
RELATIONSHIP BETWEEN FORMULA FEEDING AND DIARRHEA IN INFANTS AGED 0-6 MONTHS

By

Budi Utama¹, Ahmad Ghiffari², Liza Chairani³, Fika Nurani Siti Aisyah⁴

¹Departemen Immunologi, Fakultas Kedokteran Universitas Muhammadiyah Palembang

²Departemen Parasitologi dan Mikrobiologi, Fakultas Kedokteran Universitas Muhammadiyah Palembang

³Departemen Kesehatan Anak, Fakultas Kedokteran Universitas Muhammadiyah

⁴Medical Education Study Program, Faculty of Medicine, University of Muhammadiyah Palembang

E-mail: ¹dr.budiplbg@gmail.com, ²dokter.ghi@gmail.com

Article History:

Received: 27-12-2022

Revised: 25-01-2023

Accepted: 06-02-2023

Keywords:

Formula Milk, Diarrhea,
Infants 0-6 months

Abstract: *Diarrhea is a state of defecation with the consistency of soft to liquid stools with a frequency of more than three times a day (more than four times a day in neonates) with or without bloody mucus. From birth to 6 months of age, Mother's Milk (ASI) is the best food with guaranteed nutritional value and cleanliness. However, parents often replace breast milk with other foods, such as formula milk, for specific reasons. Formula-fed babies are more prone to diarrhea. This study aims to determine the relationship between formula feeding and the incidence of diarrhea in infants aged 0-6 months. This type of research is an observational analytic with a cross-sectional design. The population and sample of this study were infants aged 0-6 months, and 70 samples were found that met the inclusion and exclusion criteria. The research sample was taken using the Consecutive Sampling Technique. The statistical test results showed a significant relationship between formula feeding and the incidence of diarrhea with a P-Value (of 0.000) and OR (19.125). This study concludes that there is a relationship between formula feeding and the incidence of diarrhea in infants aged 0-6 months.*

INTRODUCTION

According to the World Health Organization (WHO), diarrheal disease is the second leading cause of death in children under five years of age and was responsible for the deaths of 370,000 children in 2019.¹ There are nearly 1.7 billion cases of diarrheal disease in children each year. Every year diarrhea kills around 525,000 children under five. Diarrhea is

¹ World Health Organization(WHO), "Ending Preventable Child Deaths from Pneumonia and Diarrhoea by 2025," *Diarrhoea*, last modified 2019, https://www.who.int/health-topics/diarrhoea#tab=tab_1.

estimated to be responsible for more than 1.3 billion attacks and 3.2 million deaths yearly in children under five. More than 80% of deaths occur in children under two years of age.² According to data from the Central Statistics Agency for South Sumatra, it shows an increase in the number of cases of diarrhea, namely 90,094 cases in 2020 to 94,653 cases in 2021.³

LITERATURE REVIEW

Several factors, including infectious and non-infectious factors, influence diarrhea.⁴ Bacteria, viruses, and parasites can cause infectious factors.⁵ Non-infectious factors can be caused by certain conditions in the baby's body, one of which is lactose intolerance.⁶ From birth to 6 months of age, Mother's Milk (ASI) is the best food with guaranteed nutritional value and cleanliness. However, parents often replace breast milk with other foods for specific reasons. One of the other foods infants consume is formula milk.⁷ Formula-fed infants are 14.2 times more prone to diarrhea than exclusively breastfed.⁸ One of the causes of diarrhea from formula milk is the lactose contained in the milk.

From the sequential list of causes of visits to the 5 Ilir Palembang Health Center, diarrhea is almost always included in group 3 as the leading cause of under-five patients coming to the Health Center in 2022. From the conditions described above, it becomes a reference for researchers to research "Relationship of Formula Milk Feeding with Diarrhea in Infants Aged 0-6 Months in the Work Area" Puskesmas 5 Ilir Palembang".

