



FACTORS ASSOCIATED WITH THE INCIDENCE OF DIARRHEA IN TODDLERS IN THE MEUREUBO HEALTH CENTER WORKING AREA, MEUREUBO SUB- DISTRICT, WEST ACEH DISTRICT IN 2023

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Input : September 23, 2024
Accepted : October 16, 2024

Revised : October 10, 2024
Published : October 31, 2024

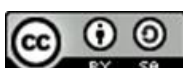
ABSTRACT

Diarrhea in children under five is a significant public health problem, especially in developing countries, where the incidence and mortality rate due to diarrhea is still high. This phenomenon is further exacerbated by the lack of access to proper sanitation and health education among the community. This study aims to identify factors related to the incidence of diarrhea in toddlers in the working area of the Meureubo Health Center, Meureubo District, West Aceh Regency, in 2023. The method used is a literature study, with data and information obtained from various sources, including scientific journals, articles, and related reports. The analysis was carried out on factors that affect the incidence of diarrhea, such as environmental sanitation, diet, immunization status, and parental knowledge about health and diarrhea prevention. Although there has been previous research on diarrhoea in toddlers, there is still a lack of understanding the specific association between parental knowledge and the incidence of diarrhoea in this local context. The results of the study showed that drinking water quality, hygiene practices, and parental knowledge about diarrhea prevention had a significant influence on the incidence of diarrhea in toddlers. These findings emphasize the need for health interventions that focus on improving access to clean water, good sanitation, and education for parents. This research is expected to provide useful information for the development of more effective health intervention programs in the region as well as increase public awareness about the importance of diarrhoea prevention among toddlers.

Keywords : Diarrhea, Personal Hygiene, Toddler

INTRODUCTION

Diarrhea is one of the main infectious diseases that affects many toddlers, especially in developing countries. The disease is characterized by loose stools that occur more than three times a day and are caused by various pathogenic agents such as viruses, bacteria, or parasites. Based on data from the World Health Organization (WHO), diarrhea is the leading cause of death among toddlers worldwide after pneumonia and complications of premature birth. Every year, around 525,000 children under five die from diarrhea, especially in developing countries that still experience limited access to clean water and proper sanitation facilities. In Indonesia, diarrhea in toddlers is also still a serious health problem. Based on Basic Health Research (Riskesdas), the prevalence of diarrhea in toddlers reaches 12.3%, with the highest incidence in children under the age of two. sanitation facilities. In Indonesia, diarrhea in toddlers is also still a serious health problem.



Inadequate hygiene behaviors, such as not washing hands before eating or after defecating, increase the risk of transmitting this disease. Poor nutritional conditions of toddlers also affect susceptibility to diarrhea. Children with malnutrition have a weaker immune system, so they are more susceptible to infection and difficult to recover from diarrhea. Parents, especially mothers, know the importance of maintaining a clean environment and providing adequate nutrition to toddlers plays a very important role in preventing diarrhea. In many areas, low levels of education and lack of information about health leave many parents unaware of proper hygiene and dietary practices for their children. This is exacerbated by unfavorable environmental conditions, such as poor waste management and minimal infrastructure. Therefore, an integrated approach, including improved access to clean water, improved nutrition, and intensive health education, is urgently needed to reduce the incidence of diarrhoea in children under five, especially in vulnerable areas such as Meureubo.

Diarrhea is a potential endemic disease that can lead to outbreaks (KLB) and is often associated with fatal outcomes. The target service coverage for children under five with diarrhea who visit health facilities is set at 20% of the estimated number of diarrhea cases. In 2019, 24,690 children under five, or 32% of the estimated cases, received treatment at health facilities. Diarrhea is closely linked to environmental health factors and occurs when there is a change in the consistency of stool, not just the frequency of bowel movements. Diarrhea is diagnosed when the stool becomes more watery than usual, or when bowel movements occur three or more times within 24 hours, with watery but non- bloody stool. According to WHO (2020), diarrhea ranks as the third leading cause of death across all age groups. In 2019, there were 1,591,944 cases of diarrhea among children under five, representing 40% of the estimated cases treated at health facilities. Furthermore, Riskesdas reports that diarrhea is more prevalent among children under five, with a prevalence rate of 11.4%, or approximately 47,764 cases, in males, and 10.5%, or around 45,855 cases, in females. Diarrhea continues to be a significant public health issue in many developing countries, including Indonesia, due to its high rates of morbidity and mortality.

Diarrhea in toddlers is a significant health problem in Indonesia, especially in areas with limited access to clean water and adequate sanitation. In the working area of the Meureubo Health Center, Meureubo District, West Aceh Regency, reports show an increase in cases of diarrhea in children under five in recent years, which raises concerns because it can cause severe dehydration to death if not treated quickly. Factors that affect this incidence include the quality of the water used, hygiene behavior in the home environment, the nutritional condition of toddlers, and parents' knowledge and attitudes towards diarrhea prevention. The region faces major challenges, with many families relying on unhygienic water sources and a lack of adequate handwashing facilities. Bad habits of hygiene, such as unsafe food storage and

inappropriate diets, contribute to this situation. Therefore, more in-depth research is needed to identify factors related to the incidence of diarrhea in toddlers in this region so that more effective interventions can be formulated to improve the health of the local community.

