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The Relationship Between Phbs Factors And The Incidence Of Diarrhea In Toddlers

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ABSTRACT

Diarrhea remains a major health problem among infants in Indonesia, and various factors related to clean and healthy living behaviors (PHBS) are believed to play an important role in reducing its incidence. In 2021, diarrhea accounted for approximately 9% of all infant deaths worldwide. This equates to more than 1,200 child deaths per day, or approximately 444,000 children per year. The objective of this study was to determine the relationship between PHBS factors and the incidence of diarrhea among infants in the Peusangan Selatan Health Center District, Bireuen Regency, in 2025. The research method used was correlation analysis with a cross-sectional design, ie, a study conducted through observation or data collection at a specific point in time. The study population consisted of mothers with infants in May 2025, totaling 864 infants, with a sample size of 91 respondents selected using non-probability sampling. The research tool was a structured questionnaire developed based on theory and references related to PHBS. The results of the multivariate analysis showed that the variable of healthy toilet use had a significant effect on the incidence of diarrhea in toddlers (p = 0.000; Exp(B) = 37.610), while the use of clean water (p = 0.997) and hand washing (p = 0.625) did not show a significant effect.

Keywords: Clean and Healthy Living Behavior (CHLB), Diarrhea, Toddlers, Clean Water

INTRODUCTION

Children are a vital asset for the continued development of a nation, so maintaining their health from an early age is a shared responsibility. Toddlerhood (children under five years of age) is a period of rapid growth and development, but it is also the time when children are most vulnerable to various infectious diseases, one of which is diarrhea. Diarrhea is an environmentally-based disease that remains a leading cause of morbidity and mortality in children worldwide, including in Indonesia.(Agustina L, 2019)

Globally, in 2021, diarrhea accounted for approximately 9% of all deaths in children under five, equivalent to more than 1,200 deaths per day. Most deaths occurred in South Asia and

Sub-Saharan Africa. Although diarrheal mortality has decreased by 6.3% since 2000 thanks to basic interventions, this figure still highlights the need for greater attention, particularly in developing countries.(Irianty H, Hayati R, 2018)

In Indonesia, diarrhea is the second leading cause of death after pneumonia in infants aged 29 days to 11 months (9.8%) and in children aged 12–59 months (4.5%). Rotavirus is the leading cause of severe diarrhea in toddlers, accounting for 41–58% of hospitalizations. In Aceh Province, in 2020, 953 toddlers suffered from diarrhea out of a total of 100,270 toddlers, resulting in 17 deaths. In Bireuen Regency itself, cases of toddler diarrhea are still found annually, with Siblah Krueng Community Health Center and Peusangan Selatan Community Health Center having the highest number of cases.(Aceh Health Profile, 2025).

Diarrhea is closely linked to the practice of Clean and Healthy Living Behaviors (PHBS) at the household level. PHBS indicators such as exclusive breastfeeding, clean water use, handwashing with soap, and the use of healthy latrines play a crucial role in preventing diarrhea.(F., 2018)However, based on a preliminary survey in the Peusangan Selatan Community Health Center work area, low levels of PHBS implementation were still found, such as a lack of handwashing habits, the unavailability of healthy latrines, the use of unclean water, and a lack of balanced nutrition.

Various previous studies have shown that PHBS has a significant influence on diarrhea incidence. However, most of these studies used a general approach and did not specifically measure specific PHBS indicators focused on the local context. This study attempts to fill this gap by examining only four key PHBS indicators relevant to diarrhea incidence: clean water use, handwashing with soap, use of healthy latrines, and breastfeeding.

Furthermore, there hasn't been much local research conducted in the Peusangan Selatan Community Health Center (Puskesmas) area in Bireuen Regency, even though the annual incidence of diarrhea remains relatively high. Therefore, this study is crucial to determine the PHBS factors that most influence diarrhea incidence in toddlers in the area.

METHOD

This research is a correlational analytic study using a cross-sectional approach. This design aims to determine the relationship between Clean and Healthy Living Behavior (PHBS) factors and the incidence of diarrhea in toddlers through data observation over a specific period.

The research was conducted in the Peusangan Selatan Community Health Center Working Area, Bireuen Regency, Aceh Province, from January to May 2025.

The population in this study was all mothers with toddlers in the Peusangan Selatan Community Health Center's working area, totaling 1,005 toddlers. The sample was determined using the Slovin formula with a 10% error rate (d), resulting in 91 respondents. The sampling technique used a non-probability sampling method with an accidental sampling approach, namely respondents who met the criteria and were willing to be interviewed during the study.

