

*Original Article***The Relationship between Exclusive Breastfeeding and Diarrhea in Infant 6-12 Months***Ellanda Rima Eryyanna¹, Harsono Salimo², Kusnandar³***Abstract**

Background: Diarrhea is the second leading cause of death in children under five in the world. It is a major cause of child morbidity and mortality in low- and middle-income countries. There are many risk and protective factors. One of the protective factors for diarrhea is exclusive breastfeeding. Breast milk contains antibodies that can protect babies from infectious diseases. This study aims to determine the relationship between exclusive breastfeeding and diarrhea in infants aged 6-12 months. **Objective:** This study used a cross-sectional design. It involved a total of 171 infants selected using a simple random sampling technique. Data were collected using questionnaires related to exclusive breastfeeding and diarrhea. Data were analyzed using the Gamma correlation test with the help of IBM SPSS 24 software. **Result:** This study showed a relationship between exclusive breastfeeding and diarrhea ($p=0.000$). **Conclusion:** There is a significant relationship between exclusive breastfeeding and diarrhea. The better the practice of exclusive breastfeeding, the better the immune system of the infant resulting in decreased diarrhea risks.

Keywords: Exclusive breastfeeding, diarrhea, infant

International Journal of Human and Health Sciences Vol. 06 No. 04 October'22 Page : 377-382
 DOI: <http://dx.doi.org/10.31344/ijhhs.v6i4.476>

Introduction

Toddlers are an age group that is vulnerable to nutritional problems and diseases.¹ One of the common diseases in children under five is diarrhea. Diarrhea is loose, watery, and more frequent bowel movements at least three times a day.² Globally, diarrhea was the second leading cause of death in children under five in 2019.³ Diarrhea becomes a major cause of child morbidity and mortality in low-and middle-income countries.^{4,5} The prevalence of diarrhea under five in Indonesia increased to 12.3% in 2018⁶ from 6.7% in 2013.⁷ In Indonesia, diarrhea becomes an extraordinary event (KLB) ten times in 8 provinces and 8 districts/cities with a CFR of 4.76% where this figure was still quite high compared to the expected CFR in an extraordinary event, namely less than one percent.⁸ One out of four children under five in Indonesia suffers from diarrhea and

this disease becomes the main cause of mortality in children under five as reported by UNICEF.^{9,10}

Many factors cause diarrhea, both risk factors, and protective factors. One of the protective factors for diarrhea is exclusive breastfeeding.¹¹⁻¹³ Breast milk is the best food for babies as it has many benefits. However, the exclusive breastfeeding practice was still low as evidenced by the global and national prevalence of exclusive breastfeeding of 40%¹⁴ and 37.3% respectively in 2018.¹⁵ This prevalence has not met Indonesia's SDGs target of infants receiving exclusive breastfeeding, namely 50%.¹⁶

Many studies have revealed the benefits of breastfeeding and optimal breastfeeding practices for both mother and infant.¹⁷⁻¹⁹ One of the benefits is a lower risk of infectious diseases such as diarrhea.^{20,21} Colostrum breast milk is the best

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natural immune booster. It is produced in the first few days after the birth of a baby.²² Colostrum contains antibodies that protect babies from infectious diseases, including diarrhea. Exclusive breastfeeding provides immunity to babies so they are not susceptible to disease.^{23,24} Protection against infection is through IgA and other bioactive factors that do not cause inflammation.²² This is in line with Palupi et al that exclusive breastfeeding reduces the risk of infant mortality as it has a lower history of illness compared to infants who are not exclusively breastfed.²⁵ Another study by Cai et al revealed that exclusive breastfeeding has a protective effect on all diseases including diarrhea in infants in China.²⁶ This study aims to analyze the relationship between exclusive breastfeeding and diarrhea in infants.

Material and Methods

This observational study used a cross-sectional design and it was conducted from July to August 2021 in the working area of Singotrunan Public Health Centre, Banyuwangi District, East Java. As this study used a cross-sectional design, the data were collected at one time.

