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FACTORS THAT INFLUENCE OWNERSHIP ON THE INCIDENCE OF DIARRHEA IN THE AREA OF PEMATANG CENGAL COMMUNITY HEALTH CENTER, LANGKAT REGENCY

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Abstract

Diarrhea is a condition where a person defecates more than 3 times a day. Diarrhea is still one of the public health problems that is of concern because it is the third major contributor to child morbidity and mortality in various developing countries including Indonesia. This study aims to determine the effect of latrine sanitation variables and defecation behavior on the incidence of diarrhea in Pematang Cengal village. The research method is a quantitative study using an analytical survey design with a Cross-Sectional approach. From the total population obtained, 3452 residents were obtained samples received from Pemantang Cengal Village were 97 respondents using the slovin formula. This study utilized instruments using secondary data from the Pematang Cengal Village Health Center. Data were analyzed using SPSS to test the Univariate, Bivariate and Multivariate analysis hypotheses using the chi square statistical test at a significance level of 95% (p-Value <0.05). The results obtained from 6 research variables conducted, there are 5 variables that have a relationship, namely ownership of a decent toilet (0.001), the distance of the toilet is at least 10 m from the water source (0.001), the toilet has a cover (0.007), the toilet has a septic tank (0.000), and the behavior of defecating in a private toilet (0.007). While the variable that has no effect is the habit of washing hands after defecating has no effect (0.057> 0.005). The multivariate results show that the variable of ownership of a septic tank has the most influence on the incidence of diarrhea with an OR value = 1.56. The conclusion is that ownership of a decent toilet, the distance of the toilet is at least 10 m from the water source, the toilet has a cover, the toilet has a septic tank, and the behavior of defecating in a private toilet are behaviors that prevent the transmission of diarrhea in Pematang Cengal Village. Overall, this study emphasizes the importance of ownership and use of healthy toilets and a good sanitation system to prevent the incidence of diarrhea in the community.

Keywords: Diarrhea, Latrines, Environmental Pollution

Introduction

Diarrhea is a condition in which a person has bowel movements that are not normal. Or in other words, a condition where the form of feces is more liquid than usual. In addition, they will also have more frequent bowel movements (with a frequency of more than 3 times a day). A person infected with diarrhea will experience several symptoms such as vomiting (nausea), increased body temperature (fever), disturbance of body fluids (dehydration), electrolyte disorders, abdominal cramps, and more severely can cause bloody stools. Diarrhea is caused by rotavirus and adenovirus. It can also be caused by bacteria and pathogens that cause diarrhea, namely: E. Coli, Salmonella and Shigella, Vibrio and Cl. Difficle. This seemingly harmless disease can turn out to be a deadly disease for children. Often people

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ignore diarrhea and think that it is common to occur due to incorrect food consumption (Nanda, M. 2024).

Diarrhoeal disease is still one of the important public health problems because it is the third major contributor to child illness and mortality in various developing countries, including Indonesia. The main cause of death from diarrhea is dehydration due to loss of fluids and electrolytes through feces. Other causes of death are dysentery, malnutrition, and infection. The age group that is most vulnerable to suffering from diarrhea are children because their immune system is still low. This is due to the lack of maximum discovery of diarrhea sufferers by cadres, health centers, and private hospitals. This shows that there is a relationship between toilet ownership, SPAL distance, floor type and the incidence of diarrhea, and there is a meaningful relationship between the occurrence of diarrhea and fecal disposal and the type of drinking water source (Hasibuan, H. 2023).

According to WHO data, every year diarrhea kills about 443,832 children under the age of 5 and an additional 50,851 children aged 5 to 9 years. Globally, there are nearly 1.7 billion cases of diarrheal disease in children every year. Diarrheal diseases are the leading cause of child mortality and morbidity in the world, and are mostly caused by contaminated food and water sources. Worldwide, 780 million people do not have access to proper drinking water and 2.5 billion people do not have proper sanitation. Diarrhea due to infection is widespread throughout developing countries. In low-income countries, children under the age of 3 experience an average of three diarrhea each year. Whenever diarrhea occurs, children will lack the nutrients necessary for their growth. As a result, diarrhea is the leading cause of malnutrition, and malnourished children are more likely to fall ill from diarrhea (WHO, 2023).