METODE PENELITIAN

This type of research is an observational analytic with a cross-sectional design. The research sample was taken using the Consecutive Sampling Technique, and it was found that 70 respondents met the inclusion and exclusion criteria during the study period. The inclusion criteria are mothers who have babies aged 0-6 months and are residents of the work area Puskesmas 5 Ilir Palembang and mothers who are willing to have their children become research subjects. The exclusion criteria were mothers who did not complete the

² Cinthya Apri Hapsari and Cecep Heriana, "Studi Epidemiologi Deskriptif Penyakit Diare Di Puskesmas Sunyaragi Kota Cirebon," in *National Nursing Conference*, vol. 1 (Sekolah Tinggi Ilmu Kesehatan Kuningan Garawangi, 2020), 5.

³ Badan Pusat Statistik Provinsi Sumatera Selatan, "Jumlah Kasus Penyakit Menurut Jenis Penyakit (Kasus), 2019-2021," <https://sumsel.bps.go.id/Indicator/30/368/1/Jumlah-Kasus-10-Penyakit-Terbanyak.Html>.

⁴ Nurul Utami and Nabila Luthfiana, "Faktor-Faktor Yang Memengaruhi Kejadian Diare Pada Anak," *Majority* 5, no. 4 (2016): 101–106.

⁵ Dyah Ragil WL and Yunita Dyah PS, "Hubungan Antara Pengetahuan Dan Kebiasaan Mencuci Tangan Pengasuh Dengan Kejadian Diare Pada Balita," *Jurnal of Health Education* 2, no. 1 (2017): 39–46, <http://journal.unnes.ac.id/sju/index.php/jhealtheu/>.

⁶ Ivana Putri Youlma Wawointana, Sulaemana Engkeng, and Sri Seprianto Maddusa, "Determinan Perilaku Pemberian Susu Formula Pada Bayi Usia 0-6 Bulan Di Wilayah Puskesmas Molompar Tombatu Timur Minahasa Tenggara," *Jurnal KESMAS* 9, no. 4 (2020): 160–167.

⁷ Christine Handayani Tampubolon, Ronny Ronny, and Florentina Rahabeat, "Differences in the Incidence of Diarrhoea in Children Aged 6-24 Months Who Receive Exclusive and Non-Exclusive Breastfeeding," *International Journal of Health Sciences and Research* 11, no. 10 (November 11, 2021): 378–386.

⁸ Rika Herawati and Cahya Murni, "Hubungan Pemberian Susu Formula Dengan Kejadian Diare Pada Bayi Usia 0-6 Bulan Di Desa Koto Tinggi Kecamatan Rambah Kabupaten Rokan Hulu, Rika Herawati* Cahya Murni*," *Jurnal Maternity and Neonatal* 2, no. 5 (n.d.): 309–317.

questionnaire and whose children had been diagnosed with Crohn's disease, celiac disease, or other congenital digestive diseases. In this study, data were obtained using a questionnaire distributed to respondents. Then processing and data analysis will be done using SPSS with the Chi-Square test.

RESULT AND DISCUSSION

The research was conducted on 70 respondents who had babies aged 0-6 months who came to the work area Puskesmas 5 Ilir Palembang. Based on table 1, it can be seen that the characteristics of respondents based on age are primarily in the age range of 26-35 years; as many as 45 respondents (64.3%), based on the last level of education, most are at the high school level as many as 39 respondents (55.7%), based on gender the most children were male, 37 respondents (47.1%), and based on the age of the baby, the most were 6 months old, namely 19 respondents (27.1%). Based on the table above also shows the distribution of giving formula milk to babies aged 0-6 months by 13 respondents (18.6) and not being given formula milk by 57 respondents (81.4%). The same result was reported by Putra (2014) in infants aged 0-6 months in the Kelurahan working area of the Kenali Besar Health Center; out of a total of 123 respondents, 75 (61%) were not given formula milk.⁹ In research conducted by Herawati Rika & Murni Cahaya (2018) in Koto Tinggi Village, Rambah District, Rokan Hulu Regency, out of a total of 47 research respondents, 11 (23.4%) were not given formula milk.¹⁰

