RELATIONSHIP BETWEEN EXCLUSIVE BREASTFEEDING HISTORY, NUTRITIONAL STATUS, SOCIO-ECONOMIC STATUS, AND MOTHER'S LEVEL OF KNOWLEDGE IN RELATION TO TODDLER DIARRHEA INCIDENCE IN CAKRANEGARA COMMUNITY HEALTH CENTER

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ABSTRACT

Background: Diarrhea is one of the most common diseases in toddlers and is influenced by a number of risk factors, such as environmental, sociodemographic, and behavioral factors. It incorporates a mother's knowledge, employment, and family income as sociodemographic characteristics. Meanwhile, behavioral aspects include nursing history, nutritional state of the infant, use of milk bottles, and hand washing habits. **Objective**: To determine the relationship between exclusive breastfeeding history, nutritional status, socio-economic status, and the mother's knowledge level with toddler diarrhea incidences at Cakranegara Community Health Center. **Method**: A cross-sectional study was conducted towards 80 mother and toddler respondents using the purposive sampling technique. The statistical tests used are the chi square and spearman rank tests. **Results**: A bivariate analysis was obtained for each variable (p-value ≤ 0.05). There is a significant relationship between a history of exclusive breastfeeding and the incidence of diarrhea ($p = 0.001$). There is also a strong link between nutritional status and diarrhea incidence ($p = 0.001$). Additionally, a significant relationship between socio-economic status and the incidence of diarrhea ($p = 0.002$) was also found. Finally, there is a significant association ($p = 0.001$) between the mother's level of knowledge and the occurrence of diarrhea. **Conclusion**: There is a significant relationship between the history of exclusive breastfeeding, nutritional status, socio-economic status, and mother knowledge level and the incidence of toddler diarrhea at Cakranegara Community Health Center.
Keywords: Diarrhea., Exclusive Breastfeeding., Nutritional Status., Socio-Economic Status., Mother's Knowledge Level

INTRODUCTION

Diarrhea is a disease that most often occurs in toddlers, especially in the first year of life. The disease is characterized by changes in feces consistency ranging from soft to liquid, in which the defecation frequency is three or more times a day[1]. Thus, diarrhea is categorized as a global problem with a mortality rate of 11%, and toddlers are in the most-at-risk group. Data from the World Health Organization (WHO) in 2019 stated that diarrhea was the second most common cause of death in children under five, accounting for 370.000 children out of 1.7 billion cases of diarrhea mortality[2]. In Indonesia, Nusa Tenggara Barat province has the highest percentage of the disease in toddlers, reported at 61.4%, while the lowest percentage was

in West Sulawesi Province with 4% in 2021 alone. Reportedly, in 2022, Lombok Utara and Mataram diarrhea incidence cases were 2.070 and 1.560 respectively. Data from the Mataram City Health Service (Dinas Kesehatan) for December 2022 showed that the highest diarrhea incidence among children under five was found in Cakranegara Community Health Center (20.76%), and the lowest was in Selaparang Community Health Center for 8.43%[5]. The death caused by diarrhea occurs more often in toddlers because, at the early age of a child's life, the body is still unable to fight incoming pathogens. It is also caused by other factors, such as the consumption of additional food, apart from exclusive breast milk, after six months of birth. Diarrhea incidence is closely related to several risk factors, including environmental factors in which clean water

provision is limited, toilet facilities, cooking processes, and the cleanliness of food storage and eating utensils. Additionally, from sociodemographic factors, the risk factors were linked to education, employment, parental income, and maternal knowledge related to clean and healthy living behavior. On the behavioral factors, there are history of exclusive breastfeeding, nutritional status of the child, use of toilets, use of feeding bottles, and hand washing behavior after defecation and after washing the child's anus who had defecated[6].