Diarrheal disease is an endemic disease that has the potential to cause Extraordinary Events (KLB) and is still a contributor to mortality rates in Indonesia, especially in toddlers. According to the results of the 2023 Indonesian Health Survey, the prevalence of diarrhea in all age groups is 2%, in toddlers is 4.9%, and in infants is 3.9%. Meanwhile, in the 2018 Sample Registration System, diarrhea remains one of the main causes of death in neonates at 7% and in infants aged 28 days at 6%. In 2023, the coverage of services for people with diarrhea at all ages will be 41.5% and for toddlers at 31.7% of the set target. The province with the highest coverage of diarrhea services in toddlers is East Java (62.2%), while the province with the lowest coverage is. Riau Islands (5.3%) (Ministry of Health of the Republic of Indonesia, 2024).

One of the factors that cause the high incidence of diarrhea in Indonesia is the Clean and Healthy Living Behavior (PHBS) which is still low at 65%. The data on the coverage of PHBS according to Riskesdas (2018) is Clean and Healthy Living Behavior (PHBS), one of the indicators is the use of healthy latrines so as to maintain a clean, healthy and odorless environment, does not pollute the water sources around them, and does not invite the arrival of flies or insects that can be transmitters of diarrhea, cholera, dysentery, thypus, worms, diseases of the gastrointestinal tract, skin diseases and poisoning (Harokan, A. 2022).

The dominant factors that cause diarrhea are clean water facilities and fecal disposal sites. These two factors will interact with human behavior, unhealthy environmental factors because they are mixed with diarrheal germs accumulating with unhealthy human behavior will cause diarrheal disease. The limited supply of clean water will facilitate the emergence of diseases in the community. The average volume of each individual's water needs per day ranges from 150-200 liters or 35-40 gallons. These needs vary and depend on the circumstances of the law, the standard of living. And people's habits. Ease of access to clean water and sanitation is a human right as the basis for obtaining body health (Iryanto, A. 2021).

The initial survey that became a problem and was raised in this article was the low ownership of healthy latrines among the people of Pematang Cengal Village, Lalat Regency, which had a direct impact on the high incidence of diarrhea. According to the survey, many residents do not own private toilets and still dispose of feces in open places, such as gardens, rivers, or waterways. The data in the

study showed that all respondents who did not have latrines experienced diarrhea, which confirms that poor sanitation has a major influence on public health, especially when it comes to the spread of infectious diseases such as diarrhea.

The purpose of writing this article is to identify and analyze the factors that affect the ownership and use of healthy latrines in the community of Pematang Cengal Village. Based on research conducted in Pematang Cengal Village, Tanjung Pura District, Langkat Regency, it is still found that people who defece in toilets that are not suitable such as cemplung toilets or defecation in rivers that pollute water sources. The problem that is at the core of the research is to highlight the importance of proper sanitation facilities as a preventive effort against the spread of diseases transmitted through human feces, which cause diarrhea in the working area of the Pematang Cengal Health Center, Lalat Regency.

Method

This study is a quantitative study with an analytical survey design using a cross-sectional approach to analyze the relationship between latrine ownership and diarrhea incidence. Data was obtained from medical records and information on community behavior related to toilet ownership. The analysis was carried out univariate (respondent characteristics), bivariate (test of the relationship between variables with chi-square), and multivariate (to find out the most influential variable based on the odds ratio/OR value). Data processing was carried out manually and analyzed using SPSS with a significance level of p value < 0.05**.**

The number of samples can be done by means of statistical calculation using the Slovin Formula. The formula is used to determine the sample size of the known population, which is 3452 total population of Pematang Cengal Village in 2023. For the price level set in the sample determination, it is 10%. With the following formula:

$$n = \frac{n}{1+(N*e^2)}$$

$$n = \frac{3452}{1+(3452*0.1^2)}$$

$$n = 97.1$$

Information:
n= Number of samples
N= Total Population
e= Fault tolerance limit = 10% -> 0.1

Therefore, the minimum sample needed in this study is 97.1 rounded up to 97 respondents. This study uses a formula from *Slovin* because the number of populations is already known.

