The Relationship between Maternal Knowledge, Personal Hygiene, and Family Economic Status and the Incidence of Diarrhea in the Working Area of the Pekauman Public Health Center, Banjarmasin

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ABSTRACT/ ABSTRAK

ABSTRACT. *Diarrhea remains a major public health problem among under-five children in Indonesia, particularly in areas with limited sanitation and disadvantaged socioeconomic conditions. Maternal knowledge, personal hygiene, and family economic status are key factors influencing the incidence of diarrhea. This study aimed to analyze the relationship between maternal knowledge, personal hygiene, and family economic status and the incidence of diarrhea in the working area of the Pekauman Public Health Center, Banjarmasin. A cross-sectional design was employed using accidental sampling, involving 40 mothers with children aged 2–5 years who visited the Pekauman Public Health Center. Data were collected using a structured questionnaire and analyzed using the Spearman Rank correlation test. The results demonstrated significant associations between maternal knowledge (p = 0.008; r = 0.412), personal hygiene (p = 0.000; r = 0.710), and family economic status (p = 0.000; r = 0.645) and the incidence of diarrhea, with personal hygiene showing the strongest correlation. This study contributes to public health practice by emphasizing the importance of integrated, family-based interventions, including strengthening maternal education, improving hygienic behaviors, and enhancing family economic capacity, to reduce diarrhea incidence at the primary health care level.*

ABSTRAK. Diare masih menjadi masalah kesehatan masyarakat utama pada balita di Indonesia, terutama di wilayah dengan keterbatasan sanitasi dan kondisi sosial ekonomi. Pengetahuan ibu, personal hygiene, dan status ekonomi keluarga merupakan faktor penting yang memengaruhi kejadian diare. Penelitian ini bertujuan untuk menganalisis hubungan pengetahuan ibu, personal hygiene, dan status ekonomi keluarga dengan kejadian diare di wilayah kerja Puskesmas Pekauman, Kota Banjarmasin. Penelitian ini menggunakan desain *cross-sectional* dengan teknik *accidental sampling* pada 40 ibu yang memiliki balita usia 2–5 tahun yang berkunjung ke Puskesmas Pekauman. Data dikumpulkan menggunakan kuesioner terstruktur dan dianalisis menggunakan uji korelasi Rank Spearman. Hasil penelitian menunjukkan adanya hubungan yang signifikan antara pengetahuan ibu (p = 0,008; r = 0,412), personal hygiene (p = 0,000; r = 0,710), dan status ekonomi keluarga (p = 0,000; r = 0,645) dengan kejadian diare, dengan personal hygiene sebagai faktor yang memiliki kekuatan hubungan paling kuat. Penelitian ini memberikan kontribusi bagi praktik kesehatan masyarakat dengan menekankan pentingnya intervensi terpadu berbasis keluarga melalui peningkatan edukasi ibu, perbaikan perilaku higienis, dan penguatan ekonomi keluarga dalam upaya menurunkan kejadian diare di tingkat pelayanan kesehatan primer.

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INTRODUCTION

Diarrhea remains a significant public health problem and is one of the leading causes of morbidity and mortality among under-five children in developing countries, including Indonesia (World Health Organization, 2024). This condition is closely associated with inadequate sanitation, limited access to clean water, and low adherence to clean and healthy living behaviors at the household level. Under-five children are particularly vulnerable due to their immature immune systems and high levels of interaction with the surrounding environment.

Globally, diarrhea continues to be a major cause of death among children under five years of age and contributes substantially to the global burden of disease, especially in regions with low socioeconomic conditions (World Health Organization, 2024; Zhu et al., 2025; Looha et al., 2025). In Indonesia, national data indicate that children aged 1–4 years have the highest prevalence of diarrhea compared to other age groups, reflecting high exposure to environmental and behavioral risk factors within this age range (Riskesdas, 2018). These findings suggest that diarrhea prevention remains a major challenge in public health services.

