Health Disorders among Elderly with Diabetes Melitus in Indonesia

VI + 78 pages + 21 tables + 2 pictures + 6 attachments

Indonesia ranks fourth with the most diabetes mellitus sufferers in the world and caused 6% of all deaths in Indonesia. The prevalence of diabetes mellitus in Indonesia was 5.7% in 2007, then increased by 10.9% in 2018. Mental health disorder (MHD) is the most frequent comorbid for Diabetes Mellitus with a prevalence of 28% globally. However, there was a lack of information regarding MHD risk factors among elderly diabetics in Indonesia. The objective of this study was to know the prevalence of mental health disorder among elderly with diabetes mellitus and associated risk factors.

This study used cross-sectional design and the sample was 2818. The instruments used were structured questionnaires provided by Riskesdas 2018. The data was performed univariate, and bivariate analysis used by the SPSS application IBM 16 version.

Prevalence of mental health disorders cases in elderly with diabetes mellitus was 19.3%. Factors associated with mental health disorders in elderly with diabetes in Indonesia were history of mental health disorders (OR = 2,434, 95% CI 1,707-3,471), female (OR = 1,426, 95% CI 1,122-1,813), domicile (OR = 0.747, 95% CI 0.607-1.183), education level below primary level (OR = 1,926, 95% CI 1,464-2,533), not normal BMI (OR = 4,567, 95% CI 3,312-6,297), have hypertension (OR = 1,747, 95% CI 1,416-2,145), have CHD (OR = 1,488, 95% CI 1,123-1,973), have stroke (OR = 1,755, 95% CI 1,292-2,384).

Patients with mental health disorders were more likely to get affected by the social factors than disease factors. Education should be provided to those, elderly whose experienced diabetes mellitus in the past in order to provide them with mechanisms for the prevention of recurrent mental health disorders.

Keywords: Mental Health Disorders, Diabetes Mellitus, Elderly

STATEMENT

I hereby declare that in this thesis no work has ever been submitted to obtain a scholarship at a tertiary institution and to the best of my knowledge there are no works or opinions that have been written or written by others, except those written in reference in this manuscript and mentioned in the library.

Semarang, May 25, 2020

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APPROVAL

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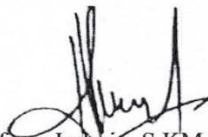
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MOTTO AND PRESENTATION

MOTTO

"Tidak ada penyakit di mana tidak ada obatnya, dan tidak ada kesulitan yang tidak disertai dengan kemudahan. Maka jangan putus asa dari rahmat Allah. Sesungguhnya, Allah bersama orang-orang yang sabar dan berusaha."

Tujuan kita ada di depan, jangan melihat ke belakang apalagi berhenti berjalan.

Jika Anda berpikir untuk menyerah kemarin atau bahkan hari ini, ingatlah orang-orang yang selalu mencintaimu dan mendoakanmu tanpa henti.

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1. Mr. Katam and Mrs. Sri Wati
2. My brother, Arif Setiawan
3. IKM 2016
4. Friends of the KSR PMI Unit
UNNES
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PREFACE

Thank you for the presence of Allah SWT who has bestowed His mercy and guidance, so the final project titled "Factors Associated With Mental Health Disorders Among Elderly With Diabetes Melitus In Indonesia (Further Analysis Of Riskesdas 2018)" can be finished properly. The preparation of this final project is intended to complete the requirements of obtaining a bachelor's degree in Public Health at Semarang State University. This final project cannot be completed with the help of all parties, with a sense of humility expressed thanks to:

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9. May good deeds from all parties receive multiple rewards by Allah SWT.

Semarang, May 2020

A handwritten signature in black ink, appearing to read 'R. Mulina', with a horizontal line underneath.

Authors

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CHAPTER I

INTRODUCTION

1.1 BACKGROUND

Mental health is defined as a state of well-being in which each individual realizes their potential, can cope with everyday stress, can work productively, and is able to contribute to the environment (WHO, 2013). Mental health is still a serious health problem in the world, including in Indonesia. According to the WHO in 2016, there were approximately 35 million people affected by depression, 60 million people with bipolar disorder, 21 million people with schizophrenia, and 47.5 million people who had dementia. The prevalence of depression globally rose to 17.8% between 2005 and 2015 (Theo Vos, 2016).

Indonesian basic health research in 2013 showed the prevalence data of mental emotional disorders that begin with symptoms of depression and anxiety reached 14 million people or 6% of the total population in Indonesia. In 2018, there were around 24 million people or 9.8% of Indonesia's population (Ministry of Health, 2018). Emotional mental disorders in Indonesia at the age of 65-74 reached 10% in 2013 then increased to 12.8% in 2018 (Ministry of Health, 2018).

Based on Law no. 13 in 1998, an elderly person is someone who reaches the age of 60 years and over. With increasing age, the physiological function becomes reduced due to the aging process so that many non-communicable diseases occur in the elderly. In addition, degenerative problems reduce the body's resistance so

that it is susceptible to infectious diseases. Most of the diseases in the elderly are Non-Communicable Diseases (PTM) including hypertension, arthritis, stroke, Chronic Obstructive Pulmonary Disease (COPD), and Diabetes Mellitus (Kemenkes RI, 2016).

Several studies have shown a positive relationship between chronic illness and mental health disorders. Diabetes is the biggest cause of mental health disorders (Id, Khanal, Sah, & Ghimire, 2019). According to research in America, the rate of depression among individuals with type 1 or type 2 diabetes mellitus throughout life is twice as risky as the average healthy person (Smith, Pedneault, & Schmitz, 2015). Then a meta-analysis involving 9279 studies showed that one in four elderly people with type II diabetes mellitus experienced depression or mental health disorders (Khaledi, Haghghatdoost, Feizi, & Aminorroaya, 2019).

Individuals with type 1 or type 2 diabetes are at higher risk for a diagnosis of depression, anxiety, and eating disorders. Mental health which is a comorbid of diabetes mellitus in the elderly increases the risk of short-term and long-term complications that can lead to decreased quality of life, and premature death (Ducat, Lee Philipson, 2015) Another study reveals risk factors for depression in people with diabetes mellitus are caused by age, older women, female gender, increased hemoglobin A1c, presence of comorbidities, adherence to diabetes management measures, and positive family history of chronic disease (Al-zahrani, Aldiab, Aldossari, & Al-ghamdi, 2019).

A study in Nepal in 2019 stated that the predictors that cause depression in individuals with type 1 or type 2 diabetes mellitus are age, low education, caring

for a household, small family members, using insulin, and having other comorbidities (Id et al., 2019). Then research related to mental emotional health disorders characterized by stress and depression has also been carried out in Indonesia. This study states that diabetes mellitus is associated with neurotic disorders in the elderly. The prevalence of neurotic disorders is mostly experienced by respondents who are female, elderly, have low education, do not have a job, do not have a partner, have other chronic diseases such as heart disease, hypertension, and stroke (Ratri, Prof, Kamso, & Km, 2013).

According to WHO, the concept of productive elderly is elderly who are physically, socially and mentally healthy so that they can play an active role in society (WHO, 2013). Elderly people with diabetes mellitus have not become the main focus in terms of stress management experienced. This is evidenced by the existence of some diabetes mellitus literature that does not consider specific health targets for elderly people with diabetes (IDF, 2017).

1.2 Research Question

1.2.1 General Research Question

Based on the description in the background above, the following problem statements can be prepared "Determinant of mental health disorders among elderly people with diabetes in Indonesia?"

1.2.2 Specific Research Question

1. Is age associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?

2. Is sex associated with mental health disorders in people with diabetes mellitus elderly in Indonesia?
3. Is domicile associated with mental health disorders in people with diabetes mellitus elderly in Indonesia?
4. Is the level of education associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?
5. Is work status associated with mental health disorders in people with diabetes mellitus elderly in Indonesia?
6. Is marital status associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?
7. Is family history of mental disorders associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?
8. Is hypertension associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?
9. Is obesity associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?
10. Is duration of illness associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?
11. Is heart disease associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?
12. Is stroke associated with mental health disorders in elderly people with diabetes mellitus in Indonesia?

1.3 Research Aim

1.3.1 General Aim

This study aims to determine the determinant of mental health disorders among elderly people with diabetes in Indonesia.

1.3.2 Specific Aim

The specific purpose of this research is to determine that:

1. To prove the association between age is with mental health disorders in the elderly with diabetes mellitus in Indonesia.
2. To prove the association between sex with mental health disorders in elderly with diabetes mellitus in Indonesia.
3. To prove the association between domicile and mental health disorders in the elderly with diabetes mellitus in Indonesia.
4. To prove the association between education levels with mental health disorders in the elderly with diabetes mellitus in Indonesia.
5. To prove the association between work status with mental health disorders in the elderly with diabetes mellitus in Indonesia.
6. To prove the association between marital status and mental health disorders in elderly with diabetes mellitus in Indonesia.
7. To prove the association between family history of mental disorders with mental health disorders in the elderly with diabetes mellitus in Indonesia.
8. To prove the association between hypertension and mental health disorders in the elderly with diabetes mellitus in Indonesia.

9. To prove the association between obesity and mental health disorders in the elderly with diabetes mellitus in Indonesia.
10. To prove the association between Duration of illness with mental health disorders in elderly with diabetes mellitus in Indonesia.
11. To prove the association between heart disease and mental health disorders in the elderly with diabetes mellitus in Indonesia.
12. To prove the association between stroke and mental health disorders in elderly with diabetes mellitus in Indonesia.

1.4 Research Benefits

1.4.1 For the community

To add the knowledge of community related to determinant of mental health disorders among elderly people with diabetes mellitus in Indonesia. In addition, people might reduce factors that can make people with diabetes mellitus comfortable so they don't become a source of depression and live their lives properly.

1.4.2 For the Public Health

To know the determinant of mental health disorders among elderly people with diabetes in Indonesia. And can be used as library materials, information, and references that can be used as input for further research in developing knowledge in the Department of Public Health, Semarang State University.

1.4.3 For the Researcher

Providing experience in carrying out scientific writing and training skills in secondary data processing. It can be used as a comparison between the theories obtained in college related to the title of this final project with the reality.

1.5 Authenticity of Research

No	Title / Authors	Year and Place	Design of Research	Variable of Research	Result
1	Diabetes Mellitus Associated with Neurosis among People in Indonesia (Further analysis of Risesdas 2007) Ratri et al, 2013	Indonesia and 2013	Descriptive Cross Sectional	Independent variables: Sex, educational level, marital status, domicile, mental health disorders, hypertension, heart disease, stroke, smoking status Dependent variables: Neurosis Disorders in Older People with Diabetes	Sex, age, educational level, Working Status, Marital Status, domicile, mental health disorders, hypertension, heart disease, and stroke associated with neurosis disorders in older people with diabetes.
2	Prevalence of Depression and Associated Factors among Patients with Type 2 Diabetes Attending the Diabetic Clinic at a Tertiary Care Hospital in Sri Lanka: A Descriptive	Sri Lanka, 2019	Descriptive-cross sectional	Independent variables: gender, age, family type, marital status, education, income, and employment Dependent variable: Prevalence and factors that influence	Depression was significantly associated with female gender (OR 2.63, 95% CI 1.26-5.46; P = 0.009), living without a spouse (single / widowed) (OR 1.83, 95% CI 1.12-2.98; P = 0.01), lower education level (OR

	Study, Maulee HA, et all			depression in patients with type 2 diabetes mellitus	1.92, 95% CI 1.14-3.22; P = 0.01), and peripheral neuropathy (OR 1.79, 95% CI 1.00-3.18; P = 0.04).
3	Depression among people living with type 2 diabetes in an urbanizing community of Nepal, / Sunny Avinas K., et all.	Nepal, 2019	Cross sectional	Independent variables: age, gender, religion, marital status, ethnicity, occupation, family density, family type, family expenses, smoking, alcohol use, and BMI. Dependent variable: Depression	Depression was significantly associated with age (p = 0.019), female (p = 0.043), education (p = 0.001), family size (p = 0.047), low family income (p = 0.043), using insulin (p = 0.001) , without family history of diabetes (p = 0.008), and having additional illness (p = 0.007)
4	Risk Factors Associated with Mental Emotional Disorders in the Elderly in DKI Jakarta (Data Analysis Riskesdas 2007), (Suyoko, 2012)	Indonesia, 2007	Cross sectional	Independent variable: Age, gender, education level, marital status, employment status, diabetes mellitus, hypertension, joint disorders, obesity, economic status, and number of family members Dependent	Risk factors associated with GME in the elderly are age ≥ 70 years, female, low education level, not working, not married, suffering from diabetes mellitus, hypertension, and joint disorders.

			variable: Risk factors for GME in the elderly		
5	Incidence of Anxiety and Depression Among Patients with Type 2 Diabetes and the Predicting Factors, (Khan et al., 2019)	Karachi, 2019	<i>Cross-sectional</i>	Independent variable: Gender, age, duration of illness, diabetes mellitus treatment, nephropathy, foot ulcers, no complications. Dependent variable: Anxiety and depression in type 2 diabetes mellitus patients.	Anxiety and depression in patients with type 2 diabetes mellitus are more at risk in women, the elderly, longer than ≥ 5 years of illness, using insulin, experiencing neuropathy, nephropathy, and foot ulcers

The difference between this research and this research with other studies is:

1. Previous research in Indonesia only examined the risk factors for GME in the elderly in DKI Jakarta, then this study was conducted within the scope of Indonesia which examined the risk factors for GME in the elderly with diabetes mellitus.
2. There are several variables in the previous research that were not included in this study due to the availability of Riskesdas 2018 data, namely the variables of smoking status and alcohol consumption in elderly people with diabetes mellitus.

3. There are variables that have never been studied in previous studies and become one of the variables in this study, namely the variable history of mental emotional disorders in the family.

1.6 Scope Of Research

1.6.1 Scope of Place

This research will be conducted in the Department of Public Health, Faculty of Sport Sciences, Semarang State University.

1.6.2 Scope of Time

This research will be conducted on December-February 2019.

1.6.3 Scope of Science

The scope of this research is the field of Public Health epidemiology of non-communicable diseases, especially the incidence of depression in people with type 2 diabetes mellitus and also have mental health disorders.

CHAPTER II

LITERATURE REVIEW

2.1 Theoretical Basic

2.1.1 Elderly

Elderly measured according to chronological age, physiological (biological) and mental maturity, the three often do not run parallel as expected. In geriatrics (elderly health science) that is considered important is the biological age of a person not the chronological age (Darmojo, RB, 2006).

