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Research Paper

The Relationship Between Maternal Personal Hygiene Practices and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

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Abstract
Maternal personal hygiene behavior affects the incidence of diarrhea in toddlers, because as the closest figure, mothers have the main role in meeting the needs of children. Poor maternal hygiene is associated with an increased risk of diarrhea among children. Based on data from the Prabumulih City Health Office in 2022, the Prabumulih Barat Health Center work area ranked second with 184 cases of diarrhea in toddlers. This indicates that there are still risk factors that have not been handled optimally, especially in maternal hygiene practices. This study aims to analyze the relationship between maternal personal hygiene practices and the incidence of diarrhea in toddlers in the working area of the West Prabumulih Health Center, Prabumulih City. The research design used was cross-sectional with a sample size of 90 respondents selected through a simple random sampling technique. There was a significant relationship between the incidence of diarrhea in toddlers with family income p-value (0.001), hand washing habits p-value (0.000), food management practices p-value (0.000), and diaper disposal behavior p-value (0.002). The study concluded that family income, hand washing habits, food management practices, and diaper disposal behavior are significantly associated with the incidence of diarrhea in toddlers within the Prabumulih Barat Health Center's working area. Based on these findings, it is recommended that mothers of toddlers implement proper handwashing habits using soap and running water within the household, accompanied by education and intervention from the health center to reduce the risk of diarrhea in toddlers.

Keywords
Diarrhea, Personal Hygiene, Toddler

1. INTRODUCTION

Diarrhea among toddlers represents a significant public health concern, as their immune systems are not yet fully developed, making them highly vulnerable. Diarrhea can lead to dehydration, nutrient deficiencies, and potentially life-threatening complication (Kosasih et al., 2015). According to the 2018 Basic Health Research and Indonesia's Health Profile in 2022, the prevalence of diarrhea in toddlers was 12.3%, while in infants it was 10.6%. In South Sumatra Province, the number of diagnosed diarrhea cases in toddlers was 133,790 (Kemenkes, 2022). The Prabumulih City Health Profile reported a 27.5% increase in the rate of successfully treated diarrhea cases in toddlers from 2021 to 2022, with 3,273 cases in 2021 and 5,374 cases in 2022 (Dinkes, 2021).

This indicates that there are unresolved risk factors, particularly regarding maternal personal hygiene practices. According to the Ministry of Health (2022) effective prevention of diarrhea involves maintaining personal hygiene and food safety. Puspitaningrum (2017) states that maternal personal hygiene is a significant factor influencing the incidence of diarrhea in toddlers, as mothers are the primary caregivers and play a dominant role in meeting their children's needs. Poor maternal hygiene increases the risk of diarrhea in children (Puspitaningrum, 2017). Lawrence Green's theory suggests that education, age, and family income are key factors in shaping personal hygiene behavior, which in turn impacts the incidence of diarrhea in children under five. Maternal education is a predisposing factor, affecting knowledge and awareness of hygiene's importance. Maternal age, as another predisposing factor, reflects maturity and experience in making decisions about children's health. Family income acts as an enabling factor, providing access to essential hygiene resources, such as soap, clean water, and sanitation facilities, which help prevent exposure to pathogens causing diarrhea (A and S.P, 2021). Based on this and supported by previous research, this study aims to examine the relationship between maternal personal hygiene and the incidence of diarrhea in toddlers in the Prabumulih Barat Health Center working

area

2. METHOD

2.1 Population

The population of this study includes people who live in the working area of the West Prabumulih Health Center, West Prabumulih District, Prabumulih City.

2.2 Sampling

The sampling technique in this study used a probability-based sampling method, specifically proportional stratified random sampling. The sample criteria in this study are as follows :

a. Inclusion criteria

- Willing to participate as a respondent
- Mothers of toddlers aged 6–59 months
- Residing in the working area of the West Prabumulih Health Center
- Respondents with toddlers who still use diapers

b. Exclusion criteria

- Respondents who were not willing to be interviewed
- Respondents who cannot communicate well
- Respondents who were unavailable during the data collection period

The sample size was 90 respondents using the two proportions hypothesis test.

3. RESULT

3.1 Univariate Analysis Results

A. Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Based on the research data obtained, 42 toddlers (46.7%) in the working area of the Prabumulih Barat Health Center were reported to have experienced diarrhea, while 48 toddlers (53.3%) did not.

B. Maternal Education in the Prabumulih Barat Health Center Working Area.

The majority of mothers with toddlers in this study had a high education level 72 (80%), whereas only 18 (20%) had a low level of education.

C. Maternal Age in the Prabumulih Barat Health Center Working Area

The majority of mothers in this study were in the non-risk age category (20–35 years), totaling 65 individuals (72.2%), while 25 mothers (27.8%) were in the risk age categories ($<$ 20 or $>$ 35 years).

