

The Relationship between the Role of Cadres and the Implementation of Clean and Healthy Living Behavior (PHBS) with the Incidence of Diarrhea at the Posyandu in BumiAyu Village South Dumai District

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Abstract

Diarrhea remains a significant global public health problem and is one of the leading causes of morbidity and mortality among children aged 1–4 years. In young children, diarrhea can result in complications ranging from mild dehydration to severe dehydration, shock, and death. Factors associated with the occurrence of diarrhea include the role of community health cadres and the implementation of Clean and Healthy Living Behavior (PHBS). This study aimed to examine the relationship between the role of health cadres, the implementation of PHBS, and the incidence of diarrhea among toddlers attending the Integrated Health Post (Posyandu) in BumiAyu Village South Dumai District. A quantitative cross-sectional study was conducted among mothers of children aged 0–59 months registered at Posyandu in 2025. From a population of 1,081 mothers, respondents were selected using simple random sampling. Data were collected using a structured questionnaire and analyzed using the chi-square test. The findings revealed that 65.2% of respondents perceived the role of health cadres as inadequate, 55.4% reported poor implementation of PHBS, and 59.8% reported diarrhea among their toddlers. Statistical analysis demonstrated a significant relationship between the role of health cadres, the implementation of PHBS, and the incidence of diarrhea among toddlers ($p < 0.001$). These findings suggest that strengthening the role of community health cadres and promoting clean and healthy living practices may contribute to reducing the incidence of diarrhea among young children in the community.

Keywords: Diarrhea; Implementation of PHBS; Role of Cadres

INTRODUCTION

The health status of toddlers is a particular concern because if health problems occur, they can be permanent or irreversible. Toddlers are vulnerable to exposure to bacteria that cause

infectious diseases because their immune systems are still weak, making them sensitive to infectious diseases (Astuti, 2022). Infectious diseases are closely related to toddler nutritional status. Diarrhea is a common infectious disease that impacts toddler health (Buulolo et al., 2022). Diarrhea remains a global problem with high morbidity and mortality rates in developing countries and is also a major cause of high morbidity and mortality rates among toddlers worldwide, especially among toddlers aged 1 to 4 years (Utami et al., 2023).

According to data from the World Health Organization (WHO), the incidence of diarrhea in toddlers in 2024 is approximately 1.7 billion cases, and 443832 toddlers die from diarrhea worldwide each year (Oishi, 2024). Of these deaths, 78% occur in developing countries, particularly in Africa and Southeast Asia. Diarrhea is the second leading cause of death among toddlers globally. Nearly 1 in 5 child deaths is due to diarrhea as reported by the Ministry of Health of the Republic of Indonesia in 2022.

According to the 2023 Indonesian Health Survey (SKI), the prevalence of diarrhea among children under five years of age was 4.9% (Larasati et al., 2025). Furthermore, in 2021, diarrhea contributed to 4.5% of mortality among children aged 12–59 months in Indonesia (as reported by the Ministry of Health of the Republic of Indonesia in 2022).

Based on data from the Riau Province Health Profile in 2023, the incidence of diarrhea among all ages was 31744 (17.7%) and among children under five (9403) was 18.7% of the target. The district/city with the highest incidence of diarrhea among all ages was Dumai City at 44.64%, and the lowest was Indragiri Hilir Regency at 11.31% as reported by the Dinas Kesehatan Provinsi Riau in 2023.

According to data from the Dumai City Health Office in 2024, the incidence of diarrhea among children under five was 5055 cases (19.61%), or an incidence rate of 14.71 per 1000 population. The prevalence of diarrhea among children under five was 9.10% of children under five, with 41.04% of those served, with a morbidity rate of 37.34 per 1000 children under five, and a mortality rate of 2% as reported by the Dinas Kesehatan Kota Dumai in 2024.

According to data from the BumiAyu Community Health Center in Dumai City from January to August 2025, the incidence of diarrhea in children under 5 years of age was 56 cases. The villages with the highest incidence were BumiAyu (26 cases (46.4%)), RatuSima (16 cases (28.6%)), and Bukit Datuk (14 cases (25%)). The incidence of diarrhea in children over 5 years of age was 284 cases, with the highest incidence being BumiAyu (136 cases (47.9%)), Bukit Datuk (77 cases (27.1%)), and RatuSima (71 cases (25%)) as reported by the Puskesmas BumiAyu in 2025.