This study used primary data taken directly by the researcher. Researcher collected data on the characteristics of respondents (mother and infant), exclusive breastfeeding, and the frequency of diarrhea experienced by infants. All data were collected using direct interview techniques by distributing questionnaires.

The subject of this study was infants aged 6-12 months in the working area of Singotrunan Public Health Centre which covered seven villages. The study used a simple random sampling technique in determining the subject. The population of infants aged 6-12 months in the working area of Singotrunan Public Health Centre has the same opportunity to become the subject by considering the inclusion and exclusion criteria. The inclusion criteria for this study were infants who had a completed KMS (growth chart), mothers who could read and write, and were willing to participate in the interviewed. Infants with a history of low birth weight and incomplete or empty immunization status were excluded from the study. The population of infants aged 6-12 months in this study was 253 infants. Calculation of the sample size used the Slovin formula and obtained 155 infants with an additional 10% to anticipate dropping out, so the sample size was

171 infants. Participants of this study signed the informed consent as evidence of their consent to participate in the study. The obtained data in this study were analyzed using the Gamma correlation test using IBM SPSS 24 with a significance of $p < 0.05$.

Result

Table 1 shows that in terms of age, out of the 171 infants involved in this study, most of them aged 8 months (18.7%) and the least were 12 months old (7.6%). Toddlers are an age group that is vulnerable to nutritional problems and diseases,¹ including diarrhea. Globally, diarrhea is the second leading cause of death for children under five in 2019.³ The highest risk of diarrhea incidence is at the age of 6-11 months where at this age babies are introduced to complementary foods and the natural immunity of toddlers under 24 months has not yet been formed.¹¹⁻¹³

Table 1. Characteristics of Respondents

Characteristics	N	%
Age (months)		
6	31	18.1
7	24	14
8	32	18.7
9	23	13.5
10	25	14.6
11	23	13.5
12	13	7.6
Gender		
Male	91	53.2
Female	80	46.8
Exclusive Breastfeeding		
Yes	113	66.1
No	58	33.9

Another respondent characteristic is gender. In this study, male infants reached 53.2% which was higher than female infants at 46.8%. Boys are more at risk for diarrhea due to higher environmental activities than girls.¹¹⁻¹³

Table 1 shows that babies with exclusive breastfeeding were higher than those without exclusive breastfeeding with a percentage of 66.1% and 33.9% respectively. Exclusive breastfeeding has many advantages, for example, providing antibodies that can protect babies from infectious diseases such as diarrhea. This is in line with a previous study by Palupi that exclusive breastfeeding reduces the risk of infant death because infants who are exclusively breastfed have a lower history of illness and lower risks of death than non-exclusively breastfed infants.²⁵

Table 2. Bivariate Analysis of Exclusive Breastfeeding with Diarrhea Frequency

Exclusive Breastfeeding Status		Diarrhea Frequency			r	P-value
		1-3x	4-6 x	>6 x		
Exclusive Breastfeeding	n	98	9	6	0.847	0.000
	%	78.3	8	5.3		
No Exclusive Breastfeeding	n	15	23	20		
	%	25.9	39.7	34.5		

Based on Table 2, the results of a bivariate analysis of the relationship between exclusive breastfeeding and the frequency of diarrhea obtained a p-value of 0.000 ($p < 0.05$). This means that there is a relationship between exclusive breastfeeding and the frequency of diarrhea. The value of the correlation coefficient (r) is 0.847 indicating a positive correlation with a very strong correlation.

Discussion

Diarrhea is loose, watery, and more frequent bowel movements. Infants are said to have diarrhea if they defecate more than 3 times a day.¹² Diarrhea occurs due to osmotic disturbances. Food that cannot be absorbed by the intestinal mucosa increases the osmotic pressure in the intestinal cavity resulting in a shift of water and electrolytes into the intestinal cavity. Excess contents of the intestinal cavity stimulate the intestines to excrete it which then causes diarrhea. Intestinal motility disorders reduce opportunities for the intestines to absorb food and increase the number of bacteria resulting in diarrhea.^{12,13}