According to the Indonesian Ministry of Health (2019), diarrhea is the second leading cause of death in children under five, the third in infants, and the fifth across all age groups. On average, each toddler in Indonesia experiences diarrhea

1.6 to 2 times annually. West Java Province reported the highest number of diarrhea cases in children under five, totaling 933,122, while Aceh Province ranked among the top five with 137,599 cases. Data from the Aceh Health Office in 2019 showed that Banda Aceh had 24,690 cases of diarrhea, or 32%, while West Aceh District recorded 2,983 cases in 2020, representing 53.2%. The Meureubo Health Center reported the highest incidence, with 67% of diarrhea cases occurring in children under five (Meureubo Health Center, 2022). Various factors contribute to the high incidence of diarrhea, including environmental conditions, nutrition, population factors, education, socioeconomic status, and community behaviors that either directly or indirectly affect the spread of the disease (Purwanti DY and Ratna Sari, 2020). Factors linked to diarrhea include environmental aspects such as the type and quality of water sources, water microbiology, family latrines, proximity of latrines (less than 10 meters), and housing density. Hygiene practices, like washing hands before eating and avoiding open defecation, are also important. Biological factors, such as how water is prepared or boiled before consumption, and individual factors, like food intolerances, as well as psychological factors like stress and panic, also contribute (Fitriani N, et al, 2021). The primary water source used by families for daily needs, including cooking, drinking, and cleaning, can come from PDAM, boreholes, or refill water. Water is a critical natural resource for both humans and other living organisms, and its importance makes it susceptible to environmental influences. Mismanagement of water resources can lead to significant damage (Kholif, M., 2020).

According to the Indonesian Ministry of Health (2019), diarrhea is the second leading cause of death among children under five, third for infants, and fifth across all age groups. On average, toddlers in Indonesia experience diarrhea 1.6 to 2 times per year. West Java recorded the highest number of diarrhea cases in toddlers with 933,122 cases, while Aceh ranked in the top five with 137,599 cases (MOH, 2019). Data from the Meureubo Health Center indicates that diarrhea cases fluctuate annually. In 2019, there were 337 cases or 9.94%, in 2020 there were 322 cases or 9.50%, and in 2021, 330 cases or 9.74% were reported. Toddlers in Penaga Baroh Village had the highest incidence of diarrhea (Puskesmas Meureubo, 2022). Of the 27 villages within the Meureubo Health Center's coverage area, six villages had the highest number of diarrhea cases: Penaga

Baroh Village with 60 cases or 1.7%, East Ranto Panyang Village with 51 cases or 5%, Meureubo Village with 35 cases or 1.03%, West Ranto Panyang Village with 34 cases or 1%, Gunong Kleng Village with 24 cases or 0.7%, and Langung Village with 17 cases or 0.5% (Puskesmas Meureubo, 2022). Several factors, both direct and indirect, contribute to diarrhea. However, some of these factors can be prevented by improving access to clean water, proper sewage management, maternal knowledge, children's nutritional status, and maternal hygiene and sanitation practices. Puskesmas Meureubo has the highest diarrhea case rate in West Aceh. This study seeks to examine whether factors like clean water sources, latrine facilities, household waste management, maternal knowledge, nutritional status, and hygiene and sanitation of mothers are related to the incidence of diarrhea among children under five in the Puskesmas Meureubo area.

Research on the incidence of diarrhea in toddlers in Indonesia has been widely conducted, but there is a significant shortage in studies that focus on rural areas, such as the Meureubo Health Center, Meureubo District, West Aceh Regency. Most of the existing research highlights urban contexts that have better sanitation infrastructure and access to clean water, thus ignoring the unique challenges faced by rural communities. Different social, economic, and cultural conditions in rural areas can affect the prevalence and treatment of diarrhea, but research explaining these local factors is still limited. This creates a gap in understanding the dynamics of more complex causes of diarrhea, where health service accessibility, community habits, and parental knowledge about child health play a major role (Colvin et al., 2023).

On the other hand, existing research often emphasizes only one or two factors that cause diarrhea, such as water quality and sanitation, without considering the interactions between various other factors that affect each other. Water quality and sanitation are important factors; However, family hygiene behavior, diet, and nutritional conditions of toddlers also have a significant role in the incidence of diarrhea. Therefore, more in-depth research is needed to explore the relationship between these various factors and how they can affect and contribute to the incidence of diarrhea in toddlers. By filling in the existing knowledge gaps, the results of this study are expected to provide more targeted recommendations in efforts to prevent and control diarrhea in rural communities such as Meureubo, so that it can be a strong basis for more effective and sustainable public health interventions.

METHOD

This study uses a quantitative approach with a cross-section design, which allows simultaneous examination between dependent and independent variables in the same time frame (Rukin, 2019). The main purpose of the study was to identify the factors related to the incidence of diarrhea in toddlers living in Meureubo District. The cross-section design seeks to capture a picture of various variables that can affect the incidence of diarrhea, including

demographic factors, environmental conditions, hygiene practices, and nutritional status of toddlers. The research was carried out in the area served by the Meureubo Health Center, located in Meureubo District, West Aceh Regency, during the period from May 13 to May 29, 2023. This period was strategically chosen to be in line with routine monitoring activities at the health center, so that it can recruit an adequate number of participants. Data collection was carried out through structured interviews with parents or caregivers of toddlers, who provided information about the child's health history, dietary habits, and sanitation practices at home. In addition, the research team also observed the condition of the residence to collect objective data related to cleanliness and sanitation facilities. The results of the study are expected to provide valuable insights into the prevalence of diarrhea among toddlers in Meureubo District and identify specific risk factors that contribute to the event. The analysis of the data collected aims to inform local health authorities and policymakers on pressing child health issues in the region, thereby facilitating the development of targeted interventions and public health strategies to reduce the incidence of diarrhoea and improve child health outcomes in the community. The study also emphasizes the importance of understanding the unique local context when facing health challenges, as well as the need for a tailored approach that takes into account the specific social, economic, and environmental factors in Meureubo District.