According to the World Health Organization (WHO) that old age includes: middle age, which is the age group of 45-59 years, the elderly (age), namely the age group 60-74 years, old age (old), namely the age group 75-90 years, the age when old (very old), namely the age group above 90 years.

The Department of Health divides the elderly into 3 groups based on their age, namely the elderly are the age group 45-59 years, the elderly are the age group of 60 years or more, and the elderly at high risk are the age group of 70 years or more, or the age of 60-69 years but have problems (for example depression, senility, delirium, hypertension) MOH 2004).

Invite No. 13 of 1998 stated that the age of 60 years and over is the most appropriate to be called elderly. Biological age is the actual age. Where tissue maturation conditions are usually applied as a biological age index.

2.1.2 Elderly with Good Mental Health

According to the Ministry of Health 2004, a healthy mental age old man has characteristics including:

1. Able to make decisions and manage their own live.
2. Having a relatively high level of satisfaction because he feels his life is meaningful.
3. Able to accept the failure he experienced as part of his life that does not need to be regretted and contains wisdom that is useful for his life.
4. Have a good personal integrity in the form of a strong self-concept and are supported to continue to exploit its potential.
5. Able to maintain meaningful social support, which is among people who love and care for them.
6. Feeling himself still needed and loved.
7. Have healthy habits and lifestyle
8. Having financial security that allows independent living is not a burden on others.
9. Can fight for their own destiny, not dependent on others.

2.1.3 Mental Health

The term mental / mental health is used to describe both emotional and cognitive well-being or the absence of mental illness. In Law No. 36 of 2009 concerning health it is stated that health is a state of well-being of the body, soul and social that enables every organ to live productively socially and economically. Mental health is a condition that allows optimal physical, mental and intellectual

development of a person and the development runs in harmony with others as they are and have a positive attitude towards themselves and others. (Directorate of Mental Health, 2001).

Mental Health foundations in the UK, individual mental health states when the person is able to:

1. Build emotional, creativity, intellect, and spiritual
2. Initiative, build, and continue mutually beneficial and satisfying Associations
3. Confident and active
4. Be aware of others and empathize with them
5. Use and enjoy loneliness
6. Play and enjoy the fun
7. Laugh, both in the world and in him.

2.1.4 Mental Health Disorders

Mental emotional disorders according to the Dictionary reference from Princeton University are part of mental disorders that are not caused by organic brain disorders and are more dominated by emotional disturbances. Research conducted by Harison shows that there are clients who visit public hospitals who experience symptoms of somatization, which is treatment with symptoms of physical complaints but there is no organic cause. This understanding implies that mental emotional disorders are more psychological aspects than biological aspects.

Richmond (2013) argues that mental emotional disorders are changes in mood and affect that are linked to specific thoughts or physical conditions that are in line with mood and affect. Mental emotional disorders are changes or disorders of mood

and affect that also affects a person's physical because of biological (physical), psychological (one of them emotional) and social aspects.

Emotional Mental Disorder is a condition that causes an individual experiences emotional changes that can develop into a pathological state if it continues (Idaiani, 2009). Symptoms of mental emotional disorders can be symptoms of depression, psychosomatic disorders, and anxiety. According to ICD -10 the signs of depressive symptoms consist of:

1. Depressive mood
2. Loss of interest and enthusiasm
3. Easily fatigued and lost energy
4. Concentration decreases
5. Self-esteem decreases
6. Feelings of guilt
7. Pessimistic about the future
8. The idea of endangering (self harm) or suicide
9. Sleep disorders
10. Decreased libido

Psychosomatic disorders are a condition in which a person experiences recurring physical symptoms, which are accompanied by a request for a medical examination but the results are negative and it has been explained by the doctor that no physical abnormality is the basis of the complaint. Patients usually refuse biological causes. Physical symptoms can include complaints of stomach pain, skin

allergies, menstrual disorders, diarrhea, shortness of breath, and others. (Siswoyo, 2011).

2.1.5 Measurement of Mental Emotional Disorders

Emotional mental disorder was measured using the self reporting questionnaire (SRQ) used by WHO. The SRQ is a questionnaire commonly used to screen for mental health problems in the community that has a yes or no answer with the intention of making it easier for the public to answer. Measurement of mental emotional disorders using the SRQ-20 which consists of questions about symptoms that are more likely to lead to neurotic disorders. Depression symptoms are found in items 6,9,10,14,15,16, and 17; symptoms of anxiety in items 3,4, and 5; somatic symptoms in 1,2,7, and 19; cognitive symptoms in items 8,12 and 13; symptoms of energy decline in items 8,11,12,13,18, and 20.

The validation test of the SRQ was carried out by Hartono in 1995. He conducted a validation test on the use of SRQ with a cut off point or a cut-off point value of 6 used in Riskesdas 2018. The use of SRQ in Riskesdas 2018 was used to describe mental health status or emotional mental disorders exist in society. If the respondent answers "Yes" to the 6 questions, then the respondent is indicated to have had a mental emotional disorder.

List of questions asked of respondents, namely:

1. Do you have frequent headaches?
2. Do you have no appetite?
3. Are you having trouble sleeping?
4. Are you easily scared?

5. Are you tense, anxious, and worried?
6. Are your hands shaking?
7. Is your digestion disturbed / bad?
8. Are you having a hard time thinking clearly?
9. Do you feel unhappy?
10. Do you cry more often?
11. Do you find it difficult to enjoy daily activities?
12. Is it difficult for you to make decisions?
13. Is your daily work interrupted?
14. Are you unable to do useful things in life?
15. Have you lost interest in things?
16. Do you feel unhappy?
17. Do you have thoughts of ending your life?
18. Do you feel tired all the time?
19. Have you had a bad taste in your stomach?
20. Do you tire easily?

2.1.6 Diabetes mellitus

2.1.6.1 Definition

DM is a group of metabolic diseases with characteristics of hyperglycemia that occurs due to abnormal insulin secretion, insulin action or both (Perkeni, 2015).

2.1.6.1 Pathogenesis

Insulin resistance in the muscles and liver and pancreatic beta cell failure has been known as the pathophysiology of central damage of type 2 diabetes. Later it was discovered that the beta cell failure occurred earlier and is more severe than previously thought. In addition to muscles, liver and beta cells, other organs such as fat tissue (increased lipolysis), gastrointestinal (incretin deficiency), pancreatic alpha cells (hyperglycagonemia), kidney (increased glucose absorption), and brain (insulin resistance) all play a role in causing impaired glucose tolerance in type-2 DM. The eight important organs in the ominous octet are important to understand because the basis of this pathophysiology provides the concept of:

1. Treatment must be aimed at correcting pathogenesis disorders, not just to reduce HbA1c.
2. The combination treatment needed must be based on the performance of the drug in multiple disorders of the pathophysiology of type 2 DM.
3. Treatment must be started as early as possible to prevent or slow the progression of beta cell failure that has occurred in people with impaired glucose tolerance.

DeFronzo in 2009 said that not only the muscles, liver and pancreatic beta cells are central in the pathogenesis of patients with type 2 diabetes, but there are other organs that play a role, which he calls the ominous octet

In general, the pathogenesis of type 2 DM is caused by the following eight things:

1. Pancreatic beta cell failure: At the time the diagnosis of type-2 DM is established, the beta cell function has been greatly reduced. Anti-diabetic drugs

that work through this pathway are sulfonylureas, meglitinids, GLP-1 agonists and DPP-4 inhibitors.

2. Liver: In patients with type-2 diabetes there is severe insulin resistance and triggers gluconeogenesis so that glucose production in the basal state by the liver (HGP = hepatic glucose production) increases. Drugs that work through this pathway are metformin, which suppresses the gluconeogenesis process.
3. Muscle: In patients with type-2 diabetes there is a multiple interference with insulin performance in intramiocellular, due to disruption of tyrosine phosphorylation resulting in impaired glucose transport in muscle cells, decreased glycogen synthesis, and decreased glucose oxidation. The drugs that work in this pathway are metformin, and thiazolidindion.
4. Fat cells: Fat cells that are resistant to the effects of antilipolysis from insulin, causing an increase in the process of lipolysis and levels of free fatty acids (FFA) in plasma. Increasing FFA will stimulate the process of gluconeogenesis, and trigger insulin resistance in the liver and muscles. FFA will also interfere with insulin secretion. This disorder caused by FFA is called lipotoxocity. The drugs that work in this pathway are thiazolidindion.
5. Intestine: Glucose ingested triggers are much larger insulin responses than if given intravenously. The effect known as incretin effect is played by 2 GLP-1 (glucagon-like polypeptide-1) and GIP (glucose-dependent insulinotropic polypeptide or also called gastric inhibitory polypeptide) hormones. In patients with type-2 DM, GLP-1 deficiency is found and is resistant to GIP. Besides this incretin was immediately broken down by the existence of the DPP-4 enzyme,

so it only worked in a few minutes. The drug that works to inhibit the performance of the DPP-4 is the DPP-4 inhibitor group. The digestive tract also has a role in absorption of carbohydrates through the performance of the alpha-glucosidase enzyme which breaks down the polysaccharide into monosaccharides which are then absorbed by the intestine and result in increasing blood glucose after eating.

6. Alpha Pancreas Cells: Pancreatic α s are the 6th organ that plays a role in hyperglycemia and have been known since 1970. α cells function in glucagon synthesis which in a state of fasting in plasma increases. This increase causes HGP in basal conditions to increase significantly compared to normal individuals. Drugs that glucagon secretion inhibitors or glucagon receptor inhibitors include GLP-1 agonists, DPP-inhibitors and amylin.
7. Kidneys: The kidneys are organs that are known to play a role in the pathogenesis of type 2 DM. The kidneys filter is about 163 grams of glucose a day. Ninety percent of this filtrated glucose will be reabsorbed through the role of SGLT-2 (Sodium Glucose co-transporter) in the proximal convulated tubule. While the remaining 10% will be absorbed through the role of SGLT-1 in the descending and ascending tubules, so that finally there is no glucose in the urine. In patients with DM there is an increase in the expression of the SGLT-2 gene. Drugs that inhibit the performance of SGLT-2 will inhibit the reabsorption of glucose in the kidney tubules so that glucose will be released through the urine. The drug that works in this pathway is the SGLT-2 inhibitor. Dapaglifozin is one example of a medicine.

8. Brain: Insulin is a strong appetite suppressant. In obese individuals both DM and non-DM, hyperinsulinemia is a compensatory mechanism of insulin resistance. In this group, food intake actually increases due to insulin resistance which also occurs in the brain. Drugs that work in this pathway are GLP-1 agonists, amylin and bromocriptine.

2.1.6.2 Classification of DM

2.1.6.2.1 Diabetes Mellitus Type 1

Destruction of beta cells, generally leads to autoimmune and absolute idiopathic insulin deficiency. The terms insulin-dependent diabetes or adolescent-onset diabetes, results from cellular autoimmune destruction that is mediated by pancreatic β cells. Markers of immune damage to β cells include islet cell autoantibodies, autoantibodies to insulin, autoantibodies to GAD (GAD65), and autoantibodies to tyrosine phosphatase IA-2 and IA-2 β . One and usually more of these autoantibodies are present in 85-90% of individuals when initially fasting hyperglycemia is detected. In addition, this disease has a strong HLA association, with associations with DQA and DQB genes, and is influenced by the DRB gene. This HLA-DR / DQ allele can be predisposing or protective (Robinson, Coons, Haensel, Vallis, & Yale, 2018)

In this form of diabetes, the level of β cell damage varies considerably, occurring quickly in some individuals (especially infants and children) and slowly in others (especially adults). Some patients, especially children and adolescents, may present with ketoacidosis as the first manifestation of this disease. Others have mild fasting hyperglycemia which can rapidly progress to severe hyperglycemia

and / or ketoacidosis in the presence of infection or other stress. Others, particularly adults, may retain sufficient residual β cell function to prevent ketoacidosis for many years. Such people eventually become dependent on insulin for survival and are at risk of developing ketoacidosis. In the last stage of the disease, there is little or no insulin secretion, as indicated by low or undetectable plasma C-peptide levels. Immune-mediated diabetes generally occurs in childhood and adolescence, but can occur at any age, even in the 8th and 9th decades of life (Groot, Golden, Wagner, & Groot, 2016).

The autoimmune destruction of β cells has several genetic predispositions and is also related to environmental factors which are less clear. Although patients are rarely obese when they present with this type of diabetes, the presence of obesity does not conflict with the diagnosis. These patients are also susceptible to other autoimmune disorders such as Graves' disease, Hashimoto's thyroiditis, Addison's disease, vitiligo, celiac thrush, autoimmune hepatitis, myasthenia gravis, and pernicious anemia (Niraula, 2013).

2.1.6.2.2 Type 2 diabetes

Type 2 diabetes mellitus does not experience autoimmune damage to β cells (Robinson et al., 2018). Most patients with this form of diabetes are obese, and obesity itself causes some degree of insulin resistance. Patients who are not obese according to traditional weight criteria may experience an increase in body fat percentage that is distributed mainly in the abdominal area. Ketoacidosis rarely occurs spontaneously in this type of diabetes; when seen, it usually arises in connection with stress from other diseases such as infections.

This form of diabetes often goes undiagnosed for years because hyperglycemia develops gradually and in the early stages it is often not severe enough for patients to see the classic symptoms of diabetes. However, these patients are at higher risk of developing macrovascular and microvascular complications. While patients with this form of diabetes may have seemingly normal or elevated insulin levels, the higher blood glucose levels in these diabetic patients are expected to result in higher insulin values if their β cell function is normal (WHO, 2019). Thus, insulin secretion is damaged in these patients and is insufficient to compensate for insulin resistance. Insulin resistance may improve with weight loss and / or pharmacological treatment of hyperglycemia but rarely returns to normal (WHO, 2019).

The risk of developing this form of diabetes increases with age, obesity, and lack of physical activity. It occurs more frequently in women with prior GDM and in individuals with hypertension or dyslipidemia, and the frequency varies in different racial / ethnic subgroups. This is often associated with a strong genetic predisposition, more so than the autoimmune form of type 1 diabetes. However, the genetics of this form of diabetes are complex and not fully determined (IDF, 2017).

2.1.6.3.3 Other Types of Diabetes

Other types of diabetes are caused by different things. Other types of diabetes include β -cell genetic defects, genetic defects in insulin action, exocrine endocrinopathy, and drug or chemical-induced diabetes (WHO, 2019).