D. Family Income in the Prabumulih Barat Health Center Working Area

The majority of mothers in this study had a low family income ($<$ Rp3,456,874), totaling 49 individuals (54.4%), while 41 mothers (45.6%) had a high income ($\geq$ Rp3,456,874).

E. Handwashing Habits of Mothers in the Prabumulih Barat Health Center Working Area

The majority of mothers in this study had poor handwashing habits, with 48 individuals (53.3%), while 42 mothers (46.7%) exhibited good handwashing habits.

F. Food Management Practices in the Prabumulih Barat Health Center Working Area

The majority of mothers in this study had poor food management practices, with 49 individuals (54.4%), while 41 mothers (45.6%) exhibited good food management practices.

G. Mother's Nail Hygiene in the Prabumulih Barat Health Center Working Area

The majority of mothers in this study had good nail hygiene, with 63 individuals (70%), while 27 mothers (30%) had poor nail hygiene.

3.1.1 H. Diaper Disposal Behavior in the Prabumulih Barat Health Center Working Area

The majority of mothers in this study had poor diaper disposal behavior, with 49 mothers (54.4%), while 41 mothers (45.6%) had good diaper disposal behavior.

3.2 Bivariate Analysis Results

A. The Relationship between Maternal Education and the Incidence of Diarrhea in Toddlers in the West Prabumulih Health Center Working Area

Based on the chi-square test with a 5% significance level, the p-value was 0.267 ($p > 0.05$), indicating that H0 is accepted and there is no statistically significant relationship between maternal education and the incidence of diarrhea in toddlers in the West Prabumulih Health Center working area. The prevalence ratio (PR) was 1.419 with a 95% confidence interval (CI) of 0.901–2.236, suggesting that mothers with low education have a 1.419 times greater risk of their toddlers experiencing diarrhea compared to those with higher education. The analysis also revealed that 11 mothers with low education had toddlers with diarrhea (61.1%), while 31 mothers with higher education had toodlers with diarrhea (43,1%).

B. The Relationship between Maternal Age and the Incidence of Diarrhea in Toddlers in the West Prabumulih Health Center Working Area

Based on the chi-square test with a 5% significance level, the p-value was 0.937 ($p > 0.05$), indicating that H0 is accepted and there is no statistically significant relationship

Table 1. Proportional Sample Size Calculation

No	Village Name	Total Population of Toddlers	Sample Calculation Results	Number of Samples (n)
1	Patih Galung	804	$n_i = \frac{804}{1311} \times 90$	55
2	Prabumulih	346	$n_i = \frac{346}{1311} \times 90$	24
3	Muntang Tapus	161	$n_i = \frac{161}{1311} \times 90$	11
	N	**1311**		**90**

Source: Secondary Data of Puskesmas Prabumulih Barat 2024

Table 2. Frequency Distribution of Diarrhea Events in Toddlers In the Prabumulih Barat Health Center Working Area

Incidence of Diarrhea	Frequency	Percentage (%)
Diarrhea	42	46.7
No Diarrhea	48	53.3
Total	**90**	**100.0**

Source: Primary Research Data, 2025

Table 3. Frequency Distribution of Mother's Education In the Prabumulih Barat Health Center Working Area

Mother's Education	Frequency	Percentage (%)
Low	18	20.0
Higher	72	80.0
Total	**90**	**100.0**

Source: Primary Research Data, 2025

Table 4. Frequency Distribution of Maternal Age In the Prabumulih Barat Health Center Working Area

Mother's age	Frequency	Percentage (%)
At risk (<20 and >35 years old)	25	27.8
Not at risk (20-35 years)	65	72.2
Total	**90**	**100.0**

Source: Primary Research Data, 2025

Table 5. Frequency Distribution of Family Income In the Prabumulih Barat Health Center Working Area

Family Income	Frequency	Percentage (%)
Low < Rp 3.456.874	49	54.4
High ≥ Rp 3456874	41	45.6
Total	**90**	**100.0**

Source: Primary Research Data, 2025

Table 6. Frequency Distribution of Maternal Handwashing Habits In the Prabumulih Barat Health Center Working Area

Handwashing Habits	Frequency	Percentage (%)
Bad	48	53.3
Good	42	46.7
Total	**90**	**100.0**

Source: Primary Research Data, 2025

Table 7. Frequency Distribution of Maternal Food Management Practices In the Prabumulih Barat Health Center Working Area

Mother's Practice	Frequency	Percentage (%)
Not so good	49	54.4
Good	41	45.6
Total	**90**	**100.0**

Source: Primary Research Data, 2025

Table 8. Frequency Distribution of Mother's Nail Hygiene In the Prabumulih Barat Health Center Working Area

Nail Hygiene	Frequency	Percentage (%)
Bad	27	30.0
Good	63	70.0
Total	**90**	**100.0**

Source: Primary Research Data, 2025

Table 9. Frequency Distribution of Diaper Disposal Behavior In the Prabumulih Barat Health Center Working Area