RESULTS AND DISCUSSION
RESULT

The results of the study showed that there was a significant relationship between several factors identified and the incidence of diarrhea in toddlers in Meureubo District. Of the 100 respondents involved, about 30% of toddlers experienced diarrhea during the observation period. Data analysis revealed that factors related to the incidence of diarrhea included water quality, hygiene practices, nutritional status, and parental knowledge about health. The quality of water used by families has proven to have an important role, where 60% of toddlers who experience diarrhea use water that does not meet health standards. Hygiene practices, such as washing hands before eating and after using the toilet, also showed significant influence; Toddlers from families with good handwashing habits have a lower risk of developing diarrhea. Poor nutritional status of toddlers was found in 40% of toddlers who had diarrhea, which suggests that inadequate nutrition contributes to children's susceptibility to infections. Parents' knowledge of diarrhoeal prevention practices also plays an important role, where families who have a good understanding of how to prevent diarrhoea show lower incidence rates.

Table 1. Frequency Distribution of Respondents Based on the Incidence of

**Diarrhea in Toddlers in the Work Area of the Meureubo Health Center,
Meureubo District, West Aceh Regency in 2023.**

No	Variabels	Frequency	Percentage	Mean (SD)	Min-Max
1	Age of Toddler			3 (1,43)	0-5
2	Mother's age			30 (5,53)	21-46
3	Mother's occupation				
	PNS	12	12,37		
	Honoror	19	19,59		
	Pedagang	7	7,22		
	Petani	13	13,40		
	IRT	46	47,42		

The table above presents the demographic data of respondents in the study on the incidence of diarrhea in toddlers in Meureubo District, with the variables analyzed including the age of toddlers, the age of the mother, and the mother's occupation. The average age of toddlers in this study was 3 years, with a standard deviation (SD) of 1.43 years, showing an age variation between 0 to 5 years, which is important to understand the influence of age on the incidence of diarrhea. The average age of respondent mothers reached 30 years, with elementary school 5.53 years and the age range ranged from 21 to 46 years, indicating that mothers were at a productive age, which could affect the way they cared for their children as well as their knowledge of health. In terms of employment, there was a significant variation among the respondents, where 12.37% of mothers worked as Civil Servants (PNS), 19.59% as honorary employees, 7.22% as traders, 13.40% as farmers, and 47.42% as housewives (IRT). The largest percentage comes from the IRT category, indicating that many mothers in the region are not engaged in formal work outside the home, which can affect the availability of time and resources for childcare and access to health information. Overall, this table provides an important demographic picture for further analysis of the factors that may contribute to the incidence of diarrhoea in toddlers, as well as the relationship between maternal demographic characteristics and child health, so that this data provides a useful basis for formulating intervention strategies and educational programs that are appropriate to the social and economic context of the local community.

Table 2. Frequency Distribution of Respondents Based on Cases of Diarrhea in Toddlers at the Meureubo Health Center Work Area, Meureubo District, West Aceh Regency in 2023.

No	Diarrhea in Toddlers	Frequency	Percentage
1	No Diarrhea	55	56,70
2	Diarrhea	42	43,30
Total		97	100,0

The table above presents data on the incidence of diarrhea in toddlers

involved in this study. Of the total 97 respondents, as many as 55 toddlers (56.70%) did not experience diarrhea, while 42 toddlers (43.30%) experienced diarrhea during the observation period. These results showed that the majority of toddlers in this study did not experience diarrhea problems, which reflects the existence of protective factors that may be effective among the group. On the other hand, a significant proportion of respondents, i.e. almost half, experienced diarrhea, indicating that this health problem remains an important concern. Information on the prevalence of diarrhea among toddlers in Meureubo District provides a crucial preliminary picture for further analysis of factors that may contribute to the incidence of diarrhea, such as environmental conditions, hygiene, access to clean water, nutritional status, and parental knowledge about health. Identifying these factors allows authorities and health workers to formulate more targeted intervention measures, as well as develop health education programs that can increase public awareness about diarrhoea prevention. Collaborative efforts between the government, health centers, and the community are expected to significantly reduce the prevalence of diarrhea in toddlers in Meureubo District, thereby ultimately improving children's health and the quality of life of the community as a whole.

Table 3. Distribution of Respondents by Clean Water Source in the Meureubo Health Center's Operational Area, Meureubo District, West Aceh Regency, for the Year 2023.