This study showed a relationship between exclusive breastfeeding and diarrhea with a p-value of 0.000 ($p < 0.05$). The results of this study are in line with a previous study by Analinta that there is a significant relationship between exclusive breastfeeding and diarrhea.²⁷ Exclusive breastfeeding protects children under five against diarrhea.^{18,19,26,28-33} A systematic review revealed that there was a significant benefit in the prevalence of rotavirus diarrhea with exclusive breastfeeding practices. Exclusive breastfeeding provides infant protection from rotavirus diarrhea in children under two years old. Many studies have reported that children who are infected with rotavirus but are breastfed have milder disease symptoms or are not infected, and have a lower hospitalization rate.³⁴ Another literature review showed the same that breastfeeding is an important factor in the prevention and protection of diarrhea in children under two. Moreover, breastfeeding can also

reduce mortality after birth and hospitalization due to diarrhea in children.³⁵ A study conducted in Bangladesh revealed that breastfeeding is a protective factor against diarrhea caused by viruses and bacteria in infants and this finding is used as a basis for initiating efforts to promote the importance of breastfeeding in Bangladesh.³⁶

Colostrum is one of the benefits of exclusive breastfeeding as it contains antibodies that can protect babies from various diseases.²³ Colostrum is a very thick yellow viscous liquid that is produced in the sixteenth week of pregnancy.³⁷ Exclusive breastfeeding is proven to provide immunity for babies so they are less likely to get sick.²⁴ The incidence of diarrhea in infants who are not exclusively breastfed is higher than in those who are exclusively breastfed.³⁸ Exclusive breastfeeding has a protective effect on all diseases in infants in China including diarrhea, acute respiratory infection, and allergies.²⁶ Some previous studies have showed that exclusive breastfeeding is associated with the frequency of illness.³⁹⁻⁴²

Some factors cause diarrhea, namely infection, malabsorption, and food allergies.^{12,43,44} Exclusive breastfeeding is the best food for babies as it contains antibodies. Babies who get breast milk will have a strong immune system so they don't get sick easily. Another advantage of breast milk is containing complete nutrition to meet the baby's needs. Babies whose nutritional needs are met will not be susceptible to disease so the frequency of illness is lower than those who are not exclusively breastfed.²³ A previous study by Palupi revealed that exclusive breastfeeding reduced the risk of death in infants as infants who are exclusively breastfed have a less frequent history of disease and have a lower risk of death than non-exclusively breastfed infants.²⁵

This study found that 33.9% of infants were not exclusively breastfed due to some reasons such as working mothers, low or even no breastmilk production, not understanding the importance of breastfeeding, and misunderstanding that infant will still be hungry if only given breast milk. Indeed, during the exclusive breastfeeding period, mothers need more attention.

Based on the results of a study conducted in Iran, most of the factors causing mothers to stop breastfeeding in six months or before two years are reduced milk production. The main factor for

stopping breastfeeding from the child's perspective is because the child feels uncomfortable and cries. In this study, it is important to improve the mother's education, ignore the gender of the child, observe the distance between pregnancies of more than three years, stop smoking during breastfeeding, and provide education about the importance of breastfeeding and the husband's support at puskesmas or maternity clinic.⁴⁵ Another study by Atika et al also states that support from the husband, family, and health worker, positive subject norms, breastfeeding free time, and positive attitudes increase exclusive breastfeeding.⁴⁶ Another study reveals barriers to breastfeeding, namely the condition of the baby, social conditions, environmental conditions, and others.⁴⁷

Conclusion

The results show that there is a relationship

between exclusive breastfeeding and diarrhea in infants aged 6-12 months with a very strong positive correlation.

Conflict of interest

The authors state no conflict of interest.

Ethical clearance

Ethical clearance has been approved by the research ethics commission of the Faculty of Medicine, Sebelas Maret University with the number 59/UN27.06.6.1/KEP/EC/2021.

Authors' contribution

Study design: all authors.

Data gathering: Ellanda Rima Eryyanna.

Writing and submitting manuscript: Ellanda Rima Eryyanna.

Editing and approval of final draft: all authors.

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