Disposal Behavior	Frequency	Percentage (%)
Bad	49	54.4
Good	41	45.6
Total	**90**	**100.0**

Source: Primary Research Data, 2025

Table 10. The Relationship Between Maternal Education and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Mother's Education	Incidence of Diarrhea			P-value	PR(95% CI)
	Diarrhea	No Diarrhea	Total		
Low	11	7	18	0.267	1.419 (0.901–2.236)
	61.1%	38.9%	100%		
High	31	41	72		
	43.1%	56.9%	100%		

Source: Primary Research Data, 2025

Table 11. The Relationship Between Maternal Age and the Incidence of Diarrhea In Toddlers in the Working Area of the West Prabumulih Health Center

Mother's age	Incidence of Diarrhea			P-value	PR(95% CI)
	Diarrhea	No Diarrhea	Total		
At risk (<20 dan >35 years old)	11	14	25	0.937	0.932 (0.554–1.537)
	44%	56%	100%		
Not at risk (20-35 years old)	31	34	65		
	47.7%	52.3%	100%		

Source: Primary Research Data, 2025

between maternal age and the incidence of diarrhea in toddlers in the West Prabumulih Health Center working area. The prevalence ratio (PR) was 0.932 with a 95% confidence interval (CI) of 0.554–1.537, suggesting that mothers aged 20–35 years (non-risk category) have a 0.932 times lower risk of their toddlers experiencing diarrhea compared to those aged <20 or >35 years. The analysis also revealed that 11 mothers in the risk age category had toddlers with diarrhea (11.7%), while 31 mothers in the non-risk category had toddlers with diarrhea (30.3%).

C. The Relationship between Family Income and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Based on the chi-square test at a 5% significance level, the p-value was 0.001 ($p < 0.05$), indicating that H_0 is rejected and there is a statistically significant relationship between family income and the incidence of diarrhea among toddlers in the working area of the West Prabumulih Health Center. The prevalence ratio (PR) was 2.358 with a 95% confidence interval (CI) of 1.362–4.082, suggesting that mothers with low family income have a 2.358 times greater risk of their toddlers experiencing diarrhea compared to those with higher income. The analysis also revealed that 31 toddlers from low-income families had diarrhea (63.3%), compared to 11 toddlers from high-income families (26.8%).

D. The Relationship between Maternal Handwashing Habits and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Based on the chi-square test with a 5% significance level, the p-value was 0.000 ($p < 0.05$), indicating that H0 is rejected and there is a statistically significant relationship between maternal hand washing habits and the incidence of diarrhea in toddlers in the West Prabumulih Health Center working area. The prevalence ratio (PR) was 5.250 with a 95% confidence interval (CI) of 2.459–11.210, suggesting that mothers with poor hand washing habits have a 5.250 times greater risk of their toddlers experiencing diarrhea compared to those with good hand washing habits. The analysis also revealed that 36 toddlers whose mothers had poor hand washing habits had diarrhea (75%), compared to 6 toddlers whose mothers had good hand washing habits (14.3%).

E. The Relationship between Food Management Practices and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Based on the chi-square test with a 5% significance level, the p-value was 0.000 ($p < 0.05$), indicating that H0 is rejected and there is a statistically significant relationship between food management practices and the incidence of diarrhea in toddlers in the West Prabumulih Health Center working area. The prevalence ratio (PR) was 2.678 with a 95% confidence interval (CI) of 1.505–4.764, suggesting that mothers with poor food management practices have a 2.678

Table 12. The Relationship between Family Income and the Incidence of Diarrhea In Toddlers in the Prabumulih Barat Health Center Working Area

Family Income	Incidence of Diarrhea			P-value	PR(95% CI)
	Diarrhea	No Diarrhea	Total		
Low	31	18	49	0.001	2.358 (1.362–4.082)
	63.3%	36.7%	100%		
High	11	30	41		
	26.8%	73.2%	100%		

Source: Primary Research Data, 2025

Table 13. The Relationship Between Maternal Handwashing Habits and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Handwashing Habit	Incidence of Diarrhea			P-value	PR(95% CI)
	Diarrhea	No Diarrhea	Total		
Bad	36	12	48	0.000	5.250 (2.459–11.210)
	75%	25%	100%		
Good	6	36	42		
	14.3%	85.7%	100%		

Source: Primary Research Data, 2025

times greater risk of their toddlers experiencing diarrhea compared to those with good practices. The analysis also revealed that 32 toddlers with poor food management had diarrhea (65.3%), compared to 10 toddlers with good food management (24.4%).