The instrument used was a structured questionnaire compiled based on previous research references. The questionnaire consisted of: Respondent identity: 3 items (toddler's age, gender, and diarrhea incidents). PHBS use of clean water: 7 items. PHBS washing hands with soap: 5 items and PHBS use of healthy latrines: 8 items with all questions using the Guttman scale with answer options "Yes" (score 1) and "No" (score 0). There were a total of 20 questions to measure PHBS behavior.

Data were analyzed univariately, bivariately, and multivariately. Bivariate analysis used the Chi-Square test to determine the relationship between independent variables and diarrhea incidence, while multivariate analysis was conducted to determine the most dominant variables influencing diarrhea incidence.

RESULTS AND DISCUSSION

The data analysis results are based on the research objective, which is to identify the relationship between Clean and Healthy Living Behavior (PHBS) factors and the incidence of diarrhea in toddlers. The analysis was conducted on data obtained from 91 respondents using a structured questionnaire. The presentation of the results includes three stages of analysis.

Univariate Analysis

1. Respondent Characteristics

Table 1. Distribution of Respondent Characteristics Affecting Diarrhea in Toddlers

Characteristics	Frequency (n)	Percentage (%)
Unuts		
2-3 Years	58	63.7
4-5 Years	33	36.3

Total	91	100.0
Gender		
Man	36	39.6
Woman	55	60.4
Total	91	100.0
Use of clean water		
Good	48	52.7
Not enough	43	47.3
Total	91	100.0
Wash your hands with clean water and soap		
Good	35	38.5
Not enough	56	61.5
Total	91	100.0
Use of healthy toilets		
Good	59	64.8
Not enough	32	35.2
Total	91	100.0

(Source: Primary Data, 2025)

Based on Table 1 above, it shows that the majority of respondents by age category are in the 2–3 year age range, namely 58 toddlers (63.7%). Based on gender, the majority of respondents are female, namely 55 toddlers (60.4%). In the clean water use variable, the majority of respondents are in the good category, namely 48 toddlers (52.7%). Meanwhile, in the handwashing habit variable with soap, the majority are in the poor category, namely 56 toddlers (61.5%). As for the healthy toilet use variable, the majority of respondents are classified as good, namely 59 toddlers (64.8%).

2. Diarrhea Incident

Table 2. Distribution of Characteristics Based on the Incidence of Diarrhea in Toddlers

Diarrhea Incident	**Frequency (n)**	**Percentage (%)**
Diarrhea	33	36.3
No Diarrhea	58	63.7
Total	91	100.0

(Source: Primary Data, 2025)

The table above explains that the highest distribution of respondents did not suffer from diarrhea, as many as 47 respondents (51.6%), while those who suffered from diarrhea were 44 respondents (48.4%).

Bivariate Analysis

1. Use of Clean Water

Table 3. Cross Tabulation of the Relationship between Use and Influence of Diarrhea on Toddlers

Use of Clean Water	Diarrhea Incident				Amount		P Value
	Diarrhea		No Diarrhea				
	F	%	F	%	F	%	
Good	12	25	36	75	48	100	0.032
Not enough	21	48.8	22	51.2	22	100	
Total	33	36.3	58	63.7	91	100	

(Source: Primary Data, 2025)

Based on the analysis results in Table 3, it was found that of the 40 respondents who were categorized as using clean water well, 36 toddlers (75.0%) did not experience diarrhea. Meanwhile, of the 51 respondents with inadequate use of clean water, 22 toddlers (51.2%) did not experience diarrhea. The results of the statistical test using the Chi-square test showed a value of $\rho = 0.032$. Because this value is smaller than the significance level ($\alpha = 0.05$), it can be concluded that there is a significant relationship between clean water use and the incidence of diarrhea in toddlers.

2. Washing Hands with Soap

Table 4. Cross Tabulation of the Relationship between Hand Washing and the Incidence of Diarrhea in Toddlers

Washing Hands with Soap	Diarrhea Incident		Amount	P Value
	Diarrhea	No Diarrhea		

	F	%	F	%	F	%	
Good	7	20	28	80	35	100	
Not enough	26	46.4	30	53.6	56	100	0.020
Total	33	36.3	58	63.7	91	100	

(Source: Primary Data, 2025)

Based on the analysis results in Table 4, it is known that of the 35 respondents with good handwashing habits using soap, as many as 28 toddlers (80.0%) did not experience diarrhea. Meanwhile, of the 56 respondents with poor handwashing habits, as many as 30 toddlers (53.6%) did not experience diarrhea. The results of the statistical test using the Chi-square test showed a ρ value of 0.020. Because the ρ value is smaller than the 0.05 significance level, it can be concluded that there is a significant relationship between handwashing habits and the incidence of diarrhea in toddlers.

