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Assessing the Impact of the First Feeding Practice on Wasting Risk Among Indonesian Children Under the Age of Five

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Abstract

The problem of undernutrition among children under the age of five (the under-five) continues to be alarmingly high in Indonesia, including in West Sumatra Province. Various factors contribute to this issue, with studies suggesting a relationship between intergenerational causes and undernutrition. This study analyzed the main risk factors of wasting among children in Padang City. Data were collected from 174 under-five and divided into unmatched cases that were selected randomly and control groups. The mothers were interviewed using a questionnaire regarding their children's feeding habits, and weight and height data were collected from primary health care. Multiple logistic regression analysis was used to calculate the odds ratio for undernutrition. The findings revealed that 37.6% of the under-five were breastfed, whereas over half received inadequate complementary feeding. Poor breastfeeding practices (p-value = <0.001; OR = 8.389; 95% CI 2.611–14.432) and inadequate complementary feeding (p-value = <0.001; OR = 13.534; 95% CI 6.025–30.400) were identified as major contributors to the increased risk of undernutrition in the under-five. The high prevalence of suboptimal under-five feeding practices in the study area highlights the necessity of enhancing maternal nutrition education to ensure optimal growth and nutrition.

Keywords: breastfeeding, complementary feeding, under-five, undernutrition

Introduction

Undernutrition in children under the age of five (the under-five) remains a significant public health issue in many developing countries, including Indonesia.[1] The 2022 Indonesian Nutritional Status Survey highlighted alarmingly high rates of underweight, wasting, and stunting among the under-five, with prevalence rates of 17.1%, 7.7%, and 21.6%, respectively.[2] However, the 2023 Indonesian Nutritional Status Survey indicated a positive trend, with reductions in underweight and stunting rates to 15.9% and 21.5%, respectively, although the prevalence of undernutrition persisted unchanged.[3] A previous study has consistently shown that childhood malnutrition is largely attributable to inadequate nutrition during critical rapid growth and development periods.[4] World Health Organization (WHO) recommends exclusive breastfeeding for the first 6 months of a newborn's life, and thereafter, introducing complementary foods while continuing breastfeeding until 2 years to ensure that their nutritional needs are adequately fulfilled.[5]

Undernutrition is a broad term that refers to the states of being underweight, wasting, stunting, and having micronutrient deficiencies. Wasting is defined as acute undernutrition and is a strong predictor of morbidity and mortality during childhood and later in adulthood.[6,7] The 2021 WHO reports estimated that undernutrition contributed to 45% of child mortality worldwide.[8] Considering the consequences of wasting, immediate treatment is required to ensure the survival of the children.[9,10]

Studies have shown that various factors affect the nutritional status of the under-five.[11–13] Wasting is directly caused by inadequate nutrient intake and recurrent infections, leading to weight loss.[14] Studies in Indonesia and Ethiopia have highlighted that poor breastfeeding practices can increase the likelihood of stunting, wasting, and being underweight.[15,16] In Indonesia, there is a considerable risk of suboptimal feeding practices, particularly when it comes to the timing, frequency, and diversity of complementary foods.[17] When these foods are not properly introduced, malnutrition risk can significantly increase.[18,19]

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However, some studies have reported inconsistent findings on the risk factors of undernutrition. Sociocultural factors are associated with undernutrition, particularly underweight and stunting.[20] Other studies found that maternal characteristics, such as education level and working status, and characteristics of children, such as small posture and health facility where children were born, were risk factors of the under-five with stunting, wasting, and being underweight.[21,22] Household factors, mainly income and expenditures per month for childcare, were also associated with underweight under-five.[23] Moreover, limited studies have focused on the role of inappropriate feeding practices in wasting among the under-five in Indonesia. Thus, the study was conducted to provide evidence from a context in which undernutrition is prevalent, aiming to gain insight into feeding patterns as a dominant risk factor for wasting among the under-five

Method

The authors conducted an unmatched case–control study among the under-five in Padang City, Indonesia, from June to September 2022. An unmatched case control in the study indicated that the controls were not selected based on matching with individual cases with specific characteristics. A number of 174 under-five were counted using the Lemeshow formula for case-control design. The cluster sampling was performed at the three primary health care (PHC) (Seberang Padang 9.45%, Andalas 7.68%, and Pauh 1.67%) with higher and lower wasting rates in Padang City.