No	Clean Water Source	Frequency	Percentage
1	Eligible	78	80,41
2	Not Eligible	19	19,59
Tota		97	100,0
1			

The table above presents data on clean water sources used by respondents in research on the incidence of diarrhea in toddlers. Of the total 97 respondents, as many as 78 individuals (80.41%) used water sources that met the feasible criteria, while 19 individuals (19.59%) used unsuitable water sources. These results show that the majority of respondents have access to clean water sources, which is important in preventing diarrhea. Good access to clean water can reduce the risk of exposure to diarrhoea-causing pathogens and support children's health. The proportion of 19.59% of respondents who use inappropriate water sources shows that there are challenges in accessing clean water for some people. Therefore, improving water supply infrastructure, education about sanitation, and programs that support the community in accessing clean water are urgently needed to reduce the incidence of diarrhea and improve public health in Meureubo District.

Table 4. Distribution of Respondents by Latrine Facilities in the Meureubo

Health Center's Service Area, Meureubo Subdistrict, West Aceh District, for 2023.

No	Latrine Facilities	Frequency	Percentage
1	Eligible	92	94,85
2	Not Eligible	5	5,15
Total		97	100,0

The table above presents data on toilet facilities used by respondents in the study on the incidence of diarrhea in toddlers. Of the total 97 respondents, as many as 92 individuals (94.85%) have toilet facilities that meet the eligibility criteria, while only 5 individuals (5.15%) use inappropriate toilet facilities. These results show that most respondents have access to toilet facilities that meet health standards, which is an important factor in maintaining hygiene and preventing diarrhea. The existence of proper toilet facilities contributes positively to public health, especially among toddlers who are more susceptible to infectious diseases. The use of toilets that meet the standards can help reduce the risk of spreading pathogens that cause diarrhea and support good hygiene practices. The small percentage of respondents who use unsuitable facilities indicates that there are still challenges that need to be overcome in terms of sanitation. Efforts to improve infrastructure and raise awareness about the importance of good sanitation are urgently needed to ensure that all members of the community have access to proper toilet facilities, to support children's health and prevent future occurrences of diarrhea. This data can also be a reference for authorities in formulating more effective policies and programs related to sanitation and public health.

Table 5 Distribution of Respondents by Household Waste Management in the Service Area of Meureubo Health Center, Meureubo District, West Aceh Regency, for 2023.

No	Household waste management	Frequency	Percentage
1	Eligible	41	42,27
2	Not Eligible	56	57,73
Total		97	100,0

The table above presents data on household waste management by respondents in a study on the incidence of diarrhea in toddlers. Of the total 97 respondents, only 41 individuals (42.27%) had a waste management system that met the criteria for decent, while 56 individuals (57.73%) used inappropriate waste management methods. These results show that the majority of respondents do not have access to adequate waste management systems, which can negatively impact environmental health and increase the risk of spreading diseases, including diarrhea. Ineffective waste management can lead to waste accumulation and environmental pollution, which further affects the quality of public health, especially for toddlers who are more susceptible to infection. The proportion of respondents who do not meet the waste management criteria emphasizes the need for attention and intervention from the authorities to improve waste management practices in the community. These efforts can include education on the importance of good waste management, the provision

of adequate facilities for waste collection and disposal, and increased awareness of the health impacts of poor waste management. This data is an important reference in formulating more effective policies and programs to improve public health through improving the household waste management system.

Table 6 Distribution of Respondents According to Wastewater Disposal Systems in the Meureubo Health Center's Service Area, Meureubo District, West Aceh Regency, 2023

No	Saluran pembuangan air limbah	Frekuensi	Persentase
1	Eligible	76	78,35
2	Not Eligible	21	21,65
Total		97	100,0

The table above presents data on wastewater drains used by respondents in the study on the incidence of diarrhea in toddlers. Of the total 97 respondents, as many as 76 individuals (78.35%) had wastewater sewers that met the feasible criteria, while 21 individuals (21.65%) used unsuitable sewers. These results show that the majority of respondents have access to adequate wastewater disposal systems, which are important factors in maintaining environmental cleanliness and preventing the occurrence of diseases, including diarrhea. The existence of proper wastewater sewers contributes positively to public health because it can reduce the risk of environmental pollution caused by liquid waste. The use of a sewer system that meets health standards helps prevent contamination of clean water sources and reduces the spread of pathogens that cause diarrhea. The percentage of 21.65% of respondents who use improper sewers shows that there are still challenges in liquid waste management in this community. Improving wastewater drainage infrastructure and education on the importance of good sanitation are urgently needed to ensure that all communities have access to safe and effective sewerage systems, to support children's health and prevent future occurrences of diarrhoea. This data also provides a valuable reference for authorities in formulating more effective policies and programs related to sanitation and public health.

Table 7 Distribution of Respondents by Maternal Knowledge in the Service Area of the Meureubo Health Center, Meureubo District, West Aceh Regency, 2023

No	Mother's Knowledge	Frequency	Percentage
1	Good	67	69,07
2	Not Good	30	30,93
Total		97	100,0

The table above presents data on the knowledge of respondent mothers in research on the incidence of diarrhea in toddlers. Of the total 97 respondents, as many as 67 individuals (69.07%) showed good knowledge about children's health, while 30 individuals (30.93%) had poor knowledge. These results show that the majority of mothers have an adequate understanding of health practices that can prevent diarrhea in toddlers. Good knowledge of health is essential in the context of diarrhoea prevention, as mothers who understand the importance

of good sanitation, hygiene and nutrition tend to be better able to take the necessary measures to protect their children from disease. The existence of 30.93% of mothers who have poor knowledge shows that there are still groups that need to get further education. Health education programs that focus on increasing maternal knowledge about diarrhoea prevention and child health are very important to be implemented to reduce the risk of diarrhoea in toddlers in this community. This data also provides a valuable reference for authorities and health institutions in formulating more effective policies and intervention strategies to improve children's health.