2.1.6.3 Diagnosis

Diagnosis of diabetes mellitus is based on examination of blood glucose levels. The recommended blood glucose test is enzymatic glucose examination with venous blood plasma. Monitoring of treatment results can be done using capillary blood glucose tests with a glucometer. For decades, the diagnosis of diabetes has been based on glucose criteria, either FPG or OGTT 75-g. In 1997, the first Expert Committee for the Diagnosis and Classification of Diabetes Mellitus revised the diagnostic criteria, using the observed association between FPG levels and the presence of retinopathy as a key factor for identifying threshold glucose levels (PB PERKENI, 2015).

The committee examined data from three cross-sectional epidemiological studies assessing retinopathy with direct fundus photography or ophthalmoscopy and measuring glycemia as FPG, 2-hour PG, and A1C. This study shows that the glycemic level below is less prevalent retinopathy and above which the prevalence of retinopathy increases in a seemingly linear fashion. The deciles of the three measures at which retinopathy began to increase were the same for each measure in each population. In addition, the glycemic value at which retinopathy increased was similar among the population. This analysis confirmed the diagnostic duration of a 2-hour PG value ≥ 200 mg / dL (11.1 mmol / L). However, a longer FPG diagnostic cut-off of 140 mg / dL (7.8 mmol / L) was recorded to identify far fewer individuals with diabetes than the 2-hour PG cut-off point. The FPG diagnostic cut-off point was reduced to ≥ 126 mg / dL (7.0 mmol / L) (PB. PERKENI, 2015).

2.1.7 Pathophysiology of Diabetes Mellitus with Mental Emotional Disorders

The pathophysiology between diabetes and mental health disorders starts from chronic stress that activates the hypothalamus - pituitary - adrenal axis (HPA axis) and sympathetic nervous system (SNS), increases cortisol production in the adrenal cortex and adrenaline and noradrenaline production in the adrenal medulla (Fernandes & Paúl, 2020). Chronic hypercortisolemia and prolonged activation of SNS increase insulin resistance, visceral obesity and lead to metabolic syndrome. On the other hand, chronic stress has behavioral consequences: noradrenaline, cortisol, and other hormones activate the fear system that determines anxiety, anorexia, or hyperphagia; These same mediators cause tachyphylaxis of the reward system, which results in depression and the desire to eat, other substances or stress. Excess cortisol interferes with neurogenesis in the hippocampus, a region involved in depression as well as in type 2 diabetes mellitus (Robinson et al., 2018)

In addition, chronic stress in people with diabetes mellitus causes immune dysfunction directly or via the HPA or SNS axis, which increases the production of inflammatory cytokines. High amounts of inflammatory cytokines interact with the normal function of pancreatic β cells, and induce insulin resistance (Fernandes & Paúl, 2020). Proinflammatory cytokines have been found to interact with many of the pathophysiological domains that characterize depression, including neurotransmitter metabolism, neuroendocrine function, synaptic plasticity, and behavior. 50% of patients treated with interferon Alfa were depressed and patients with depression had statistically higher levels of blood cytokines such as tumor necrosis factor and interleukin 6 than those without depression. This correlation suggests that stress in people with diabetes mellitus (chronic damage to the HPA

and SNS axes) can cause inflammation to increase depression (Robinson et al., 2018).

2.1.8 Determinant of Mental Health Disorders among Elderly with Diabetes Mellitus

2.1.8.1 Age

According to research conducted by Avinash in 2019 on factors associated with the incidence of depression in type 2 diabetes mellitus patients in Nepal, it was revealed that age was significantly associated with depression. This is indicated by the increasing prevalence of depression with increasing age. Old age makes a person lose control of their life, then limited financial resources, feelings of hopelessness, isolation which often triggers suicidal thoughts and emotions such as sadness, anxiety, loneliness and low self-esteem, which in turn leads to social withdrawal and apathy.

A study conducted on the elderly revealed that the age of 50 years and over are at risk for mental emotional disorders due to biological factors that may be caused by changes in the central nervous system (Pouwer et al., 2003). Older patients are more prone to chronic diabetes complications due to longer exposure to adverse metabolic and vascular effects (Bansal et al., 2018). With an increase in average life expectancy, chronic conditions inherent to aging, such as dementia (specifically Alzheimer's disease), inevitably co-exist with associated behavioral and psychological disorders, highlighting the need for specialized interventions in the mental health problems of the elderly (Khaledi et al. ., 2019). Apart from

dementia and mild cognitive impairment, other problems such as weakness, delirium and the risk of mental health problems or the unmet needs of older people, require greater attention from professionals and policy agencies. The burden of mental health problems is often seen as an inevitable part of the aging process, exacerbating negative stereotypes about growing old (Fernandes & Paúl, 2020).

The risk of mental emotional disorders or depression in patients after the age of 50 years is 3 to 5 times greater than patients aged less than 50 years and this is more due to biological factors and not due to genetic factors (Madkhali et al., 2020). It may also be due to changes in the nervous system (catecholaminergic neurotransmitters) that may play a role in depression in the elderly. The risk of mental disorders is higher in the female sex group, the adult group is not married, does not work, and has a low socioeconomic status (Besral, 2013).

2.1.8.2 Sex

According to Ratri's research in 2013 entitled the relationship of diabetes mellitus with neurotic disorders in the elderly in Indonesia, it is stated that the female gender is more susceptible to mental health disorders than the male elderly. The proportion of elderly women who are affected by mental health disorders is greater than that of men is 25.6%. Women are more susceptible to mental health problems due to hormonal changes and differences in characteristics between men and women. Apart from hormonal changes, the characteristics of women who put emotional rather than rational importance also play a role. When faced with problems, women tend to put forward feelings (Marini, 2008).

Depression and anxiety are possible sources of hypothalamic-pituitary-adrenal (HPA) axis dysregulation and there is evidence that HPA axis abnormalities can lead to insulin resistance (Sun et al., 2018). The function of the HPA axis is also known to differ by sex and these differences emerged during the lifetime around the same time that the prevalence of depression and anxiety began to show a sex-specific pattern. This makes women think more about their illness than men (Aiello, Colombo, & Galea, 2016).

2.1.8.3 Domicile

Research conducted by Ratri in 2013 in Indonesia revealed that elderly living in urban areas were much more prone to mental health problems compared to older people living in rural areas. This is evidenced by the proportion of elderly people in urban areas who experience mental health disorders is 22.7% higher when compared to parents who live in urban areas.

Elderly with diabetes mellitus who live in urban areas are more at risk for mental emotional disorders because there is more pollution in urban areas than in rural areas. In addition, the elderly also admit that living in cities is more difficult to do stress coping activities because it is hotter so it is easier to add to the burden on the mind. The elderly who live in urban areas who do not have a job tend to be more stressed than the elderly who live in rural areas.

2.1.8.4 Educational Level

According to research conducted by Avinash et al in 2019 regarding depression in people with type 2 diabetes mellitus in Nepal, there is a relationship between education level and depression (Id et al., 2019). Diabetes mellitus sufferers

with low educational status are more likely to experience depression due to their low knowledge and understanding of the disease being experienced, then low adherence to drug use and dietary regulation makes them vulnerable to complications, thus exacerbating their disease state and increasing their chances to experience anxiety, depression, to mental emotional disorders (Subramaniam, Abdin, Vaingankar, & Picco, 2017).

Educated people are less likely to experience depression because they can find better jobs and have more health care resources than less educated people (Madkhali et al., 2020). Depression is significantly associated with lower levels of education. Higher education is a protective factor against depression in diabetics. Education provides a better understanding of disease and its complications as well as clues for better adherence and self-care (Arambewela et al., 2019).

Low education is associated with an increased risk for dementia and some depression. It is possible for those with low education to have limitations in coping patterns with the problems experienced. However, those with higher education have more abilities and knowledge so that they have an impact on the ability to overcome life problems and tend to be able to solve problems. Therefore, the risk of experiencing mental emotional disorders is lower (Besral, 2013).

2.1.8.5 Work Status

Employment status is significantly associated with depression especially in people who do not work at all. Not having a job means that a person does not have income to fulfill the necessary nutrition and medicine. A study in Palestine states

that housewives with diabetes mellitus who do not work have a risk of developing depression compared to those who have a job (Id et al., 2019).

Not having a job can affect a person's mental balance due to only doing activities at home and not having interactions with other people throughout the day. They cannot get the cost of undergoing diabetes mellitus treatment unless they are only dependent on other people. The high cost of care makes someone who does not have a job feel depressed and has an impact on their psychology (Joseph et al, 2019).

Complications such as nephropathy, neuropathy, and diabetic foot among others, and comorbid conditions can increase the cost of managing or treating diabetes mellitus. It can cause some level of economic stress and consequently depression. This is more likely to apply to patients with lower socioeconomic status. In addition, the presence of comorbidities and complications in patients adds to the unnatural suffering of patients and thus makes them vulnerable to depression. Functional limitations due to complications such as retinopathy and amputation can also contribute to the development of depression.

2.1.8.6 Marital Status

The proportion of elderly people with diabetes mellitus with marital status has never married or been married but divorced has a risk of mental health problems by 27.5% higher than the elderly who still have a partner (Ratri et al., 2013). The elderly become depressed and worry about what their families will think about their diabetes mellitus, whether they will treat them differently or stay the same. Family plays a very important role in treating them as vulnerable or trying to adjust their

diet or exercise properly. Therefore, they tend to need a partner who can be a friend who is always supportive to have a healthy diet, exercise, even about the necessary care.

According to other studies, couples have a significant relationship with the incidence of depression in elderly people with diabetes mellitus. The burden of elderly people with diabetes mellitus who have a partner will decrease. This is because a healthy partner is a pillar of support for the patient. The support process creates a balance in the daily lives of diabetes mellitus couples based on shared goals, achievements and failures (Dellafiore, Rosa, Pittella, & Caruso, 2018).

2.1.8.7 Mental Health History

Research conducted in Indonesia in 2013 states that the proportion of neurosis or mental health disorders in the elderly with a family history of mental disorders is 41.6% (Ratri et al., 2013). Genetic factors are recognized to have a great influence on human mentality. The tendency to psychosis, namely schizophrenia and depression, is a mental illness that is genetically inherited from its parents. Other disorders that are thought to be genetic are alcohol dependence, drugs, Alzheimer's syndrome, phenylketonurine, and Huntington syndrome. Mental disorders also occur due to abnormalities in the number and structure of chromosomes. An excessive or reduced number of chromosomes can cause an individual to experience mental disorders (Siswanto, 2018).

Individuals or respondents who experience mental / mental disorders have problems with cognitive, affective, and psychomotor abilities as well as social

relationships. Although the final prognosis is said to be cured, basically the individual still has sequelae. So, after the first illness / disorder, genetic factors still have a role in the possibility of subsequent mental disorders (relapse) (Debra, 2018).

Hereditary factors that affect a person's mental health, in certain cases such as mental retardation, there is a trisomy chromosome in the chromosome pair number 21. Based on neurological theory as well as constitutional factors that indicate the overall genetic makeup or later obtained from the interaction between the genotype and the phenotype. The risk of developing depressive mental disorders in twins is even higher whose genetic factors play a role in the occurrence of depressive mental disorders in monozygous twins by 60-80%, while in heterozygous twins by 25-35%. (Suyoko, 2012).

2.1.8.8 Obesity

According to Cano et al in 2015 obesity has a relationship due to depression in diabetic patients. Mikolajczyk and colleagues say that women who experience symptoms of depression tend to eat sugary foods and fast food, which can impact their weight. This of course will thicken the adipose tissue in the body so that in the long run it causes obesity (Sun et al., 2018). Several previous studies have found inflammatory stimuli such as adipose tissue, food constituents, environmental pollutants and chronic infections to be associated with insulin resistance or diabetes risk. Interestingly, there are also data suggesting that women have an exaggerated inflammatory response to experimentally-induced psychological stress while men's inflammatory responses are blunted (Sv et al., 2016).

Increased cortisol levels reflect the clinical impression that dinner occurs during times of stress. Some obese patients describe little or no hunger for breakfast. Elderly people who are depressed often consume half of their daily calories at night. Obesity certainly has an impact on diabetes and can lead to other chronic diseases (Mccombe et al., 2018).

2.1.8.9 Duration of Illness

Duration of illness was significantly associated with the incidence of mental health disorders in the elderly. This is because the longer the elderly suffer from diabetes mellitus, the longer the pain is experienced. Treatment of diabetes mellitus which requires a person to spend a lifetime to make a person become depressed (Nefs et al 2019).

People who suffer from diabetes mellitus for a long period of time cause their immune system to weaken, making it easier for them to experience comorbid conditions such as neuropathy, nephropathy, diabetic foot and others that can cause mental emotional disorders. The comorbid circumstances also cause them to spend more money on treatment, which may have a financial impact on their lives (Bansal et al., 2018).

2.1.8.10 Comorbidity

Elderly who suffer from diabetes mellitus feel their internal organs such as kidneys and eyes will not function or they will experience heart failure or stroke. The thinking of the elderly who suffer from diabetes mellitus regarding the comorbidities that may be experienced can increase the risk of developing mental emotional disorders (Sivertsen, Petrie, Wilhelmsen-langeland, & Hysing, 2014). A

study identified depression and hypertension comorbidity in 38.5% of patients and thus concluded that cardiovascular disease often coexists with depression, which in turn is associated with higher levels of cognitive impairment and functional disabilities which can lead to further suffering, health conditions. worse, difficult treatment, and poor outcomes (Madkhali et al., 2020).

This condition is worrying because physically and socially respondents who experience mental emotional disorders can exacerbate physical disorders chronic illness. This condition can also interfere with the individual's relationship with the environment which has the potential to cause the individual to experience mental disorders. The risk of experiencing mental emotional disorders seems to be greater along with the increasing number of chronic diseases suffered by respondents (Suyoko, 2012).

Respondents who suffer from only one chronic illness have a 2.7 times greater risk of suffering from mental emotional disorders, respondents who suffer from two chronic diseases have a 4.7 times greater risk of suffering from mental emotional disorders, while respondents who suffer from 3 or more chronic diseases have an 11 times greater risk of suffering from mental emotional disorders (Bansal et al., 2018). The effects of chronic disease also exacerbate mental emotional disorders and exacerbate disabilities. This complex relationship must receive priority treatment by improving the chronic disease treatment system along with improving the management of mental emotional disorders (Roy & Lloyd, 2012).

