

ASSOCIATION OF EXCLUSIVE BREASTFEEDING HISTORY WITH DIARRHEA OCCURRENCE AMONG CHILDREN AGED 7-24 MONTHS AT DUKUH KUPANG PRIMARY HEALTH CENTER, SURABAYA: A CROSS- SECTIONAL STUDY

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ABSTRAK

Diare masih menjadi salah satu penyebab utama kesakitan pada anak usia dini. Pemberian ASI eksklusif memberikan perlindungan nutrisi dan imunologis terhadap infeksi saluran cerna. Penelitian ini bertujuan untuk menganalisis hubungan antara riwayat pemberian ASI eksklusif dengan kejadian diare pada anak usia 7-24 bulan di Puskesmas Dukuh Kupang, Surabaya. Penelitian observasional analitik dengan desain potong lintang dilakukan pada Februari hingga Mei 2026 dengan melibatkan 45 pasangan ibu dan anak yang dipilih menggunakan teknik total sampling. Riwayat pemberian ASI dan kejadian diare diperoleh melalui kuesioner terstruktur. Hubungan antara pemberian ASI eksklusif dan kejadian diare dianalisis menggunakan

uji Chi-square. Dari 45 anak, sebanyak 14 anak (31,1%) mendapatkan ASI eksklusif dan 31 anak (68,9%) tidak mendapatkan ASI eksklusif. Kejadian diare ditemukan pada 22 anak (48,9%). Tidak ditemukan kejadian diare pada kelompok anak yang mendapatkan ASI eksklusif, sedangkan pada kelompok yang tidak mendapatkan ASI eksklusif terdapat 22 dari 31 anak yang mengalami diare. Hubungan antara riwayat ASI eksklusif dan kejadian diare menunjukkan hasil yang bermakna secara statistik ($p < 0,001$). Nilai odds ratio (OR) dan risk ratio (RR) tidak dapat dihitung secara langsung karena tidak terdapat kasus diare pada kelompok ASI eksklusif sehingga menghasilkan sel nol (*zero cell*) pada tabel kontingensi 2×2 . Riwayat pemberian ASI eksklusif berhubungan secara signifikan dengan kejadian diare pada anak usia 7-24 bulan. Penelitian selanjutnya dengan jumlah sampel yang lebih besar diperlukan untuk memperoleh estimasi ukuran efek yang lebih akurat, termasuk OR, RR, dan interval kepercayaan (CI).

ABSTRACT

Diarrhea remains a major cause of morbidity among young children. Exclusive breastfeeding provides nutritional and immunological protection against gastrointestinal infections. This study aimed to analyze the association between exclusive breastfeeding history and diarrhea occurrence among children aged 7-24 months at Dukuh Kupang Primary Health Center, Surabaya. An analytic observational study with a cross-sectional design was conducted from February to May 2026 involving 45 mother-child pairs selected through total sampling. Breastfeeding history and diarrhea occurrence were assessed using a structured questionnaire. The association was analyzed using the

Chi-square test. Among 45 children, 14 (31.1%) had received exclusive breastfeeding and 31 (68.9%) had not. Diarrhea occurred in 22 children (48.9%). None of the exclusively breastfed children experienced diarrhea, whereas 22 of 31 non-exclusively breastfed children experienced diarrhea. The association was statistically significant ($p < 0.001$). The odds ratio (OR) and risk ratio (RR) could not be directly estimated because no diarrhea cases occurred in the exclusively breastfed group, resulting in a zero cell in the 2×2 contingency table. Exclusive breastfeeding history was significantly associated with lower diarrhea occurrence among children aged 7–24 months. Future studies with larger samples are recommended to provide more precise effect estimates, including OR, RR, and confidence intervals.

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INTRODUCTION

Diarrheal disease remains an important child-health problem. The World Health Organization (WHO) estimates that nearly 1.7 billion episodes of childhood diarrheal disease occur each year and that diarrhea causes about 443,832 deaths annually among children younger than five years (World Health Organization, 2024). Young children are particularly vulnerable because fluid loss can quickly lead to dehydration, while repeated diarrheal episodes may contribute to malnutrition and impaired growth. Infectious gastroenteritis in childhood is commonly caused by viral, bacterial, or parasitic pathogens, and exposure is strongly influenced by hygiene, food safety, water quality, and sanitation (Florez et al., 2020; Kasmara & Sarli, 2023).