Table 8 Distribution of Respondents by Maternal Education Level in the Meureubo Health Center Service Area, Meureubo District, West Aceh Regency, 2023

No	Mother's Education Level	Frequency	Percentage
1	High	20	20,62
2	Medium	43	44,33
3	Basic	34	35,05
Total		97	100,0

The table above presents data on the education level of respondent mothers in the study on the incidence of diarrhea in toddlers. Of the total 97 respondents, as many as 20 individuals (20.62%) have a higher education level, 43 individuals (44.33%) have a secondary education level, and 34 individuals (35.05%) have a basic education level. These results suggest that the majority of mothers have secondary education, which can have a positive effect on their understanding of child health and care. Higher levels of education tend to correlate with better knowledge of health practices, which can influence health care behavior and disease prevention among children. The proportion of mothers who have basic education, which is 35.05%, indicates a group that may have limitations in understanding child health and diarrhea prevention. This condition emphasizes the importance of health education programs designed to improve mothers' knowledge and skills in caring for children, especially for those with lower educational backgrounds. This effort is expected to help reduce the risk of diarrhea and improve the health of children in the community. This data can also be the basis for authorities and health institutions to formulate more effective policies and programs to support education and public health.

Table 9 Frequency Distribution of Respondents by Toddler Nutritional Status in the Meureubo Health Center Area, Meureubo District, West Aceh Regency, 2023

No	Nutritional Status of Toddlers	Frequency	Percentage
1	Good Nutrition	70	72,16
2	Nutrition Excess	7	7,22
3	Undernourished	20	20,62
Total		97	100,0

The table above presents data on the nutritional status of toddlers involved in the study on the incidence of diarrhea. Of the total 97 respondents, as many as

70 individuals (72.16%) had good nutritional status, while 7 individuals (7.22%) were overnourished, and 20 individuals (20.62%) were malnourished. These results show that the majority of toddlers in this study have good nutritional status, which is an important factor in maintaining children's health and immunity. Good nutritional status contributes positively to immunity, so that toddlers who get the right nutritional intake tend to be more resistant to infections, including diarrhea. The existence of 20.62% of toddlers who are malnourished indicates a group that is vulnerable to health problems, while 7.22% of toddlers who are overnourished also need to be considered because it has the potential to lead to other health problems, such as obesity in the future. This condition emphasizes the importance of targeted nutritional interventions to ensure that all toddlers get adequate and balanced intake. Educational programs about nutrition for parents are needed to increase understanding of the importance of good nutrition for children's health. This data provides a valuable reference for authorities and health institutions in formulating more effective policies and programs to support children's nutritional health in the community.

Table 10 Distribution of Respondents by Personal Hygiene and Environmental Sanitation Practices in the Service Area of Meureubo Health Center, Meureubo District, West Aceh Regency, 2023

No	Personal Hygiene and Environmental Sanitation	Frequency	Percentage
1	Good	59	60,82
2	Bad	38	39,18
Total		97	100,0

The table above presents data on personal hygiene and environmental sanitation of respondents in a study on the incidence of diarrhea in toddlers. Of the total 97 respondents, as many as 59 individuals (60.82%) showed good personal hygiene and environmental sanitation conditions, while 38 individuals (39.18%) were in the poor category. These results show that most respondents have adequate hygiene practices, which is an important factor in preventing diarrhea. Good personal hygiene and environmental sanitation can help reduce the risk of spreading diarrhoea-causing pathogens, where practices such as washing hands before meals and maintaining environmental hygiene are crucial in protecting toddlers from infection. The existence of 39.18% of respondents who have poor conditions shows that there are challenges that need to be overcome, especially in terms of awareness and implementation of good sanitation practices among the community. The existence of groups that are still in poor condition emphasizes the need for educational programs and interventions designed to improve hygiene knowledge and practices. Efforts to raise awareness about the importance of environmental sanitation and personal hygiene should be prioritized, while this data also provides a valuable reference for authorities and health institutions in formulating more effective policies and programs to support public health and prevent the incidence of diarrhoea in children under five.

Table 11 Bivariate Analysis of the Association between Clean Water Sources

and the Frequency of Diarrhea Incidence in Toddlers within the Meureubo Health Center's Service Area.

No	Clean Water Source	Diarrhea in Toddlers				Total		p value
		Not Diarrhea		Diarrhea				
		n	%	n	%	n	%	
1	Eligible	51	65,38	27	34,62	78	100,0	0,0001
2	Not Eligible	4	21,05	15	78,95	19	100,0	
	Total	55	56,70	42	43,30	97	100,0	

The table above presents data on the relationship between clean water sources and the incidence of diarrhea in toddlers. Out of a total of 97 respondents, there were two categories of clean water sources: "decent" and "undecent." In the group with a proper water source, as many as 51 toddlers (65.38%) did not experience diarrhea, while 27 toddlers (34.62%) experienced diarrhea. On the other hand, in the group that used inappropriate water sources, only 4 toddlers (21.05%) did not experience diarrhea, while 15 toddlers (78.95%) experienced diarrhea. These results showed that toddlers who used unsuitable water sources had a higher risk of developing diarrhea compared to those who used decent water sources. The p-value obtained was 0.0001, which showed that there was a very significant relationship between clean water sources and the incidence of diarrhea in toddlers, indicating that access to decent clean water sources played an important role in preventing diarrhea. These findings underscore the importance of good clean water supply and management in an effort to improve public health, especially to protect toddlers from the risk of infection. This data provides a strong basis for formulating interventions aimed at improving access to clean water and supporting more effective health programs to prevent the incidence of diarrhoea in toddlers in the community.