The incidence of diarrhea in children is influenced by environmental factors, including sources of drinking water, waste management, wastewater drainage systems, latrine availability, and floor type (Susanti et al., 2024). In addition, family economic status, child age, exclusive breastfeeding practices, personal hygiene, food quality, and parental knowledge play important roles in determining diarrhea risk (Yohana et al., 2024). Maternal knowledge plays a crucial role in diarrhea prevention among under-five children, as mothers are typically the primary caregivers responsible for implementing hygienic practices within the household. Adequate maternal knowledge can lead to effective personal hygiene practices, proper food handling and environmental cleanliness, and early recognition of diarrhea symptoms, all of which are essential for timely and appropriate care (Khan et al., 2023; Manurung, 2022; Sulfiati & Soesanty, 2020). Previous studies have demonstrated a significant relationship between maternal knowledge levels and the incidence of diarrhea among under-five children, with higher knowledge associated with a reduced risk of diarrhea (Rita Puspa Sari et al., 2024).

Beyond knowledge, family economic status also influences the incidence of diarrhea among under-five children. Families with lower economic status tend to have limited access to adequate sanitation facilities, clean water, and healthy living environments. Evidence indicates that diarrhea incidence is more prevalent among families with low income compared to those with higher income, reinforcing the association between economic conditions and diarrhea risk (Moniz et al., 2025; Okeyo et al., 2024).

Personal hygiene is a critical behavioral factor in diarrhea prevention, particularly handwashing practices, food hygiene, and the management of waste and feces. Poor personal hygiene practices increase the risk of exposure to diarrhea-causing microorganisms among under-five children. Previous studies have reported that most respondents with inadequate personal hygiene practices experienced diarrhea, whereas lower diarrhea incidence was observed in families with good hygienic practices (Safaryna et al., 2024; Kamilla et al., 2013; Fassa et al., 2024).

Banjarmasin City is one of the areas with a high burden of diarrhea cases in South Kalimantan Province, with the Pekauman Public Health Center reporting the highest number of diarrhea cases among under-five children compared to other public health centers (Dinkeskota, 2024). This situation is associated with regional characteristics such as high population density, the proximity of residential areas to river flows, and limited sanitation infrastructure, all of which may increase the risk of environmental contamination and disease transmission (Data Penduduk, 2024; Data Puskesmas Pekauman, 2024).

Although numerous studies have examined the relationships between maternal knowledge, personal hygiene, and economic status and the incidence of diarrhea, most have investigated these factors separately. Studies that simultaneously analyze all three variables at the primary health care level, particularly in areas with a high burden of diarrhea cases such as the Pekauman Public Health Center, remain limited. Therefore, this study aimed to analyze the relationships between maternal knowledge, personal hygiene, and family economic status and the incidence of diarrhea among under-five children in the working area of the Pekauman Public Health Center, Banjarmasin City.

RESEARCH METHOD

This study employed an analytic quantitative design with a cross-sectional approach to analyze the relationships between maternal knowledge, personal hygiene, and family economic status and the incidence of diarrhea among under-five children. A correlational observational method was applied, in which data on the independent and dependent variables were collected simultaneously at a single point in time to describe the respondents' actual conditions during the study period.

The study was conducted in the working area of the Pekauman Public Health Center, Banjarmasin City, from 8 to 15 May 2025. The study population consisted of mothers who had children aged 2–5 years and visited the Pekauman Public Health Center during the data collection period. The sample comprised 40 respondents, selected using a total sampling technique, in which all mothers who met the inclusion criteria during the three-month study period were included.

Data were collected using a structured, closed-ended questionnaire developed based on standard references and previous studies. Instrument validity and reliability were tested through a pilot study involving 30 respondents at another public health center. All questionnaire items were declared valid, and the reliability test yielded Cronbach's alpha values above 0.60, indicating adequate internal consistency. Maternal knowledge and personal hygiene variables were categorized as poor, moderate, and good; family economic status was classified as low, moderate, and high; and diarrhea incidence was grouped into frequent, rare, and never. All variables were measured on an ordinal scale.

Data collection was conducted through face-to-face interviews, with an average duration of approximately 10–15 minutes per respondent. Data processing included editing, coding, tabulation, and data cleaning prior to analysis. Data analysis was performed using SPSS software, consisting of univariate analysis to describe frequency and percentage distributions and bivariate analysis using the Spearman Rank correlation test, as the data were ordinal and not normally distributed. Statistical significance was determined at a p-value < 0.05.

This study was conducted in accordance with ethical principles for research involving human subjects. All respondents received a clear explanation of the study objectives and procedures and provided written informed consent prior to participation. Respondent confidentiality and anonymity were ensured through the use of identification codes, and the study received ethical approval from the relevant institutional ethics committee.