3. Healthy Toilet

Table 5. Cross-tabulation of the relationship between healthy toilets and the incidence of diarrhea in toddlers

Healthy Toilet	**Diarrhea Incident**				**Amount**		**P Value**
	Diarrhea		**No Diarrhea**				
	F	**%**	**F**	**%**	**F**	**%**	
Good	13	22	48	78	59	100	
Not enough	20	62.5	12	37.5	32	100	0,000
Total	33	36.3	58	63.7	91	100	

(Source: Primary Data, 2025)

Based on the analysis results in Table 5, it was found that of the 59 respondents who used healthy latrines properly, 46 toddlers (78.0%) did not experience diarrhea. Meanwhile, of the 32 respondents who did not use latrines properly, 20 toddlers (36.3%) experienced diarrhea. The results of the statistical test using the Chi-square test showed a ρ value of 0.000. Because this value is smaller than the 0.05 significance level, it can be concluded that there is a significant relationship between the use of healthy latrines and the incidence of diarrhea in toddlers.

Multivariate Analysis

Table 6. Multivariate analysis of PHBS factors with the incidence of diarrhea in toddlers

		B	SE	Wald	df	Sig.	Exp(B)	
Step 1a	Use of clean water(1)	21,834	6274	,000	1	.997	**30352174**	
	Washing hands(1)	,402	,823	,239	1	.625	1,495	
	Healthy Toilet	3,627	,934	15,070	1	.000	37,610	
	Constant	-23,473	6274,859	,000	1	.997	.000	

(Source: Primary Data (2025)

Based on Table 6, the results of multivariate analysis with logistic regression show that of the three variables analyzed, only the use of healthy latrines has a statistically significant relationship with the incidence of diarrhea in toddlers, with a p-value = 0.000 and Exp(B) = 37.610. This shows that toddlers who are in an environment with healthy latrines have a 37 times greater chance of not experiencing diarrhea compared to those who do not use healthy latrines.

Meanwhile, the clean water use variable showed a p-value of 0.997, and hand washing had a p-value of 0.625, both of which were greater than the significance level ($\alpha = 0.05$). Thus, these two variables did not have a significant effect in this multivariate model.

DISCUSSION

The results of the univariate analysis showed that the majority of respondents used clean water in the good category, namely 48 toddlers (52.7%). This indicates that the majority of the community understands the importance of using clean water in daily life, such as for drinking, cooking, bathing, and washing. The use of clean water is a crucial component in preventing environmental-based diseases, including diarrhea. Water that does not meet sanitation standards can contain bacteria, viruses, or parasites that can cause diarrhea, cholera, dysentery, skin diseases, and poisoning.(Ministry of Health, 2020)

However, these univariate results are not in line with the research.(Irianty et al., 2018)which found a significant relationship between clean water use and diarrhea incidence (p=0.026). This discrepancy may be caused by differences in the physical environment, community habits, or the quality of the clean water facilities used.

Meanwhile, regarding handwashing with soap, 56 toddlers (61.5%) were in the "poor" category. This indicates low public awareness of the importance of hand hygiene as part of a clean and healthy lifestyle. Yet, hands are the primary medium for transmitting pathogenic microorganisms, which can enter the body through food or indirect contact.

This result is in line with research(Wulandari, 2023)which also found high rates of diarrhea in children with poor handwashing practices. Proper and regular handwashing with soap has been shown to significantly reduce the risk of gastrointestinal infections, including diarrhea.

Regarding the Use of Healthy Latrines, the majority of respondents (64.8%) reported using healthy latrines. Using latrines that meet health standards plays a crucial role in preventing environmental contamination by feces. Improperly disposed of feces can contaminate groundwater, drinking water sources, and the surrounding environment, becoming a route for the transmission of diarrheal diseases.

This finding is consistent with research(Hamzah & Hamzah, 2021)This shows that families using healthy latrines have a lower risk of diarrhea. The use of standard latrines is an important indicator of good sanitation behavior.

The Relationship Between Clean Water Use and Diarrhea Incidence

This study found that of the 40 respondents who used clean water properly, 36 toddlers (75.0%) did not suffer from diarrhea. Meanwhile, of the 22 respondents who used clean water inadequately, only 22 toddlers (51.2%) did not suffer from diarrhea. The chi-square test results showed a p-value of 0.032, indicating a significant relationship between clean water use and the incidence of diarrhea. These results confirm that the availability and utilization of clean water directly affect toddler health. When compared with a previous study by Hamzah (2021), the results of this study are consistent, where the use of water that does not meet health standards has been shown to increase the risk of diarrhea. This is especially relevant in the Peusangan Selatan Community Health Center work area, considering that some residents still use water sources whose quality is not guaranteed.(Hamzah & Hamzah, 2021).