Maternal knowledge and behavior during child care such as hand washing habit, cutlery and cooking cleanliness are important factors throughout child growth and development process. In view of this, the risk factors depend on those maternal knowledge and behavior. On the other hand, provision of exclusive breastfeeding to children from the beginning of life until the age of six months also has pivotal role in the prevention of diarrheal disease considering its content for child growth and development and child body defense system from infectious disease. Thus, good provision of nutrition is not only by the provision of breast milk, but also the provision of other nutritional source such as complementary food, infant formula, and any other needs.

Based on the description of the problem, this is what underlies the researcher's interest in conducting a study with the aim of determining the relationship between exclusive breastfeeding history, nutritional status, socioeconomic status, and maternal knowledge with the occurrence of diarrhea in toddlers at Cakranegara Primary Health Center.

MATERIALS AND METHODS

The research used quantitative observational and analytical research methods with a cross-sectional design. Non-probability sampling was used, specifically purposive sampling, which involves carefully selecting respondents based on predetermined inclusion and exclusion criteria set by the researcher. The total number of respondents who met the criteria was 80. The samples in this study were mothers and toddlers who met the inclusion criteria. The toddlers' age is between 6 and 59 months, and are clients of Cakranegara Community Health Center from September to October 2023. Those toddlers are also residents of the surrounding area of the community health center. Toddlers with a history of lactose intolerance and cow milk allergies were excluded from this research. The mother who met the criteria was asked to fill out a consent form before participating in the guided interview to answer the questionnaire. At the same time, toddlers' height and weight were measured using manual scales - stadiometers and infantometers. Furthermore, the collected data was processed using SPSS 25.0.

The research was conducted for four days at the Children and Adolescents Polyclinic at the health center. This research has a certificate of ethical suitability from the Research Ethics Commission of the Faculty of Medicine, Al-Azhar Islamic University, Number 137/EC-01/FK-06/UNIZAR/IX/2023, and a research permit from the Mataram City Research and Development Agency, Number 07/924/Balitbang-KT/IX/2023.

RESULT

Table 1. Characteristics of toddlers' respondent

Gender	Frequency	Diarrhea incidence	
	n (%)	Yes (%)	No (%)
Male	41 (51.2%)	24 (63.1%)	17 (40.5%)
Female	39 (48.8%)	14 (36.9%)	25 (59.5%)
Total	**80**	**38**	**42**
Age (months)			
6 – 36	61 (76.2%)	29 (76.3%)	32 (76.2%)
37 – 59	19 (23.8%)	9 (23.7%)	10 (23.8%)
Total	**80**	**38**	**42**
Exclusive breastfeeding (EB) history			
Non EB	38 (47.5%)	26 (68.4%)	12 (28.6%)
EB	42 (52.5%)	12 (31.6%)	30 (71.4%)
Total	**80**	**38**	**42**
Nutritional Status			
Malnutrition	0	0	0
Mild malnutrition	30 (37.5%)	21 (55.3%)	9 (21.4%)
Normal	39 (48.8%)	15 (39.4%)	24 (57.1%)
Overnutrition	11 (13.7%)	2 (5.3%)	9 (21.5%)
Total	**80**	**38**	**42**

Source: Primary Data (2023)

Table 1 shows that of the 80 toddler respondents, there were more boys than girls, with 41 of those being boys. From those respondents, 24 toddlers experienced diarrhea. The largest age group was between 6 and 36 months old, accounting for 61 respondents. Among that group, 29 of them have diarrhea. Exclusive breastfeeding history shows that 42 respondents received exclusive breastfeeding and 31 received breast milk until two years old. None of the respondents mentioned were categorized as malnourished