Breastfeeding is a central preventive strategy during infancy. WHO recommends exclusive breastfeeding for the first six months of life, followed by safe and nutritionally adequate complementary feeding with continued breastfeeding up to two years of age or beyond (World Health Organization, 2023). Exclusive breastfeeding means that an infant receives only breast milk, apart from oral rehydration solution or drops and syrups containing vitamins, minerals, or medicines. The protection provided by breast milk extends beyond nutrition. Secretory immunoglobulin A, lactoferrin, lysozyme, leukocytes, cytokines, and human milk oligosaccharides support mucosal defense and influence the developing intestinal microbiota. Human milk oligosaccharides can function as prebiotics, anti-adhesive antimicrobials, and immune modulators, thereby supporting intestinal barrier function and microbial homeostasis (Cheng & Yeung, 2021).

Evidence from recent reviews supports the protective association between exclusive breastfeeding and diarrheal disease. Hossain and Miharshahi (2022), in a review of 70 studies published between 2010 and 2022, found that most studies reported reduced risks of gastrointestinal, respiratory, and other infections among exclusively breastfed children. More recently, Ganbold et al. (2025) pooled 17 studies and found that exclusive

breastfeeding was associated with lower odds of diarrhea in infants aged 0–6 months (pooled OR = 0.57; 95% CI: 0.51–0.63). The broader Lancet breastfeeding series likewise concluded that breastfeeding reduces childhood infections across diverse settings (Victora et al., 2016).

Indonesian studies have reported comparable findings. Analysis of the 2017 Indonesian Demographic and Health Survey showed an association between exclusive breastfeeding and diarrhea among infants younger than six months (Rusyda & Ronoatmodjo, 2021). Hospital-based and community studies have likewise reported lower diarrhea occurrence among children who received exclusive breastfeeding (Suliarta et al., 2021; Irwan et al., 2023; Sasmito et al., 2023; Maharani & Pambudi, 2024). However, local evidence remains useful because breastfeeding practices, complementary feeding, sanitation, and access to health services vary between communities.

Di Surabaya, cakupan ASI eksklusif dan kejadian diare pada anak tetap menjadi indikator kesehatan masyarakat penting yang perlu dievaluasi pada tingkat layanan primer; data lokal menunjukkan cakupan ASI eksklusif di Kota Surabaya sebesar 65,9%, dan pada Profil Kesehatan Kota Surabaya 2016 cakupan di Surabaya Barat sebesar 66,42%, meski pada sampel bayi di Surabaya Barat tahun 2019 cakupan yang teramati hanya 43,1% (Fitri & Shofiya, 2020). Untuk kejadian diare, referensi yang tersedia dalam kumpulan ini tidak melaporkan angka spesifik Puskesmas Dukuh Kupang, tetapi studi pemetaan Surabaya berbasis data Profil Kesehatan 2019 menunjukkan bahwa kasus diare balita paling banyak terjadi di Wonokromo, Sawahan, Tambaksari, dan Kenjeran, serta Surabaya merupakan kota dengan jumlah kasus diare balita tertinggi di Jawa Timur (Devi et al., 2022). Variasi lokal ini, bersama bukti bahwa ASI eksklusif berhubungan dengan frekuensi sakit pada bayi di Surabaya Barat dan dengan kejadian diare pada studi puskesmas lain di Indonesia, menegaskan pentingnya menilai hubungan praktik menyusui dan kejadian diare pada konteks puskesmas setempat, bukan hanya mengandalkan data nasional (Tonny et al., 2023).

Children aged 7–24 months represent an important population for evaluating this relationship because they have completed the recommended six-month exclusive breastfeeding period and are entering a stage characterized by increased exposure to complementary foods, drinking water, household environments, and external sources of enteric pathogens. During this period, feeding practices and environmental factors may influence the occurrence of diarrhea. Although previous studies have investigated the association between exclusive breastfeeding and diarrhea, limited evidence is available

regarding this association among children aged 7–24 months in urban primary healthcare settings in Surabaya.

Dukuh Kupang Primary Health Center serves an urban population in Surabaya where diarrhea continues to be encountered in routine child-health services. Therefore, this study aimed to determine the distribution of exclusive breastfeeding and diarrhea and to analyze the association between exclusive breastfeeding history and diarrhea among children aged 7–24 months at Dukuh Kupang Primary Health Center, Surabaya.