Subsequently, the sample was grouped into cases and control groups at a ratio of 1:1. Cases were defined as under-five with weight for height Z-Score (WHZ) <−2 standard deviation (SD) according to the WHO anthropometric and growth standards (WHZ <−2 SD), which were selected by simple random sampling. The controls were the under-five with normal nutritional status (−2 SD > WHZ > +1 SD), selected purposively from similar subdistricts where cases were recruited.[24] The under-five who were sick or whose mothers could not communicate well were excluded.

Anthropometric information, including weight and height, was obtained secondary from PHC in the subdistricts. These data were collected through a permission letter to the Padang City Health Office. Anthropometric data were analyzed and classified according to the WHO anthropometric and growth standards into low weight-for-age (underweight) and low height-for-age (stunted) groups based on a Z-score cut-off of <−2 SD.[25] Sociodemographic information such as the mother's and father's educational level, family-related data such as working status, and feeding practices were collected from the mothers or caregivers using a validated questionnaire (using questionnaires from the previous study).[26] Complementary feeding practices were assessed using semiquantitative food frequency questionnaires (SQ-FFQ).

Appropriate and adequate complementary feeding, including the timely introduction of complementary foods, proper frequency and portion sizes, a wide variety of foods, and suitable texture and taste. Appropriate breastfeeding practices were defined as breastfeeding only for the first six months after giving birth, except for medications or vitamin and mineral supplements, which were continued by breastfeeding until 2 years. Optimal complementary feeding was described as providing adequate and safe nutritious foods alongside breastfeeding from six months onward, with gradual increases in quantity, frequency, and texture, according to the child's needs and abilities. Indicators such as timely initiation, frequency adequacy, nutrient adequacy, food diversity, and appropriate texture were used to evaluate complementary feeding practices.

The under-five were considered to have a timely introduction to complementary feeding or a timely initiation if they received complementary foods at six months. The authors considered children to have an adequate frequency of complementary feeding if they received foods at least three times per day and nutrient adequacy if the amount met 80% of their daily nutrition requirement. Children who consumed a minimum of four food groups in the past 24 hours were considered to have a diverse diet. The flavor of complementary feeding was considered appropriate when children were given sweet and salty foods according to their age (more than 12 months). Finally, the texture was considered appropriate when children were given soft, semi-solid, or solid foods based on their age.

A Chi-square test was performed to examine the association between a single predictor and outcome variable with a level of significance p-value of <0.05 and a 95% confidence interval (CI). A multiple logistic regression using the enter method was employed to develop a predictive model and identify the most significant risk factors for wasting, with significance determined by a p-value of <0.05 and an odds ratio (OR) >1. The IBM SPSS Statistics for Windows (free version) software was used for statistical analyses.

Results

This study involved 174 under-five from three subdistricts with a high prevalence of wasting in Padang City. The under-five in the case group were mostly male (57.5%) and aged more than 24 months (51.7%). This study found more underweight under-five in the case group compared with the control group (63.2% vs. 39.1%); however, the control group had more stunted children than the case group (40.2% vs. 23.0%) (Table 1).

