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## Analysis of Family Income Factors on Diarrhea Incidence through Behavior in Tapalang

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### Abstract

Diarrhea is one of an endemic disease and also a potential disease of outbreaks in Indonesia, including in Mamuju, West Sulawesi, where the disease is often accompanied by death. Tapalang sub-district with the highest cases of diarrhea in Mamuju in recent years. This study used a case control design with a fixed disease sampling technique. The population in this study were all toddlers in Tapalang as many as 1927 people with a total sample of 60 cases and 60 controls so that a total of 120 samples. The instruments used in this study were questionnaires, checklists and observation sheets. Data were analyzed using Multivariate analysis. The results showed that there was a direct and statistically significant effect between family income on the incidence of diarrhea ( $b = 1.50$ ; 95% CI = 0.319 to 2.68;  $p = 0.013$ ). There was an indirect influence between family income on the incidence of diarrhea through behavior but not statistically significant ( $b = 0.98$ ; 95% CI = -0.76 to 2.73;  $p = 0.269$ ). There is a direct influence between behavior and the incidence of diarrhea even though it is not statistically significant ( $b = 0.74$ ; 95% CI = -0.41 to 1.90  $p = 0.210$ ). The conclusions of toddlers diarrhea in Tapalang is influenced by family income. It is hoped that this research can be used as a reference for related parties in diarrhea control policies and also for mothers and toddlers' families in efforts to prevent diarrhea in toddlers.

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## INTRODUCTION

Diarrhea is a disease that causes the second death in children under five years of age where every year diarrhea kills around 525,000 children under five. There are 1.7 billion cases of diarrheal disease globally in childhood each year (WHO 2017).

Diarrhea is an endemic disease in Indonesia and is also a potential disease of outbreaks that are often accompanied by death. In 2015 there were 18 times diarrhea outbreaks in 11 provinces, 18 districts / cities, with 1,213 sufferers and 30 deaths. The estimated number of diarrhea in health facilities in Indonesia reported in 2017 is 7,077,299 people, while the number of reported diarrrhea patients is handled in health facilities as many as 4,274,790 people or 60.4% (RI Ministry of Health 2018).

West Sulawesi Province is the second youngest province in Indonesia, as a new province and classified as small and under development, also has serious problems related to diarrheal diseases where there are 35,936 patients with diarrhea in health facilities in 2017 people with the number of patients treated were 32,532 or 90.5% (Kemenkes RI 2018).

Mamuju has a problem with the incidence of diarrhea where the number of diarrhea cases reported by the P2PL Division of the Mamuju Health Office in 2016 was recorded at 10,348 with diarrhea morbidity rates of 214 per 1,000 residents (Dinas Kesehatan Mamuju 2017).

Tapalang Subdistrict, which is one of the sub-districts in Mamuju Regency, is geographically located on the Mandar bay coast and traversed by several rivers in several villages, from the existing conditions Tapalang Sub-District has significant cases of diarrhea for years. Tapalang Health Center has become the highest health center that has had the highest number of diarrhea cases in recent years, where diarrhea cases that have occurred since 2015 have not been controlled due to a significant increase in 2016, from 1,037 cases in 2015 to 1,267 cases. The incidence of diarrhea has decreased again in 2017 and 2018, as for diarrhea cases reported by program implementers in Health

Center as many as 883 people in 2017 and 714 in 2018 (Puskesmas Tapalang 2018).

The incident was due to Tapalang that consist of several villages located on the coast as well as several villages on the banks of the river both upstream (mountains), downstream and estuary which made some people who do not have a toilet choose to defecate on beach or in the nearest river, as well as a variety the characteristics of Tapalang Subdistrict community in terms of their education level, knowledge, employment to economic status which have implications for their habits and ability to conduct health efforts (Puskesmas Tapalang 2018).

The incidence of diarrrhea reported in the Tapalang Health Center from the past few years was mostly experienced by toddlers. There were 714 cases of diarrrhea in 2018, 318 or 44.5% of them were diarrrhea occurring in toddlers. Based on the report of the person in charge of the diarrrhea program Tapalang Health Center, the incidence of diarrrhea that occurred in the last 3 months was 67 cases of which 40 or 59.7% of them occurred in children under five (Puskesmas Tapalang 2018).