The Relationship Between Handwashing with Soap and the Incidence of Diarrhea

This study found that of the 35 respondents who washed their hands with soap properly, 28 toddlers (80.0%) did not suffer from diarrhea. Conversely, of the 56 respondents who washed their hands with soap poorly, only 30 toddlers (53.6%) did not experience diarrhea.

Statistical tests showed a p-value of 0.020, indicating a significant relationship between handwashing habits and the incidence of diarrhea in toddlers. This finding indicates that basic behaviors such as handwashing are still not optimal among the community in the Peusangan Selatan Community Health Center work area. This study is in line with the study of Dida Ningtias (2024), which found that poor handwashing habits increase the risk of diarrhea by almost 4 times. This indicates that education about handwashing with soap is very important in promotive efforts at community health centers, especially for mothers with toddlers.(Ningtias et al., 2024).

The Relationship Between the Use of Healthy Toilets and the Incidence of Diarrhea

In this study, of the 59 respondents who used healthy latrines properly, 46 toddlers (78.0%) did not suffer from diarrhea. Meanwhile, of the 32 respondents who did not use healthy latrines, 20 toddlers (36.3%) did suffer from diarrhea. The chi-square test yielded a p-value of 0.000, indicating a highly significant association between healthy latrines and diarrheal incidence.

These findings confirm that substandard fecal disposal practices are a major risk factor for diarrhea, especially in toddlers who are more susceptible to gastrointestinal infections. My research corroborates the findings of Hamzah's (2021) study, which found that the use of inadequate latrines significantly contributes to the high incidence of diarrhea.(Katiandagho & Darwel, 2019)

Thus, environmental sanitation-based interventions must be a priority in the Peusangan Selatan Community Health Center work area.

Based on the results of the multivariate logistic regression test, it is known that the most dominant variable influencing the incidence of diarrhea in toddlers in the Peusangan Selatan Community Health Center work area is the use of healthy latrines, with a significance value of p = 0.000 and an odds ratio value (Exp (B)) of 37.610. This means that toddlers who live in an environment with unhealthy latrines are 37 times more likely to experience diarrhea compared to toddlers who live in homes with proper latrines. Meanwhile, although the variables of clean water use and hand washing with soap have an important role in the bivariate analysis, in the multivariate analysis both did not show a significant effect simultaneously on the incidence of diarrhea. The p value for clean water use was 0.997 and hand washing was 0.625, both > 0.05.

These findings indicate that when all three variables are analyzed simultaneously, the use of sanitary latrines is the most dominant factor in preventing diarrhea. This is likely because

latrines serve as the final point for human waste management, which, if not properly managed, can contaminate water and the surrounding environment, as well as become a source of the spread of fecal-based diseases such as diarrhea. These results are consistent with previous theory and research that suggests poor sanitation systems are a major risk factor for diarrheal disease.

In the context of the Peusangan Selatan Community Health Center (Puskesmas)'s work area, this indicates that increasing ownership and use of healthy latrines must be a top priority for the PHBS program in the community. Public education should focus not only on clean water and handwashing habits, but also on developing safe, affordable, and sustainable basic sanitation infrastructure.

This research is also strengthened and in line with studies from(Sinum ADNS, Ali Harokan, 2024), which highlights that household environmental factors play an important role in determining disease risk in toddlers.

CONCLUSION AND SUGGESTIONS

Based on the results of research on the relationship between Clean and Healthy Living Behavior (PHBS) factors and the incidence of diarrhea in toddlers in the Peusangan Selatan Community Health Center Working Area of Bireuen Regency, it can be concluded that there is a significant relationship between the use of clean water ($\rho = 0.032$), the habit of washing hands with soap ($\rho = 0.020$), and the use of healthy latrines ($\rho = 0.000$) with the incidence of diarrhea in toddlers. However, the results of multivariate analysis show that the factor of the use of healthy latrines is the most dominant variable influencing the incidence of diarrhea. Therefore, efforts to improve PHBS, especially in the provision of healthy latrines and education on proper handwashing habits, are important steps in preventing diarrhea in toddlers.

The suggestions expected by researchers for the community, especially parents who have toddlers, are expected to increase the implementation of clean and healthy living behavior (PHBS) in the household environment, especially in terms of using clean water, washing hands with soap, and using healthy toilets to prevent diarrhea in children.

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