Table 1. Demographic and Nutritional Status of the Participants (n = 174)

Characteristics of the Children	Nutrition Status	
	Cases n (%)	Controls n (%)
Sex		
Male	50 (57.5)	41 (47.1)
Female	37 (42.5)	46 (52.9)
Age		
≤24 months	42 (48.3)	45 (51.7)
>24–36 months	19 (21.8)	12 (13.8)
>36–60 months	26 (29.9)	30 (34.5)
Weight by age		
Underweight	55 (63.2)	34 (39.1)
Normal	32 (36.8)	53 (60.9)
HAZ		
Stunted	20 (23.0)	35 (40.2)
Normal	67 (77.0)	52 (59.8)

Notes: WHZ = weight by age, Underweight = WHZ <-2 SD, HAZ = height for age Z-score, Stunted = HAZ <-2 SD

Table 2 shows that breastfeeding practices do not appropriately follow the WHO recommendations (57.5%). Likewise, complementary feeding practices are below the recommendation in terms of portion size and food variations (>50%). The SQ-FFQ also revealed the main sources of children's food intake. Potato and rice consumption were the main sources of carbohydrates, whereas eggs and chicken were the main sources of protein (> 80% of daily intake for both food groups). On the other hand, spinach and carrots were the most preferred vegetables consumed, and oranges and bananas were the fruits with the highest consumption among the under-five (>90% of daily intake for both food groups).

Table 2. Association Between Feeding Practices and Nutritional Status (Wasting) Among the Under-Five

Variable	Wasting Status		p-value
	Yes n (%)	No n (%)	
Breastfeeding practices			
Inappropriate	50 (57.5)	14 (16.1)	<0.001
Appropriate	37 (42.5)	73 (83.9)	
Timely initiation of complementary feeding			
Inappropriate	35 (40.2)	8 (9.2)	<0.001
Appropriate	52 (59.8)	79 (90.8)	
Frequency of the complementary feeding			
Inadequate	38 (43.7)	7 (8.0)	<0.001
Adequate	49 (56.3)	80 (92.0)	
Portion of complementary feeding			
Inadequate	69 (79.3)	33 (37.9)	<0.001
Adequate	18 (20.7)	54 (62.1)	
Variation in the complementary feeding			
Not diverse	70 (80.5)	20 (23.0)	<0.001
Diverse	17 (19.5)	67 (77.0)	
Flavors of complementary feeding			
Inappropriate	8 (9.2)	3 (3.4)	0.211
Appropriate	79 (90.8)	84 (96.6)	
Texture of the complementary feeding			
Inappropriate	13 (14.9)	15 (17.2)	0.837
Appropriate	74 (85.1)	72 (82.8)	

From the bivariate analysis, this study found that poor breastfeeding practice, an unageable timely introduction to complementary feeding, inadequate frequency and portion, inappropriate taste for age, and poor food diversity were risk factors for wasting among the under-five. However, inappropriate texture was not significantly associated with wasting (p-value >0.05).

Table 3. Risk Factors for Wasting Among the Under-Five

Variable	OR	95% CI		p-value
		Lower	Upper	
1st Model–Full Model				
Breastfeeding practices	2.955	0.919	9.503	0.069
Timely initiation of complementary feeding	1.112	0.273	4.520	0.883
Frequency of the complementary feeding	2.187	0.569	8.413	0.255
Portion of complementary feeding	1.039	0.184	3.700	0.802
Variation in the complementary feeding	14.713	3.577	60.508	<0.001
Flavors of complementary feeding	3.564	0.589	21.555	0.166
Texture of the complementary feeding	0.894	0.272	2.940	0.854
2nd Model–Adjusted Model				
Breastfeeding practices	8.389	2.611	14.432	<0.001
Variation in the complementary feeding	13.534	6.025	30.400	<0.001

Notes: OR = odds ratio; CI = confidence interval

Further analysis with a multiple logistic regression to examine the main risk factor of wasting among the under-five showed inappropriate breastfeeding practice (p-value <0.001; OR = 6.139; 95% CI 2.611–14.432) and food diversity of the complementary feeding (p-value <0.001; OR = 13.534; 95% CI 6.025–30.400) as significant factors for wasting. From the final model of multivariate analysis, the under-five with inappropriate breastfeeding practices had an OR of 8.389 (95% CI: 2.611–14.432) being wasting compared to those with appropriate breastfeeding practices. In addition, inappropriate variation in complementary feeding had an OR of 13.534 (95% CI: 6.025–30.400) being wasting compared with children with appropriate variation in complementary feeding.