Diarrhea can be caused by food contaminated with microorganisms (*E. coli*, salmonella, echovirus, rotavirus, and adenovirus), malabsorption syndrome (carbohydrate, fat, and protein), infectious diseases (measles, acute respiratory infections), and a weakened immune system (Hanafiani and Irianti, 2021). The impact of diarrhea in toddlers is the loss of a number of fluids and electrolytes in the body due to vomiting and liquid feces, leading to dehydration (mild to severe), shock and death (Buulolo et al., 2022).

Risk factors for diarrhea include environmental factors such as inadequate sanitation and inadequate clean water facilities, behavioral factors such as infrequent handwashing before eating and after defecating, improper waste disposal practices, and a lack of Clean, Healthy, and Clean-living Behavior (PHBS). Other risk factors include the lack of exclusive breastfeeding, low public knowledge about diarrhea, malnutrition, and personal hygiene, poor housing sanitation, and the role of community health workers. One of the risk factors that influences the incidence of diarrhea in toddlers is the role of cadres (Buulolo *et al.*, 2022).

Cadres are central to the implementation of integrated health post (Posyandu) activities. Their active participation is expected to mobilize community participation to improve family health (Juliati *et al.*, 2019). Cadres are a form of community participation in the health sector that is easily accessible to mothers of toddlers. Cadres play a crucial role in providing health services that reach the community and provide more face-to-face contact than other health workers (Sugiarti *et al.*, 2021). One role of cadres is to provide education to mothers of toddlers on prevention measures to avoid diarrhea. The information mothers of toddlers receive from integrated health post (Posyandu) cadres significantly influences their knowledge of maintaining their children's health and preventing the spread of diarrhea. Therefore, cadres play a crucial role in providing education about diarrhea to mothers of toddlers (Nurhaedah *et al.*, 2022).

One of the impacts that influence the occurrence of diarrhea is Clean and Healthy Living Behavior (PHBS), including inadequate use of clean water, water contaminated by feces, lack of sanitation facilities, unhygienic feces disposal, and poor personal and environmental hygiene (Nawali *et al.*, 2022). PHBS is a crucial component of health development, requiring awareness, ability, and willingness to live a healthy lifestyle among all residents to achieve optimal health (Rahayu *et al.*, 2024).

There are 10 PHBS indicators that can be used as a basis for assessing the success of PHBS practices at home, including: 1) Weighing newborns and toddlers separately; 2) Exclusive breastfeeding; 3) Regular delivery assisted by medical personnel, 4) Using clean water, 5) Washing hands with soap and water, 6) Using a clean bathroom, 7) Eliminating mosquito larvae, 8) Eating a healthy diet that includes fruits and vegetables, 9) Exercising daily, and 10) Not smoking indoors (Maga *et al.* 2024). Research conducted by Jumhafni *et al.*, (2024) showed a significant relationship between clean and healthy living behaviors (PHBS) in the Timampu Community Health Center (Puskesmas) work area.

Based on the results of a preliminary survey conducted on September 2, 2025, among 20 toddlers at the Integrated Health Post (Posyandu) in BumiAyu Village South Dumai District, 6 (30%) toddlers did not experience diarrhea, and 14 (70%) toddlers had experienced diarrhea in the past three months. Of the 14 toddlers who experienced diarrhea, it was found that the role of the cadres was good and 9 people (64.3%) the role of the cadres was not good and 5 people (35.7%) the role of the cadres was good. Observations of PHBS in mothers of toddlers found that 8 people (57.1%) mothers of toddlers implemented PHBS poorly and 6 people (42.9%) mothers of toddlers implemented PHBS well. Seeing these conditions, researchers are interested in conducting further research related to the relationship between the role of cadres

and Clean and Healthy Living Behavior (PHBS) with the incidence of diarrhea at Posyandu, BumiAyu Village South Dumai District.

METHODOLOGY

Research Design

This research is analytical observational, where the independent variables (the role of cadres and Clean and Healthy Living Behaviors) and the dependent variable (the incidence of diarrhea) are studied simultaneously. This study aims to determine the relationship between the role of cadres and Clean and Healthy Living Behaviors (PHBS) (independent variables) and the incidence of diarrhea (dependent variable).