Result

Univariate Analysis Results

Univariate analysis is an analysis based on the characteristics of the respondents in this study, namely age, gender, and history of diarrheal diseases.

Table 1. Distribution of Respondent Characteristics by Age, Sex, and History of Diarrheal Disease

Characteristics	Frekeunsi (f)	Percentage (%)
Age (years)		
< 20	22	22,6
36-45	37	38,2
46-55	14	14,5
56-65	18	18,5
> 65	6	6,2
Gender		
Male – Male	41	42,3
Woman	56	57,7
Incidence of Diarrhea		
Menderita	61	79,6
Not suffering	36	20,5
Total	**97**	**100**

Table 1 shows that there are characteristics of respondents based on age, gender, and incidence of diarrhea in the community. Of the 68 respondents in the study, the most respondents were 36-45 years old, which amounted to 37 respondents (30%), followed by the age of <20 years with a total of 22 (22.6%) respondents, 56-65 years old with 18 (18.5%) respondents, 46-55 years old with 14 (14.5%) respondents, and the lowest respondent was at the age of >65 years with a total of 6 (6.2%) respondents. Meanwhile, the characteristics of respondents based on gender, namely from 68 respondents, there were 56 (57.7%) female respondents and 41 (42.3%) male respondents. Based on the distribution of the frequency of respondents suffering from diarrhea, out of 97 respondents, there were 54 (79.6%) respondents with diarrhea and respondents who did not have diarrhea as many as 14 (20.5%) respondents.

Bivariate Analysis Results

The results in this bivariate test show that there are indications that the use of toilets for residents is not good enough to affect the spread of viruses and bacteria so as to cause diarrhea, the following shows the relationship between these variables.

Table 2 Effect of Toilet Ownership on the Incidence of Diarrhea

Variabel	≠ Diarrhea		Diarrhea		Total		P Value	PR
	n	%	n	%	n	%		
≠ Have	0	0	21	100	21	100	0,001	**1,48 (1,20-1,82)**
Have	36	47,4	40	52,6	76	100		
Total	36	37,2	61	62,8	97	100		

Table 2 shows that among respondents who do not have latrines, as many as 21 respondents (100%) experience diarrhea, while among those who do latrines, as many as 40 respondents (52.6%)

experience diarrhea. A P value of 0.001 < 0.05 indicates that latrine ownership is closely related to a decrease in the incidence of diarrhea.

Table 3 Effect of Distance of Toilet at Least 10 Meters from Water Source with the Incidence of Diarrhea

Variabel	≠Diarrhea		Diarrhea		Total		P Value	PR
	n	%	n	%	n	%		
≠Have	0	0	21	100	21	100	0,001	**1,50 (1,21-1,86)**
Have	27	35,5	49	64,5	76	100		
Total	27	20,6	70	79,4	97	100		

From the analysis in table 3, respondents who did not have a safe distance between the toilet and the water source showed that 21 respondents (100%) had diarrhea, while 49 respondents (55.5%) of those who had a safe distance had diarrhea. A P-value of 0.001 < 0.05 indicates that inadequate latrine spacing can increase the risk of diarrhea.

Table 4 Effect of Latrines That Are Closed with the Incidence of Diarrhea

Variabel	≠Diarrhea		Diarrhea		Total		P Value	PR
	n	%	n	%	n	%		
≠Have	0	0	21	100	21	100	0,007	**1,41 (1,18-1,69)**
Have	27	35,6	49	64,4	76	100		
Total	27	20,6	70	79,4	97	100		

Table 4 shows that 21 respondents (100%) of the respondents who did not have a closed latrine experienced diarrhea, while 49 respondents (64.4%) of those who had a closed latrine experienced diarrhea. A P value of 0.007 < 0.05 indicates that closed latrines are associated with a decrease in the incidence of diarrhea.