Table 2. Mother respondents' characteristics

	Frequency	Diarrhea Incidence	
Age (year)	**n (%)**	**Yes (%)**	**No (%)**
< 20	2 (2.5%)	2 (5.3%)	0
20 - 35	69 (86.3%)	33 (86.8%)	36 (85.7%)
> 35	9 (11.2%)	3 (7.9%)	6 (14.3%)
Total	**80**	**38**	**42**
Occupation			
Housewife	66 (82.5%)	29 (76.3%)	37 (88.1%)
Civil servant	1 (1.2%)	0	1 (2.4%)
Private sector employee	10 (12.5%)	7 (18.4%)	3 (7.1%)
Self-employed	3 (3.8%)	2 (5.3%)	1 (2.4%)
Total	**80**	**38**	**42**
Socio-economic status			
Low	40 (50.0%)	26 (68.4%)	14 (33.3%)
Middle	29 (36.2%)	9 (23.7%)	20 (47.5%)
High	5 (6.3%)	1 (2.6%)	4 (9.6%)
Upper	6 (7.5%)	2 (5.3%)	4 (9.6%)
Total	**80**	**38**	**42**
Mother's educational background			
Elementary dropout	4 (5.0%)	3 (8%)	1 (2.4%)
Elementary	13 (16.2%)	11 (28.9%)	2 (4.8%)
Junior high	15 (!8.8%)	9 (23.7%)	6 (14.3%)
Senior high	38 (47.5%)	13 (34.2%)	25 (59.5%)
University	10 (12.5%)	2 (5.2%)	8 (19.0%)
Total	**80**	**38**	**42**
Mothers' knowledge			
Low	31 (38.7%)	21 (55.3%)	10 (23.8%)
Moderate	24 (30.0%)	11 (28.9%)	13 (31.0%)
Good	25 (31.3%)	6 (15.8%)	19 (45.2%)
Total	**80**	**38**	**42**

Source: Primary Data (2023)

Table 2 shows that most of the 69 respondents were classified into a 20 – 35 age group, of which 33 experienced diarrheas. Meanwhile, in the occupation category, 66 of the respondents are housewives, and 29 of their toddlers have diarrhea. The study also shows that 40 of the respondents come from low socioeconomic households. The table also outlines that there were only 4 elementary school drop-out participants. However, in terms of mothers' knowledge level, the table shows a negative trend, as 31 of them have a low level of required awareness.

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Table 3. Cross tabulation of the relationship between a history of exclusive breastfeeding and the incidence of diarrhea in toddlers

Diarrhea incidence	Exclusive breastfeeding history						*p* – value	PR	95% CI
	Exclusive Breastfeeding		Non EB		Total				
	(n)	(%)	(n)	(%)	(n)	(%)			
Yes	12	15.0	26	32.5	38	47.5	0.001*	5.417	2.080-14.106
No	30	37.5	12	15.0	42	52.5			
Total	**42**	**52.5**	**38**	**47.5**	**80**	**100**			

Source: Primary Data (2023)
Note:
n	: Number
%	: Percentage
p - value	: probability value
PR	: Prevalence ratio
CI	: Confidence Interval
*	: Chi-square statistical test

The results of the Chi-square statistical test obtained a probability or chance value of *p*-value 0.001 (*p*-value $\leq$ 0.05). The value shows that there is a significant relationship between the history of exclusive breastfeeding and the incidence of diarrhea in toddlers at the Cakranegara Community Health Center. In addition, a PR value of 5.417 illustrates that toddlers who are not exclusively breastfed have a five-fold higher risk of experiencing diarrhea compared to those who are.

Table 4. Cross tabulation of the relationship between nutritional status and the incidence of diarrhea in toddlers

Diarrhea incidence	Nutritional status										r_s	*p* -value
	Malnutrition		Mild malnutrition		Normal		Overnutrition		Total			
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)		
Yes	0	0	21	26.2	15	18.7	2	2.5	38	47.5	0.373	0.001*
No	0	0	9	11.3	24	30.0	9	11.3	42	52.5		
Total	**0**	**0**	**30**	**37.5**	**39**	**48.7**	**11**	**13.8**	**80**	**100**		

Source: Primary Data (2023)
Note:
n	: Number
%	: Percentage
*	: Spearman Rank statistical test
r_s	: Correlation Coefficient Value
p - value	: Probability value ($p \leq 0.05$)

The results of the Spearman Rank statistical test obtained a probability or chance value of *p*-value 0.001 (*p*-value $\leq$ 0.05). The value shows that there is a significant relationship between nutritional status and the incidence of diarrhea in toddlers at the Cakranegara Community Health Center. It can be seen from the correlation coefficient value of 0.373 which shows that nutritional status and the incidence of diarrhea have an insignificant relationship but are positively or directly proportional. Thus, the higher the number of malnutrition toddler the higher chance of diarrhea occurring.