2.2 Theoretical Framework

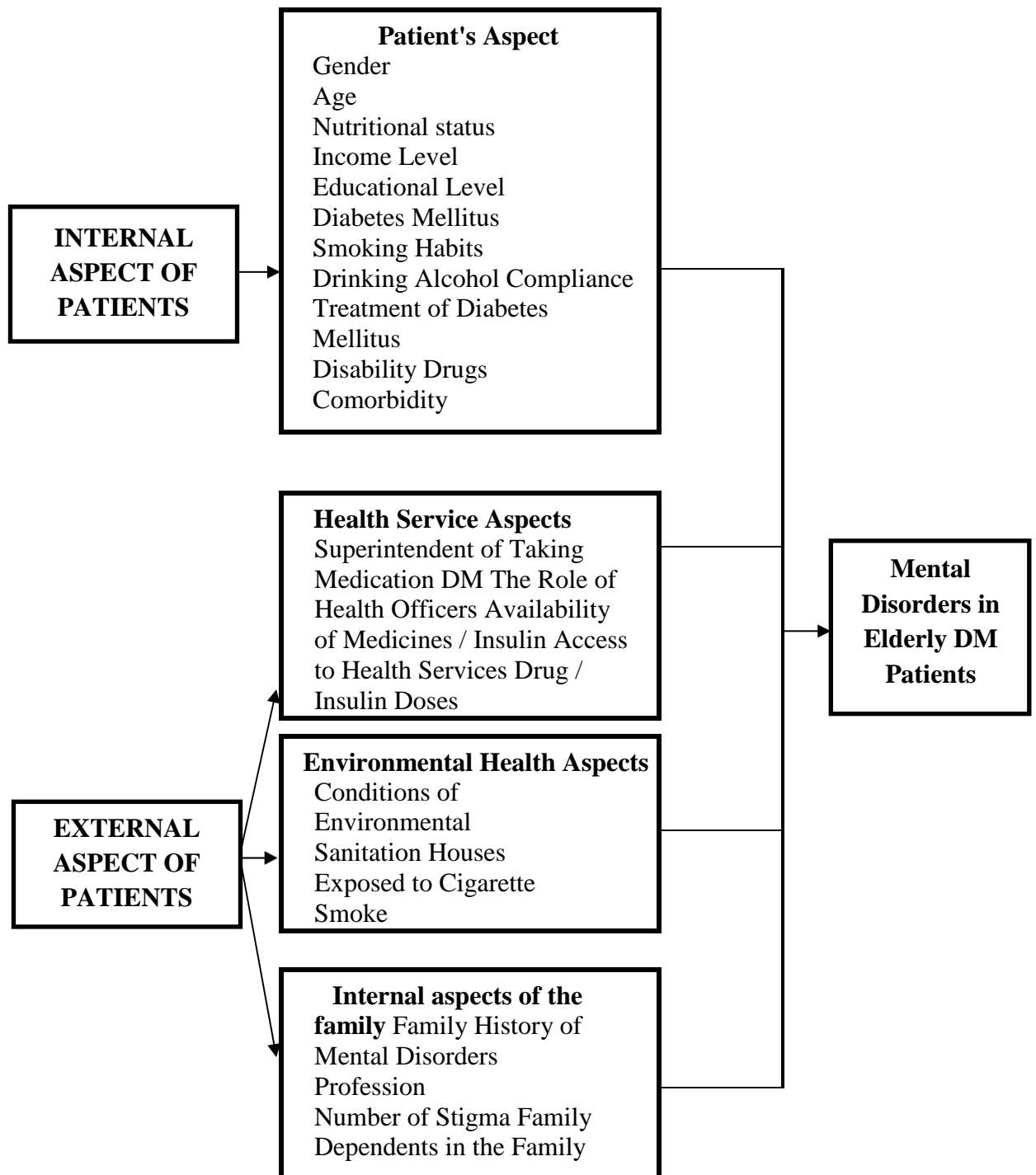


Figure 2.1 Theoretical Framework

Source: Modification of Geriatric Medicine and Evidence Based Approach (2003), Ratri (2013), Suyoko (2012), (Id et al, 2019)

CHAPTER III
RESEARCH METHODE

3.1 Conceptual Framework

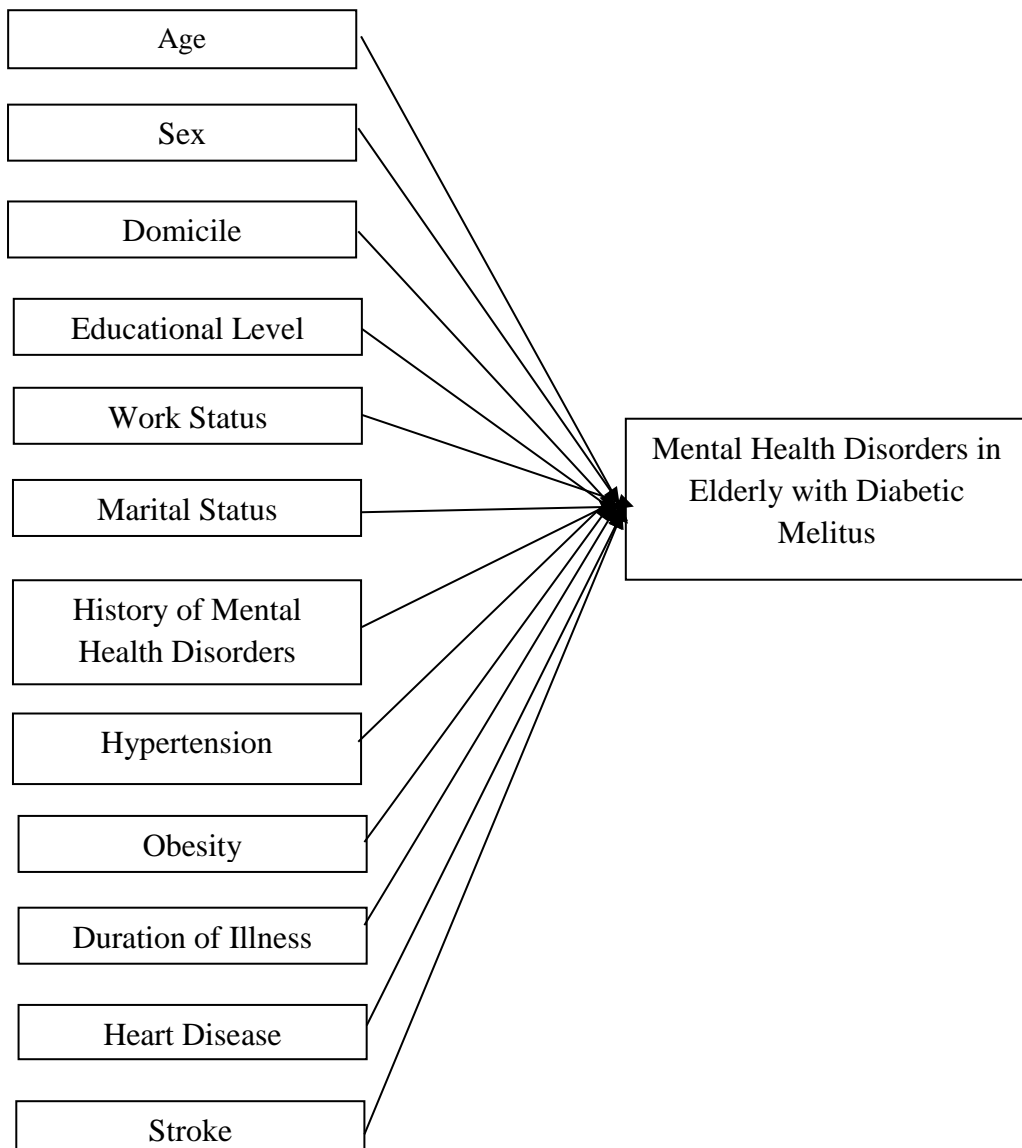


Figure 2.2 Conceptual Framework

3.2 Research Hypothesis

The hypothesis is the answer while the research whose truth will be proven in the study (Notoatmodjo, 2010). The hypotheses that can be stated in this study are:

1. There is an association between age with mental health disorders in the elderly with diabetes mellitus in Indonesia.
2. There is an association between sex with mental health disorders in the elderly with diabetes mellitus in Indonesia.
3. There is an association between domicile with mental health disorders in elderly with diabetes mellitus in Indonesia.
4. There is an association between educational levels with mental health disorders in elderly with diabetes mellitus in Indonesia.
5. There is an association between work status with mental health disorders in elderly with diabetes mellitus in Indonesia.
6. There is an association between marital status with mental health disorders in the elderly with diabetes mellitus in Indonesia.
7. There is an association between the history of mental health with mental health disorders in diabetes patients.
8. There is an association between hypertension and mental health disorders in the elderly with diabetes mellitus in Indonesia.
9. There is an association between obesity with mental health disorders in the elderly with diabetes mellitus in Indonesia.
10. There is an association between the duration of illness with mental health disorders in the elderly with diabetes mellitus in Indonesia.

11. There is an association between heart disease with mental health disorders in the elderly with diabetes mellitus in Indonesia.
12. There is an association between stroke with mental health disorders in the elderly with diabetes mellitus in Indonesia.

3.3 Type and Design of Research

The type of research used in this study is analytic using cross sectional research design. Analytical research is research that is used to determine the causal Association between two variables observationally.

3.4 Research Variable

Variables are everything in the form of what is determined by the researcher to be studied, so that information is obtained about it (Sugiyono, 2008).

1.4.1 Independent Variables

Independent variables are variables that influence or are the cause of the emergency of dependent variables (Sugiyono, 2008). The independent variables in this study were sex, domicile, educational level, work status, marital status, history of mental health disorders, hypertension, duration of illness, heart disease, and stroke.

1.4.2 Dependent Variables

Dependent variables are variables that are influenced by the existence of independent variables (Sugiyono, 2008). The dependent variable in this study was mental health disorders in patients with diabetes mellitus.

3.5 Operational Definition and Variable Measurement

No	Variable	Definition	Measurement	Category	Scale
1	Mental health disorder in diabetes patient status	A condition that indicates an individual aged ≥ 60 years experiencing emotional changes that can develop into a pathological state if it continues. Mental health is assessed using the Self Reporting Questionnaire (SRQ) which consists of 20 criteria for emotional mental disorders if the respondent answers "Yes" to at least six questions.	Questionnaire	1 = Yes, if the respondent has diabetes mellitus and mental health problems. 2 = No, if the respondent has diabetes mellitus and does not have any mental health problems.	Nominal
2	Age	The length of the respondent's life was calculated from birth to the last birthday.	Questionnaire	1 = ≥ 70 years 2 = 60-69 years	Nominal
3	Sex	Distribution of respondents based on the type of reproductive organs	Questionnaire	1 = Female 2 = Male	Nominal
4	Domicile	Place where the respondent is domiciled for the last 3 months	Questionnaire	1 = Urban 2 = Rural	Nominal
5	Educational Level	The highest level of education was achieved by the respondents	Questionnaire	1 = Never-JHS) 2 = SHS-university	Nominal
6	Work Status	Routine activities carried out by respondents to generate income economically to fulfill their daily needs	Questionnaire	1 = Not Working 2 = Working	Nominal

7	Marital status	Respondent's formal marriage history	Questionnaire	1 = Not Married 2 = Married	Nominal
8	Mental health disorders family history	The respondent's family member has been diagnosed with a mental emotional disorder by a health worker (doctor / midwife / nurse)	Questionnaire	1 = Yes 2 = No	Nominal
9	Hypertension	Respondents suffering from hypertension based on the diagnosis of health workers (doctors / nurses / midwives) in the last month	Questionnaire	1 = Yes 2 = No	Nominal
10	Duration of illness	The duration of the respondent's illness was calculated from the start of illness to the time of the interview	Questionnaire	1 = ≥ 5 Years 2 = ≤ 5 Years	Nominal
11	Heart Disease	Respondents suffered from heart disease based on the diagnosis of health workers (doctors / nurses / midwives) in the past month	Questionnaire	1 = Yes 2 = No	Nominal
12	Stroke	Respondents suffered from a stroke based on the diagnosis of health professionals (doctor / midwife / nurse) in the past month	Questionnaire	1 = Yes 2 = No	Nominal

3.6 Population and Sample of Research

3.6.1 Population

Population is a generalization area consisting of objects / subjects that have certain qualities and characteristics that are determined by researchers to study and then draw conclusions (Sugiyono, 2011). The population in the Riskesdas study was all households in Indonesia. The population in this study were all Indonesian citizens aged ≤ 60 years.

3.6.2 Sample

The 2018 Riskesdas sample uses the 2018 Susenas sample frame which was held in March 2018. The target sample was visited by 300,000 households from 30,000 Susenas Census Blocks (BS) conducted by the Central Statistics Agency (BPS) using the PPS (probability proportional to size) method using linear systematic sampling, with Two Stage Sampling. Two-stage sampling is carried out in two ways, the first step is implicit stratification of all Census Blocks (BS) from the 2010 Population Census (SP) based on the welfare strata. From the 720,000 BS master frame the results of the SP 2010, 180,000 BS (25%) were selected on a PPS basis to be the sampling frame for the BS selection. Select a number of n BS with the PPS method in each strata urban / rural per district / city in a systematic manner resulting in a Census Block Sample List (DSBS). The total number of BSs selected is 30,000 BS.

The second step is to select 10 households in each BS updated by systematic sampling with the highest educational implicit stratification that the Head of Household (Head of Household) attains, to maintain representation of the value of the diversity of household characteristics. In this study, the sample used was Indonesian citizens aged ≥ 60 years and suffering from diabetes mellitus. The

number of samples in Riskesdas was 2,818 elderly samples suffering from diabetes mellitus.

3.7 Data Source of Research

The data used in this research is secondary data. Secondary data is data that is not obtained directly from the object to be studied or data obtained from other people or from documents (Sugiyono, 2011). Secondary data in this study were data obtained from the 2018 Basic Health Research data. Individuals who were the Riskesdas sample to be interviewed were all household members (ART) in selected households.

3.8 Instrument of Research

The research instrument is the tools that will be used for data collection (Soekidjo Notoatmodjo, 2010). The instrument used in this study is a secondary data questionnaire provided by Basic Health Research in 2018.

3.9 Collecting the Data Technique

The technique used in this study is observation. Observation is a procedure that plans, including including seeing and taking notes of the number and extent of certain activities that have to do with the problem studied (Soekidjo Notoatmodjo, 2010). Collecting data were done by the management data of Riskesdas 2018.