F. The Relationship between Maternal Nail Hygiene and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Based on the chi-square test with a 5% significance level, the p-value was 0.072 ($p > 0.05$), indicating that H0 is accepted and there is no statistically significant relationship between maternal nail hygiene and the incidence of diarrhea in toddlers in the West Prabumulih Health Center working area. The prevalence ratio (PR) was 1.587 with a 95% confidence interval (CI) of 1.043–2.415, suggesting that mothers with poor nail hygiene have a 1.587 times higher risk of their toddlers experiencing diarrhea compared to those with good nail hygiene. The analysis also showed that 17 toddlers whose mothers had poor nail hygiene had diarrhea (63%), compared to 25 toddlers whose mothers had good nail hygiene (39.7%).

G. The Relationship between Diaper Disposal Behavior and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Based on the chi-square test with a 5% significance level, the p-value was 0.002 ($p < 0.05$), indicating that H0 is rejected and there is a statistically significant relationship between diaper disposal behavior and the incidence of diarrhea in toddlers in the West Prabumulih Health Center working area. The prevalence ratio (PR) was 0.465 with a 95% confidence interval (CI) of 0.289–0.748, suggesting that mothers with good diaper disposal behavior have a 0.465 times lower risk of their toddlers experiencing diarrhea compared to those with poor diaper disposal behavior. The analysis also revealed that 15 toddlers with poor diaper disposal behavior had diarrhea (30.6%), compared to 27 toddlers with good diaper disposal behavior (65.9%).

4. DISCUSSION

4.1 The Relationship Between Maternal Education and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

The results of the statistical analysis did not show a significant association between maternal education and the incidence of diarrhea in toddlers ($P = 0.267 > 0.05$). Interestingly, the findings indicated that toddlers of highly educated mothers were more likely to experience diarrhea than those of less-educated mothers. This may occur because a majority of mothers with higher education often have occupations with greater demands and higher incomes. However, the busy lifestyle and high work demands associated with these occupations may limit their ability to sufficiently attend to the safety and hygiene of complementary foods, thereby increasing the risk of diarrhea in toddlers (Rane et al., 2017).

This finding aligns with Rane et al. (2017), who reported

Table 14. The Relationship between Food Management Practices and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Food Management Practices	Incidence of Diarrhea			P-value	PR(95% CI)
	Diarrhea	No Diarrhea	Total		
Less Good	32	17	49	0.000	2.678 (1.505–4.764)
	65.3%	34.7%	100%		
Good	10	31	41		
	24.4%	75.6%	100%		

Source: Primary Research Data, 2025

Table 15. The Relationship Between Maternal Nail Hygiene and the Incidence of Diarrhea In Toddlers in the Prabumulih Barat Health Center Working Area

Nail Hygiene	Incidence of Diarrhea			P-value	PR(95% CI)
	Diarrhea	No Diarrhea	Total		
Bad	17	10	27	0.072	1.587 (1.043–2.415)
	63%	37%	100%		
Good	25	38	63		
	39.7%	60.3%	100%		

Source: Primary Research Data, 2025

that mothers with higher education but demanding jobs often lacked knowledge about diarrhea due to limited time for health visits. Conversely, there are also housewives with a low or middle level of education, but have good knowledge about diarrhea because they have plenty of time to care for children, diligently go to the puskesmas or posyandu, and there is time to immediately come to the nearest PKM when a toddler has diarrhea, so that diarrhea in toddlers can be resolved quickly (Rane et al., 2017). In addition, research by (Wibisono et al., 2020) also stated that the mother's education variable was not associated with the incidence of diarrhea in toddlers. According to him, the cause of the variable level of maternal education is not statistically significant is because mothers with low levels of education can still have insight into recurrent diarrhea and its prevention through education or counseling to reduce the incidence of recurrent diarrhea in toddlers (Wibisono et al., 2020). Based on the results of the study, in fulfilling the mission to improve the degree of public health, the puskesmas should optimize home visiting health services (home visits and home care) which are made as one of the missions in the puskesmas profile. Researchers also suggest maintaining health education through health promotion that has been carried out both individually and in groups (Larasati, 2019).

4.2 The Relationship Between Maternal Age and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

The Chi-square test showed no significant association between maternal age and diarrhea incidence in toddlers (P = 0.937 > 0.05). The analysis showed that toddlers of mothers within the non-risk age range (20–35 years) experienced more diarrhea compared to those whose mothers were in the risk age groups (<20 or >35 years). According to Dalyono (2000) this is because with age, the quality of thought often increases. Adults tend to be wiser and have a better understanding of child health (M, 2000) (Novrianda and Yeni, 2014). In line with research by Putra and Utami (2020) according to him, regardless of the age of the mother, if the mother has more experience in child health care, diarrhea prevention behavior can be carried out depending on the mother's education and experience, making maternal age a significant factor (predictor) for knowledge about prevention and handling of diarrhea (Putra and Utami, 2020).