RESULTS

Respondent Characteristics

Tabel 1. Table 1. Age Distribution of Respondents

No	Age Group (Years)	Frequency (n)	Percentage (%)
1	20–25	6	15.0
2	25–30	12	30.0
3	31–35	14	35.0
4	>35	8	20.0
	Total	40	100.0

The age distribution of respondents is presented in table 1. The majority of respondents were aged 31–35 years (14 respondents; 35.0%), followed by those aged 25–30 years (12 respondents; 30.0%), >35 years (8 respondents; 20.0%), and 20–25 years (6 respondents; 15.0%).

Table 2. Educational Level Distribution of Respondents

No	Education Level	Frequency (n)	Percentage (%)
1	Elementary School	5	12.5
2	Junior High School	7	17.5
3	Senior High School	18	45.0
4	Diploma/Bachelor	10	25.0
	Total	40	100.0

The distribution of respondents' educational levels is shown in table 2. Most respondents had completed senior high school (18 respondents; 45.0%), followed by those with a diploma or bachelor's degree (10 respondents; 25.0%), junior high school (7 respondents; 17.5%), and elementary school (5 respondents; 12.5%).

Table 3. Occupational Distribution of Respondents

No	Occupation	Frequency (n)	Percentage (%)
1	Housewife	22	55.0
2	Government Employee	5	12.5
3	Self-employed	9	22.5
4	Others	4	10.0
	Total	40	100.0

As presented in Table 3, the majority of respondents were housewives (22 respondents; 55.0%), followed by self-employed respondents (9 respondents; 22.5%), government employees (5 respondents; 12.5%), and those in other occupations (4 respondents; 10.0%).

Table 4. Distribution of Number of Children

No	Number of Children	Frequency (n)	Percentage (%)
1	One child	9	22.5
2	Two children	16	40.0
3	Three children	11	27.5
4	More than three	4	10.0
	Total	40	100.0

The distribution of the number of children is shown in table 4. Most respondents had two children (16 respondents; 40.0%), followed by those with three children (11 respondents; 27.5%), one child (9 respondents; 22.5%), and more than three children (4 respondents; 10.0%).

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Table 5. Distribution of Maternal Knowledge Levels

No	Knowledge Level	Frequency (n)	Percentage (%)
1	Poor	6	15.0
2	Moderate	13	32.5
3	Good	21	52.5
	Total	40	100.0

The distribution of maternal knowledge levels is presented in table 5. A total of 21 respondents (52.5%) had good knowledge, 13 respondents (32.5%) had moderate knowledge, and 6 respondents (15.0%) had poor knowledge.

Table 6. Distribution of Personal Hygiene Levels

No	Personal Hygiene Level	Frequency (n)	Percentage (%)
1	Poor	12	30.0
2	Moderate	12	30.0
3	Good	16	40.0
	Total	40	100.0

Table 6 shows the distribution of personal hygiene levels. Sixteen respondents (40.0%) had good personal hygiene, while 12 respondents (30.0%) were classified as moderate and another 12 respondents (30.0%) as poor.

Table 7. Distribution of Family Economic Status

No	Economic Status	Frequency (n)	Percentage (%)
1	Low	12	30.0
2	Moderate	18	45.0
3	High	10	25.0
	Total	40	100.0

The distribution of family economic status is presented in table 7. Most respondents were in the moderate economic status category (18 respondents; 45.0%), followed by low economic status (12 respondents; 30.0%) and high economic status (10 respondents; 25.0%).

Table 8. Distribution of Diarrhea Incidence

No	Diarrhea Incidence	Frequency (n)	Percentage (%)
1	Frequent	22	55.0
2	Rare	10	25.0
3	Never	8	20.0
	Total	40	100.0

Table 8 presents the distribution of diarrhea incidence. A total of 22 respondents (55.0%) reported frequent diarrhea, 10 respondents (25.0%) reported rare diarrhea, and 8 respondents (20.0%) reported never experiencing diarrhea within the past three monthsir.