3.10 Procedure of Research

The group or sample in this study were respondents who participated in the 2018 Basic Health Research survey conducted by the Ministry of Health of the Republic of Indonesia.

1. Before conducting the research, the researcher compiled a request for data submitted to the Health Research and Development Agency of the Indonesian Ministry of Health.
2. Then the proposal will be processed whether the proposal is feasible or not.
3. Proper proposals will be given data by the Health Research and Development Agency of the Indonesian Ministry of Health.
4. After that, the data will be processed according to the needed variables, in this study using several independent variables and one dependent variable.
5. Then begin to compile what variables are needed in this study and then to analyze.

3.11 Data processing and analysis techniques

3.11.1 Data Processing

Data that is still in the instrument sheets is still in the form of raw data, for that it requires processing so that it can be used in the process further analysis (Gulo, 2005). To get a problem conclusion studied, then data analysis is an important step in research. The collected data will be processed and analyzed using a computer program.

The data processing process includes:

1. Data Editing

Check and re-examine the completeness and accuracy of secondary data provided by Basic Health Research. This is done to check whether there is a mistake in filling in the data sheet.

2. Data Coding

Provides codes in the columns that are available to separate data based on predetermined classifications. This stage aims to facilitate analysis, and accelerate when doing scoring data.

3. Data Scoring

This activity aims to facilitate data analysis. Data that has been coded is assessed by scoring in accordance with the values of the codes that have been determined.

4. Data Entry

Enter data from an instrument into a computer so that it can be analyzed.

5. Cleaning Data

Re-check the data entry to ensure that the data is free from errors in reading the code.

3.11.2 Data Analysis

Analyzing data is an advanced process of processing data to see how to interpret data, then analyzing data from the results that already exist at the stage of data processing results (Prasetyo, 2006).

Data analysis in this study uses the following techniques:

3.11.2.1 Univariate Analysis

Analysis carried out on each variable from the results of the study (Soekidjo Notoatmodjo, 2010). This analysis only produces distributions and percentages of each variable, for example the frequency distribution of respondents based on age, sex, education level, and occupation. Univariate analysis is useful to see if the data is feasible to analyze, see the data description collected, and whether the data has been optimal for further analysis.

3.11.2.2 Bivariate Analysis

Bivariate analysis was performed on two variables that were suspected to be related or correlated (Soekidjo Notoatmodjo, 2010). Bivariate analysis in research This was done to find out the determinant of mental health disorders among diabetics patients in the elderly. This bivariate test used the chi square test because the data studied were categorical. If the probability value is <0.05 , then H_0 is rejected and H_a is accepted.

CHAPTER IV

RESULT

4.1 General Research

4.1.1 Overview of Research Locations

According to Basic Health Research in 2018 people with diabetes mellitus in Indonesia experienced a significant increase in prevalence, in 2007 the prevalence of diabetes mellitus was 5.7%, then 6.9% in 2013 to 8.5% in 2018. Riskesdas data from year to year show the highest prevalence of diabetes mellitus sufferers is at the age of 60 years and over. Based on several studies showing a positive Association between chronic illness and mental health disorders. Diabetes is the biggest cause of mental health disorders (Id et al, 2019). People living with type 1 or type 2 diabetes are at higher risk for diagnosis of depression, anxiety and eating disorders (Ducat et al, 2015).

The high number of diabetes mellitus in Indonesia especially in the elderly requires special attention because the elderly with diabetes mellitus are a group that is vulnerable to emotional mental health disorders. The research locations covered all regions in Indonesia that were included in the Basic Health Research survey in 2018. The determination of the status of diabetes mellitus by the Basic Health Research uses interview techniques. Then the status of the elderly with mental emotional disorders is obtained from filling out a questionnaire of 20 questions according to the standards set by Riskesdas.

4.1.2 Characteristics of Respondents

4.1.2.1.1 Characteristics of Respondents by Age

The distribution of respondents by age can be seen in the table:

Table 4.1 Characteristics of Respondents Based on Age and Gender

Characteristic	Frequency	Percentage
Age		
≥70 years	1.329	47.2
60-69 years	1.489	52.8
Total	2.818	100
Sex		
Female	1.655	58.7
Male	1.163	41.3
Total	2.818	100
Mental Health Disorders		
Yes	545	19.3
No	2.273	80.7
Total	2.818	100

Based on table 4.1, information is obtained that the most respondents who experience diabetes mellitus in Indonesia are 60-69 years old with a frequency of 1,489 (52.8%), then the characteristics of respondents based on the largest gender are female with a frequency of 1,655 (58.7%), and respondents who experienced GME were as many as 545 (19.3%).

4.2 Research result

4.2.1 Univariate Analysis

Univariate analysis was obtained to determine the frequency distribution and proportion of the characteristics of the respondents from each of the variables studied. The results of univariate analysis based on the results of research on 2,818 respondents can be seen in the following description.

4.2.1.1 Distribution of Respondents

Based on the results of the study, the distribution of respondents based on education level, employment status, marital status, domicile, family history of GME, length of illness, and obesity is presented in the following table:

Tabel 4.2 Distribution of Respondent

Level of Education	Frequency	Presentage
Never-JHS	2.084	72,7
SHS-University	770	27,3
Total	2.818	100
Working Status		
Not Working	1.816	64,5
Working	1.002	35,5
Total	2.818	100
Marital Status		
Not Married	1182	42,0
Married	1636	58,0
Total	2.818	100
Domicile		
Rural	1350	48,0
Urban	1468	52,0
Total	2.818	100
Family History of GME		
Yes	171	16,1
No	2647	93,9
Total	2.818	100
Duration of Illness		
≥5 years	1262	44,8
≤5 years	1556	55,2
Total	2.818	100
Obesity		
Yes	189	6,8
No	2629	93,2
Total	2.818	100

Based on table 4.2 information is obtained that the distribution of respondents according to the level of education is the largest number of respondents

with a non-junior high school education level, which is 2,084 (72.7%), then the distribution of respondents according to the most occupational status is respondents who do not work as many as 1,816 (64.5%). The most distribution of respondents based on marital status was respondents with married status of 1,638 (58%), then the distribution of respondents based on their largest domicile was 1,468 (52%). The distribution of respondents who did not have a history of GME in the family was 2,647 (93.9%), then the distribution of respondents based on the most length of illness was ≤ 5 years of 1,556 (55.2%), and the distribution of respondents based on obesity status was mostly respondents who were not obese, namely 2,629 (93.2%).

4.2.2 Bivariate Analysis

Bivariate analysis was performed to determine the Association between variables independent and dependent variable.

4.2.2.1 Association Between Age and Emotional Mental Disorder in Elderly People with Diabetes based on 2018 Riskesdas data

Based on the test of the Association between age and incidence Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.3 Association between Age and Emotional Mental Disorders in Elderly with diabetes based on 2018 Riskesdas data

Age	Emotional Mental Disorders				Value of p
	Yes		Not		
	N	%	N	%	
≥ 70 years old	274	20.6	1055	79.4	0.105
60-69 years old	271	18.2	1218	81.8	
Total	545	19.3	2273	80.7	

Based on table 4.3 the results of the analysis the association of age with emotional disorders in elderly people with diabetes, showed that of the 2,818 respondents interviewed with respondents aged ≥ 70 years old who had mental emotional disorders were 274 respondents (20.6%) and those without mental disorders emotionally are 1055 respondents (79.4%). While 60-69 years who experienced mental emotional disorders as many as 271 respondents (18.2%) and those who did not experience mental emotional disorders were 1218 respondents (81.8%). The test results with chi-square obtained p value > 0.05 so that it shows no significant Association between age and mental emotional disorders in elderly people with diabetes.

4.2.2.2 Association of Sex with Emotional Mental Disorders in the elderly with diabetes based on 2018 Riskesdas data

Based on the test of the Association between sex and incidence Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.4 Sex Association with Emotional Mental Health Disorders in Elderly with diabetes based on 2018 Riskesdas data

Sex	Emotional Mental Disorders				PR (95% CI)	Value of p
	Yes		Not			
	N	%	N	%		
Female	366	22.1	1289	77.9	1,561	<0,001
Male	179	15.3	986	84.7	(1,282-1,901)	
Total	545	19.3	2273	80.7		

Based on table 4.4 the results of the analysis of the Association of sex with emotional mental disorders in elderly people with diabetes, showed that of 2,818 respondents interviewed with female respondents who experienced mental emotional disorders as many as 366 respondents (22.1%) and those who did not

experience mental emotional disorders were 1289 respondents (77.9%) while male respondents who have emotional mental disorders are 179 respondents (15.3%) and those who do not have mental emotional disorders are 986 respondents (84.7%). Chi-square test results obtained p value <0.05 so that it shows a significant Association between age and mental emotional disorders in elderly people with diabetes. The PR value obtained was 1.561 (CI 1.289-1.901), this means that the prevalence of emotional mental disorders among elderly people with diabetes who is female is 1.5 times greater risk of developing emotional mental disorders compared to male gender.

4.2.2.3 Association of Education Level with Emotional Mental Disorders in the Elderly with diabetes based on 2018 Riskesdas data

Based on the test of the Association between education level and incidence Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.5 Association of Education Level with Emotional Mental Health Disorders in the Elderly with diabetes based on 2018 Riskesdas data

Level of education	Emotional Mental Disorders				PR (95% CI)	Value of p
	Yes		Not			
	N	%	N	%		
No Middle School	464	22.6	1584	77.4	2,487 (1,932-3,200)	$<0,001$
SMA-PT	81	10.6	689	89.4		
Total	545	19.3	2273	80.7		

Based on table 4.5 the results of an analysis of the Association of education levels with emotional mental disorders in elderly people with diabetes, showed that of the 2,818 respondents interviewed among respondents who had never attended

school to junior high school graduates who experienced mental emotional disorders as many as 464 respondents (22.6%) and who did not experience Mental emotional disorders were 1584 respondents (77.4%) while respondents from high school graduates to PTs who had mental emotional disorders were 81 respondents (10.6%) and those who did not have mental emotional disorders were 689 respondents (89.4%). The test results with chi-square obtained p value <0.05 so that it shows a significant Association between the level of education with mental emotional disorders in elderly people with diabetes. The PR score was 2.487 (CI 1.932-3.200), this means that the prevalence of emotional mental disorders among elderly people with diabetes who have never attended school to junior high school graduates have a 2.4 times greater risk of developing emotional mental disorders compared to those who graduated from senior high school to university.

4.2.2.4 Employment Association with Emotional Mental Disorders in the Elderly with diabetes based on Riskesdas 2018 data

Based on testing the Association between work and events Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.6 Association of Employment with Emotional Mental Health Disorders in the elderly with diabetes based on Riskesdas 2018 data

Profession	Emotional Mental Disorders				PR (95% CI)	Value of p
	Yes		Not			
	N	%	N	%		
Does not work	389	21.4	1427	78.6	1,353 (1,111-1,647)	0.003
Work	156	15.5	846	84.5		
Total	545	19.3	2273	80.7		

Based on table 4.6 the results of the analysis of the Association of work with mental emotional disorders in elderly people with diabetes, showed that of 2,818

respondents interviewed of unemployed respondents who experienced mental emotional disorders as many as 389 respondents (21.4%) and those who did not experience mental emotional disorders were 1427 respondents (78.6%) while those who worked who had mental emotional disorders were 156 respondents (15.5%) and those who did not have mental emotional disorders were 846 respondents (84.5%). Chi-square test results obtained p value <0.05 so that it shows a significant Association between work with mental emotional disorders in elderly people with diabetes. The PR value is 1.353 (CI 1.111-1.647) This means that the prevalence of mental emotional disorders among elderly people with diabetes who do not work is 1.3 times more likely to suffer mental emotional disorders than those who work.

4.2.2.5 Association of Marital Status with Emotional Mental Disorders in Elderly People with Diabetes based on 2018 Riskesdas data

Based on the test of the Association between marital status and events Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.7 Association of Marital Status with Emotional Mental Health Disorders in the Elderly with diabetes based on Riskesdas 2018 data

Old sick	Emotional Mental Disorders				Value of p
	Yes		Not		
	N	%	N	%	
Not Married / Divorced	247	20.8	935	79.2	0.075
Married	298	18.3	1338	81.7	
Total	545	19.3	2273	80.7	

Based on table 4.7 the results of the analysis of the Association of work with mental emotional disorders in elderly people with diabetes, showed that of the 2,818 respondents interviewed of respondents who were not married or divorced who

experienced mental emotional disorders as many as 247 respondents (20.8%) and those who did not experience mental emotional disorders there were 935 respondents (79.2%) while those who were married who had mental emotional disorders were 298 respondents (18.3%) and those who did not have mental emotional disorders were 1338 respondents (81.7%). The results of the chi-square test were obtained p value > 0.05 so that there was no significant association between marital status and mental emotional disorders in elderly people with diabetes.

4.2.2.6 Association of Domicile with Emotional Mental Disorders in Elderly with diabetes based on 2018 Riskesdas data

Based on the test of the Association between domicile and events Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.8 Association between Domicile and Emotional Mental Health Disorders in Elderly people with diabetes based on 2018 Riskesdas data

Domicile	Emotional Mental Disorders				PR (95% CI)	Value of p
	Yes		Not			
	N	%	N	%		
Urban	296	21.9	1054	78.1	0.609	<0,001
Rural	249	16.9	1219	83.1	(0.504-0.736)	
Total	545	19.3	2273	80.7		

Based on table 4.8 the results of the analysis of the Association of domicile with emotional emotional disorders in elderly people with diabetes, showed that of the 2,818 respondents interviewed of respondents living in urban areas who experienced mental emotional disorders as many as 296 respondents (21.9%) and those who did not experience mental emotional disorders were 1054 respondents (78.1%) while those living in rural areas who have mental emotional disorders are

249 respondents (16.9%) and those who do not have mental emotional disorders are 1219 respondents (83.1%). The test results with chi-square obtained p value <0.05 so it shows a significant association between domicile and mental emotional disorders in elderly people with diabetes. Obtained PR value of 0.609 (CI 0.504-0.736). This means that the prevalence of mental emotional disorders among elderly people with diabetes who live in urban areas is 0.6 times more likely to sufferer mental emotional disorders than those who live in rural areas.