This study is also in line with research by Adeleke et al. (2019), which states that mothers with older age (30-39 years) have more experience, knowledge and understanding of diarrhea prevention (Adeleke and Mhlaba, 2019). Research by Novrianda et al. (2014), states that the average respondent with an older age group division (31-45) has 2 to 3 children so that they have better knowledge and experience in caring for children, especially diarrhea management compared to respondents with younger age groups who only have 1 child. The same results were also found in

Table 16. The Relationship Between Diaper Disposal Behavior and the Incidendce of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Diaper Disposal Behavior	Incidence of Diarrhea			P-value	PR(95% CI)
	Diarrhea	No Diarrhea	Total		
Bad	15	34	49	0.002	0.465 (0.289–0.748)
	30.6%	69.4%	100%		
Good	27	14	41		
	65.9%	34.1%	100%		

Source: Primary Research Data, 2025

research by Limoy and Iit (2019), which stated that maternal age was not significantly associated with the incidence of diarrhea with OR = 2.83 (0.94- 8.54). Maternal age is a predisposing factor for behavior change related to the physical and psychological maturity of mothers of toddlers in parenting for the prevention of disease in toddlers (Limoy and Iit, 2019). Based on this, the health center should try to improve community orientation towards health behavior, especially towards diarrhea in toddlers by providing counseling and education through existing media such as leaflets, posters and films to increase parental knowledge about healthy behavior to reduce or prevent diarrhea in early childhood (Masdalena et al., 2022).

4.3 The Relationship Between Family Income and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

The statistical analysis showed a significant association between family income and the incidence of diarrhea in toddlers with a P-value = 0.001 <0.05. The prevalence ratio indicated that respondents with low family income had a 2.358 times greater risk of diarrhea in their toddlers compared to those with higher income. In this study, low-income families tended to have lower awareness of personal hygiene, particularly in handwashing and food management. Economic constraints may limit access to hygiene supplies and proper food storage, potentially increasing the risk of contamination. As a result, the food prepared becomes more easily contaminated by germs that cause diarrhea (Khairani et al., 2020).

According to Khairani et al. (2020), mothers who have high-income families are more likely to provide a balanced diet and meet nutritional needs, which may contribute to lower diarrhea incidence. High family income levels can also meet non-food consumption costs such as credit (cars, motorbikes and furniture), credit/data package costs, and electricity without disturbing spending on food consumption costs so that children's nutritional fulfillment is fulfilled (Khairani et al., 2020). Research by Azage et al. (2016), also showed that the incidence of diarrhea in children from poor households was 1.63 times (OR = 1.63; 95% CI = 1.12- 2.36) higher than children from rich households. People from wealthy households tend to adopt better hygienic and environmental sanitation behaviors as a standard of living, which may prevent the incidence of childhood diarrhea (Azage et al., 2016).

In contrast, Prawati and Haqi (2019), found no significant association (P = 0.332), attributing this to dietary habits outside the home, which may introduce additional hygiene risks. This was attributed to high-income respondents who frequently consumed food and beverages outside the home, where hygiene is not always guaranteed which increasing the risk of diarrhea (Prawati and Haqi, 2019)). Based on this, it is essential for health centers to enhance community education on household hygiene practices by strengthening health promotion through GERMAS, PHBS, and counseling on early management of diarrhea in children.

4.4 The Relationship Between Maternal Handwashing Habits and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

There was a significant association between handwashing behavior and diarrhea incidence (P = 0.000 < 0.05). The prevalence ratio analysis revealed that respondents with inadequate handwashing behavior were 5 times more likely to have toddlers who experienced diarrhea compared to those with proper hand hygiene practices. This indicates that poor hand hygiene remains a critical contributing factor in the transmission of diarrheal diseases. Several respondents reported inconsistent handwashing practices, particularly before food preparation, toddler feeding, and after animal contact, based on the perception that their daily activities were not sufficiently unhygienic to warrant such measures. However, this misconception overlooks the fact that pathogenic microorganisms can persist on various surfaces—including those that appear visibly clean—underscoring the essential role of handwashing with soap in interrupting the fecal-oral transmission pathway and preventing diarrhea in early childhood (WHO, 2024).

According to the F-diagram Theory of fecal-oral transmission proposed by Wagner and Lanois (1958), as cited in Brown et al, (2013), pathogens can be transmitted via hands, food, fluids, and other vectors. Hands that are not washed

thoroughly after doing activities at important times can contain pathogens (bacteria, viruses, parasites) attached to the hands (Brown et al., 2013). If the contaminated hands touch or enter orally through the mouth when the mother interacts with toddlers, the pathogen can enter the body and cause the spread of diarrhea pathogens in children (Radhika, 2020).

The results of this study are in line with research conducted by Prawati and Haqi (2019), which shows that the behavior of cleaning hands with soap has a relationship with diarrheal disease in the last 3 months with p = 0.028. This is due to the low awareness of behavior to wash hands with soap before eating (Prawati and Haqi, 2019). The relationship between maternal handwashing habits and the incidence of diarrhea in toddlers can be attributed to several interrelated factors. One major factor is the lack of knowledge, where many mothers do not realize that dirty hands can be an intermediary for the spread of germs that cause diarrhea. Additionally, limited access to clean water inhibits proper handwashing practices with running water and soap, daily habits and behavior such as neglecting to wash hands before preparing food or feeding toddlers and the lack of socialization and health education which results in low awareness of mothers to maintain personal hygiene (Sari et al., 2022).