Table 5 Effects of Toilets That Have Septic Tanks with the Incidence of Diarrhea

Variabel	≠Diarrhea		Diarrhea		Total		P Value	PR
	N	%	n	%	n	%		
≠Have	0	0	21	100	21	100	0,000	1,56 (1,23-1,97)
Have	39	51,4	37	48,6	76	100		
Total	39	20,6	58	79,4	97	100		

Table 5 shows that 21 respondents (100%) who did not have a septic tank experienced diarrhea, while 37 (48.6%) of those who had a septic tank experienced diarrhea. A P value of 0.000 < 0.05 indicates that the possession of a septic tank plays an important role in preventing diarrhea.

Table 6 Effect of defecation in private toilets with the incidence of diarrhea

Variabel	≠Diarrhea		Diarrhea		Total		P Value	PR
	n	%	n	%	n	%		
≠Have	0	0	21	100	21	100	0,007	
Have	30	34,5	46	60,5	76	100		**1,40 (1,17-1,67)**
Total	30	28,6	67	79,4	97	100		

Table 6 shows that 21 respondents (100%) of the respondents who did not defecate in the latrine experienced diarrhea, while 46 respondents (60.5%) of those who defected in the latrine experienced diarrhea. The P value of 0.007 < 0.05 indicates that the habit of defecating in the toilet is related to a decrease in the incidence of diarrhea.

Table 7 Effect of Hand Washing Habits After Bowel Movements with the Incidence of Diarrhea

Variabel	≠Diarrhea		Diarrhea		Total		P Value	PR
	n	%	n	%	n	%		
≠Have	0	0	21	100	21	100		
Have	21	27,6	55	72,4	76	100	0,057	1,35 (1,15-1,58)
Total	21	27,6	76	72,4	97	100		

Although all respondents washed their hands after defecation, the results showed that 21 respondents (100%) of those who did not wash their hands had diarrhea, while 55 respondents (72.4%) of those who washed their hands had diarrhea. The P value of 0.057 > 0.05 showed that there was no relationship between hand washing after defecation and the incidence of diarrhea. While handwashing is important, other factors such as latrine ownership and waste management may have more influence on the incidence of diarrhea.

Multivariate Analysis Results

Multivariate analysis is an analysis to see the most influential factors of this study.

Table 8. Multivariate analysis of variables

Variabel	P Value	OR
Ownership of Latrines	0,001	1,48
Distance of the latrine at least 10 meters from the water source	0,001	1,50
The latrines that are given are closed	0,000	1,41
Latrines That Have Septic Tanks	0,007	1,56
BOWEL MOVEMENTS in private toilets	0,007	1,40
Habit of Washing Hands After Bowel Movements	0,057	1,35

The results of the multivariate analysis of this study using a logistic regression test showed that the most influential factor in this study was the variable of latrines that had a Septic Tank with OR =

1.56, meaning that people whose latrines did not have a Septic Tank had a 0.249 chance of having diarrhea compared to people who had a septic tank.

Discussion

In the research that the researcher wants to do, that to see the existence of permanent latrines can determine the quality of life of the community, especially in overcoming diarrheal diseases. There are several variables that are studied to see the influence of the variables of latrine ownership in the incidence of diarrhea carried out in the work area of the Pematang Cengal health center, namely:

The Effect of Toilet Ownership on the Incidence of Diarrhea

Feces are the result of metabolism that must be disposed of in a safe place, namely the latrines. Improper and careless disposal of feces can result in contamination of water, soil, or become a source of infection, and will bring danger to health, and can increase the number of pain from diarrhea because the disease is classified as a waterborne disease that is easily transmitted (Notoatmodjo, 2011).

It was found that out of 97 respondents, 76 respondents used decent latrines while those who did not have latrines were 21 respondents. Respondents who have diarrhea because they do not have latrines amounted to 21 respondents in the sense that all people who have proper latrines do not suffer from diarrhea. This study shows that there is a relationship between toilet ownership and the incidence of diarrhea in residents in Pematang Cengal Village with a p value = 0.001 < 0.005, meaning that the ownership of residents' toilets can affect the incidence of community diarrhea.

Therefore, diarrhea can be transmitted through human feces, everyone in the family must use latrines and latrines must be clean to avoid insects and viruses that can transmit or transfer diseases to food. Households that have a habit of defecating feces that do not meet the requirements increase the risk of diarrhea in the public by 2 times compared to households that have the habit of defecating feces according to the rules (Hamzah, B., et al, 2021).