Based on previous research, it has been stated that behavioral factors such as hand washing habits, treat drinking water habits, snacking habits, bowel habits and so on also affect to the incidence of diarrrhea, where by getting used to washing hands with soap, treating drinking water, snacking on healthy foods and urinating in healthy latrines will reduce the risk of diarrrhea especially if special interventions for the prevention of diarrrhea are carried out (Panda et al. 2014) (Mcquade et al. 2019).

Income is one of the influencing factors, based on previous research which states that income affects the incidence of diarrrhea (Schmidt et al. 2009). This is also in accordance with research that states that income in this case family income affects the incidence of diarrrhea, where if family income is in the high category, family purchasing power will be good and will certainly reduce the risk of diarrrhea (Kahabuka et al. 2012).

Several previous studies have suggested that diarrrhea causes severe acute malnutrition complications in children (Irena et al. 2011)

(Berkman et al. 2002). Diarrhea can also inhibit children growth and increase the chance of death substantially regardless of other factors (Garrett et al. 2008) (Talbert et al. 2012). The purpose of this study was to analyze family income factors on the incidence of diarrhea through behavior in Tapalang District, Mamuju Regency, West Sulawesi.

## METHODS

The type of research used is quantitative research using a case control study or retrospective study. Sampling uses the Fixed Disease Sampling technique. The population in this study were all toddlers in Tapalang as many as 1927 people with a total sample of 60 cases and 60 controls so that a total of 120 samples. The instruments used in this study were questionnaires, checklists and observation sheets. Data were analyzed using Multivariate analysis.

## RESULTS AND DISCUSSION

**Table 1.** Frequency distribution of research variables factors that influence the incidence of diarrhea in Tapalang, April 2019 (n = 120)

Variable	n	%
Income		
Less	91	75.83
Sufficient	29	24.17
Behavior		
Bad	39	32.50
Good	81	67.50
Diarrhea Incidence		
Having diarrhea	60	50.00
No diarrhea	60	50.00

Table 1 Shows the results of the income variables of 120 respondents, more families of children under five with less income levels, namely 91 respondents (75.83%) and 29 respondents (24.17%) with sufficient levels of family income. Behavior variables from 120 respondents as many as 81 respondents (67.5%) applied good health behavior while 39 respondents (32.5%) behaved badly. Diarrhea variable showed that the number of children under five who had diarrhea was 60 respondents (50%) compared to the number of children under five who did not experience diarrhea with a total of 60 respondents (50%). The characteristics of the respondents were seen from mother/caregiver education and family income.

**Table 2.** Income Relationships with Behavior

Variable Group	Behavior		OR	p
	Bad (%)	Good (%)		
Income				
Less	37 (40.66)	54 (59.34)		
Sufficient	2 (6.90)	27 (93.10)	9.25	0.001
Total	39 (32.50)	81 (67.50)		

Table 2 presents a bivariate analysis of the relationship between income and behavior, obtained an Odds Ratio (OR) value of 9.25 with a p value of 0.001 <0.05; these results indicate that there is an influence and statistically significant

between income and maternal behavior in children under five.

Total	60 (50.00)	60 (50.00)
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**Table 3.** Income Relationships with Diarrhea

Variable Group	Diarrhea		OR	p
	Diarrhea (%)	No Diarrhea (%)		
<b>Income</b>				
Less	55 (60.44)	36 (39.56)	7.33	0.000
Sufficient	5 (17.24)	24 (82.76)		
Total	60 (50.00)	60 (50.00)		
<b>Behavior</b>				
Bad	31 (79.49)	8 (20.51)	6.94	0.000
Good	29 (35.80)	52 (64.20)		

Table 3 presents a bivariate analysis of the relationship between income and diarrhea, obtained an Odds Ratio (OR) value of 7.33 with a p value of 0.00 <0.05; CI (95%) = 2.40 to 26.44 these results indicate that there is a statistically significant influence between maternal income and the incidence of diarrhea in toddlers.