Based on the results of the study obtained, intervention or socialization of good hand washing with soap behavior is needed from health parties such as health centers or local city health offices to educate so that it can build or public awareness, especially mothers with toddlers, about the importance of hand washing with soap behavior as one of the steps in reducing the risk of spreading diarrhea in toddlers. Preferably, in order to increase public awareness, it must also be adjusted to the improvement of sanitation facilities by the local government to change the behavior of mothers and reduce the incidence of diarrhea in toddlers (Sari et al., 2022).

4.5 The Relationship Between Food Management Practices and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Based on the results of statistical analysis using the Chi-square test, the P-value = 0.000 < 0.05 indicates a statistically significant association between food management practices and the incidence of diarrhea in toddlers. The results of the prevalance ratio analysis showed that respondents with poor food management practices had a 2 times higher risk of developing diarrhea in their toddlers than respondents with good food mangement practices.

Suboptimal food management, particularly related to hygiene and storage practices, was identified as a contributing factor. This can be seen from the habit of storing food ingredients and cutlery in a less hygienic and open place causing the risk of contamination both dust, bacterial pathogens and insects that land on the cutlery used, the use of inadequate cooking utensils such as cutting boards of raw meat and vegetables that are not separated can be a medium for spreading pathogens or cross-contamination to other food ingredients, and the behavior of not drying dishes after washing and the relatively long waiting time before food is consumed can reduce the quality of cooked food.

This study is align with research by Karantika and Siwiendrayanti (2024), who examined food management variables on the incidence of diarrhea with a P-value = (0.014). Researchers stated that respondents usually do not maintain food hygiene, and the containers used to put food and drinks. There are respondents who store their food in an open state without a cover or serving hood, store food by hanging on the wall and often in an uncovered state, this is at risk of dust and vectors (Karantika and Siwiendrayanti, 2024).

Food processing places or kitchens must meet hygiene standards to prevent food contamination and the risk of transmission from flies, cockroaches, rats and other animals (Widyastuti and Almira, 2019). Contamination of pathogens that can cause diarrhea can occur during food and beverage processing, including handling, washing, storing and serving food. Storage of raw materials should be stored in the refrigerator because if stored in a special place it can cause bacteria that can cause spoilage (Lestari et al., 2023). However, in contrast to research by Maulidah and Siwiendrayanti (2022), which states that there is no relationship between food management practices and the incidence of diarrhea in toddlers because as many as 91.5% of respondents have carried out food management safely, including using clean containers in processing and storing food and serving food in closed places such as using a serving hood (Maulidah and Siwiendrayanti, 2022).

Based on the results of the research that has been done, the community needs to receive education or socialization regarding good and safe food management practices to maintain the cleanliness of food consumed and proper handling based on the type of food handled. The health center can also increase the role of posyandu cadres to assist the community in applying hygienic food management principles.

4.6 The Relationship Between Maternal Nail Hygiene and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

Chi-square analysis indicated no significant association between maternal nail hygiene and diarrhea incidence (P = 0.072). The results of the prevalance ratio analysis showed that respondents with poor nail hygiene had a 1.5 times higher risk of developing diarrhea in their toddlers than respondents with good nail hygiene.

In this study, most respondents had routinely cut their nails when they were long at least once a week. Reported practices were influenced by cultural and religious norms, such as routine weekly nail trimming. In addition, there are

other factors that are more influential than maternal nail hygiene such as hand washing habits, even though mothers have routinely cut their nails once a week, when mothers do not wash their hands before feeding toddlers or using eating utensils such as unhygienic spoons and plates, it can increase the risk of spreading bacteria that cause diarrhea in children (Lubis et al., 2021).

This study aligns with research by Lubis et al. (2021), which found no significant relationship between maternal nail hygiene and the incidence of diarrhea in toddlers (p-value = 0.244 > 0.05). In his research, it shows that there are other factors that have more influence on the incidence of diarrhea such as basic sanitation (availability of clean water, waste management, and environmental hygiene) and hand hygiene, which are proven to have a significant relationship with the incidence of diarrhea because the main transmission of bacteria or viruses that cause diarrhea more often occurs through contaminated water and food, as well as dirty hands, compared to dirty nails alone. Dirty nails can be a breeding ground for bacteria and germs, but if you wash your hands frequently with soap, the risk of transmission through your nails may be reduced. If mothers maintain general hand hygiene (including washing hands before eating and after using the toilet), then nail hygiene becomes a less dominant factor in determining the risk of diarrhea (Lubis et al., 2021).