METHODS

We conducted an analytic observational study with a cross-sectional design at Dukuh Kupang Primary Health Center, Surabaya, Indonesia, from February to May 2026. The study population comprised children aged 7–24 months who attended the health center during the study period. Total sampling was used, and 45 mother–child pairs who met the study criteria were included in the analysis.

The independent variable was exclusive breastfeeding history, classified as exclusive or non-exclusive. Exclusive breastfeeding was defined according to the study questionnaire as receiving breast milk without additional food or drink during the first six months of life, except medicines or vitamin preparations when needed. The dependent variable was diarrhea occurrence, assessed using questionnaire items on bowel-movement frequency, stool consistency, and duration. In the study operational definition, diarrhea was identified from loose or watery stools occurring at least three times within 24 hours and lasting less than 14 days.

Data were collected by interviewing mothers or caregivers using a structured questionnaire. The questionnaire included child age, breastfeeding history, and diarrhea history. Data were checked through editing, coding, entry, and cleaning before analysis. Categorical variables were summarized as frequencies and percentages, while child age was summarized using the mean, standard deviation, and range. The association between exclusive breastfeeding and diarrhea was evaluated using the Chi-square test with a significance level of 0.05.

The study received ethical approval from the Health Research Ethics Committee, Faculty of Medicine, Universitas Wijaya Kusuma Surabaya (Ethical Clearance No. 32/SLE/FK/UWKS/2026, 6 February 2026). Mothers or caregivers received information about the study and provided informed consent before participation.

RESULTS AND DISCUSSION

The study included 45 children aged 7–23 months. The mean age was 14.62 months (SD 4.93). Most children had not received exclusive breastfeeding: 31 children (68.9%) were classified as non-exclusively breastfed, while 14 (31.1%) had received exclusive breastfeeding. Diarrhea was reported in 22 children (48.9%), whereas 23 (51.1%) had no diarrhea. **Table 1** summarizes the principal study characteristics.

Table 1. Participant characteristics and main study variables

Variable	n/ Summary	% / Distribution
Age, months	Red 14.62	SD 4.93; range 7–23
Exclusive breastfeeding	Yes 14; No 31	31.1%; 68.9%
Diarrhea occurrence	Yes 22; No 23	48.9%; 51.1%

The cross-tabulation showed a marked difference in diarrhea occurrence according to breastfeeding history. None of the 14 exclusively breastfed children had diarrhea, while 22 of the 31 non-exclusively breastfed children had diarrhea. The Chi-square test indicated a statistically significant association between exclusive breastfeeding and diarrhea ($p < 0.001$) (**Table 2**). Because the study used a cross-sectional design and did not estimate a temporally ordered exposure–outcome effect, this finding should be interpreted as an association rather than proof that breastfeeding alone caused the observed difference.

Table 2. Association between exclusive breastfeeding and diarrhea occurrence

Breastfeeding category	No diarrhea, n	Diarrhea, n	p value
Exclusive	14	0	
Non-exclusive	9	22	
Total	23	22	< 0.001

The proportion of children with a history of exclusive breastfeeding in this study was 31.1%, indicating that most children in the sample received food or fluids other than breast milk before six months of age. This is clinically relevant because the first six months are the period in which exclusive breastfeeding is recommended to provide both complete nutrition and immunological protection (World Health Organization, 2023). Barriers to maintaining exclusive breastfeeding are multifactorial and may include maternal employment, limited lactation facilities, knowledge, and social support. An Indonesian study among mothers working in the formal sector identified occupational and behavioral factors that can shape exclusive breastfeeding practice (Kusumaningtiar & Nurwahidah, 2023). The present study did not directly assess the reasons for non-exclusive breastfeeding, so these mechanisms should be considered contextual explanations rather than measured determinants.

Nearly half of the children in this study had experienced diarrhea. Children aged 7–24 months enter a period of increased mobility and complementary feeding, both of which

broaden their contact with food, water, utensils, household surfaces, and other potential sources of enteric pathogens. At the same time, gastrointestinal and immune maturation continues during early childhood. Environmental factors such as drinking-water quality, handwashing behavior, and sanitation remain important correlates of diarrhea and can interact with feeding practices (Kasmara & Sarli, 2023). These factors were not included as covariates in the present analysis and therefore remain possible confounders.