Formula milk is milk obtained from animals (cows, goats, sheep) whose nutrition is similar to the content of breast milk (ASI). Formula milk is liquid or powder containing particular formula given to infants and children as a substitute for breast milk. World Health Organization (WHO) recommends exclusive breastfeeding for the first six months in infants. However, there are times when a baby cannot be breastfed for specific reasons.¹¹ Several reasons are given; for example, milk does not come out, or the milk supply is small, working mothers lack knowledge of mothers about breastfeeding, and temptation because of the formula milk content offered. One option for babies who cannot be breastfed is formula feeding.

The table below showed the distribution of diarrhea in infants aged 0-6 months as many as 15 respondents (21.4%) and no diarrhea, namely 55 respondents (78.6%). The results showed that the highest prevalence of diarrhea in infants aged 0-6 months was in the non-diarrhea category, namely 55 (78.6%) respondents. The same results were reported by Putra (2014) in infants aged 0-6 months in the Kelurahan working area of the Kenali Besar Health Center; out of a total of 123 respondents, 78 (63.4%) did not have diarrhea.¹² In research conducted by Herawati Rika & Murni Cahaya (2018) In Koto Tinggi Village, Rambah District,

⁹ Iskandar Iskandar and Maulidar Maulidar, "Hubungan Pemberian Susu Formula Dengan Kejadian Diare Pada Bayi Usia 0-6 Bulan (Relationship Formula Milk Feeding with the Incidence of Diarrhea in Infants 0-6 Months)," *AcTion Journal: Aceh Nutritional Journal* 1, no. 2 (2016): 73-77.

¹⁰ Herawati and Murni, "Hubungan Pemberian Susu Formula Dengan Kejadian Diare Pada Bayi Usia 0-6 Bulan Di Desa Koto Tinggi Kecamatan Rambah Kabupaten Rokan Hulu, Rika Herawati*Cahaya Murni*."

¹¹ Zainab Hussain and Najeeha Khan, "Assessment of the Nutritional Status of Bottle-Fed Infants and the Prevalence of Infections, Allergy and Diarrhea among Bottle Fed Infants and Its Comparison with Exclusively Breast Fed Infants Aged 0-6 Months," *Journal of Pediatrics & Neonatal Care* 6, no. 4 (March 9, 2017): 119-122.

¹² Iskandar and Maulidar, "Hubungan Pemberian Susu Formula Dengan Kejadian Diare Pada Bayi Usia 0-6 Bulan (Relationship Formula Milk Feeding with the Incidence of Diarrhea in Infants 0-6 Months)."

Rokan Hulu Regency, out of a total of 47 research respondents, 22 (46.8%) did not have diarrhea.¹³

Table1. Frequency Distribution of Mother's Age, Education Level, Mother's Occupation, Baby's Gender, Baby's Age, Formula Milk Feeding, and Diarrhea Incidence

Variable	Category	Frequency (n)	Percentage (%)
Mother's Age (years)	17-25	14	20
	26-35	45	64,3
	36-45	11	15,7
Level of education	SD	4	5,7
	Junior High School	6	8,6
	Senior High School	39	55,7
	College	21	30
Mother's job	Self-employed	7	10
	Private employees	8	11,4
	IRT	48	68,6
	Laborer	2	2,9
	Civil Servant	5	7,1
Gender of Baby	Boy	37	52,9
	Girl	33	47,1
Baby Age (months)	0	4	5,7
	1	7	10
	2	16	22,9
	3	4	5,7
	4	10	14,3
	5	10	14,3
	6	19	27,1
Formula Feeding	Yes	13	18,6

¹³ Herawati and Murni, "Hubungan Pemberian Susu Formula Dengan Kejadian Diare Pada Bayi Usia 0-6 Bulan Di Desa Koto Tinggi Kecamatan Rambah Kabupaten Rokan Hulu, Rika Herawati*Cahya Murni*."