Discussion

This study found that the percentage of wasting was higher among males (57.5%) than females under-five (42.5%), consistent with a previous study in Indonesia and in the Congo.[21,27] Poor breastfeeding and complementary feeding practices were identified as significant risk factors for wasting in the under-five, respectively, OR = 8.389 (95% CI 2.611–14.432) and OR = 13.534 (95% CI 6.025–30.400). These include the untimely initiation of complementary feeding as well as inappropriate frequency, portion, variation, and taste of complementary foods. Poor breastfeeding practices and a lack of dietary diversity in complementary foods were identified as the most significant risk factors.

This study's findings were consistent with those of several studies on Asia and Africa. A study in Ethiopia indicated that appropriate breastfeeding is a protective factor against wasting (adjusted odds ratio (AOR) = 0.38; [95 % CI: 0.14–0.99]).[28] A study from Uttar Pradesh, India, found that children who were not exclusively breastfed, bottle-fed within one hour of birth, and not given colostrum were at a higher risk of being underweight and wasting.[29] A study conducted in South Kivu Province, Democratic Republic of Congo, found that inadequate complementary feeding was strongly associated with undernutrition among children aged 2 years (AOR 6.88; 95% CI 1.24-18.37).[30] A study in South Sulawesi Province, Indonesia, found that exclusive breastfeeding, prolonged breastfeeding, and duration of complementary feeding were correlated with constant body weight among children 12–24 months.[31] Similarly, a study in Norhtern Tanzania reported that children with less diverse complementary foods had a higher risk of stunting (absolute risk reduction (ARR) 1.3; 95% CI 1.01–1.6), and the introduction of prelacteal food was linked to an increased risk of wasting (ARR 2.9; 95% CI 1.3–6.3).[32] In northwest Ethiopia, being underweight was associated with shorter breastfeeding durations (<2 years) (AOR 2.60; 95% CI: 1.35–5.00) and a lack of food diversity in complementary feeding (AOR 6.30; 95% CI: 1.70–23.00).[33]

However, this study's findings contradict those of a cross-sectional study in Yogyakarta, Indonesia, which reported no association between feeding practices and the nutritional status of children aged 7 to 59 months.[33] These contradictory findings could be related to differences in the study design. However, another case–control study in Pasar Prabumulih PHC, Indonesia, indicated that the dietary pattern was significantly associated with stunting among children (OR = 2.667; 95% CI: 1.099–6.468).[34]

Failure to adhere to the WHO guidelines on infant and young child feeding practices can lead to malnutrition in the under-five.[32] Evidence from multiple studies suggests that practices such as providing colostrum, initiating breastfeeding, Exclusive breastfeeding until 6 months, continuing breastfeeding until the recommended 2 years, and timely introduction

of appropriate and adequate complementary foods are associated with a reduced risk of recurrent diarrhea and other infectious diseases, both of which are significant contributors to malnutrition.[35,36] Postponing breastfeeding initiation can result in infants missing out on colostrum, essential for strengthening immunity against infections. In addition, Inadequate nutrition combined with infections inhibits optimal growth in children.[37]