Table 5. Cross tabulation of the relationship between socio-economic status and the incidence of diarrhea in toddlers

Diarrhea	Socio-economic Status										r_s	p - value
	Low		Moderate		High		Upper		Total			
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)		
Yes	26	32.5	9	11.3	1	1.2	2	2.5	38	47.5	0.339	0.002[*]
No	14	17.5	20	25.0	4	5.0	4	5.0	42	52.5		
Total	**40**	**50**	**29**	**36.3**	**5**	**6.2**	**6**	**7.5**	**80**	**100**		

Source: Primary Data (2023)
Note:
n	: Number
%	: Percentage
*	: Spearman Rank statistical test
r_s	: Correlation Coefficient Value
p - value	: Probability value ($p \leq 0.05$)

The results of the Spearman-Rank statistical test obtained a probability or chance value of p-value 0.002 (p-value $\leq$ 0.05). The value shows that there is a significant relationship between socio-economic status and the incidence of diarrhea in toddlers at the Cakranegara Community Health Center. This statistical result has a positive or directly proportional relationship, which means that if there is an increase in the number of families with low socio-economic status, the higher the chance of diarrhea occurring in toddlers. Meanwhile, the relationship between the two variables can be seen from the correlation coefficient value of 0.339, which shows that socio-economic status and the incidence of diarrhea have an insignificant correlation.

Table 6. Cross tabulation of the relationship between maternal knowledge level and the incidence of diarrhea in toddlers

Diarrhea incidence	Maternal knowledge level								r_s	p - value
	Low		Moderate		Good		Total			
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)		
Yes	21	26.3	11	13.7	6	7.5	38	47.5	0.365	0.001[*]
No	10	12.5	13	16.3	19	23.8	42	52.5		
Total	**31**	**38.8**	**24**	**30.0**	**25**	**31.3**	**80**	**100**		

Source: Primary Data (2023)

Note:
n	: Number
%	: Percentage
*	: Spearman Rank statistical test
r_s	: Correlation Coefficient Value
p - value	: Probability value ($p \leq 0.05$)

The results of the Spearman Rank statistical test obtained a probability or chance value of p-value 0.001 (p-value $\leq$ 0.05). The value shows that there is a significant relationship between maternal knowledge and the incidence of diarrhea in toddlers at the Cakranegara Community Health Center. The coefficient value of 0.3365 illustrates an insignificant relationship between maternal knowledge and diarrhea incidence. The statistical results have a positive or directly proportional relationship, which means that when there is an increase in the number of mothers who have a low level of knowledge, the higher the chance of diarrhea occurring in toddlers.

DISCUSSION

In this study, there were 12 toddlers who were exclusively breastfed and experienced diarrhea. This is caused by the use of unclean baby bottles (breastfeeding bottles) or by mothers' poor handwashing behavior. Toddlers who receive exclusive breastfeeding experience diarrhea less often since breast milk contains many nutrients that protect the toddler's immune system from infectious diseases such as diarrhea[7]. Other ingredients in breast milk

are water, carbohydrates, protein, fat, vitamins, and minerals, which are useful for supporting the growth and nutritional needs of children's development.