Table 3 presents a bivariate analysis of the relationship between behavior and diarrhea, obtained an Odds Ratio (OR) value of 6.94 with a value of p 0.000 <0.05; CI (95%) = 2.64 to 19.56, the results show that there is an influence and statistically there is a significant relationship between maternal behavior and the incidence of diarrhea in toddlers

**Table 4.** The results of Multivariate analysis of income influence on the incidence of diarrhea through behavior April-June 2019 (n = 120)

Dependent Variable	Independent Variable	b	CI 95%		p
			Lower	Upper	
<b>Indirect Effects</b>					
Behavior	←Income	0.98	-0.76	2.73	0.269
<b>Direct Effects</b>					
Diarrhea	←Income	1.50	0.31	2.68	0.013
	←Behavior	0.744	-0.41	1.90	0.210
N observation = 120					
df = 8					
AIC = 238.66					
BIC = 260.96					

Table 4 shows that there is a direct influence between income on diarrhea in children under five in Tapalang and is statistically significant. Mothers of children under five with less income have log odds for their children suffered from diarrhea 1.50 points higher ( $b = 1.50$ ;  $CI = -0.31$  to  $2.68$ ;  $p = 0.013$ ) than mothers of children under five with sufficient income. The results of Multivariate analysis showed that there was an indirect influence between maternal income and diarrhea through behavior but was not statistically significant. Mothers with low family income have log odds for their children suffering from diarrhea 0.98 points higher ( $b = 0.98$ ;  $CI = -0.76$  to  $2.73$ ;  $p = 0.269$ ) than mothers with sufficient family income.

The Multivariate analysis results show that there is a direct influence between the behavior of diarrhea in children under five in Tapalang although it is not statistically significant. The behavior of poor mothers who had log odds for their children suffered from diarrhea 0.74 points higher ( $b = 0.74$ ;  $CI = -0.41$  to  $1.90$ ;  $p = 0.210$ ) than mothers who had good behavior.

The results showed that income in this case family income had a directly influence on the incidence of diarrhea in toddlers in Tapalang ( $OR = 1.50$ ,  $p = 0.013$ ) and was statistically significant but for indirect effects it was not statistically significant ( $OR = 0.98$ ,  $p = 0.269$ ). Low income family influences 1.50 times greater risk of suffering from diarrhea directly than families who have sufficient income or according to the UMR, but family income does not guarantee the family behaves well, especially clean and healthy living behavior. This research is supported by the results of previous studies which showed that income in this case family income has a significant relationship with the incidence of diarrhea in toddlers ( $p = 0.004$ ), low income is influenced by the parents work, where parents who have a lower middle income do not want to take their babies to the doctor with the high costs will be incurred as the reason, they tend to prefer shamans or treat their children with traditional herbs (Abdullah et al. 2012).

Because of the geographical conditions of Tapalang that located on the coast and also in the mountains, so the majority of the people work as farmers and fishermen, only a small proportion of them who become civil servants and entrepreneurs where working as farmers and fishermen makes the community get income below the UMR in every month and categorized as less. This has implications for the community ability to reach health services, not only in terms of medical expenses but also other costs if their family members seek treatment such as transportation costs and other costs.

These results are in accordance with previous studies who suggested that the higher the family income, the better living facilities would be and would be better able to access health care facilities in an effort to treat and even prevent diarrhea, especially dehydration because of diarrhea (Ainsyah and Lusno. 2018).

Adequate family income does not guarantee good maternal behavior in applying parenting to her childbirth, besides education and knowledge, awareness in practicing is equally important, although family income is considered capable of meeting nutritional and food security needs and other health related needs. In addition, most families who have enough income, because in addition to the head of the family working, Mother also works, this affects the behavior of mothers in caring for their babies.

This is supported by research which in his research suggests that income is also not related to the habit of washing the mother's hand which causes diarrhea in infants ( $p = 0.066$ ) (Rifai et al. 2016). These results are also in line with other studies, in previous studies stating that there was no relationship between family income and the incidence of diarrhea ( $p = 0.430$ ) (Christy 2014).