Appropriate and adequate complementary feeding was defined as the timely introduction of complementary foods, proper frequency and portion sizes, a wide variety of foods, and suitable texture and taste. Adequate nutrition in the first 1,000 days of a child's life, from conception until post-delivery, is extremely important for healthy growth and development.[38] This study found that feeding practices in the first year of children's age, especially fully breastfeeding during the first six months and continuing with nutritious complementary feeding, were relatively low among mothers in Padang City, Indonesia. The complementary feeding often lacked variety and was inappropriate in terms of texture, taste, and portion sizes for the child's age. Therefore, strategies must be developed to raise awareness and improve knowledge among mothers and caregivers regarding optimal feeding practices to combat malnutrition. A previous study has shown that maternal knowledge is linked to early complementary feeding in Indonesia.[39] A good partnership between the Ministry of Education and the Ministry of Health is essential to create a comprehensive educational approach targeting adolescent girls and women of reproductive age, aiming to prevent these issues before they even arise. However, the interpretation of the findings should consider the limitations of the study. As the SQ-FFQ was used to assess the adequacy of complementary feeding, recall bias may have occurred during data collection, potentially leading to over- or underestimation of reported food consumption.[40]

Conclusion

This study highlights that inadequate breastfeeding and poor complementary feeding practices, particularly those lacking diversity and proper timing, are risk factors for wasting among the under-five. There is a need for strategies to prevent malnutrition among children by providing education about breastfeeding and complementary feeding targeted at mothers and caretakers. Strategies must highlight the benefits of providing diverse foods to children as well.

Abbreviations

The under-five: children under the age of five; WHO: World Health Organization; PHC: primary health care; WHZ: weight for height Z-Score; SD: standard deviation; SQ-FFQ: Semiquantitative Food Frequency Questionnaires; CI: confidence interval; OR: odds ratio; AOR: adjusted odds ratio; ARR: absolute risk reduction

Ethics Approval and Consent to Participate

This study was granted ethical clearance from the Research Ethics Commission of the Faculty of Public Health, University of Andalas, under approval number of 6/UN16.12/KEP-FKM/2022. Prior to data collection, permission was obtained from the Padang City Health Office. The study's purpose and data collection procedures were thoroughly explained to all participants. Written and signed informed consent was obtained from the mothers, who provided consent on behalf of their children to participate in the study.

Competing Interest

The authors declared no conflicts of interest to disclose.

Availability of Data and Materials

This article contains all the data that were generated or analyzed during the study.

Authors' Contribution

A was responsible for data collection, data entry, and performing data analysis. A, ADA, and MTPLK collaborated in manuscript preparation, content refinement, and administrative tasks. The results were discussed by all the authors, who also contributed to preparing the final version of the manuscript.

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References

1. Elmighrabi NF, Fleming CAK, Dhami MV, et al. Childhood undernutrition in North Africa: Systematic review and meta-analysis of observational studies. Glob Health Action. 2023; 16 (1): 2240158. DOI: 10.1080/16549716.2023.2240158.
2. Badan Kebijakan Pembangunan Kesehatan. Buku Saku Hasil Survei Status Gizi Indonesia (SSGI) 2022. Jakarta: Kementerian Kesehatan Republik Indonesia; 2023.
3. Badan Kebijakan Pembangunan Kesehatan. Survei Kesehatan Indonesia (SKI): 2023 Dalam Angka. Jakarta: Kementerian Kesehatan Republik Indonesia; 2024.