The proteins contained in breast milk, such as casein, lactoferrin, a-lactalbumin, lysozyme, secretory immunoglobulin A, and serum albumin, can help lyse pathogens in the digestive tract, preventing pathogenic microorganisms from attaching to the small intestine and inhibiting the proliferation of pathogenic microorganisms in the intestine. Lactoferrin, the second most abundant protein in breast milk, is a glycoprotein for binding iron, which is involved in various immune functions[8]. In Table 4, the cross-tabulation between nutritional status and the highest incidence of diarrhea occurs in toddlers who have poor nutritional status (26.3%). The poor nutritional status of toddlers leads to infectious diseases such as diarrhea. In this way, toddlers with poor nutritional status will experience diarrhea longer than those who do not. Generally, nutritional status in toddlers depends on parental occupation and income. Well-off toddlers commonly receive good nutrient intake. On the other hand, when toddlers experience nutritional deficiencies, it can lead to disruption or decline in the immune system and create vulnerability to diarrhea[10]. In this study, there were 40 respondents who had low socio-economic status, defined as income of less than Rp. 1.500.000. According to Table 5 of the cross tabulation of socioeconomic status and diarrhea incidence, low socioeconomic class household have a higher incidence of diarrhea, with 26 respondents under the age of five experiencing diarrhea compared to other socioeconomic status levels. As evidenced by family income, a person's socioeconomic situation becomes a predictor of their condition[11]. Low socioeconomic level can influence food consumption and is linked to toddlers' nutritional status. If their nutritional status is deficient or inadequate, they are more likely to get diarrhea. Additional precursor of the issue is low-income household are more likely to have inadequate sanitation and personal hygiene[12].

Table 6 displays the mother's knowledge level in three categories: low, moderate, and good. The results of the analysis in this study show that the mother's level of knowledge was still relatively poor; toddlers who experienced diarrhea had mothers with a low level of knowledge (21 respondents), while only 6 respondents who experienced diarrhea had mothers with a good level of knowledge. Notoatmodjo defines health behavior as all of a person's activities aimed at preventing sickness[13]. One factor that can influence a person's behavior is their level of knowledge, particularly maternal knowledge. This factor is critical because it will involve recognizing definitions, modes of transmission, causes, and how to administer first aid to prevent dehydration in toddlers[14]. In this study, mothers' competencies were evaluated based on their knowledge and behavior when dealing with diarrheal disorders. One of the predisposing variables influencing how diarrhea is handled in children is maternal knowledge of the condition[15].

CONCLUSIONS AND SUGGESTIONS

Based on the results of this study, it can be concluded that there is a significant relationship between the history of exclusive breastfeeding and the incidence of diarrhea in toddlers at the Cakranegara Community Health Center, with a p-value of 0.001 and a PR value of 5.417, implying that toddlers who do not receive exclusive breastfeeding are five times more likely to develop diarrhea. There is a significant relationship between nutritional status and the incidence of diarrhea in toddlers at the health center, with a p-value of 0.001 and a correlation coefficient of 0.373, indicating a positive relationship direction and an insignificant correlation. There is a significant relationship between socioeconomic status and the incidence of diarrhea in toddlers at the health center, with a p-value of 0.002 and a correlation coefficient of 0.339, indicating a positive relationship direction and an insignificant correlation, as well as a significant relationship between maternal knowledge and diarrhea incidence. There is a significant relationship between the level of maternal knowledge and the incidence of diarrhea in toddlers at the center with a p-value of 0.001 and a correlation coefficient of 0.365 with a positive relationship and an insignificant correlation level.

It is finally suggested that future researchers can develop this research by using multivariate analysis. This study can be expanded by looking into other factors that influence diarrhea incidence, such as behavioral factors including the use of feeding bottle and hand washing routine. Furthermore, sociodemographic factors including work, and environmental factors that include water sources and toilet availability play important role in the incidence of diarrhea. It is hoped that different research methods, such as case control, will be used to figure out the causal relationship between diseases. Lastly, it is expected that relevant agencies will provide additional education awareness to the public – mothers and caregivers of toddler – regarding risk factors, treatment, and prevention related to the incidence of diarrhea in toddlers.

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