Population and Sample

The population of this study was all 1081 children under five (0-59 months) who attended the Integrated Health Service Post (Posyandu) in Ratu Sima Village, South Dumai District, from January to August 2025. The sample was drawn from the study population that met the inclusion criteria of 92 mothers of toddlers. The inclusion criteria are toddlers in Posyandu, BumiAyu Village South Dumai District, toddlers who have KMS and toddlers who are willing to be respondents. The sampling technique used was simple random sampling, a random sampling method that ensures that each toddler in the population has an equal chance of being selected.

Statistical Analysis

Bivariate analyze the relationship between the two variables. To test whether there is a relationship between the variables of the role of cadres and PHBS with the incidence of diarrhea, Chi Square analysis was used, with a significance level of $\alpha = 0.05$. The results obtained from the Chi Square analysis using the SPSS program, namely the p value, were then compared with $\alpha = 0.05$

RESULTS AND DISCUSSION

This study was conducted from 6 October 2025 to 25 October 2025, covering 92 mothers of toddlers aged 0-59 months at the Integrated Health Post (Posyandu) in BumiAyu Village South Dumai District. The data collected in this study include respondent characteristics (maternal age, maternal education, maternal occupation, and gender of toddler), independent variables (the role of cadres and the implementation of PHBS), and dependent variables (the incidence of diarrhea) measured by a questionnaire. The results of the study are presented in Table 1.

Based on Table 1, it can be seen that of the 92 mothers of toddlers, the majority of the mothers of toddlers were in the early adulthood age range (26-35 years), namely 53 people (57.6%), had junior high school education, namely 31 people (33.7%), worked as housewives (IRT), namely 56 people (60.9%) and the majority of the toddlers were male, namely 49 people (53.3%).

Based on Table 2, it can be seen that of the 92 mothers of toddlers, the majority of mothers of toddlers said that the role of cadres was inadequate, namely 60 people (65.2%).

Based on Table 3, it can be seen that of the 92 mothers of toddlers, the majority of mothers of toddlers were less effective in implementing PHBS, namely 51 people (55.4%).

Table 1 Frequency distribution based on respondent characteristics at the Posyandu in BumiAyu Village South Dumai District

Variable	n	Percentage (%)
Age (Year)		
1. 17 – 25 (Early Teens)	39	42.4
2. 26 – 35 (Early Adulthood)	53	57.6
Total	92	100
Education		
1. SD	30	32.6
2. SMP	31	33.7
3. SMA	19	20.7
4. Perguruan Tinggi	12	13.0
Total	92	100
Work		
1. IRT	56	60.9
2. Wiraswasta	31	33.7
3. PNS	5	5.4
Total	92	100
Toddlers Gender		
1. Female	43	46.7
2. Male	49	53.3
Total	92	100

Table 2 Frequency distribution based on the role of respondent cadres at the Posyandu in BumiAyu Village South Dumai District

Cadre Role	Frequency (n)	Percentage (%)
1. Inadequate	60	65.2
2. Good	32	34.8
Total	92	100

Table 3 Frequency distribution based on the implementation of PHBS respondents at the Posyandu in BumiAyu Village South Dumai District

Implementation of PHBS	Frequency (n)	Percentage (%)
1. Inadequate	51	55.4
2. Good	41	44.6
Total	92	100

Table 4 shows that of the 92 mothers of toddlers, the majority (55 mothers) reported that their children had diarrhea.

Table 4 Frequency distribution based on respondent's diarrhea incidence at the Posyandu in BumiAyu Village South Dumai District

Diarrhea Incidence	Frequency (n)	Percentage (%)
1. Yes	55	59.8
2. No	37	40.2
Total	92	100

Bivariate analysis examines the relationship between independent and dependent variables. This bivariate analysis was used to determine the relationship between the role of cadres and the implementation of PHBS and the incidence of diarrhea at the Posyandu in BumiAyu Village South Dumai District, in 2025. The Chi-Square statistical test was used with a confidence level of $\alpha \leq 0.05$

Based on Table 5, it can be seen that out of 60 mothers of toddlers who received poor cadre roles, there were 12 people (20%) whose toddlers did not experience diarrhea. Meanwhile, out of 32 mothers of toddlers who received good cadre roles, there were 7 mother of toddlers (22%) whose toddlers experienced diarrhea. Based on the statistical test with Pearson Chi-Square, a p value of 0.000 ($p \leq 0.05$) was obtained at a significance level of α (0.05) using a 95% confidence level. This means that there is a relationship between the role of cadres and the incidence of diarrhea at the Posyandu in BumiAyu Village South Dumai District. It can be seen that the OR (Odd Ratio) value is 14.286. This means that mothers of toddlers who received poor cadre roles will have a 14.286 times greater chance of their toddlers experiencing diarrhea compared to mothers of toddlers who received good cadre roles.

