

ORIGINAL ARTICLE

The relationship between maternal personal hygiene and the incidence of diarrhea in toddlers at the cibereum health center

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ABSTRACT

Diarrhea is one of the leading causes of mortality in children under five years of age. Hygienic living behavior plays a crucial role in preventing the transmission of diarrhea. Maternal behavior is closely associated with the prevention and reduction of diarrhea in toddlers. This study aims to describe and determine the relationship between maternal knowledge, attitudes, and personal hygiene practices and the incidence of diarrhea among toddlers at the Cibereum Public Health Center, South Cimahi, Indonesia. This study employed an analytical cross-sectional design. Data were collected from 70 respondents using a consecutive sampling technique. Information was obtained through structured questionnaires. Data analysis was conducted using the chi-square test and Fisher's exact test. The results showed that the majority of mothers demonstrated good levels of knowledge, positive attitudes, and personal hygiene practices. Accordingly, 81.4% of toddlers were reported to rarely experience diarrhea (p-value = 0.22). Statistical analysis indicated no significant relationship between maternal knowledge, attitudes, and personal hygiene practices and the incidence of diarrhea in toddlers. These findings suggest that multiple factors contribute to the occurrence of diarrhea in toddlers. Nevertheless, adequate knowledge, positive attitudes, and personal hygiene practices remain important preventive measures against diarrhea in this population.

Keyword: Attitudes, knowledge, maternal personal hygiene, toddler, diarrhea

Received: 2025-09-23, Revised: 2025-10-13, Accepted: 2025-10-20, Published: 2025-10-31.

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How to cite :

Triningtyas, A.Y., Hidayat, E.M. and Widyaningrum, B.E (2025) "The relationship between maternal personal hygiene and the incidence of diarrhea in toddlers at the cibereum health center", Acta Medical and Health Sciences, 4(2).p.94–102. doi: <https://doi.org/10.35990/amhs.v4n2.p94-102>

INTRODUCTION

Diarrhea is a clinical condition characterized by an increase in defecation frequency, defined as more than three episodes per day, accompanied by a decrease in stool consistency. In breastfed infants, a bowel movement frequency of three to four times daily is considered within physiological limits. As long as the infant demonstrates appropriate weight gain, this condition should not be classified as diarrhea. Notably, diarrhea may also present when stool consistency becomes markedly loose, even in the absence of increased frequency.^{1,2} The World Health Organization (WHO, 2024) reports that diarrhea remains a major global health burden, contributing to approximately 443,832 child deaths annually, with 78% of these cases occurring in developing nations. In Indonesia, diarrhea continues to represent a significant public health concern, particularly in regions with suboptimal sanitation.^{3,4} These data underscore the strong association between diarrheal disease incidence and inadequate environmental sanitation as well as poor community hygiene practices.⁵

Diarrhea is an infectious disease influenced by multiple determinants. Children, particularly infants and toddlers, exhibit greater susceptibility compared to adults due to their relatively immature immune systems. Maternal behavior plays a pivotal role in the prevention of diarrhea, as mothers are predominantly responsible for childcare activities, including bathing infants, preparing food and beverages, and maintaining household hygiene. Poor maternal personal hygiene, such as inadequate handwashing, improper cleaning of food and eating utensils, unsafe food storage, and poor environmental sanitation, has been shown to significantly increase the risk of diarrheal episodes in young children.⁵ Furthermore, the principal transmission routes, commonly referred to as the “four Fs” (feces, food, flies, and fingers), are closely linked to personal hygiene practices and contribute substantially to the transmission cycle of diarrhea.⁶ Previous studies have

demonstrated that inadequate maternal knowledge regarding personal hygiene correlates with suboptimal hygiene practices, which subsequently increase the risk of diarrhea among toddlers.^{7,8} Based on this evidence, the present study aims to investigate comprehensively the relationship between maternal knowledge, attitudes, and personal hygiene practices and the incidence of diarrhea in children under five years of age.