4.2.2.7 Association of GME History with Emotional Mental Disorders in the Elderly with diabetes based on 2018 Riskesdas data

Based on the test of the Association between the history of GME in families with events Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.9 Association between GME History and Emotional Mental Health Disorders in the Elderly with diabetes based on 2018 Riskesdas data

GME History	Emotional Mental Disorders				PR (95% CI)	Value of p
	Yes		Not			
	N	%	N	%		
Yes	63	36.8	108	63.2	2,620	$<0,001$
No	482	18.2	2165	81.8	(1,891-3,630)	
Total	545	19.3	2273	80.7		

Based on table 4.9 the results of the analysis of the Association of GME history with emotional emotional disorders in elderly people with diabetes, showed

that of 2,818 respondents interviewed with respondents with a history of GME in families with mental emotional disorders as many as 63 respondents (36.8%) and those without mental emotional disorders there were 108 respondents (63.2%) while those without a history of GME in families with mental emotional disorders were 482 respondents (18.2%) and those without mental emotional disorders were 2165 respondents (81.8%). The PR value was 2,620 (CI 1,891-3,630), this means that the prevalence of mental emotional disorders among elderly people with diabetes who have a history of GME in the family has a 2.6 times greater risk of developing emotional mental disorders compared to those without a history of GME in the family.

4.2.2.8 Association between Duration of Illness and Emotional Mental Disorders in the elderly with diabetes based on 2018 Riskesdas data

Based on the test of the Association between duration of illness and the incidence mental emotional disorders in the elderly with diabetes obtained the following results:

Table 4.10 Association between Duration of Illness and Emotional Mental Health Disorders in the elderly with diabetes based on 2018 Riskesdas data

Duration of Illness	Emotional Mental Disorders				Value of p
	Yes		Not		
	N	%	N	%	
≥5 years	244	19.3	1018	80.7	0.994
≤5 years	301	19.3	1255	80.7	
Total	545	19.3	2273	80.7	

Based on table 4.10 the results of the analysis of the Association of long-term illness with mental emotional disorders in elderly people with diabetes,

showed that of the 2,818 respondents who were interviewed with a duration of more than five years who experienced mental emotional disorders as many as 244 respondents (19.3%) and those who did not experience mental emotional disorders 1018 respondents (80.7%) while respondents with a duration of less than five years who had mental emotional disorders were 301 respondents (19.3%) and those without mental emotional disorders were 1255 respondents (80.7%). The results of the chi-square test were obtained p value > 0.05 so that it showed no significant Association between the duration of illness with mental emotional disorders in elderly people with diabetes.

4.2.2.9 Association between Obesity and Emotional Mental Disorders in the elderly with diabetes based on 2018 Riskesdas data

Based on the test of the Association between obesity and incidence mental emotional disorders in elderly people with diabetes obtained the following results:

Table 4.11 Association between Obesity and Emotional Mental Health Disorders in the elderly with diabetes based on 2018 Riskesdas data

Obesity	Emotional Mental Disorders				PR (95% CI)	Value of p
	Yes		Not			
	N	%	N	%		
Obesity	100	52.9	89	47.1	5,514	<0,001
Normal	445	16.9	2185	83.1	(4,072-7,468)	
Total	545	19.3	2273	80.7		

Based on table 4.11 the results of the analysis of the Association of obesity with emotional mental disorders in elderly people with diabetes, showed that of

2,818 respondents who were obese while experiencing mental emotional disorders as many as 100 respondents (52.9%) and those who did not experience mental emotional disorders were 89 respondents (47.1%) while respondents who have normal OBESITY who have mental emotional disorders are 445 respondents (16.9%) and those who do not have mental emotional disorders are 2185 respondents (83.1%). The test results with chi-square obtained p value <0.05 so that it shows a significant Association between obesity with mental emotional disorders in elderly people with diabetes. The PR value was 5,541 (CI 4,072-7,468), this means that the prevalence of emotional mental disorders among elderly people with diabetes who are obese is at a 5.5 times greater risk of developing emotional mental disorders compared to those who are not obese.

4.2.2.10 Association between Hypertension with Emotional Mental Disorders in the Elderly with diabetes based on 2018 Riskesdas data

Based on the test of the Association between hypertension and the incidence Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.12 Association of Hypertension with Emotional Mental Health Disorders in the Elderly with diabetes based on 2018 Riskesdas data

Hypertension	Emotional Mental Disorders		PR (95% CI)	Value of p
	Yes	Not		

	N	%	N	%		
Yes	351	24.4	1090	75.6	1,964	<0.001
Not	194	13.9	1183	85.9	(1,618-2,383)	
Total	545	19.3	2273	80.7		

Based on table 4.12 the results of the analysis of the Association of hypertension with mental emotional disorders in elderly people with diabetes, showed that of 2,818 respondents who were interviewed with hypertension for more than five years who experienced mental emotional disorders as many as 351 respondents (24.4%) and those who did not experience mental emotional disorders were 1090 respondents (75.6%) while respondents who did not have hypertension who had mental emotional disorders were 194 respondents (13.9%) and those without mental emotional disorders were 1183 respondents (85.9%). The test results with chi-square obtained p value <0.05 so that it shows a significant Association between hypertension and mental emotional disorders in elderly people with diabetes. The PR value was 1964 (CI 1.618-2.383), this means that the prevalence of mental emotional disorders in elderly people with diabetes who have hypertension is 1.9 times more likely to develop emotional mental disorders compared to those who do not have hypertension.

4.2.2.11 Association of Heart Disease with Emotional Mental Disorders in Elderly with diabetes based on 2018 Riskesdas data

Based on testing the Association between heart disease and events Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.13 Association between Heart Disease and Emotional Mental Health Disorders in the elderly with diabetes based on 2018 Riskesdas data

Heart disease	Emotional Mental Disorders				Value of p
	Yes		Not		
	N	%	N	%	
Yes	83	23.9	264	76.1	0.021
No	462	18.6	2009	81.4	
Total	545	19.3	2273	80.7	

Based on table 4.13 the results of the analysis of the Association of heart disease with mental emotional disorders in elderly people with diabetes, showed that of 2,818 respondents who were interviewed with heart disease who experienced mental emotional disorders as many as 83 respondents (23.9%) and those who did not experience mental emotional disorders were 264 respondents (76.1%) while respondents who did not have heart disease who had emotional mental disorders were 462 respondents (18.6%) and those who did not have mental emotional disorders were 2009 respondents (81.4%). The test results with chi-square obtained p value <0.05 so that it shows a significant Association between heart disease with mental emotional disorders in elderly people with diabetes. The PR value was 1.367 (CI 1.047-1.785), this means that the prevalence of mental emotional disorders among elderly people with diabetes who have heart disease is 1.3 times more likely to suffer mental emotional disorders than those without heart disease.

4.2.2.12 Association between Stroke and Emotional Mental Disorders in the elderly with diabetes based on the 2018 Riskesdas data

Based on the test of the Association between stroke and incidence Emotional Mental Disorders in the elderly with diabetes obtained the following results:

Table 4.13 Association between Heart Disease and Emotional Mental Health Disorders in the elderly with diabetes based on 2018 Riskesdas data

Stroke	Emotional Mental Disorders				PR (95% CI)	Value of p
	Yes		Not			
	N	%	N	%		
Yes	86	33.3	172	66.7	2,289	<0,001
No	459	17.9	2101	82.1	(1,733-3,022)	
Total	545	19.3	2273	80.7		

Based on table 4.14 the results of the analysis of the Association of stroke with emotional emotional disorders in elderly people with diabetes, showed that of 2,818 respondents who were interviewed with strokes who experienced mental emotional disorders as many as 86 respondents (33.3%) and those without mental emotional disorders were 172 respondents (66.7%) while respondents who did not have a stroke who had emotional mental disorders were 459 respondents (17.9%) and those who did not have mental emotional disorders were 2101 respondents (82.1%). The test results with chi-square obtained p value <0.05 so that it shows a meaningful Association between stroke and mental emotional disorders in elderly people with diabetes. The PR value was 2.289 (CI 1.733-3.022), this means that the prevalence of mental emotional disorders among elderly people with diabetes who have a stroke has a 2.2 times greater risk of suffering from mental emotional disorders compared to those who do not have a stroke.

CHAPTER V

DISCUSSION

5.1 Discussion Of Research Results

5.1.1 Association between Age and Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

This study is in line with Bansal Rishav et al. (2020) in their study entitled risk factors for low mental health status in elderly people in India, said that age is not associated with the incidence of mental emotional disorders in elderly people with diabetes mellitus. This study states that the elderly aged more than 70 years and the elderly aged 60-69 years who have diabetes mellitus do not have a significant effect on mental health conditions.

This is in contrast to Suyoko's research in 2012 which states that age is related to the incidence of emotional mental health disorders in the elderly in DKI Jakarta, namely that respondents aged over 70 years have a 1.9 times risk of developing emotional mental health disorders compared to elderly people aged 60-69. year. This is because in this study, age is not related because the variable age of the elderly here is only differentiated between 60-69 years and more than 70 years, which causes the age variable categorization range to be not too far away so that it does not have a significant effect on the incidence of emotional mental disorders. the elderly.

5.1.2 Association of Sex with Emotional Mental Disorders in Elderly Patients with Diabetes in Indonesia

This study is in line with research by Sivertsen et al (2014) in their study entitled mental health in elderly people with type 1 diabetes mellitus in Norway who also stated that gender was not associated with the incidence of mental health disorders in type 1 diabetes mellitus sufferers. In Carrie M.'s study. Bernstein (2013) also states that gender is not associated with the incidence of mental health problems in type 1 diabetes mellitus sufferers in the USA. In addition, Bansal Rishav et al (2020) in their study entitled risk factors for low mental health status in elderly people with diabetes mellitus in India said that gender is not associated with the incidence of mental emotional disorders in elderly people with diabetes mellitus.

Other studies say that women are more prone to mental health problems due to hormonal changes and differences in characteristics between men and women. Apart from hormonal changes, the characteristics of women who put emotional rather than rational importance also play a role. However, in this study, gender had no significant effect on the incidence of mental emotional disorders in elderly people with diabetes mellitus. This is because men and women with diabetes mellitus have the same risk ratio for mental emotional disorders.

5.1.3 Association of Education Level with Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

This is in line with the research of Giri Widakdo and Besral in 2013 which states that there is a relationship between education level and mental health disorders in elderly people with diabetes mellitus with an OR of 6.249, which means that elderly people with diabetes mellitus who have a low level of education have a risk of experiencing disorders. emotional mental health was 6,249 times greater than those with high levels of education. Most of the elderly with diabetes mellitus with low education have low knowledge of coping with stress and depression due to chronic disease.

In addition, this research is also in line with Suyoko's research in 2012 which examined the factors associated with mental health disorders in the elderly in DKI Jakarta, the Riskesdas 2007 analysis. This study stated that the elderly who had a low level of education had a 1.8 times risk of getting the disorder. mental health compared to the elderly who have high levels of education. Educated people are less likely to experience depression because they can find better jobs and have more health care resources than less educated people (Madkhali et al., 2020). In this study, low education is associated with the incidence of mental emotional disorders in elderly people with diabetes mellitus because someone with low education tends to find it difficult to understand how to treat and treat the disease itself. In addition, low education makes it difficult for a person to think positively so that it increases his own mental burden. This can lead to depression which can then turn into a more severe mental emotional disorder.

5.1.4 Association between Working Status with Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

This is in line with the research of Giri Widakdo and Besral in 2013 which states that there is a relationship between work and mental health disorders in elderly people with diabetes mellitus with an OR of 1.45, which means elderly people with diabetes mellitus who do not have a job have a risk of experiencing mental emotional health disorders. 1.45 times more than those who have a job. In addition, this research is also in line with Suyoko's research in 2012 which examined the factors associated with mental health disorders in the elderly in DKI Jakarta, the Riskesdas 2007 analysis. This research states that the elderly who do not have a job have a 1.5 times risk of getting health problems. mental compared to the elderly who have a job.

Elderly who do not have a job can affect their mental balance because they only do activities at home and do not have interactions with other people throughout the day. They cannot get the cost of undergoing diabetes mellitus treatment unless they are only dependent on other people. The high cost of treatment makes someone who does not have a job feel depressed and has a psychological impact. This will make them focus on their illness so that it adds to the mental burden in their lives.

5.1.5 Association of Marital Status with Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

Emotional Disorders in Elderly Diabetes Patients in Indonesia
This study is in line with research by Rishav Bansal, et al (2020) which states that

marital status does not show a significant relationship with the incidence of mental health disorders in elderly people with diabetes mellitus. This is because there are other families besides couples who provide full support to respondents who suffer from diabetes mellitus to routinely take medicines and other treatments so that they make respondents feel better.

This study is not in line with Giri Widakdo and Besral in 2013 who stated that there was a relationship between marital status and mental health problems in elderly people with diabetes mellitus with OR 1.2, which means that elderly people with diabetes mellitus who are not married or divorced have a risk of experiencing disorders. emotional mental health 1.2 times greater than that of married. In this study, the elderly still have family or other friends who can be friends who are always supportive of having a healthy diet, exercising, even regarding the necessary care.

5.1.6 Association of Domicile with Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

This is in line with Makhdali's research, M Jnaidi (2019) which states that respondents who live in urban areas are at greater risk for mental emotional disorders than those who live in rural areas. This is because the living burden of elderly people in urban areas is higher than in villages, besides that the level of pollution in urban areas is higher than in villages which causes the elderly who live in urban areas to be more stressed. In this study, there were more elderly living in urban areas than the elderly who lived in cities.

Ratri's research (2013) proves that the proportion of elderly people who have neurotic disorders. This is evidenced by the proportion of elderly people in urban areas who experience mental health disorders is 22.7% higher when compared to elderly who live in urban areas. Elderly with diabetes mellitus who live in urban areas are more at risk for mental emotional disorders because there is more pollution in urban areas than in rural areas. In addition, the elderly also admit that living in cities is more difficult to do stress-coping activities because it is hotter so it is easier to add to the burden on the mind. The elderly who live in urban areas who do not have a job tend to be more stressed than the elderly who live in rural areas.

5.1.7 Association of GME History in Families with Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

This study is in line with the research of Giri Widakdo and Besral in 2013 which states that there is a relationship between family history of having GME and mental health disorders in elderly people with diabetes mellitus with OR 3.77 or which means that elderly people with diabetes mellitus who have a history of GME in the family are at risk for experienced mental emotional health disorders 3.7 times greater than those without a history of GME in the family. Based on neurological theory and the existence of constitutional factors that indicate the overall genetics or obtained later from the results of genotype and phenotype interactions. It is added that the risk of depressive psychosis in twins is even higher whose genetic factors

play a role in depressive psychosis in monozygous twins by 60-80%, while in heterozygous twins it is 25-35% (Roosi Hermani, 2008).