Table 5 The relationship between the role of cadres and the incidence of diarrhea at the Posyandu in BumiAyu Village South Dumai District in 2025

Cadre Role	Diarrhea Incidence				Total		P value	OR (95% CI)
	Yes		No					
	n	%	n	%	n	%		
Inadequate	48	80	12	20	60	100	0.000	14.286 (4999 – 40825)
Good	7	22	27	78	32	100		
Total	55	60	37	40	92	100		

Table 6 shows that of the 51 mothers of toddlers who were less likely to implement PHBS, 8 (16%) had toddlers did not experience diarrhea. Meanwhile, of the 41 mothers of toddlers who were more likely to implement PHBS, 12 (29%) had toddlers experienced diarrhea. A statistical test using the person chi-square test yielded a p-value of 0.000 ($p \leq 0.05$) at a significance level of α (0.05) using a 95% confidence level. This indicates a relationship between PHBS implementation and diarrhea incidence at the Integrated Health Service Post (Posyandu) in BumiAyu Village South Dumai District. The odds ratio (OR) is 12.990. This means that mothers of toddlers who are less likely to implement PHBS are 12.990 times higher odds of experiencing diarrhea than mothers of toddlers who are more likely to implement PHBS.

Table 6 The relationship between the implementation of phbs and the incidence of diarrhea at the Posyandu in BumiAyu Village South Dumai District in 2025

Implementation of PHBS	Diarrhea Incidence				Total		P value	OR (95% CI)
	Yes		No					
	n	%	n	%	n	%		
Inadequate	43	84	8	16	51	100	0.000	12.990 (4726 – 35700)
Good	12	29	29	71	41	100		
Total	55	60	37	40	92	100		

According to Sugiarti *et al.* (2021), community health cadres are a form of community participation in health care that is easily accessible to mothers of toddlers. Cadres play a crucial role in providing health services that reach the community and provide more face-to-face contact than other health workers. According to Nurhaedah *et al.* (2022), one of the roles of community health cadres is to provide education to mothers of toddlers, specifically on prevention measures to avoid diarrhea. The information mothers of toddlers receive from community health cadres significantly influences their knowledge of maintaining their children's health and preventing the spread of diarrhea. Therefore, the role of community health cadres is crucial in providing education about diarrhea to mothers of toddlers.

This study is also supported by research by Syahputra *et al.* (2023), which showed a relationship between the role of community health cadres and diarrhea incidence in the Working Area of the Lampaseh City Community Health Center (UPTD), Kuta Raja District, Banda Aceh City, in 2022 with a p-value of 0.014. Research by Novianti (2024) shows that improving the skills and knowledge of community health workers (cadres) in understanding diarrhea symptoms and providing initial treatment can reduce the incidence of diarrhea in infants and toddlers. This finding aligns with research by Ariyanto (2018), which showed a relationship between support from community health workers (Posyandu) and diarrhea management efforts in toddlers (1-5 years old) in Banjarmasin.

This study also found that there are 12 (20%) toddlers who did not experience diarrhea, feels that role of community health workers was less effective. The researchers hypothesized this was due to mothers' good knowledge about diarrhea and behaviors that can prevent it in toddlers. This is proven by researchers' interviews with respondents, namely mothers of toddlers who know the causes of diarrhea and preventive measures through getting used to clean living. Although information about diarrhea was not obtained from community health workers (Posyandu), mothers of toddlers could obtain it from electronic and print media. Therefore, mothers with good knowledge about diarrhea can prevent their children from developing diarrhea by adopting behaviors that can prevent their children from developing diarrhea. Another factor could be good nutritional intake (macro and micronutrients) in toddlers. The better nutrition a toddler is, the lower the incidence of diarrhea. Good nutrition in toddlers will increase strong immunity and prevent various diseases, including diarrhea. This is proven by interviews and direct observation of researchers at the respondent's home, namely the family's economic income is above the minimum wage and the food menu consists of rice, fish/tempe and vegetables.