	No	57	81.4
Diarrhea incident	Diarrhea	15	21,4
	No Diarrhea	55	78.6

The risk factors that can cause diarrhea can be assessed from the host, agent, and environment. Host diarrhea is common in children with weakened digestive and immune systems. Agents that cause diarrhea can be caused by bacteria, viruses, or parasites. Environmental factors are essential in the interaction relationship between host and agent factors.¹⁴ Examples of influencing environmental factors include poor sanitation and inadequate clean water, community behavior such as rarely washing hands when eating and after defecating, and inadequate disposal of feces. Not exclusively breastfeeding, especially during the first 4-6 months, can increase the risk of developing diarrheal disease. Bivariate analysis was carried out to find a relationship between formula feeding and the incidence of diarrhea in infants aged 0-6 months.

Table 2. The relationship between giving formula milk and the incidence of diarrhea

Formula Feeding	Diarrhea incident						Fisher's Exact P	OR (95 % CI)
	Diarrhea		No Diarrhea		Amount			
	N	%	N	%	N	%		
Yes	9	69,2	4	30,8	13	100	0.000	19.125
No	6	20.5	44	89.5	57	100		
Total	15	21,4	48	78.6	70	100		

This study found a significant relationship between formula feeding and the incidence of diarrhea in infants aged 0-6 months, where the p-value was (0.000). Research conducted by Iskandar & Maulidar (2016) in the working area of the Teupin Raya Health Center, Pidie Regency, reported the same results, namely that there was a significant relationship between formula feeding and the incidence of diarrhea in infants aged 0-6 months.¹⁵ Research conducted by Herawati Rika & Murni Cahaya (2018) in Koto Tinggi Village, Rambah District, Rokan Hulu Regency, reported the same results, namely that there was a significant relationship between formula feeding and the incidence of diarrhea in infants aged 0-6 months.¹⁶

This study had limitations, including the diagnosis of diarrhea in infants, which was

¹⁴ Sang Gede Purnama, *Buku Ajar Penyakit Berbasis Lingkungan*, 2016.

¹⁵ Iskandar and Maulidar, "Hubungan Pemberian Susu Formula Dengan Kejadian Diare Pada Bayi Usia 0-6 Bulan (Relationship Formula Milk Feeding with the Incidence of Diarrhea in Infants 0-6 Months)."

¹⁶ Herawati and Murni, "Hubungan Pemberian Susu Formula Dengan Kejadian Diare Pada Bayi Usia 0-6 Bulan Di Desa Koto Tinggi Kecamatan Rambah Kabupaten Rokan Hulu, Rika Herawati*Cahaya Murni*."

only based on the results of interviews with respondents. This can lead to bias because diarrhea should be determined with a more precise diagnosis, namely with a doctor's medical record. The type of diarrhea is also not known with certainty, which could be biased because it is possible that diarrhea occurs due to other infections or contracted by other people. Further research can be suggested by looking at medical records regarding a definite diagnosis of diarrhea. Another limitation of the study was that there were still some respondents who gave exclusive breastfeeding and formula milk, which could lead to bias in this study because the child was still being given breast milk, not just formula milk. Suggestions for further research are to examine the difference between giving only formula milk and giving formula milk as a companion to breastfeeding on the incidence of diarrhea.

CONCLUSION

Based on the results of the study, it can be concluded that there is a significant relationship between formula feeding and the incidence of diarrhea in infants aged 0-6 months.

ACKNOWLEDGEMENTS

Thanks go to the 5 Ilir Palembang Health Center for permitting us to collect this research data in the working area of the 5 Ilir Palembang Health Center, and we also thank all mothers who have babies aged 0-6 months who are willing to be respondents in the study.

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HALAMAN INI SENGAJA DIKOSONGKAB