The Effect of the Distance of the Toilet Mnimal 10 Meters from the Water Source with the Incidence of Diarrhea

When building latrines, there is something that must be considered, namely that the source of drinking water is not polluted by paying attention to the distance between the storage hole and the drinking water source of 10 meters. Meet the physical standards of water standards. Does not pollute the soil, can be cleaned and is safe to use, there are protective walls and roofs. The water used for daily needs should be sourced clean and safe, free from germs and disease seeds, not contaminated with harmful chemical substances, and meet the standards that have been determined by WHO and the Ministry of Health of the Republic of Indonesia. Digging wells are the most widely used means by families. Therefore, it is important to plan a good latrine so that it is not polluted with water and causes disease (Yantu, S.S., et al, 2021).

The results of statistical analysis carried out on the variables of the distance between latrines and water sources with the incidence of diarrhea in the community in Pematang Cengal village found that the two variables had a relationship in this study. When viewed from the incidence of diarrhea with the risk of contamination in the family latrines, it is known that of the 97 respondents, 49 (64.5%) had diarrhea and those who did not have diarrhea amounted to 27 (35.5%) respondents, where this figure is smaller than those who have diarrhea. So it can be seen that there are other factors that cause the occurrence of diarrhea, namely the distance of the latrine that is not enough from 10 m, with a p value = 0.001 < 0.005.

The same research as this study is conducted by Kurniawati, Farhah and Abiyyah which concluded that the availability of healthy toilets that pay attention to the distance between water sources

and the incidence of diarrhea in the community is significantly related in Babakansari village, Kiaracondong district, Bandung (Kurniawati, et al. 2021).

The Effect of Covered Toilets with the Incidence of Diarrhea

Toilet lids can also reduce the chance of cross-contamination from objects or hands that come into contact with the surface of the toilet. The habit of closing latrines after use reflects hygienic behavior that also supports environmentally-based disease prevention efforts. This study is in line with previous studies that stated that proper sanitation facilities, including the design of closed latrines, can significantly reduce the prevalence of diarrheal diseases. Therefore, the promotion of the use of healthy latrines and clean and healthy living behaviors (PHBS) must be part of the public health strategy in preventing environment-based diseases (Iryanto, A.A., et al, 2021).

The results showed that there was a significant relationship between the use of latrines with lids and a decrease in the incidence of diarrhea with a p value = 0.007 < 0.005. Where of the 21 (100%) respondents who did not have a cover on the latrine had diarrhea, while the latrines that had a cover the number of respondents infected with diarrhea were not present or 0%. So it can be said that latrines that have lids can function as a physical barrier to prevent the spread of germs or bacteria that cause diarrhea to the surrounding environment. When the toilet does not have a lid, germs from open stool can spread through the air, insects (such as flies), or direct contact, increasing the risk of diarrhea transmission.

The Effect of Latrines That Have a Septic Tank with the Incidence of Diarrhea

One of the important components of a healthy sanitation system is the presence of septic tanks in latrines. Toilets connected to septic tanks allow human feces to be disposed of safely and do not pollute the surrounding environment, in contrast to toilets that directly dump waste into rivers, waterways, or into open ground. However, the effectiveness of septic tanks in preventing diarrhea is also influenced by several other factors, such as the quality of septic tank construction, population density, people's behavior in disposing of waste, and handwashing habits. In addition, septic tanks that are not maintained or rarely vacuumed can actually cause pollution in the event of a leak.

The results showed that there was a significant relationship between the use of latrines with septic tanks and a reduction in the incidence of diarrhea with a significance value of p value = 0.000 < 0.005 which stated that it was related. That is, of the 97 respondents who had a septic tank, 21 (100%) respondents suffered from diarrhea. This is because the septic tank functions to isolate human waste, thereby preventing the spread of pathogenic microorganisms to drinking water sources or the environment that can be a medium for diarrhea transmission. Latrines without septic tanks or with open sewer systems increase the risk of groundwater and surface water contamination, which ultimately contributes to the increase in cases of diarrhea, especially in children and communities living in densely populated areas.