DISCUSSION

This study aims to explore the relationship between clean water sources and the incidence of diarrhea in toddlers in Meureubo District. The results obtained showed that there was a significant difference between toddlers who used decent and unsuitable water sources in terms of the incidence of diarrhea. The data presented showed that toddlers who accessed a decent source of clean water had a lower risk of developing diarrhea compared to toddlers who used an unsuitable water source. This research is in line with many previous studies that reveal that access to clean water and good sanitation is a key factor in preventing infectious diseases, including diarrhea (Anggraini et al., 2021). Poor sanitation conditions and the use of polluted water can lead to exposure of toddlers to various pathogens that cause diarrhea, so good access to clean water is essential to protect children's health. The majority of toddlers who use decent water sources show better health status, reflecting the vital role of clean water in maintaining cleanliness and health. Improving clean water supply infrastructure is urgent, and the government and related agencies need to make real efforts to ensure that all communities, especially in vulnerable areas such as Meureubo District, can access safe and clean water sources. Educational programs on good sanitation

practices and the importance of maintaining cleanliness are also very necessary, including the use of clean water, washing hands with soap, cooking food properly, and maintaining environmental cleanliness. Collaboration between the government, non-governmental organizations, and the community is needed to create sustainable change, and appropriate measures are expected to reduce the incidence of diarrhea in children under five and improve overall public health and quality of life in Meureubo District. This research highlights the importance of access to clean water and provides a foundation for the development of more effective and integrated public health policies.

The availability of clean water significantly influences the incidence of diarrhea. Research consistently shows a link between access to clean water and diarrhea rates. For instance, Damayanti (2017) found that families with limited access to clean water are more prone to diarrhea compared to those with better water access. Similarly, Padji and Sudarmadji (2017) reported that reduced availability of clean water correlates with increased cases of diarrhea. Utami and Handayani (2017) emphasized that adequate clean water availability is crucial for lowering diarrhea rates in children and reducing child mortality associated with the disease (Marini et al., 2020). Waterborne diseases, including diarrhea, hepatitis A and E, skin infections, and other gastrointestinal disorders, highlight the necessity of providing clean water in sufficient quantity and quality to support personal and environmental hygiene. Ensuring a reliable supply of clean water is a preventive measure against such diseases (Ministry of Health, 2011). Field observations revealed that some respondents with adequate water sources still experienced diarrhea, likely due to other factors like insufficient maternal knowledge. Conversely, some respondents with inadequate water sources did not contract diarrhea, possibly due to better maternal knowledge. This aligns with Christy's research (2014), which asserts that inadequate maternal knowledge can hinder efforts to prevent and manage diarrhea in children. Thus, maternal knowledge emerges as a more influential factor than environmental or socioeconomic conditions in affecting diarrhea incidence among toddlers.

This study shows that several main factors affect the high incidence of diarrhea in toddlers in the working area of the Meureubo Health Center, Meureubo District, West Aceh Regency in 2023. Poor sanitation conditions are closely related to the increase in cases of diarrhea, where 65% of toddlers living in environments with inadequate sanitation are exposed to this disease. In addition, 60% of children under five who are affected by diarrhea consume water from unsuitable sources, such as unprotected wells or river water. Clean and healthy living behaviors (PHBS), especially when it comes to washing hands with soap after defecating and before eating, are also not well implemented by most mothers under five, leading to 70% of them not practicing proper handwashing habits. Exclusive breastfeeding for the first six months has been shown to reduce the risk of diarrhea, but 55% of toddlers affected by diarrhea do not get exclusive breastfeeding. Unhealthy environmental conditions, such as poorly ventilated homes and inadequate waste management, also increase the risk of diarrhoea, with 60% of toddlers living in such environments exposed to the disease.

Based on the results of this study, environmental and behavioral factors have

a great influence on the incidence of diarrhea in toddlers in the working area of the Meureubo Health Center. Poor sanitation conditions play a significant role in the increased risk of diarrheal diseases. The use of inappropriate toilets and inadequate household waste management create an environment that supports the spread of pathogens that cause diarrhea (Gaharpung et al., 2023). An unclean environment becomes a breeding ground for bacteria, viruses, and parasites that can contaminate the water and food consumed by toddlers, thereby increasing the risk of diarrhea (Ginting & Hastia., 2019). To reduce the incidence of diarrhea, it is necessary to improve sanitation infrastructure such as the construction of proper toilets and better and safer waste management. Continuous education programs are also important to increase public awareness about the importance of environmental cleanliness and the implementation of clean and healthy living behaviors. These efforts are expected to suppress the spread of diarrheal diseases, especially among toddlers, and overall improve the degree of public health in the region.