4. World Health Organization. Malnutrition in children. Geneva: World Health Organization.
5. World Health Organization, United Nations Children's Fund. Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services: the revised Baby-friendly Hospital Initiative 2018 implementation guidance. Frequently asked questions. Geneva: World Health Organization; 2018.
6. World Health Organization. Fact Sheets-Malnutrition. Geneva: World Health Organization; 2024.
7. World Health Organization. Essential nutrition actions: Improving maternal, newborn, infant and young child health and nutrition. Geneva: World Health Organization; 2013.
8. World Health Organization. Malnutrition. Geneva: World Health Organization.
9. Sinha RK, Dua R, Bijalwan V, et al. Determinants of stunting, wasting, and underweight in five high-burden pockets of four Indian states. Indian J Community Med. 2018; 43 (4): 279-283. DOI: 10.4103/ijcm.IJCM_151_18.
10. Ibrahim C, Bookari K, Sacre Y, et al. Breastfeeding practices, infant formula use, complementary feeding and childhood malnutrition: An updated overview of the eastern mediterranean landscape. Nutrients. 2022; 14 (19): 4201. DOI: 10.3390/nu14194201.
11. Kang Y, Kim J. Risk factors for undernutrition among children 0–59 months of age in Myanmar. Matern Child Nutr. 2019; 15 (4): e12821. DOI: 10.1111/mcn.12821.
12. Boah M, Azupogo F, Amporfro DA, et al. The epidemiology of undernutrition and its determinants in children under five years in Ghana. PLoS One. 2019; 14 (7): e0219665. DOI: 10.1371/journal.pone.0219665.
13. Simanjuntak BY, Haya M, Suryani D, et al. Early inititation of breastfeeding and vitamin a supplementation with nutritional status of children aged 6-59 months. Kesmas. 2018; 12 (3): 107–113. DOI: 10.21109/kesmas.v12i3.1747.
14. World Health Organization. Comprehensive implementation plan on maternal, infant and young child nutrition. Geneva: World Health Organization; 2014.
15. Anato A. Predictors of wasting among children under-five years in largely food insecure area of north Wollo, Ethiopia: A cross-sectional study. J Nutr Sci. 2022; 11: e8. DOI: 10.1017/jns.2022.8.
16. Basri H, Hadju V. Breastfeeding and complementary food on nutritional status infants in Indonesia. Enferm Clin. 2020; 30 (Suppl. 4): 191–195. DOI: 10.1016/j.enfcli.2019.10.067.
17. Sirkka O, Abrahamse-Berkeveld M, van der Beek EM. Complementary feeding practices among young children in China, India, and Indonesia: A narrative review. Curr Dev Nutr. 2022; 6 (6): nzac092. DOI: 10.1093/cdn/nzac092.
18. Putri TA, Dewi YLR, Murti B. Meta-analysis the effects of non exclusive breastfeeding and inappropriate complementary feeding on stunting in children under five. J Mater Child Health. 2020; 05 (05): 514–524. DOI: 0.26911/thejmch.2020.05.05.06.
19. Kusumawardani DA, Luthfiyana NU. Child feeding practices and stunting: A case-control study in Jember regency of Indonesia. Indian J Public Health Res Dev. 2020; 11 (6): 229–234. DOI: 10.37506/ijphrd.v11i6.9774.
20. Dabar D, Yadav V, Goel AD, et al. Risk factors for undernutrition in under-five children living in a migrant populated area of South Delhi. J Family Med Prim Care. 2020; 9 (4): 2022. DOI: 10.4103/jfmpc.jfmpc_1185_19.
21. Luzingu JK, Stroupe N, Alaofe H, et al. Risk factors associated with under-five stunting, wasting, and underweight in four provinces of the Democratic Republic of Congo: Analysis of the ASSP project baseline data. BMC Public Health. 2022; 22: 2422. DOI: 10.1186/s12889-022-14842-x.
22. Suratri MAL, Putro G, Rachmat B, et al. Risk factors for stunting among children under five years in the province of East Nusa Tenggara (NTT), Indonesia. Int J Environ Res Public Health. 2023; 20 (2): 1640. DOI: 10.3390/ijerph20021640.