Researchers also found that 7 mothers of toddlers (22%) experienced diarrhea despite receiving good support from cadres. Researchers speculate that this is because the toddlers lacked Early Initiation of Breastfeeding (IMD), making them susceptible to infectious diseases like diarrhea. Frequent infections can hinder nutrient absorption in the digestive tract, leading to nutritional deficiencies. Another factor could be the low socioeconomic status of the mothers. This data was obtained during home visits to mothers of toddlers, which revealed that most homes lacked adequate health standards, leading to various illnesses such as those in toddlers. Most toddlers susceptible to diarrhea come from families with low purchasing power, poor housing conditions, and lack of clean water. Education and economic improvement play a significant role in preventing and managing diarrhea.

This research is supported by the theory proposed by Nawali *et al.* (2022), who stated that one of the impacts influencing diarrhea is Clean and Healthy Living Behavior (PHBS), including inadequate use of clean water, water contaminated by feces, lack of sanitation facilities, unhygienic feces disposal, poor personal hygiene, and environmental conditions. According to Rahayu *et al.* (2024), PHBS is a crucial component of health development, requiring awareness, ability, and a willingness to live a healthy life among all residents to achieve optimal health.

Mantiri and Michelles (2022) reported that the implementation of Clean and Healthy Living Behavior (PHBS) plays an important role in preventing diarrhea among toddlers. PHBS encompasses various preventive practices, including ensuring that clean water sources are located at a safe distance from sanitation facilities (10 m away), washing hands with soap before food preparation and consumption, thoroughly washing fruits and vegetables with clean water before eating, and consuming properly boiled or treated drinking water. In contrast, the consumption of untreated water and improperly prepared food may increase the risk of diarrheal diseases. Among the various PHBS components, proper hand hygiene is considered one of the most effective measures for preventing the transmission of diarrheal pathogens. Effective handwashing involves thoroughly cleaning all parts of the hands with soap and clean running water. Previous studies have demonstrated that adopting healthy hygiene practices, particularly regular handwashing with soap, can significantly reduce the spread of diarrheal infections. Additionally, maintaining a clean household environment, ensuring proper waste management, and constructing sanitation facilities at an adequate distance from drinking water sources are essential measures for reducing the incidence of diarrhea among toddlers.

The results of this study are supported by research conducted by Nawalia *et al.* (2022), which showed a relationship between clean and healthy living behaviors (PHBS) and the incidence of diarrhea in toddlers. One factor influencing diarrhea is Clean and Healthy Living Behaviors (PHBS). Jumhafni and colleagues (2024) study showed a significant relationship between PHBS and the incidence of diarrhea in toddlers in the Timampu Community Health Center (Puskesmas) work area. This study also aligns with research by Rahayu *et al.* (2024), which showed a significant relationship ($p=0.000$) between Clean and Healthy Living Behaviors (PHBS) and the prevalence of diarrhea among students at SDN 4 Watopute.

This study found that 8 (16%) mothers of toddlers did not adhere to PHBS, but their children did not experience diarrhea. The researchers hypothesized that this was due to the toddlers' adequate nutritional intake from birth, such as colostrum, which helps develop their immunity. Therefore, toddlers are less susceptible to infectious diseases like diarrhea. This study also found that 12 (29%) mothers of toddlers who practiced PHBS (Clean and Healthy Living) still experienced diarrhea. This is because mothers with low education levels lack up-to-date information about diarrhea, such as the potential for resistance to diarrheal bacteria. This data is supported by the fact that most mothers of toddlers have a low level of education, with only elementary or junior high school graduates. Therefore, low education levels influence the mothers' access to information, including information about diarrhea.

Another factor could be that most of the respondents had sons. Boys tend to be more susceptible to diarrhea than girls due to several factors. Boys' higher physical activity levels, which

encourages increased physical contact with the environment, increase the likelihood of exposure to diarrheal bacteria.

CONCLUSION

Based on the results of the study entitled "The Relationship between the Role of Cadres and the Implementation of PHBS with the Incidence of Diarrhea at the Integrated Health Post (Posyandu) in BumiAyu Village South Dumai District in 2025, it can be concluded that there is a relationship between the role of cadres and the implementation of PHBS with the incidence of diarrhea in toddlers at the Integrated Health Post (Posyandu) in BumiAyu Village South Dumai District, with a P value $(0.000) < \alpha (0.05)$.

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