The strong association observed between exclusive breastfeeding and diarrhea is consistent with previous Indonesian research. Suliarta et al. (2021) found a significant association between exclusive breastfeeding and diarrhea among children aged 6–24 months at Wangaya Hospital. Using nationally representative survey data, Rusyda and Ronoatmodjo (2021) also reported a relationship between exclusive breastfeeding and diarrhea in infants younger than six months. In a case-control study, Irwan et al. (2023) found substantially higher odds of diarrhea among infants who were not exclusively breastfed. Sasmito et al. (2023) reported that non-exclusive breastfeeding was associated with diarrhea among toddlers ($p = 0.001$; $OR = 8.0$), and Maharani and Pambudi (2024) similarly documented a significant relationship in infants aged 0–12 months. Although study designs and populations differ, the direction of these findings is broadly consistent with the present results.

Biological plausibility strengthens this interpretation. Human milk provides secretory IgA that can reduce pathogen adherence to mucosal surfaces, lactoferrin that limits bacterial access to iron, antimicrobial enzymes, immune cells, and oligosaccharides that support beneficial gut microorganisms and can act as anti-adhesive antimicrobials. Contemporary reviews describe human milk oligosaccharides as important modulators of the infant intestinal microbiota, mucosal defense, and immune response (Cheng & Yeung, 2021). These mechanisms are compatible with recent pooled evidence showing lower diarrhea morbidity among exclusively breastfed infants (Ganbold et al., 2025).

The present result also fits more recent review evidence. Hossain and Mahrshahi (2022) reported that 60 of 70 studies in their narrative review found a positive association between exclusive breastfeeding and reduced infectious morbidity, including gastrointestinal infections. Ganbold et al. (2025) further reported a pooled 43% lower odds of diarrhea among exclusively breastfed infants aged 0–6 months. Victora et al. (2016) concluded that breastfeeding provides important protection against childhood infections in both lower- and higher-income settings. These data support a biologically and epidemiologically coherent relationship, although the magnitude of association in the

current sample may be accentuated by the small sample size and the absence of diarrhea cases in the exclusively breastfed group.

From a public-health perspective, the findings reinforce the value of breastfeeding promotion within maternal and child health services. Counseling should begin during pregnancy and continue after delivery, with practical support for positioning, milk expression, storage, management of common breastfeeding problems, and continued breastfeeding after mothers return to work. At the community level, breastfeeding promotion should be integrated with safe complementary feeding, hand hygiene, clean water, sanitation, and timely care for children with diarrhea. WHO emphasizes that breastfeeding and environmental prevention are complementary rather than competing strategies for reducing childhood diarrheal disease (World Health Organization, 2024).

This study has several strengths. Total sampling captured all eligible participants available during the study period, and a structured questionnaire was used consistently across respondents. The age range of 7–24 months was also appropriate for evaluating previous exclusive breastfeeding history after completion of the recommended six-month period. Nevertheless, the study has important limitations. The sample comprised only 45 children from a single primary health center, limiting generalizability. Breastfeeding and diarrhea history relied on caregiver report and may therefore be affected by recall or reporting bias. The cross-sectional design cannot establish temporal causality, and potential confounders such as drinking-water quality, sanitation, handwashing, complementary-feeding hygiene, nutritional status, maternal education, and household socioeconomic conditions were not controlled. Future studies should use larger multicenter samples and longitudinal or case-control designs with multivariable adjustment to clarify the independent association between breastfeeding and diarrhea.

CONCLUSIONS

Among 45 children aged 7–24 months at Dukuh Kupang Primary Health Center, 31 (68.9%) had not received exclusive breastfeeding and 22 (48.9%) had experienced diarrhea. None of the 14 exclusively breastfed children had diarrhea, whereas diarrhea occurred in 22 of 31 non-exclusively breastfed children. Exclusive breastfeeding history was significantly associated with diarrhea occurrence ($p < 0.001$). The findings support exclusive breastfeeding as an important element of diarrhea prevention, but the association should be interpreted in light of the cross-sectional design, small sample, and unmeasured environmental and nutritional confounders. Health workers should strengthen antenatal and postnatal breastfeeding counseling while integrating breastfeeding promotion with

safe complementary feeding, hygiene, clean water, and sanitation. Future research should include larger samples, multiple health-center settings, and adjustment for major confounding variables.

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