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Table 9. Relationship Between Maternal Knowledge and Diarrhea Incidence

Knowledge Level	Frequent	Rare	Never	Total
	f	f	f	f
Poor	6	0	0	**6**
Sufficient	7	6	0	**13**
Good	9	4	8	**21**
Total	22	10	8	**40**

Spearman Rank **Correlation Test Results**
Asymp.**Sig. (2-tailed) = 0,008**
Correlation Coefficient = 0,412

The cross-tabulation between maternal knowledge and diarrhea incidence is shown in Table 9. The Spearman Rank correlation test yielded a correlation coefficient of r = 0.412 with a p-value = 0.008, indicating a statistically significant relationship between maternal knowledge level and the incidence of diarrhea.

Table 10. Relationship Between Personal Hygiene and Diarrhea Incidence

Personal Hygiene	Frequent	Rare	Never	Total
	f	f	f	f
Poor	12	0	0	12
Sufficient	7	5	0	12
Good	3	5	8	16
Total	22	10	8	40

Spearman Rank **Correlation Test Results**
Asymp.**Sig. (2-tailed) = 0,000**
Correlation Coefficient = 0,710

Table 10 presents the relationship between personal hygiene and diarrhea incidence. The Spearman Rank correlation analysis showed a correlation coefficient of r = 0.710 with a p-value = 0.000, indicating a statistically significant and strong association between personal hygiene and diarrhea incidence.

Table 11. Relationship Between Family Economic Status and Diarrhea Incidence

Economic Status	Frequent	Rare	Never	Total
	f	f	f	f
Low	12	0	0	12
Medium	9	5	4	18
High	1	5	4	10
Total	22	10	8	40

Spearman Rank Correlation Test Results
Asymp.Sig. (2-tailed) = 0,000
Correlation Coefficient = 0,645

The relationship between family economic status and diarrhea incidence is shown in Table 11. The Spearman Rank correlation test resulted in a correlation coefficient of r = 0.645 with a p-value = 0.000, demonstrating a statistically significant association between family economic status and the incidence of diarrhea.

DISCUSSION

Synthesis of Respondent Profiles and Urban Environmental Pressures

The majority of respondents in this study were mothers aged 31–40 years with a senior high school educational background. Theoretically, this age range and educational level are considered optimal for absorbing health-related information and maintaining emotional stability in child caregiving (Novrianda et al., 2014). However, the effectiveness of these individual characteristics is substantially constrained by the environmental and geographical conditions of the Pekauman area, which is a densely populated urban setting exposed to neighborhood effects, where pathogens can spread through shared physical spaces (Widyastuti et al., 2025; Ramadhani et al., 2023).

Although approximately 60% of respondents were housewives, their physical presence at home did not necessarily reduce the risk of diarrhea among children. Urban studies in Indonesia have shown that households with poor ventilation, high humidity, and inadequate waste management remain at increased risk of disease, even when mothers are consistently present to supervise their children (Fassa et al., 2024; Hudoyoko & Iravati, 2014; Kurniawati et al., 2021). In other words, housewives may be temporally available but have limited capacity to control household sanitation conditions.

These findings indicate the need for community-based and structural interventions, rather than relying solely on individual health education. High population density and limited sanitation infrastructure render household-level diarrhea prevention efforts insufficient. Therefore, prevention strategies must account for environmental and social determinants of child health, including waste management, access to clean water, and community-based health education.

Maternal Knowledge: The Gap between Literacy and Structural Enabling Factors

The results showed that 52.5% of mothers had good maternal knowledge regarding diarrhea prevention; however, some households continued to experience diarrhea cases. This

finding aligns with the PRECEDE PROCEED framework, in which knowledge as a predisposing factor requires enabling factors, such as infrastructure, clean water supply, and sanitation, to be effective (Green & Kreuter, 2005). Mothers with poor knowledge (15.0%) reported the highest frequency of diarrhea, underscoring that health literacy remains a fundamental component of prevention

Rita Puspa Sari et al. (2024) reported that mothers with low health literacy had a 2.5-fold higher risk of having children with recurrent diarrhea due to failure to recognize early signs of dehydration. Although most mothers demonstrated adequate knowledge, its application was often constrained by economic barriers, such as the cost of fuel for boiling water or the lack of clean storage containers. This phenomenon is commonly referred to as the knowledge–action gap (Khaliq et al., 2022; Hairani et al., 2019).