Poor drinking water quality plays a significant role in the increase in the incidence of diarrhea in toddlers in the working area of the Meureubo Health Center. Water contaminated with pathogens such as bacteria, viruses, and parasites, especially those coming from unprotected sources such as wells or river water, can easily cause infections if consumed without going through a treatment process such as boiling. Toddlers, with an immature immune system, are particularly susceptible to infections caused by unsuitable drinking water. Anticipating to prevent diarrhea, counseling about the importance of treating drinking water in the right way needs to be intensified. The provision of clean water infrastructure such as PAM water or protected wells must be a priority to increase public access to water that is safe for consumption (Silangen & Sembel., 2020). Education about the importance of boiling water before drinking, as well as periodic monitoring of water quality in this area, is a crucial step in reducing the risk of diarrhea in toddlers, so that public health can be better maintained.

Clean and Healthy Living Behaviors (PHBS) such as washing hands with soap are an important step in preventing diarrhea in toddlers. This study shows that the practice of washing hands with soap is still low among mothers of toddlers, who often do not do it before breastfeeding, before eating, or after defecating, thus increasing the risk of spreading pathogens in toddlers. Lack of awareness and knowledge about the importance of PHBS is one of the factors in the low implementation of these habits. Counseling and training on how to wash hands correctly, especially at five critical times: before eating, before preparing food, before breastfeeding, after defecating, and after cleaning toddlers, is indispensable. The availability of adequate handwashing facilities, such as clean water and soap, must also be ensured to facilitate the implementation of this habit. The better implementation of PHBS is expected to significantly reduce the incidence of diarrhea in toddlers, so that public health can be better maintained.

Exclusive breastfeeding plays a crucial role in increasing the baby's immunity to infections, including diarrhea, by providing better natural immunity than babies who are fed formula or complementary foods that have

not been sterilized (Aballah et al., 2019). The results of this study show that babies who receive exclusive breast milk for the first six months have a lower risk of developing diarrhea because breast milk contains antibodies and important nutrients that strengthen the immune system and maintain the health of the baby's digestive tract. In environments that may not be completely hygienic, as found in this study, exclusive breastfeeding becomes a very important additional protection. Education to mothers about the benefits of exclusive breastfeeding needs to be intensified, including information on the correct way to breastfeed, as well as managing problems that may arise during breastfeeding. Ongoing counseling programs through various media and health facilities, as well as family support and government policies that support breastfeeding mothers, are urgently needed to encourage exclusive breastfeeding practices. This increase in education and support is expected to reduce the incidence of diarrhea in toddlers and improve the health of children in the Meureubo Health Center work area.

The condition of the living environment plays an important role in the health of toddlers, especially related to the risk of diarrhea (Wahyuni., 2021). Inadequate ventilation of the house can lead to a buildup of bacteria and viruses in the room, which ultimately increases the risk of infection in homeowners, especially toddlers whose immune systems are not yet fully developed. Poor waste management around the house is also a breeding ground for flies, which have the potential to bring pathogens into the food and drinks consumed by toddlers, thereby increasing the risk of diarrhea (Collinet et al., 2020). The community needs to improve the condition of the living environment by ensuring good ventilation for healthy air circulation and proper waste management to prevent the spread of disease. Education on the importance of environmental cleanliness and the provision of adequate waste management facilities must continue to be improved to minimize the risk of diarrhea in toddlers and maintain overall public health.

CONCLUSION

This study shows that the incidence of diarrhea in toddlers in the working area of the Meureubo Health Center is influenced by various factors, such as poor sanitation conditions, inappropriate drinking water quality, low implementation of Clean and Healthy Living Behaviors (PHBS), exclusive breastfeeding, and inadequate living environment conditions. The implications of this study show the importance of improving sanitation infrastructure, access to clean water, and counseling to the community, especially mothers under five, about the importance of PHBS and exclusive breastfeeding. The results of the statistical test showed that there was a significant correlation between the availability of clean water sources and the incidence of diarrhea in toddlers, with a p value of 0.0001. The existence of latrine facilities also has a close relationship with diarrhea cases, with a p-value of 0.013. Household waste management practices showed a significant relationship with the incidence of diarrhea, as evidenced by a p-value of 0.0001, while the wastewater disposal system also had a significant relationship with the incidence of diarrhea, with a p-value of 0.0001. Maternal knowledge about

health was an important factor influencing the incidence of diarrhea, supported by a p-value of 0.0001, and the level of education showed a significant association with the incidence of diarrhea, with a p-value of 0.036. The nutritional status of toddlers also had a significant relationship with the incidence of diarrhea, as indicated by a p-value of 0.022, while personal hygiene and environmental sanitation had a very strong relationship with the incidence of diarrhea, with a p-value of 0.0001. More targeted interventions are needed to reduce the incidence of diarrhoea and improve the health of toddlers in the region, through improved sanitation, health education, and improved nutritional quality.