The results showed that there was an influence between the behavior with the incidence of diarrhea in children under five in Tapalang although it was not statistically significant ( $OR = 0.74$ ,  $p = 0.210$ ). Mothers' bad behavior in treating their babies has a 0.74 times greater influence at risk of suffering from diarrhea compared to good and healthy

behavior. The results obtained in the field, the majority of mothers have applied good behavior in treating their babies but many still suffer from diarrhea. This is possible because the behavior variable still has a correlation with other variables besides education, latrine conditions and income. This result is in accordance with previous research, which found that maternal behavior influences the incidence of diarrhea in toddlers (RP = 1,687) (Muhajjar et al. 2016).

One of the behaviors referred to in this study is the source of clean water owned by the family for bathing, washing, and for other purposes, this study is in line with the research conducted by Selviana, et al which states that there is no relationship between sources of clean water for washing the cutlery and drink with the incidence of diarrhea in toddlers ( $p = 0.612$ ) (Selviana et al. 2017).

Behavior is related to attitude, attitude is a person's assessment of the affective, cognitive and conative aspects positively or negatively towards an object. Attitude is a predisposition to behavior, forming a certain mindset that can influence a person's behavior, such as a positive attitude towards diarrhea will influence behavior in prevention efforts. These results are in accordance with research which states that attitudes do not have a significant relationship to the incidence of diarrhea in toddlers (Almaet al. 2017). Likewise with the research which states that attitudes have a relationship with the incidence of diarrhea (Yunida 2018).

Some good behaviors in caring for toddlers have an influence on the incidence of diarrhea such as the habit of washing hands with soap, disposing of baby feces in the toilet, maintaining cleanliness of giving exclusive breastfeeding, maintaining cleanliness of food and drinks, etc. This is in accordance with the research who concluded that maternal behavior affects the incidence of diarrhea in toddlers (Nurpauji et al. 2015).

Good behavior that has been applied by mothers of toddlers turned out to not guarantee the occurrence of diarrhea in children under five mothers' behavior in caring for children under five is related to the type of parenting mother.

Parenting is an illustration of the attitudes and behavior of parents and children in interacting and communicating during care, this study is in line with research conducted by Dhiana, et al., Which states that the incidence of diarrhea in toddlers does not have a relationship with the type of parenting (Dhiana et al. 2017).

The results of this study are not in line with the research conducted by Syahrizal which showed that the probability value between the behavior of mothers with the incidence of diarrhea amounted to 0.021 with an OR value of 3.9 so it was concluded that behavior had a significant relationship (Syahrizal 2018).

The behavior cooking water to be consumed (if not bottled water) is also one of behaviors associated with the incidence of diarrhea, mother's habit of cooking water to be consume is a risk factor for diarrhea. Mother who do not cook water to consume are at risk 168 times more likely to suffer from diarrhea than mothers who cook water to consume (Hairani et al. 2017).

However, sources of ready-to-drink water such as refill water or packaging do not guarantee that the water is free from sources of disease. The results of study show that the proportion of participants in diarrhea whose drinking bottled water is relatively high compared to other sources of water, the study found that drinking water treatment has no relationship with the incidence of diarrhea (Sumolang et al. 2019).

In addition to drinking water, Hand Washing with Soap (CTPS) is a healthy behavior that has been scientifically proven to prevent the spread of infectious diseases such as diarrhea, this study is in line with research which stated that CTPS has no association with diarrhea ( $p = 0.978$ ) (Trihora and Siwiendrayati 2015). But this study is not in line with research by Selomo, et al., who stated that hand washing with soap has a relationship with the incidence of diarrhea. Likewise, Hartati's research stated that there was a relationship between handwashing habits and the incidence of diarrhea in toddlers ( $p = 0.000$ ) (Selomo et al. 2018).

## CONCLUSION

The incidence of babies diarrhea in Tapalang is influenced by family income and statistically has a significant value that is ( $b = 1.50$ ,  $p = 0.013$ ), family income variable has an indirect effect through variables between (behavior) but statistically not significant ( $b = 0.98$ ,  $p = 0.269$ ).

Behavior has a direct influence on the incidence of diarrhea even though it is not statistically significant ( $b = 0.74$ ,  $p = 0.210$ ), this can occur because of other correlations between behavior with other factors besides this, this can occur because the data or the number of samples that are still classified as lacking.

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