Therefore, health education must be integrated with the provision of supportive facilities. Only through structural support and adequate access to resources can maternal knowledge be translated into consistent preventive practices. Multisectoral interventions are essential to bridge the gap between literacy and real-world household practices.

Personal Hygiene and Economic Constraints: A Synthesis

Approximately 30% of respondents exhibited poor personal hygiene, and all of these households reported recurrent diarrhea. This behavior is not solely attributable to a lack of discipline but is strongly influenced by low family economic status. Families with incomes below the minimum wage often deprioritize expenditures for antiseptic soap or sanitation in favor of basic necessities (Muramatsu-Noguchi et al., 2022).

In addition, economic limitations restrict access to private sanitation facilities. Merid et al. (2024) demonstrated that the use of shared latrines in densely populated areas increases the risk of fecal–oral transmission by nearly 50% compared to private facilities, due to shared pathogen contact points. In households with multiple children, hygiene resources such as soap and towels are often shared, further increasing the risk of cross-contamination (Afifah & Pranata, 2023; Putri & Hendrawati, 2021).

Consequently, diarrhea prevention strategies should not focus exclusively on individual behavior. Interventions must address economic barriers, including the distribution of hygiene supplies, the provision of sanitation facilities, and practical household hygiene education. This approach ensures that mothers are able to implement hygienic practices despite resource constraints.

Environmental Transmission in Dense Urban Ecosystems

High population density in the Pekauman area accelerates diarrhea transmission pathways as described in the F-diagram. Even when mothers maintain proper hand hygiene (fingers), drinking water (fluids) and environmental drainage (fields) are frequently contaminated due to open wastewater channels (World Health Organization, 2023; Tessema et al., 2023). This demonstrates that individual hygienic practices alone are insufficient to prevent diarrhea.

Aung et al. (2023) further noted that the close proximity of open drainage systems to food preparation areas results in individual hygiene providing only partial protection. This

phenomenon explains why mothers with good hygienic practices may still report occasional diarrhea cases, an effect of environmental spillover from community-level sanitation conditions.

Therefore, diarrhea prevention interventions must be collective in nature, involving improvements in environmental sanitation, waste management, and community education. Household-level health efforts are effective only when supported by conducive physical and social environments, underscoring the need to integrate individual and structural approaches in diarrhea prevention strategies.

Study Limitations

This study has several limitations. First, the small sample size (n = 40) limits statistical power and generalizability to the broader South Kalimantan region, rendering the study exploratory in nature. Second, the cross-sectional design provides only a snapshot at a single point in time and does not allow for causal inference. Third, the use of accidental/total sampling may have excluded mothers who rarely access health services, potentially underrepresenting the most vulnerable groups. Finally, personal hygiene data were self-reported, making them susceptible to social desirability bias.

CONCLUSION

The findings of this study indicate that the level of maternal knowledge regarding diarrhea in the working area of the Pekauman Public Health Center remains moderate, although a small proportion of mothers still demonstrate low knowledge levels. This suggests that family understanding of the causes, symptoms, and prevention of diarrhea among under-five children requires further improvement. Levels of personal hygiene and household environmental cleanliness varied, with some mothers exhibiting suboptimal practices that may increase the risk of diarrhea among children. Family economic status also plays a critical role, as most families were classified within the low to moderate economic categories. These economic constraints limit access to adequate sanitation facilities, clean water, nutritious food, and health services, thereby increasing children's vulnerability to diarrhea. These findings confirm that maternal knowledge, hygiene practices, and family economic status are key, interrelated determinants of diarrhea risk among under-five children. Overall, this study emphasizes the importance of an integrated approach to diarrhea prevention that includes strengthening maternal health literacy, reinforcing family hygiene behaviors, and promoting household economic empowerment. Interventions that focus on only one aspect are insufficient; successful diarrhea prevention requires environmental support, adequate sanitation infrastructure, and active engagement of communities and health workers at the community level.

Based on the findings from this respondent group, the Pekauman Public Health Center is encouraged to implement an integrated approach that combines improvements in health literacy with support for hygiene facilities. Practical measures include education on diarrhea symptoms, demonstrations of effective hygiene practices, and the provision of affordable sanitation facilities for families with low economic status. These interventions should involve cross-sectoral collaboration to improve environmental sanitation, thereby maximizing diarrhea prevention efforts at the household level.

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