Genetic factors are recognized to have a great influence on human mentality. The tendency to psychosis, namely schizophrenia and depression, is a mental illness that is genetically inherited from its parents. Other disorders that are thought to be genetic are alcohol dependence, drugs, Alzheimer's syndrome, phenylketonurine, and Huntington syndrome. Mental disorders also occur due to abnormalities in the number and structure of chromosomes. An excessive or reduced number of chromosomes can cause individuals to experience mental disorders (Siswanto, 2012).

5.1.8 Association between Duration of Illness and Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

This research is in line with the research conducted by Suyoko in 2012 which stated that the duration of treatment does not affect mental emotional disorders in the elderly. One study found that compared to having depressive symptoms and depression with low anxiety, having increased depressive or anxiety symptoms was associated with an increased risk of diabetes over 10 years (Engum, 2007). Another study found a synergistic interaction between having prediabetes and comorbid depression and symptoms of anxiety, compared with no symptoms of depression or anxiety, and the risk of developing diabetes for more than 5 years (Deschênes, Burns, & Schmitz, 2015).

In this study, the length of illness did not have a significant effect because the proportion of elderly people who had a duration of less than 5 years was more than those with more than 5 years of illness. This causes the duration of illness to have no significant effect on mental emotional health problems in diabetes mellitus sufferers in Indonesia.

5.1.9 Association of Hypertension with Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

This research is in line with Suyoko's research in 2012 which examined the factors associated with mental health disorders in the elderly in DKI Jakarta, the Riskesdas 2007 analysis. This study stated that the elderly who suffer from hypertension are 1.5 times more likely to develop mental health disorders than the elderly who do not suffer from hypertension. This is because the elderly with chronic hypertension will experience decreased cognitive function, dementia, and stroke.

Elderly suffering from diabetes mellitus and also experiencing hypertension will add to their mental burden. This mental burden came from her worry to think about treating her diabetes mellitus and also thinking about treating her hypertension. This situation makes them think harder to get the cost of treatment and management. Dementia is closely related to the occurrence of mental emotional disorders (Parsudi, 2007).

5.1.10 Association of Heart Disease with Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

This research is in line with research conducted by Giri Widakdo and Besral in 2016 which states that there is a relationship between family history of having GME and mental health disorders in elderly people with diabetes mellitus with OR 3.9 or which means elderly people with diabetes mellitus who have a family history of GME had a 3.9 times greater risk of experiencing mental emotional health disorders than those without a family history of GME.

In this study, the elderly with diabetes mellitus and also other chronic diseases such as heart disease will increase their mental burden. This is because they will think about the costs required for treatment, the stigma of society, then undergo a dietary diet that is suitable for both diseases. Therefore, stress coping is needed so as not to experience or aggravate mental emotional disorders in the elderly.

5.1.11 Association of Stroke with Emotional Mental Disorders in Elderly Patients with Diabetes in Indonesia

Giri Widakdo and Besral in 2013 stated that there was a relationship between family history of having GME and mental health problems in elderly people with diabetes mellitus with an OR of 5.7, which means elderly people with diabetes mellitus who have a family history of GME have a risk of experiencing mental emotional health disorders. 5.7 times greater than those without a family history of GME.

In this study, the elderly with diabetes mellitus and also other chronic diseases such as stroke will increase their mental burden. This is because they will think about the costs required for treatment, the stigma of society, then undergo a

dietary diet that is suitable for both diseases. Therefore, stress coping is needed so as not to experience or aggravate mental emotional disorders in the elderly.

5.1.12 Association between Obesity and Emotional Mental Disorders in Elderly People with Diabetes in Indonesia

In addition, this research is also in line with Suyoko's research in 2012 which examined the factors associated with mental health disorders in the elderly in DKI Jakarta, the Riskesdas 2007 analysis. This research states that the elderly who do not have a job have a 1.5 times risk of getting health problems. mental compared to the elderly who have a job.

Other studies have found that obesity is linked to mental health problems in the elderly because mood stabilizers, such as lithium and valproate, have also been linked to weight gain. Tricyclic antidepressants and selective serotonin reuptake inhibitors have been implicated in weight gain and the magnitude of the effects varies between drugs in each class (Sun et al., 2018).

5.2 Obstacles And Weaknesses Of Research

5.2.1 RESEARCH OBSTACLES

In the research that has been done, there are obstacles affect research results. These obstacles include:

1. This research uses Riskesdas 2018 secondary data which has limitations, for example in selecting research variables adjusted to the availability of the variables in the 2018 Riskesdas questionnaire.

2. Researchers were not directly involved in data collection so they could not modify the questionnaire that had been made by Riskesdas including the implementation in the field and other systematic errors.

5.2.2 RESEARCH WEAKNESSES

This research cannot be separated from the weaknesses of the research, namely in this study the independent variables are only categorized into two categories. This of course will have different results if more specific categories are made. For example, the job status variable can be made into more than two variables. In addition, the variable marital status was only categorized into two categories. This, of course, will also result in different results if the categories are reproduced.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSION

Based on the results of the study can be concluded as follows:

1. There is no association between age and the incidence of emotional mental disorders in the elderly with diabetes mellitus in Indonesia.
2. There is an association between sex with the incidence of emotional mental disorders in the elderly with diabetes mellitus in Indonesia.
3. There is an association between the level of education with the incidence of emotional mental disorders in elderly people with diabetes mellitus in Indonesia.
4. There is an association between work and the incidence of emotional mental disorders in the elderly with diabetes mellitus in Indonesia.
5. There is no Association between marital status and the incidence of emotional mental disorders in elderly people with diabetes mellitus in Indonesia.
6. There is an association between domicile and the incidence of emotional mental disorders in elderly people with diabetes mellitus in Indonesia.
7. There is an association between obesity and the incidence of emotional mental disorders in the elderly with diabetes mellitus in Indonesia.

8. There is an association between the history of GME in the family with the incidence of emotional mental disorders in elderly people with diabetes mellitus in Indonesia.
9. There is no association between the duration of illness with the incidence of emotional mental disorders in the elderly with diabetes mellitus in Indonesia.
10. There is an association between hypertension and the incidence of mental emotional disorders in elderly people with diabetes mellitus in Indonesia.
11. There is an association between heart disease and the incidence of emotional mental disorders in elderly people with diabetes mellitus in Indonesia.
12. There is an association between stroke and the incidence of emotional mental disorders in the elderly with diabetes mellitus in Indonesia.

6.2 RECOMMENDATIONS

Based on the results of this study, some suggestions that researchers can convey include:

6.2.1 For the Government

1. To maximize the prolanis program to give special attention to elderly people with diabetes mellitus.
2. Encourage the elderly to fill their days with productive activities such as exercising and making crafts so that they can reduce mental health problems that may arise.

6.1.3 For the Community

1. Paying attention to family members who have diabetes mellitus by fulfilling balanced nutritional needs and monitoring the elderly by routinely taking medication to a local health service facility.
2. Families with elderly people with diabetes mellitus provide support to elderly people with diabetes to keep thinking positively and also diligently taking medication and adopting a healthy lifestyle.

6.1.4 For Future Researchers

1. Further researchers can carry out further research to deepen the results of this study using a different design by utilizing secondary data from Riskesdas.
2. Conducting further research by adding other variables relevant to the research by utilizing secondary data from Riskesdas.


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Attachments

Attachments 1 Advisor's Letter of Assignment


UNNES
KEPUTUSAN
DEKAN FAKULTAS ILMU KEOLAHRAGAAN
UNIVERSITAS NEGERI SEMARANG
 Nomor: 19434/UN37.1.6/ITU/2019
 Tentang
PENETAPAN DOSEN PEMBIMBING SKRIPSI/TUGAS AKHIR SEMESTER
GASAL/GENAP
TAHUN AKADEMIK 2019/2020

Menimbang : Bahwa untuk memperlancar mahasiswa Jurusan/Prodi Ilmu Kesehatan Masyarakat/Kesehatan Masyarakat Fakultas Ilmu Keolahragaan membuat Skripsi/Tugas Akhir, maka perlu menetapkan Dosen-dosen Jurusan/Prodi Ilmu Kesehatan Masyarakat/Kesehatan Masyarakat Fakultas Ilmu Keolahragaan UNNES untuk menjadi pembimbing.

Mengingat : 1. Undang-undang No.20 Tahun 2003 tentang Sistem Pendidikan Nasional (Tambahan Lembaran Negara RI No.4301, penjelasan atas Lembaran Negara RI Tahun 2003, Nomor 78)
 2. Peraturan Rektor No. 21 Tahun 2011 tentang Sistem Informasi Skripsi UNNES
 3. SK Rektor UNNES No. 164/O/2004 tentang Pedoman penyusunan Skripsi/Tugas Akhir Mahasiswa Strata Satu (S1) UNNES;
 4. SK Rektor UNNES No.162/O/2004 tentang penyelenggaraan Pendidikan UNNES;


Menimbang : Usulan Ketua Jurusan/Prodi Ilmu Kesehatan Masyarakat/Kesehatan Masyarakat Tanggal 12 November 2019


MEMUTUSKAN

Menetapkan
PERTAMA : Menunjuk dan menugaskan kepada:
 Nama : Dr. dr. MAHALUL AZAM M.Kes.
 NIP : 197511192001121001
 Pangkat/Golongan : Pembina Tk. I - IV/b
 Jabatan Akademik : Lektor Kepala (Wakil Dekan I)
 Sebagai Pembimbing
 Untuk membimbing mahasiswa penyusun skripsi/Tugas Akhir :
 Nama : RINA SULISTIANA
 NIM : 6411416102
 Jurusan/Prodi : Ilmu Kesehatan Masyarakat/Kesehatan Masyarakat
 Topik :
KEDUA : Keputusan ini mulai berlaku sejak tanggal ditetapkan.


DITETAPKAN DI : SEMARANG
 PADA HARI : SENIN, 13 November 2019

Tembusan
 1. Wakil Dekan Bidang Akademik
 2. Ketua Jurusan
 3. Petinggal


 Pr. UNNES Endang Rahayu, M.Pd.
 NRE 196103201984032001


 6411416102
 FM-03-AKD-24/Rev. 00

Attachments 2. Research Permit from the Faculty of Sports Science



UNNES

KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI
 UNIVERSITAS NEGERI SEMARANG
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31 Oktober 2019

Nomor : B/18694/UN37.1.6/LT/2019
 Hal : Izin Penelitian

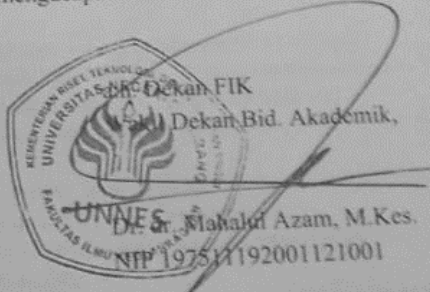
Yth. Kepala Badan Litbangkes
 Jl. Percetakan Negara No. 29 Jakarta Pusat

Dengan hormat, bersama ini kami sampaikan bahwa mahasiswa di bawah ini:

Nama	: Rina Sulistiana
NIM	: 6411416102
Program Studi	: Kesehatan Masyarakat (Epidemiologi dan Biostatistik), S1
Semester	: Gasal
Tahun akademik	: 2019/2020
Judul	: Determinan Gangguan Kesehatan Mental pada Penderita Diabetes Melitus Usia Lanjut di Indonesia


Kami mohon yang bersangkutan diberikan izin untuk melaksanakan penelitian skripsi di perusahaan atau instansi yang Saudara pimpin, dengan alokasi waktu Waktu 1 November 2019 s.d 1 Januari 2020.

Atas perhatian dan kerjasama Saudara, kami mengucapkan terima kasih.



Dekan FIK
 Dekan Bid. Akademik,
 Dr. Mahadi Azam, M.Kes.
 NIP. 197511192001121001


Tembusan:
 Dekan FIK;
 Universitas Negeri Semarang



Nomor Agenda Surat 658 357 169 4

Sistem Informasi Surat Dinas - UNNES (2019)

Attachments 3 Proof of Use of Data from the Republic of Indonesia Ministry of Health Research and Development



KEMENTERIAN KESEHATAN RI
BADAN PENELITIAN DAN PENGEMBANGAN KESEHATAN
 Jalan Percetakan Negeri No. 39 Jakarta 10560 Kotak Pos 1226
 Telepon : (021) 4261088 Faksimile : (021) 4243933
 Website : <http://www.litbang.depkes.go.id> E-mail : sesban@litbang.depkes.go.id

SURAT PERNYATAAN
Nomor : 01131902 - 146


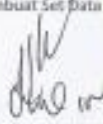

Pada hari ini Selasa tanggal 5 bulan November tahun 2015 yang bertanda tangan di bawah ini :

Nama	: <u>RINA SULISTIANA</u>
Jenis Kelamin	: <u>PEREMPUAN</u>
Tempat, Tanggal Lahir	: <u>PATI, 30 SEPTEMBER 1986</u>
Alamat E-mail	: <u>rinastulistianna@gmail.com</u>
Hp	: <u>089682826899</u>
NIP	: <u>64141602</u>
Pekerjaan	: <u>Mahasiswa</u>
Instansi	: <u>Universitas Negeri Semarang</u>
Alamat Kantor	: <u>Gedung 9 Kampus sekoran Gunungpati Semarang 50178</u>
Judul Kegiatan	: <u>Determinan Gangguan Kesehatan Mental pada Penderita Diabeter Mellitus Usia Lanjut di Indonesia</u>


Menyatakan dengan sesungguhnya bahwa :

- Saya sanggup dan bersedia untuk mematuhi ketentuan – ketentuan yang telah ditetapkan dalam melakukan kegiatan penelitian dan pengembangan sesuai dengan Undang – Undang Nomor 36 Tahun 2009 tentang Kesehatan dan Peraturan Pemerintah Nomor 39 Tahun 1995 tentang Penelitian dan Pengembangan Kesehatan.
- Saya telah menerima subset Data hasil penelitian SKRIPSI SAYA yang direkam dalam media elektronik yang dibuat oleh Lab. Manajemen Data Badan Litbangkes.
- Data hasil penelitian yang saya peroleh sebagaimana dimaksud pada angka 2 akan saya gunakan hanya/ terbatas untuk kepentingan SKRIPSI, dan terkait hal tersebut saya :
 - Tidak akan membuat salinan dari data tersebut untuk kepentingan lain dan/atau mengalihkan data tersebut kepada pihak lain.
 - Akan mempergunakan data tersebut hanya untuk 1 (satu) topik judul penelitian.
 - Apabila saya menggunakan data untuk keperluan lain selain dari ketentuan di atas harus mengajukan kembali secara formal kepada Kepala Badan Litbang Kesehatan.
 - Akan melakukan komunikasi dengan Lab. Manajemen Data dalam hal penggunaan variabel dalam subset data.
 - Untuk melakukan publikasi hasil analisis, saya sanggup dan bersedia terlebih dahulu mempertimbangkan etika dan manfaat bagi kepentingan masyarakat.
- Saya berkewajiban untuk menyerahkan hasil analisis dalam bentuk artikel, makalah atau lainnya kepada Lab. Manajemen Data Badan Litbangkes.