METHODS AND SUBJECT

This study employed an analytical observational design with a cross-sectional approach. The study population consisted of mothers with children aged 12–60 months who resided within the working area of the Cibereum Community Health Center (Puskesmas), Cimahi, Indonesia. A total of 70 respondents were selected using sequential sampling. The inclusion criteria were (1) mothers with children aged 12–60 months who had resided in the area for at least the past three months, (2) literacy in reading and writing, and (3) willingness to participate by providing written informed consent. The exclusion criteria included (1) children with malnutrition or underweight status as determined by the weight-for-age (BW/A) z-score recorded in the Maternal and Child Health (KIA) handbook and (2) children with comorbidities.

Data collection was conducted using a structured questionnaire administered to respondents. The questionnaire was tested for validity and reliability prior to use. Respondents who met the eligibility criteria and agreed to participate were instructed to complete the questionnaire accurately and honestly based on their personal hygiene knowledge and practices. Data were analyzed using the chi-square test with a 95% confidence level. When the assumptions for chi-square analysis were not met, Fisher's exact test was applied. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS).

RESULTS AND DISCUSSION

This research received ethical approval from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Jenderal Achmad Yani, under approval number 057/UM1.11/2024.

Maternal age is an important determinant in the incidence of diarrhea among children under five years of age. Mothers aged 25–34 years generally possess better knowledge and awareness of diarrheal risk factors, which is reflected by a lower prevalence of diarrhea in this group compared with younger mothers and those aged over 35 years. Furthermore, maternal education significantly influences diarrheal risk. Children of mothers with lower educational attainment are more susceptible

to diarrhea, whereas children whose mothers have achieved higher levels of education tend to exhibit a reduced risk.⁹

Toddlers under three years of age commonly experience diarrhea episodes two to three times annually. This finding is consistent with the present study, which revealed that the majority of diarrhea cases occurred among children below three years of age.¹⁰ Previous studies, including research by Lestari, have also reported that male toddlers are relatively more vulnerable to diarrhea than female toddlers. However, susceptibility is ultimately shaped by environmental factors, lifestyle, and parental care practices.¹¹ The sociodemographic characteristics of respondents are presented in Tables 1 and 2.

Table 1. Maternal Age Distribution

Variable	Mean	SD	Median	Min–Max
Maternal age (years)	32.20	6.60	30.50	20–48

Table 2. Maternal Education, Toddler Age, and Gender

Characteristic	Frequency (n = 70)	Percentage (%)
Maternal Education		
Elementary School	3	4.3
Junior High School	11	15.7
Senior High School	43	61.4
Higher Education	13	18.6
Toddler Age		
12–24 months	22	31.4
25–36 months	23	32.9
37–48 months	13	18.6
49–60 months	12	17.1
Toddler Gender		
Male	32	45.7
Female	38	54.3

Maternal Knowledge, Attitudes, and Practices Regarding Personal Hygiene

The findings of this study demonstrate that the majority of mothers exhibited adequate knowledge, favorable attitudes, and appropriate practices related to personal hygiene. Maternal knowledge concerning personal hygiene is often shaped by various factors, particularly experiential learning. Mothers with sufficient caregiving experience tend to possess a more comprehensive understanding of diarrhea, including its risk factors, preventive measures, and appropriate management strategies for reducing the incidence of diarrhea in toddlers.¹²

Adequate knowledge plays a critical role in shaping cognitive processes that

influence both attitudes and practices. Mothers who are well-informed regarding hygiene tend to exhibit greater awareness of its importance, resulting in more vigilant health maintenance behaviors for their children and household.¹³ Furthermore, good knowledge promotes positive attitudes, which subsequently foster the adoption of proper personal hygiene practices. Such practices, when consistently implemented, may significantly contribute to the prevention of diarrheal diseases in children under five years of age. Although diarrhea in toddlers can be attributed to multiple risk factors, it is largely preventable when mothers possess sufficient knowledge, maintain favorable attitudes, and consistently practice proper hygiene.¹⁴

Table 3. Maternal Knowledge, Attitudes, and Practices on Personal Hygiene

Variable	Good (n, %)	Poor (n, %)
Knowledge	58 (82.9%)	12 (17.1%)
Attitude	41 (58.6%)	29 (41.4%)
Practice	47 (67.1%)	23 (32.9%)

Incidence of Diarrhea Among Children Under Five

The findings of this study indicate that 13 children under five years of age (18.6%) were categorized as experiencing frequent diarrheal episodes, whereas 57 children (81.4%) were classified as rarely experiencing diarrhea. The categorization of diarrhea frequency was based on the

number of episodes occurring within one year (Table 4).