BIBLIOGRAPHY

- Aballah, E. M. I., Eldakhakhny, A. M., & Mohammed, B. M. (2019). Effect of Breast Feeding Versus Formula Feeding On Surgical Wound Healing Among Infants during the First Six Months of Age. *Zagazig Nursing Journal*, 15(1), 1-18. <https://doi.org/10.18535/jmscr/v6i3.18>
- Adisasmito, Wiku. Risk factors for diarrhea in infants and toddlers in Indonesia: Systematic review of academic research in public health. *Makara kesehatan*, 2007, 11.1: 1-10.
- Almatsier, Sunita. Basic principles of nutrition. *Jakarta: Gramedia Pustaka Utama*, 2005.
- Anggita, Imas Masturoh, Nauri, *Health Research Methodology*, Jakarta: KEMENKES RI; 2018.
- Angraini, W., Amin, M., Pratiwi, B. A., Febriawati, H., & Yanuarti, R. (2021). PENGETAHUAN IBU, AKSES AIR BERSIH DAN DIARE DENGAN STUNTING DI PUSKESMAS ATURAN MUMPO BENGKULU TENGAH. *Jurnal Kesmas (Kesehatan Masyarakat) Khatulistiwa*, 8(2), 92. <https://doi.org/10.29406/jkmk.v8i2.2816>
- Ardhiana, Putu, et al, *Research Methodology for Education*, Medan: Yayasan kita menulis; 2021.
- Arindari, Dewy Rury; Yulianto, Eko. The Relationship between Maternal Knowledge and Attitudes with the Incidence of Diarrhea in Toddlers in the Punti Kayu Palembang Center Working Area. *Scientific Journal of Health*, 2018, 7.1: 47-54.
- Bangun, Henny Arwina, et al., The Relationship between Basic Sanitation and the Incidence Diarrhea in Toddlers in Durian Village, Pantai Labu District, Deli Serdang Regency. *Journal of Health Technology and Social Sciences (Tekesnos)*, 2020, 2.1:57-66.
- Colvin, C. J., Smith, H. J., Swartz, A., Ahs, J. W., de Heer, J., Opiyo, N., Kim, J. C., Marraccini, T., & George, A. (2013). Understanding careseeking for child illness in sub-Saharan Africa: A systematic review and conceptual framework based on qualitative research of household recognition and response to child diarrhoea, pneumonia and malaria. *Social Science &*

- Medicine, 86, 66–78. <https://doi.org/10.1016/j.socscimed.2013.02.031>
- Gaharpung, M. S., Wega, M. O., Kuwa, M. K. R., Nggato, K. R., & Sulastien, H. (2023). Gambaran Sanitasi Lingkungan pada Tempat Tinggal Balita Penderita Diare. *Jurnal Keperawatan*, 15(4), 143-150. <https://doi.org/10.47560/keb.v8i1.192>
- Ginting, T., & Hastia, S. (2019). Hubungan sanitasi lingkungan dan personal hygiene ibu dengan kejadian diare pada balita di Kelurahan Sidorejo Puskemas Sering Kota Medan. *Jurnal Prima Medika Sains*, 1(1), 12-17. <https://doi.org/10.47560/keb.v8i1.192>
- Hargono, A., Waloejo, C., Pandin, M. P., & Choirunnisa, Z. (2022). Penyuluhan Pengolahan Sanitasi Air Bersih untuk Meningkatkan Kesehatan Masyarakat Desa Mengare, Gresik. *Abimanyu: Journal of Community Engagement*, 3(1), 1–10. <https://doi.org/10.26740/abi.v3n1.p1-10>
- Indonesian Ministry of Health. *Diarrhea Bulletin*. Ministry of Health of the Republic of Indonesia. 2016.
- West Aceh District Health Office, *Health Profile of West Aceh District*, West Aceh: Health Office; 2019.
- Aceh Provincial Health Office, *Aceh Provincial Health Profile*, Aceh: Health Office; 2020.
- Fitrah, Muh, Luthfiyah, *Research Methods: Qualitative Research, classroom action and case studies*, Sukabumi: Jejak Publisher; 2017.
- Fitriani N, Darmawan A, P, *Analysis of risk factors for diarrhea in toddlers in the Pakuan Baru Health Center working area*, Jambi City: Med Dedication J Pengabdian Kpd Mas FKIK UNJA; 2021;4(1):154-64.
- Ganguly, Enakshi, *et al.*, Prevalence and risk factors of diarrhea morbidity among under- five children in India: A systematic review and meta-analysis. *Indian journal of child health*, 2015, 2.4: 152.
- Gibson. *Nutritional status and its measurement*. Bogor Agricultural Institute. 2005.
- Hamzah, B., *et al.*, The relationship between clean and healthy living behavior and the incidence of diarrhea in toddlers in Belawa District, Wajo Regency in 2012. *Makassar: FKM UNHAS*, 2012.
- Hijriani H, A A, K A. Knowledge of healthy hygiene behavior (PHBS) in children with diarrhea at class B General Hospital, ubang Regency: *J Heal Sains*; 2020;1(5).
- Silangen, M. G., Tilaar, S., & Sembel, A. (2020). Pemetaan masalah penyediaan air minum di Perkotaan Tobelo Kabupaten Halmahera. *Spasial*, 7(1), 70-81. <https://doi.org/10.33387/tekstual.v18i2.3054>
- Wahyuni, N. T. (2021). FAKTOR RISIKO KEJADIAN DIARE PADA BALITA SYSTEMATIC REVIEW BIDANG KESEHATAN MASYARAKAT. *Jurnal Ilmu Kedokteran Dan Kesehatan*, 8(3). <https://doi.org/10.33024/jikk.v8i3.4667>