Demikian surat pernyataan ini saya buat dengan sesungguhnya tanpa adanya unsur paksaan dari pihak manapun. Apabila dikemudian hari terjadi penyimpangan dari pernyataan saya tersebut, maka hak penggunaan data dan publikasi dinyatakan batal demi hukum, serta tidak dapat mengajukan kembali permohonan penggunaan data Badan Litbangkes untuk kepentingan apapun.

<p>Mengetahui, Kepala Lab. Mandat</p> 	<p>Pembuat Set Data</p> 	<p>Penerima Data</p>  <p>(Rina Sulistiana)</p>
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Attachments 4. Letter of Assignment for Undergraduate Examination Committee

 KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS NEGERI SEMARANG
FAKULTAS ILMU KEOLAHRAGAAN
JURUSAN LMU KESEHATAN MASYARAKAT
Gedung F1 lantai 2, Kampus Sekaran Gunungpati Semarang 50229,
Telp (024) 8508107; Telp/fax (024) 8508007

LEMBAR PENGANTAR PENDAFTARAN UJIAN SKRIPSI

Yth. Tim Skripsi Jurusan IKM UNNES

Berikut saya hadapkan mahasiswa:


Nama : RINA SULISTIANA
NIM : 6411416106

Setelah saya periksa kelayakan akademik (meliputi: SKS, nilai mata kuliah prasyarat dan pembimbing) dari mahasiswa tersebut saya terangkan bahwa yang bersangkutan diijinkan untuk mendaftar ujian skripsi.

Selanjutnya mohon tim skripsi dapat menerima pendaftaran mahasiswa tersebut setelah yang bersangkutan melengkapi semua ketentuan administrasi yang telah ditetapkan.

Demikian, atas perhatiannya diucapkan terimakasih.

Semarang, 29 Mei 2020
Sekretaris Jurusan


Muhammad Azinar, S.KM, M.Kes.
NIP. 198205182012121002

Attachments 5. Research Instruments: Research Documentation Sheets

1.	No. Respondents	:
2.	PSU Code	:
3.	Age Taken from the Riskesdas data subset of 2018 RKD18.RT questionnaire. Block IV Column 7 and 8	: Year
4.	Gender Taken from the Riskesdas data subset in 2018 RKD18.RT questionnaire. Block IV Column 4	1. Male 2. Girl
5.	Level of education Taken from the Riskesdas data subset of 2018 RKD18.RT Questionnaire. Block IV Column 9	1. Never / never attended school 2. Not completed in primary school 3. Graduated from elementary school 4. Graduated from junior high school 5. Graduated from high school 6. The end D1 / D2 / D3 7. The end of PT
6.	Profession Taken from the Riskesdas data subset of 2018 RKD18.RT Questionnaire. Block IV Column 10	1. Does not work 2. School 3. PNS / TNI / POLRI / BUMN / BUMD 4. General employees 5. entrepreneur 6. Farmers 7. Fisherman 8. Labor / Driver / Household Assistant 9. the other
7.	Marital status Taken from the Riskesdas data subset in 2018 RKD18.RT questionnaire. Block IV Column 6	1. Single 2. Marry 3. Divorced 4. Death divorce
8.	Domicile Taken from the Riskesdas data subset of 2018 RKD18.RT Questionnaire. Block I Line 5	1. Urban 2. Rural
9.	Family history of GME Taken from the Riskesdas data subset in 2018	1. Yes 2. Not
10.	Hypertension	1. Yes

	Taken from the Riskesdas data subset of 2018 Questionnaire RKD18.IND.B21	2. Not
11.	Heart disease Taken from Riskesdas 2018 data subset Questionnaire RKD18.IND.B14	1. Yes 2. Not
12.	Stroke Taken from the Riskesdas data subset of 2018 Questionnaire RKD18.IND.B25	1. Yes 2. Not
13.	Obesity Taken from the Riskesdas data subset of 2018 RKD18.IND Questionnaire. L01-02	1. Yes 2. Not
14.	Old sick Taken from the Riskesdas data subset of 2018 RKD18.IND Questionnaire. B07	1. Yes 2. Not
15.	DM status Taken from Riskesdas data subset 2018 Questionnaire RKD18.IND.B06	1. Yes 2. Not
16.	GME Status Taken from the 2018 Riskesdas data subset Questionnaire RKD18.IND.C12-31	1. Yes 2. Not

Attachments 6.Results of Calculation of Statistical Tests

Univariat Analysis

Status_DM

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Ya	2818	100.0	100.0	100.0

GME

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Tidak	2273	80.7	80.7	80.7
Ya	545	19.3	19.3	100.0
Total	2818	100.0	100.0	

Usia

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid lebih dari 69	1329	47.2	47.2	47.2
60-69	1489	52.8	52.8	100.0
Total	2818	100.0	100.0	

Wilayah

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Perkotaan	1799	63.8	63.8	63.8
Pedesaan	1019	36.2	36.2	100.0
Total	2818	100.0	100.0	

Status_Perkawinan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak kawin	1182	41.9	41.9	41.9
	Kawin	1636	58.1	58.1	100.0
	Total	2818	100.0	100.0	

Pendidikan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak Sekolah-SMP	2049	72.7	72.7	72.7
	SMA-PT	769	27.3	27.3	100.0
	Total	2818	100.0	100.0	

Status_Pekerjaan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak Bekerja	1723	61.1	61.1	61.1
	Bekerja	1095	38.9	38.9	100.0
	Total	2818	100.0	100.0	

Obesitas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ya	189	6.7	6.7	6.7
	Tidak	2629	93.3	93.3	100.0
	Total	2818	100.0	100.0	

Hipertensi

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ya	1441	51.1	51.1	51.1
	Tidak	1377	48.9	48.9	100.0
	Total	2818	100.0	100.0	

Jantung

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ya	347	12.3	12.3	12.3
	Tidak	2471	87.7	87.7	100.0
	Total	2818	100.0	100.0	

Stroke

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ya	258	9.2	9.2	9.2
	Tidak	2560	90.8	90.8	100.0
	Total	2818	100.0	100.0	

Riwayat_GME

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ya	171	6.1	6.1	6.1
	Tidak	2647	93.9	93.9	100.0
	Total	2818	100.0	100.0	

Lama_Sakit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	lebih dari 5 tahun	1555	55.2	55.2	55.2
	kurang dari 5 tahun	1263	44.8	44.8	100.0
	Total	2818	100.0	100.0	

Jenis_Kelamin

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Perempuan	1655	58.7	58.7	58.7
	Laki-laki	1163	41.3	41.3	100.0
	Total	2818	100.0	100.0	

Bivariate Analysis**Crosstab**

Count		Status_Perkawinan		
		Tidak kawin	Kawin	Total
GME	Ya	247	298	545
	Tidak	935	1338	2273
Total		1182	1636	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.163 ^a	1	.075		
Continuity Correction ^b	2.994	1	.084		
Likelihood Ratio	3.148	1	.076		
Fisher's Exact Test				.082	.042
Linear-by-Linear Association	3.162	1	.075		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 228,60.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	1.186	.983	1.432
For cohort Status_Perkawinan = Tidak kawin	1.102	.992	1.223
For cohort Status_Perkawinan = Kawin	.929	.854	1.010
N of Valid Cases	2818		

Crosstab

Count		Wilayah		
		Perkotaan	Pedesaan	Total
GME	Ya	296	249	545
	Tidak	1503	770	2273
Total		1799	1019	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	26.570 ^a	1	.000		
Continuity Correction ^b	26.061	1	.000		
Likelihood Ratio	25.972	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	26.560	1	.000		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 197,07.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	.609	.504	.736
For cohort Wilayah = Perkotaan	.821	.756	.892
For cohort Wilayah = Pedesaan	1.349	1.211	1.503
N of Valid Cases	2818		

Crosstab

Count		Usia		
		lebih dari 69	60-69	Total
GME	Ya	274	271	545
	Tidak	1055	1218	2273
Total		1329	1489	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.629 ^a	1	.105		
Continuity Correction ^b	2.477	1	.116		
Likelihood Ratio	2.626	1	.105		
Fisher's Exact Test				.115	.058
Linear-by-Linear Association	2.629	1	.105		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 257,03.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	1.167	.968	1.407
For cohort Usia = lebih dari 69	1.083	.986	1.190
For cohort Usia = 60-69	.928	.846	1.018
N of Valid Cases	2818		

Crosstab

Count		Stroke		Total
		Ya	Tidak	
GME	Ya	86	459	545
	Tidak	172	2101	2273
Total		258	2560	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	35.649 ^a	1	.000		
Continuity Correction ^b	34.669	1	.000		
Likelihood Ratio	31.416	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	35.637	1	.000		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 49,90.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	2.289	1.733	3.022
For cohort Stroke = Ya	2.085	1.638	2.655
For cohort Stroke = Tidak	.911	.877	.947
N of Valid Cases	2818		

Crosstab

Count		Jantung		Total
		Ya	Tidak	
GME	Ya	83	462	545
	Tidak	264	2009	2273
Total		347	2471	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.320 ^a	1	.021		
Continuity Correction ^b	4.990	1	.025		
Likelihood Ratio	5.077	1	.024		
Fisher's Exact Test				.024	.014
Linear-by-Linear Association	5.318	1	.021		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 67,11.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	1.367	1.047	1.785
For cohort Jantung = Ya	1.311	1.044	1.647
For cohort Jantung = Tidak	.959	.923	.997
N of Valid Cases	2818		

Crosstab

Count		Hipertensi		Total
		Ya	Tidak	
GME	Ya	351	194	545
	Tidak	1090	1183	2273
Total		1441	1377	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	47.604 ^a	1	.000		
Continuity Correction ^b	46.948	1	.000		
Likelihood Ratio	48.227	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	47.587	1	.000		
N of Valid Cases ^b	2818				

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 266,31.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	1.964	1.618	2.383
For cohort Hipertensi = Ya	1.343	1.245	1.449
For cohort Hipertensi = Tidak	.684	.607	.771
N of Valid Cases	2818		

Crosstab

Count				
		Obesitas		Total
		Ya	Tidak	
GME	Ya	100	445	545
	Tidak	89	2184	2273
Total		189	2629	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.464E2 ^a	1	.000		
Continuity Correction ^b	144.056	1	.000		
Likelihood Ratio	115.636	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	146.302	1	.000		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 36,55.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	5.514	4.072	7.468
For cohort Obesitas = Ya	4.686	3.578	6.138
For cohort Obesitas = Tidak	.850	.816	.885
N of Valid Cases	2818		

Crosstab

Count		Status_Pekerjaan		
		Tidak Bekerja	Bekerja	Total
GME	Ya	364	181	545
	Tidak	1359	914	2273
Total		1723	1095	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9.067 ^a	1	.003		
Continuity Correction ^b	8.775	1	.003		
Likelihood Ratio	9.210	1	.002		
Fisher's Exact Test				.003	.001
Linear-by-Linear Association	9.064	1	.003		
N of Valid Cases ^b	2818				

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 211,77.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	1.353	1.111	1.647
For cohort Status_Pekerjaan = Tidak Bekerja	1.117	1.044	1.196
For cohort Status_Pekerjaan = Bekerja	.826	.726	.940
N of Valid Cases	2818		

Crosstab

Count		Pendidikan		
		Tidak Sekolah-SMP	SMA-PT	Total
GME	Ya	464	81	545
	Tidak	1585	688	2273
Total		2049	769	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	52.583 ^a	1	.000		
Continuity Correction ^b	51.810	1	.000		
Likelihood Ratio	57.929	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	52.565	1	.000		
N of Valid Cases ^b	2818				

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 148,72.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	2.487	1.932	3.200
For cohort Pendidikan = Tidak Sekolah-SMP	1.221	1.168	1.276
For cohort Pendidikan = SMA-PT	.491	.398	.606
N of Valid Cases	2818		

Crosstab

Count		Jenis_Kelamin		
		Perempuan	Laki-laki	Total
GME	Ya	366	179	545
	Tidak	1289	984	2273
Total		1655	1163	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	19.794 ^a	1	.000		
Continuity Correction ^b	19.365	1	.000		
Likelihood Ratio	20.194	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	19.787	1	.000		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 224,92.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	1.561	1.282	1.901
For cohort Jenis_Kelamin = Perempuan	1.184	1.105	1.269
For cohort Jenis_Kelamin = Laki-laki	.759	.667	.863
N of Valid Cases	2818		

Crosstab

Count		Lama_Sakit		
		leih dari 5 tahun	kurang dari 5 tahun	Total
GME	Ya	300	245	545
	Tidak	1255	1018	2273
Total		1555	1263	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.005 ^a	1	.944		
Continuity Correction ^b	.001	1	.982		
Likelihood Ratio	.005	1	.944		
Fisher's Exact Test				.962	.491
Linear-by-Linear Association	.005	1	.944		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 244,26.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	.993	.823	1.199
For cohort Lama_Sakit = lebih dari 5 tahun	.997	.916	1.085
For cohort Lama_Sakit = kurang dari 5 tahun	1.004	.905	1.113
N of Valid Cases	2818		

Crosstab

Count		Riwayat_GME		
		Ya	Tidak	Total
GME	Ya	63	482	545
	Tidak	108	2165	2273
Total		171	2647	2818

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	35.748 ^a	1	.000		
Continuity Correction ^b	34.564	1	.000		
Likelihood Ratio	30.571	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	35.735	1	.000		
N of Valid Cases ^b	2818				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 33,07.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for GME (Ya / Tidak)	2.620	1.891	3.630
For cohort Riwayat_GME = Ya	2.433	1.809	3.272
For cohort Riwayat_GME = Tidak	.929	.900	.958
N of Valid Cases	2818		