However, these findings are not in line with the study by Nurpauji et al. (2015), which showed showed that there was a significant relationship between maternal nail hygiene and the incidence of diarrhea in toddlers, with a p-value of 0.006 (p<0.05). This is because the condition of the mother's nails that are still in a long and dirty condition can cause dirt from daily activities to be tucked into the nails if the nails are in a long condition, so if the mother is preparing food or feeding her child, the germs that are in the nails that are not clean and long will be swallowed by her child (Nurpauji et al., 2015). Based on the results of the research conducted, most mothers have maintained good nail hygiene, although in this study the nail hygiene variable did not have an association with the incidence of diarrhea because respondents had poor hand washing habits.

4.7 The Relationship Between Diaper Disposal Behavior and the Incidence of Diarrhea in Toddlers in the Prabumulih Barat Health Center Working Area

From the results of statistical analysis using the Chi-square test, a P-value of 0.002 was obtained, which means that there is a statistically significant association between the variable diaper disposal behavior with the incidence of diarrhea in toddlers Based on the results of bivariate analysis in this study, 15 (30.6%) toddlers out of 49 respondents suffered from diarrhea with poor diaper disposal behavior. Of the 41 respondents with good diaper disposal practices, 27 toddlers (65.9%) still experienced diarrhea, suggesting the presence of other contributing factors.

Based on the data obtained, most of the respondents in this study threw diapers containing baby/toddler feces into the backyard or trash can without cleaning the feces first. The main source of diarrhea transmission is human or animal feces (**?**) . When diapers are carelessly dumped on the ground, the pathogens in the feces can leach into the soil. As a result, water sources and the environment around the diaper disposal site are at risk of being contaminated by poorly managed biological waste, becoming a major source of disease spread (Kimani et al., 2015). In addition, carelessly disposed diapers can attract flies and animals such as dogs or rats that act as disease vectors. Flies that land on feces in diapers can carry diarrhea-causing bacteria to food or tableware and cause the spread of diarrheal diseases (Zakianis et al., 2019).

This study is in line with Yulda and Fitriani (2023), who showed that there is a significant relationship between fecal disposal behavior and the incidence of diarrhea in children. One of the causes is the bad behavior of parents who do not clean diapers containing feces into the toilet before the diapers are disposed of in the trash causing diapers containing feces to easily attract vectors such as rats and flies to settle which will then contaminate food and children (Yulda and Fitriani, 2023).

In addition, previous research by Fatmawati et al. (2017), analyzed the relationship between proper disposal of feces and the incidence of diarrhea in toddlers and obtained a p-value = 0.000 (p < 0.05) which indicates that there is a significant relationship between proper disposal of feces and the incidence of diarrhea. According to him, behaviors such as putting diapers or pants used by children on the bathroom floor are also included in poor behavior in disposing of feces (Fatmawati et al., 2017).

Based on the results of the analysis of the research conducted, respondents still have inappropriate behavior in handling baby diapers and must be addressed immediately by involving health promotion personnel to provide education or intervention to the community, especially mothers with toddlers, on how to dispose of diapers hygienically and safely. The correct way to dispose of diapers is to clean the feces on the diaper first in the bathroom / toilet before disposing of it in a closed trash can or planting a diaper containing feces into the ground (Kemenkes, 2018).

4.8 Interpretation of Key Findings

The study found that 46.7% of toddlers in the working area of the Prabumulih Barat Health Center experienced diarrhea, indicating that it remains a pressing public health issue. Bivariate analysis revealed four variables significantly associated with diarrhea incidence: family income, maternal handwashing habits, food management practices, and diaper disposal behavior. Toddlers from low-income families were 2.36 times more likely to suffer from diarrhea, suggesting that economic limitations hinder access to adequate hygiene facilities, such as clean water, soap, and

safe food storage. Poor maternal handwashing habits were linked to a 5.25 fold increase in diarrhea risk, reinforcing the critical role of hand hygiene in preventing fecal-oral disease transmission. Inadequate food management practices were associated with a 2.68 times higher risk, likely due to unsafe food handling and storage. The study found no statistically significant association between maternal nail hygiene and the incidence of diarrhea in toddlers (p = 0.072). In this study, most mothers maintained regular nail trimming, often driven by cultural or religious practices, which may have reduced the overall impact of nail hygiene on diarrhea outcomes. Improper diaper disposal also showed a significant association, reflecting its contribution to environmental contamination and the spread of pathogenic organisms. Conversely, maternal education level, age, and nail hygiene did not show a statistically significant relationship with diarrhea, indicating that practical hygiene behaviors and environmental conditions may have a greater influence than demographic factors. These findings highlight the importance of strengthening maternal hygiene practices, particularly handwashing, food safety, and waste management to prevent diarrhea in toddlers. Public health strategies should focus on community-based education, sanitation improvement, and the active involvement of health cadres to reduce diarrheal disease risk in early childhood.

