

Factors Related To The Incidence Of Diarrhea In Toddlers In The Coastal Area Of Kuala Lempuing Health Center Working Area, Bengkulu City

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ABSTRACT

Intoduction: Diarrhea is one of the global health problems that remains a serious challenge, especially in developing countries including Indonesia. According to data from WHO and UNICEF (2023), approximately 2 billion cases of diarrhea occur each year worldwide. Of this number, around 1.7 billion cases result in more than 525,000 deaths of toddlers each year. About 78% of toddler deaths due to diarrhea occur in Africa and Southeast Asia. Method: This study used a quantitative approach with a cross-sectional design. A sample of 92 respondents was selected through simple random sampling. The instruments used were observation, and analysis was conducted using the Chi-Square test. Result and Discussion: The univariate analysis showed that 52 respondents had poor water pH, with 30 respondents (32.6%) having acidic water, and 22 respondents (23.9%) having alkaline water containing microbes. Additionally, 37 respondents (40.2%) had poor physical water conditions, and 43 respondents (46.7%) experienced diarrhea. The bivariate analysis indicated a significant relationship between water pH ($p=0.005$), the presence of microbes ($p=0.003$), and the physical condition of the water ($p=0.005$) with the incidence of diarrhea. These findings suggest that water pH, the presence of microbes, and water physical conditions are factors that can influence the occurrence of diarrhea. Conclusion: The researchers recommend that the health center monitor more frequently and enhance surveys, as well as provide education regarding the environment and water that causes diarrhea. It is also hoped that the community will periodically improve their. home environment and maintain the cleanliness of water sources.

INTRODUCTION

Diarrhea remains a major global health problem, particularly affecting children under five in developing countries. According to the World Health Organization (WHO) and UNICEF (2023), approximately two billion diarrhea cases occur annually worldwide, resulting in more than 525,000 deaths among children each year, with 78% of these deaths occurring in Africa and Southeast Asia. In Indonesia, diarrhea continues to be one of the leading causes of morbidity and mortality among toddlers due to poor sanitation, inadequate access to clean water, and limited hygiene awareness.

The Indonesian Health Survey (2023) reported that the national prevalence of diarrhea across all age groups was 4.3%, with the highest prevalence found in Central Papua (16.1%) and the lowest in the Riau Islands (2.1%).

In Bengkulu Province, the prevalence of diarrhea diagnosed by healthcare professionals reached 1.8%, with 6,571 reported cases. The Bengkulu City Health Office (2023) reported that Kuala Lempuing Health Center had the highest incidence of diarrhea, with 518 total cases including 171 cases among toddlers.

Several environmental and behavioral factors contribute to the occurrence of diarrhea, including unsafe water sources, poor sanitation, and improper hygiene practices. Among these, water quality plays a central role. The physical, chemical, and biological characteristics of water, such as pH level, microbial contamination, and physical appearance (color, odor, and taste), are closely related to disease transmission. The presence of pathogenic bacteria such as *Escherichia coli* in household water can significantly increase the risk of diarrhea, especially in children with weaker immune systems.

The coastal area of Kuala Lempuing is geographically low-lying with high humidity and limited access to clean water, creating favorable conditions for microbial growth and contamination. Preliminary surveys in this area found that households using well water with acidic pH and poor

physical quality had higher cases of diarrhea among toddlers compared to those using treated water. These findings highlight the importance of environmental monitoring and community education about water safety.

RESEARCH METHODS

This study used a quantitative analytic design with a cross-sectional approach, aiming to determine the relationship between water pH, microbial presence, and physical water condition with diarrhea incidence among toddlers. The design was chosen because it allows researchers to analyze relationships between variables at a single point in time (Notoatmodjo, 2012). The population in this study included all toddlers in the working area of the Kuala Lempuing Health Center, totaling 2,788 individuals (Sugiyono, 2013).

The sample consisted of 92 respondents, selected using a simple random sampling technique. The number of samples was determined using the Federer formula (1963), which ensures the adequacy of sample size for statistical analysis.

RESULTS

Based on Table 1, it can be seen that out of all respondents, 23 respondents (76.7%) who used acidic water (low pH) had toddlers experiencing diarrhea, while 7 respondents (23.3%) did not. Among respondents who used alkaline water, 13 respondents (59.1%) had diarrhea cases, and 9 respondents (40.9%) did not.

Meanwhile, in households that used neutral pH water, 15 respondents (37.5%) experienced diarrhea, and 25 respondents (62.5%) did not. Regarding microbial contamination, 28 respondents (75.7%) with the presence of microbes in household water had toddlers suffering from diarrhea, while 9 respondents (24.3%) who had no microbial contamination also experienced diarrhea.

Respondents who used water without microbial contamination were 23 respondents (41.8%) with diarrhea and 32 respondents (58.2%) without diarrhea. For the physical condition of the water, 31 respondents (72.1%) who used water categorized as poor (cloudy or smelly) had diarrhea cases, while 12 respondents (27.9%) did not. In contrast, 20 respondents (40.8%) who used good-quality water experienced diarrhea, and 29 respondents (59.2%) did not.

Tabel 1. incidence of diarrhea

Variabel	incidence of diarrhea			
	Yes		No	
	n	%	n	%
pH air				
pH air asam	23	76,7%	7	23,3%
pH air basa pH	13	59,1%	9	40,9%
air Netral	15	37,5%	25	62,5%
Mikroba				
Ada Mikroba	28	75,7%	23	41,8%
Tidak ada Mikroba	9	24,3%	32	58,2%
Fisik air				
Kurang Baik	31	72,1%	12	27,9%
Baik	20	40,8%	29	59,2%

DISCUSSION

The results showed a significant relationship between water pH, microbial presence, and physical water condition with diarrhea incidence among toddlers. This indicates that poor water quality greatly influences the occurrence of diarrhea in coastal areas. Acidic or alkaline water can disrupt the balance of microorganisms in the digestive tract and support the growth of pathogenic bacteria such as *Escherichia coli*.

This finding aligns with research by Dewi (2019), which stated that abnormal water pH is one of the risk factors for diarrhea. The presence of microbes in household water also increases the risk of diarrhea. According to WHO (2023), microbial contamination, especially from fecal sources, remains the main cause of diarrhea in developing countries.

Poor physical water quality, such as cloudy color or unpleasant odor, indicates pollution by organic materials. This supports the statement of the Ministry of Health (2017), which explains that unsafe water quality can lead to infectious diseases like diarrhea.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the research on factors related to the incidence of diarrhea among toddlers in the coastal area of the Kuala Lempuing Health Center working area, the following conclusions can be drawn:

1. Most respondents (56.5%) used water with abnormal pH levels.
2. A total of 37 respondents (40.2%) had household water contaminated with microbes.
3. More than one-third of respondents (40.2%) used water with poor physical quality such as cloudy color and unpleasant odor.
4. There is a significant relationship between water pH ($p = 0.005$), microbial presence ($p = 0.003$), and physical water condition ($p = 0.005$) with the incidence of diarrhea among toddlers in the Kuala Lempuing Health Center working area, Bengkulu City.

Suggestion

The results of this research are expected to contribute to public health knowledge, especially in environmental health and disease prevention. It is suggested that:

1. The Kuala Lempuing Health Center conduct regular monitoring of water quality and promote health education programs regarding clean water management.
2. The community maintain household hygiene, improve sanitation, and ensure water is properly boiled or filtered before consumption.
3. Future researchers are encouraged to conduct studies on other factors that may influence diarrhea incidence, such as personal hygiene behavior and environmental sanitation.

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