According to the Indonesian Pediatric Society (Ikatan Dokter Anak Indonesia), children typically experience two to three episodes of diarrhea per year. Those with a frequency of three or more episodes annually are classified as having frequent diarrhea.¹⁰

Table 4. Incidence of Diarrhea Among Children Under Five

Diarrhea Frequency	n	%
Frequent	13	18.6%
Rare	57	81.4%
Total	70	100.0%

Association Between Maternal Knowledge of Personal Hygiene and Diarrhea Incidence Among Children Under Five

As presented in Table 5, the probability value ($p = 1.00$) exceeded the conventional significance level ($\alpha = 0.05$), indicating that there was no statistically significant association between maternal knowledge of personal hygiene and the incidence of diarrhea in children under five. This finding suggests that maternal knowledge alone does not significantly influence the occurrence of diarrheal episodes within the studied population.

From a theoretical perspective, knowledge represents the outcome of cognitive efforts to obtain and interpret information in response to a specific issue. Individuals with adequate knowledge are generally more inclined to adopt health-promoting behaviors, particularly mothers who play a central role in safeguarding the health of their children and household.¹⁴

The results of this study differ from those reported by Made Deva at Puskesmas

Putri Ayu, Jambi (2023), which demonstrated a significant relationship between maternal knowledge of personal hygiene and diarrheal incidence among children under five.¹⁴ However, the present findings are consistent with those reported by Faradina at Puskesmas Aur Duri, Jambi (2023), which similarly revealed no significant association.

The absence of a significant correlation in this study may be attributed to the multifactorial etiology of diarrhea. Personal hygiene is not the sole determinant, as various other factors contribute to diarrheal occurrence, including pathogenic agents, host susceptibility, environmental conditions, and behavioral practices.^{15,16} Additional risk factors include infections caused by bacteria, viruses, and parasites; malabsorption; food allergies; chemical or foodborne toxins; reduced immune function; low birth weight; malnutrition; inadequate breastfeeding practices; incomplete immunization; young maternal age; and limited childcare experience.¹⁵

Table 5. Association Between Maternal Knowledge of Personal Hygiene and the Incidence of Diarrhea Among Children Under Five

Knowledge Level	Frequent (n, %)	Rare (n, %)	Total (n, %)	p-value
Good	11 (18.9%)	47 (81.1%)	58 (100%)	> 0.05
Poor	2 (16.6%)	10 (83.4%)	12 (100%)	
Total	13 (18.5%)	57 (81.5%)	70 (100%)	

Association Between Maternal Attitudes Toward Personal Hygiene and Diarrhea Incidence Among Children Under Five

As shown in Table 6, the probability value was 0.810, which exceeds the conventional significance threshold ($\alpha = 0.05$). This indicates that maternal attitudes regarding personal hygiene were not significantly associated with the incidence of diarrhea among children under five.

Attitude is defined as an individual’s predisposition or readiness to respond to

specific stimuli in the environment and serves as an antecedent to action or behavior. In this study, mothers who exhibited positive attitudes were more likely to have children who rarely experienced diarrhea. This tendency may be attributed to their awareness, understanding, and concern regarding appropriate preventive and management practices for diarrheal diseases in young children.¹⁷ Positive maternal attitudes are therefore expected to support preventive behaviors that reduce the risk of diarrhea.

Previous studies provide supporting evidence. Widhiastiti (Denpasar, 2023) identified attitude as a determinant influencing maternal hygiene practices aimed at protecting children from diarrhea.¹⁸ Hermanita (Pekanbaru, 2023) similarly reported that positive attitudes are associated with maternal age, educational background, experience, and sociocultural environment, which collectively shape decision-making related to diarrhea prevention in children under five.¹⁹

However, a positive attitude alone does not guarantee the absence of diarrhea. Even when mothers practice adequate hygiene measures such as handwashing, proper food handling, and safe utensil cleaning, other contributing factors may persist. Effective diarrhea prevention

requires a comprehensive approach that addresses environmental factors, including access to clean water, proper waste management, and adequate sanitation facilities.²⁰ Poor environmental conditions may facilitate the proliferation of infectious agents, including bacteria, viruses, and parasites, thereby undermining the protective effect of positive maternal attitudes.