23. Salleh R, Ahmad MH, Man CS, et al. Risk factors associated with underweight children under the age of five in Putrajaya, Malaysia: A case-control study. J Gizi Pangan. 2023; 18 (2): 89–98. DOI: 10.25182/jgp.2023.18.2.89-98.
24. Menteri Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2020 Tentang Standar Antropometri Anak. Jakarta: Kementerian Kesehatan Republik Indonesia; 2020.
25. Ferreira H da S. Anthropometric assessment of children's nutritional status: A new approach based on an adaptation of Waterlow's classification. BMC Pediatr. 2020; 20: 65. DOI: 10.1186/s12887-020-1940-6.
26. Azrimaidaliza, Syarif L, Resmiati. The Association of Income, Infectious Disease and Feeding Patterns with Undernutrition among Children Under Five. 2022; 6 (1SP): 259–265. DOI: 10.20473/amnt.v6i1SP.2022.259-265.
27. Jokhu LA, Syauqy A. Determinants of concurrent wasting and stunting among children 6 to 23 mo in Indonesia. Nutrition. 2024; 122: 112390. DOI: 10.1016/j.nut.2024.112390.
28. Fekadu Y, Mesfin A, Haile D, et al. Factors associated with nutritional status of infants and young children in Somali Region, Ethiopia: A cross-sectional study. BMC Public Health. 2015; 15: 846. DOI: 10.1186/s12889-015-2190-7.
29. Ahmad S, Mishra S. Impact of feeding practices on nutritional status of preschool children of Lucknow district: A community based cross-sectional study. Clin Epidemiol Glob Health. 2022; 15: 101011. DOI: 10.1016/j.cegh.2022.101011.
30. Kambale RM, Ngaboyeka GA, Kasengi JB, et al. Infant and young child feeding practices and nutritional status in two Health Zones of South Kivu, Eastern Democratic Republic of Congo: A community-based study [Preprint]. Research Square; 2020. DOI: 10.21203/rs.3.rs-25742/v1.
31. Walters CN, Rakotomanana H, Komakech JJ, et al. Maternal determinants of optimal breastfeeding and complementary feeding and their association with child undernutrition in Malawi (2015–2016). BMC Public Health. 2019; 19: 1503. DOI: 10.1186/s12889-019-7877-8.
32. Masuke R, Msuya SE, Mahande JM, et al. Effect of inappropriate complementary feeding practices on the nutritional status of children aged 6-24 months in urban Moshi, Northern Tanzania: Cohort study. PLoS One. 2021; 16 (5): e0250562. DOI: 10.1371/journal.pone.0250562.
33. Palupi IR, Susetyowati MR, Faza F. Feeding practices and nutritional status among children under five years of age in Sleman district, Yogyakarta, Indonesia. Pakistan J Nutr. 2019; 18 (9): 888–894. DOI: 10.3923/pjn.2019.888.894.
34. Olivina H, Fauziah M, Permatasari TAE, et al. Analisis pola makanan tambahan sebagai faktor risiko stunting pada balita di Puskesmas Pasar Prabumulih. Antigen J Kesehat Masy Ilmu Gizi. 2024; 2 (3): 230–243. DOI: 10.57213/antigen.v2i3.384.
35. Abie BM, Goshu YA. Early initiation of breastfeeding and colostrum feeding among mothers of children aged less than 24 months in Debre Tabor, northwest Ethiopia: A cross-sectional study. BMC Res Notes. 2019; 12: 65. DOI: 10.1186/s13104-019-4094-6.

36. Gayatri M. Exclusive breastfeeding practice in Indonesia: A population-based study. Korean J Fam Med. 2021; 42 (5): 395-402. DOI: 10.4082/kjfm.20.0131.
37. Scott JA. The first 1000 days: A critical period of nutritional opportunity and vulnerability. Nutr Diet. 2020; 77 (3): 295–297. DOI: 10.1111/1747-0080.12617.
38. Likhar A, Patil MS. Importance of maternal nutrition in the first 1,000 days of life and its effects on child development: A narrative review. Cureus. 2022; 14 (10): e30083. DOI: 10.7759/cureus.30083.
39. Fau Y, Painem P, Purba EM, et al. The relationship between mother's knowledge and attitudes and giving early complementary breastfeeding at UPTD Boronadu Health Center South Nias Regency in 2022. J Eduhealth. 2022; 13 (02): 919–925.
40. Tang Y, Liu Y, Xu L, et al. Validity and reproducibility of a revised semiquantitative food frequency questionnaire (SQFFQ) for women of age-group 12-44 years in Chengdu. J Health Popul Nutr. 2015; 33 (1): 50–59.