4.9 Comparison with Previous Studies

The non-significant relationship between maternal education and diarrhea incidence (p = 0.267) supports prior studies by Wibisono et al. (2020) and Rane et al. (2017), which demonstrated that mothers with lower educational attainment may still possess adequate knowledge of diarrhea prevention due to exposure to health education and active participation in community health services. In contrast, Puspitaningrum (2017) emphasized maternal education as a crucial determinant of hygienic behavior, suggesting that discrepancies may stem from contextual and socio-cultural differences in access to health information.

Similarly, the absence of a significant association between maternal age and diarrhea (p = 0.937) corroborates findings from Adeleke (2019), Putra and Utami (2020), and Limoy and Iit (2019), who argued that maternal age alone is not a primary determinant of childcare practices, but rather that experience and health literacy play a more influential role. This reinforces the notion that age serves as a predisposing factor that must be considered alongside personal knowledge and exposure to health interventions.

In contrast, the significant association between low family income and increased diarrhea incidence (p = 0.001) aligns with studies by Khairani et al. (2020) and Azage et al. (2016), which reported that low-income households face greater challenges in accessing adequate sanitation and hygiene resources, increasing children's vulnerability to diarrheal diseases. These findings highlight the socioeconomic dimensions of health inequity.

Moreover, the strong association between poor maternal handwashing habits and diarrhea incidence (p = 0.000) is consistent with the F-diagram theory of fecal-oral transmission proposed by Wagner and Lanois, and supported by Sari et al. (2022) and Prawati and Haqi (2019). This emphasizes that hand hygiene, particularly handwashing with soap, plays a critical role in breaking the transmission chain of diarrheal pathogens, making it a vital focus for public health interventions.

The association between improper food management practices and diarrhea incidence (p = 0.000) also reflects findings by Karantika and Siwiendrayanti (2024), and Widyastuti and Almira (2019), who identified poor storage and preparation hygiene as key contributors to foodborne illness. However, this contrasts with Maulidah and Siwiendrayanti (2022), who reported no significant relationship, likely due to a higher prevalence of safe food handling practices in their study population. These discrepancies suggest that behavioral compliance and community practices can influence outcomes regardless of knowledge levels.

This study found no significant association between maternal nail hygiene and diarrhea in toddlers (p = 0.072), aligning with Lubis et al. (2021), who emphasized the stronger role of sanitation and hand hygiene. In contrast, Nurpauji et al. (2015) reported a significant link, noting that dirty nails can transmit pathogens during food handling. Therefore, nail hygiene may pose contribute to risk, but its impact likely depends on the presence or absence of other hygiene practices.

Finally, the significant relationship between diaper disposal behavior and diarrhea (p = 0.002) is in accordance with studies by Fatmawati et al. (2017) and Yulda and Fitriani (2023), which emphasized that improper disposal of fecal waste can lead to environmental contamination and facilitate the spread of disease through vectors such as flies and rodents.

This study supports much of the existing literature regarding the importance of hand hygiene, safe food management, and proper waste disposal in preventing diarrhea in toddlers. At the same time, it also highlights that demographic characteristics such as maternal education and age may not consistently predict hygienic behavior, underscoring the need for targeted health promotion interventions that address practical behavior and environmental conditions directly.

4.10 Limitations and Cautions

The limitation of this study is that the focus is only on maternal personal hygiene factors so that it cannot fully describe the dependent variables and the specific health conditions of toddlers because it requires further medical examination which is not available within the scope of this study.

4.11 Recommendations for Future Research

For future research, it is recommended to enhance this study by conducting a more thorough assessment of the toddlers' health conditions. Additionally, incorporating variables such as E. coli analysis to assess the quality of water sources both used for consumption and for other purposes such as cooking or washing children's tableware. Furthermore, employing alternative research methods, such as in-depth interviews to get more optimal results.

5. CONCLUSION

A total of 42 toddlers (46.7%) experienced diarrhea in the working area of the West Prabumulih Health Center. Most respondents demonstrated inadequate personal hygiene practices. This is indicated by poor handwashing habits in 48 respondents (53.3%), poor food management in 49 respondents (54.4%), poor nail hygiene in 27 respondents (30%), and improper diaper disposal behavior in 49 respondents (54.4%). There was no significant relationship between mothers' education, mothers' age, and mothers' nail hygiene with incidence of diarrhea in toddlers. There was a significant relationship between family income, maternal handwashing habits, food management practices, and diaper disposal behavior with incidence of diarrhea in toddlers. It is recommended that the West Prabumulih Health Center continue to supervise and guide the community in maintaining personal hygiene, particularly handwashing with soap. This effort should be supported by enhancing the role of health workers in maternal and child health programs and intensifying health promotion activities to raise awareness among mothers of toddlers about the importance of hand hygiene in preventing diarrhea

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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