In addition, maternal attitudes are often shaped by personal experiences in managing diarrheal episodes in their children.²¹ Nevertheless, the findings of this study indicate that maternal attitudes toward personal hygiene alone do not have a statistically significant influence on the incidence of diarrhea among children under five.

Table 6. Association Between Maternal Attitudes Toward Personal Hygiene and Diarrhea Incidence Among Children Under Five

Maternal Attitude	Diarrhea Incidence (n, %)		Total (n, %)	p-value
	Frequent	Rare		
Positive	8 (19.5%)	33 (80.5%)	41 (100%)	> 0.05
Negative	5 (17.2%)	24 (82.8%)	29 (100%)	
Total	13 (18.5%)	57 (81.5%)	70 (100%)	

Association Between Maternal Personal Hygiene Practices and Diarrhea Incidence Among Children Under Five

As presented in Table 7, the probability value was 0.022, which is lower than the conventional significance threshold ($\alpha = 0.05$). This finding indicates a statistically significant

association between maternal personal hygiene practices and the incidence of diarrhea among children under five. Mothers who demonstrated good personal hygiene practices were less likely to have children who experienced diarrhea compared to those with poor hygiene practices.

Table 7. Association Between Maternal Personal Hygiene Practices and Diarrhea Incidence Among Children Under Five

Maternal Practice	Diarrhea Incidence (n, %)		Total (n, %)	p-value
	Frequent	Rare		
Good	5 (10.6%)	42 (89.4%)	47 (100%)	< 0.05
Poor	8 (34.8%)	15 (65.2%)	23 (100%)	
Total	13 (18.5%)	57 (81.5%)	70 (100%)	

Maternal personal hygiene practices are strongly linked to diarrheal disease incidence. Poor hygiene behaviors increase the risk of diarrhea in young children, while proper implementation of personal hygiene measures can substantially reduce this risk. These findings are consistent with previous research by Nuri V in Kaling, Tasikmadu, Central Java (2019), which reported that inadequate maternal personal hygiene was closely associated with a higher prevalence of diarrhea among children under five. Poor hygiene behaviors, such as failure to wash hands with soap and running water, improper food storage, and inadequate sanitation facilities, contribute to an elevated risk of diarrheal disease.¹³

Similarly, the present findings align with research by Noviyanti (Surakarta, 2024), which demonstrated that diarrhea frequency in children under five was closely related to maternal hygiene behaviors. Preventive practices, including regular handwashing with soap after contact with potentially contaminated objects, proper food preparation and cooking, safe food storage, attention to dietary safety, and discouragement of unsupervised street food consumption, were found to effectively prevent diarrhea in children.²² Good maternal personal hygiene practices play a crucial role in both the prevention and management of diarrhea by reducing the risk of pathogenic exposure and supporting overall child health. By maintaining personal and environmental cleanliness, mothers can foster a healthier home environment conducive to optimal child growth and development.²²

CONCLUSION

Based on the findings of this study, the following conclusions can be drawn. The majority of mothers of children under five at Puskesmas Cibeureum, South Cimahi, demonstrated good knowledge, positive attitudes, and appropriate

practices regarding personal hygiene. The incidence of diarrhea among children under five in the study area was relatively low. No significant association was found between maternal knowledge of personal hygiene and the incidence of diarrhea among children under five. No significant association was observed between maternal attitudes toward personal hygiene and diarrhea incidence in children under five. A statistically significant association was identified between maternal personal hygiene practices and the incidence of diarrhea among children under five.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest associated with the publication of this article.

ACKNOWLEDGMENTS

The authors would like to acknowledge the invaluable support and assistance provided by all professionals involved in this research, particularly the head and staff of the Cibeureum Health Center.

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