The Effect of Defecation in Private Toilets with the Incidence of Diarrhea

Poor sanitation conditions are one of the main factors in the spread of diarrheal diseases. Defecation in any place allows fecal contamination of the environment, including drinking water and food sources. This can lead to increased exposure to bacteria, viruses, or parasites that cause diarrhea. The use of healthy, closed family toilets helps break the chain of disease transmission. Health-qualified latrines prevent vectors such as flies and cockroaches from carrying germs from feces onto food or frequently touched surfaces.

This study showed that 21 respondents (100%) of the respondents who did not defecate in private toilets experienced diarrhea. With a significance value of p value = 0.007 < 0.005, this shows a relationship between those who defecated in the toilet and those who did not. This is in line with research conducted by Ira Sandi Tunny, the results of statistical tests show that there are still many

people who do not have family toilets in Mesa Country as many as 88 heads of families (64.7%) resulting in people contracting frequent diarrhea (Tunny, I.S., 2022).

The Effect of Hand Washing Habits After Bowel Movements with the Incidence of Diarrhea

The act of washing hands after defecation is one of the most important hygienic efforts in preventing the transmission of infectious diseases, especially diarrhea. Human feces contain a variety of pathogenic microorganisms, such as Escherichia coli, Shigella, and Rotavirus, which can be transmitted by hand to food, drinking water, and surrounding surfaces.

The results showed that the significance value of p value = 0.057 > 0.005 meant that the variables were not interrelated. In this study, it can be stated that the habit of washing hands after defecation is not enough to make a person contract diarrhea. In contrast to the research conducted by Prawati and Haqi, the results of a study on 211 respondents of RW VI residents about the relationship between the behavior of washing hands using soap before consuming food and the occurrence of diarrhea obtained an expected count value that was eligible for the chi-square test. The value obtained p = 0.028. This shows that the behavior of cleaning hands with soap has a relationship with diarrheal diseases in the last 3 months (Pratiwi, D.D., et al, 2019).

Multivariate Analysis

The results of multivariate analysis in this study show that the variable of the presence of septic tanks in latrines is the most influential factor in the incidence of diarrhea in the community. This is shown by the Odds Ratio (OR) value of 1.56, which indicates that there is an increased risk of diarrhea in people who do not have a septic tank compared to those who do. Without septic tanks, human waste (feces and urine) can be directly dumped into rivers, ditches, or seeps into the ground without treatment. This allows diarrhea-causing bacteria, viruses, and parasites such as E. coli, Shigella, Rotavirus, and Giardia to contaminate water used for drinking, cooking, or washing. Latrines without septic tanks are usually latrines that do not meet the requirements of proper sanitation. This condition increases the risk of transmission of environmentally based infectious diseases, especially in densely populated areas or with limited clean water infrastructure.

Conclusion

Based on the results of research conducted in the working area of the Pematang Cengal Health Center, it can be concluded that there is a significant relationship between the sanitary condition of latrines and the incidence of diarrhea in the community. Namely of the 6 research variables from 97 respondents, there were 5 variables that had a significance value of <0.005. These variables include: proper toilet ownership, distance of toilets, at least 10 m from the water source, toilets have covers, toilets have septic tanks, and bowel behavior in private toilets. Overall, this study emphasizes the importance of owning and using healthy latrines and a good sanitation system to prevent the occurrence of diarrhea in the community. Efforts to promote clean and healthy living behaviors (PHBS) and proper sanitation management are urgently needed as a preventive strategy against environment-based diseases, especially diarrheal diseases.

Suggestion

Based on the results of the research, it is recommended to the Puskesmas and the local government to increase education and promotion about the importance of using healthy latrines as part of clean and healthy living behaviors (PHBS). Counseling programs to the community need to focus on aspects of proper latrine ownership, maintaining a safe distance between latrines and clean water sources, and the importance of sanitation facilities such as latrine covers and septic tanks. In addition,

support in the form of technical assistance and facilities for people who do not have healthy latrines needs to be prioritized, especially in areas that are still at high risk of diarrhea. The involvement of health cadres, community leaders, and cross-sector programs is also very important to drive change.

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