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Exclusive breastfeeding and maternal employment as determinants of toddler nutritional status in Banda Aceh, Indonesia

Pemberian ASI eksklusif dan pekerjaan ibu sebagai determinan status gizi balita di Banda Aceh, Indonesia

Burhanuddin Syam[1*], Evi Dewi Yani[2], Rahmayani[3], Ismail[4], Nisrina Hanum[5], Munalita[6]

[1] Bachelor of Public Health Study Program, Faculty of Public Health, Universitas Serambi Mekkah, Aceh, Indonesia. E-mail: burhanuddinsyam@serambimekkah.ac.id
[2] Bachelor of Public Health Study Program, Faculty of Public Health, Universitas Serambi Mekkah, Aceh, Indonesia. E-mail: evidewiyani@serambimekkah.ac.id
[3] Bachelor of Public Health Study Program, Faculty of Public Health, Universitas Serambi Mekkah, Aceh, Indonesia. E-mail: rahmayani@serambimekkah.ac.id
[4] Faculty of Nursing, Poltekkes Kemenkes Aceh. E-mail: ismail@poltekkesaceh.ac.id
[5] Bachelor of Public Health Study Program, Faculty of Public Health, Universitas Serambi Mekkah, Aceh, Indonesia. E-mail: nisrinahanum@serambimekkah.ac.id
[6] Bachelor of Public Health Study Program, Faculty of Public Health, Universitas Serambi Mekkah, Aceh, Indonesia. E-mail: munalita@gmail.com

***Correspondence Author:**
Bachelor of Public Health Study Program, Faculty of Public Health, Universitas Serambi Mekkah, Jl. Dr. Mr. T. H. Mohd Hasan, Landom, Kecematan Lueng Bata, Kota Banda Aceh, Provinsi Aceh 23122.
E-mail: burhanuddinsyam@serambimekkah.ac.id

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Abstract

Child malnutrition remains a significant public health concern with long-term consequences for growth, cognitive development and morbidity. This study aimed to examine the association between exclusive breastfeeding, maternal employment, and nutritional status of toddlers in the Lampaseh Health Center area of Banda Aceh. A cross-sectional study was conducted on 47 mothers selected through random sampling. Data were collected using structured questionnaires and verified using health records. Nutritional status was assessed using the weight-for-age (WAZ) indicator, based on WHO standards. Data were analyzed using chi-square tests and odds ratios (OR). The results showed that children of employed mothers were more likely to be undernourished than those of unemployed mothers (OR = 5.25; p = 0.029). Similarly, toddlers who were not exclusively breastfed had a higher likelihood of undernutrition than those who were exclusively breastfed (OR = 10.77; p = 0.001). In conclusion, exclusive breastfeeding and maternal employment are significant determinants of the nutritional status of toddlers. However, the cross-sectional design and small sample size limit the causal inference and generalizability of the results. Strengthening breastfeeding support and targeted interventions for working mothers is recommended to improve child nutrition outcomes.

Keywords: Exclusive breastfeeding, nutritional status, occupation, toddler

Abstrak

Masalah gizi pada balita masih menjadi perhatian utama kesehatan masyarakat karena berdampak jangka panjang terhadap pertumbuhan, perkembangan kognitif, dan risiko kesakitan. Penelitian ini bertujuan untuk menganalisis hubungan antara pemberian ASI eksklusif, status pekerjaan ibu, dan status gizi balita di wilayah kerja Puskesmas Lampaseh, Kota Banda Aceh. Penelitian menggunakan desain cross-sectional dengan melibatkan 47 ibu yang dipilih secara acak. Data dikumpulkan melalui kuesioner terstruktur dan diverifikasi menggunakan catatan kesehatan. Status gizi diukur berdasarkan indikator berat badan menurut umur (BB/U) sesuai standar WHO. Analisis data menggunakan uji chi-square dan perhitungan odds ratio (OR). Hasil penelitian menunjukkan bahwa balita dari ibu yang bekerja memiliki risiko lebih tinggi mengalami gizi kurang dibandingkan ibu yang tidak bekerja (OR = 5,25; p = 0,029). Selain itu, balita yang tidak mendapatkan ASI eksklusif memiliki kemungkinan lebih besar mengalami gizi kurang dibandingkan yang mendapatkan ASI eksklusif (OR = 10,77; p = 0,001). Kesimpulannya, pemberian ASI eksklusif dan status pekerjaan ibu merupakan faktor penting yang memengaruhi status gizi balita. Namun, desain penelitian dan ukuran sampel yang terbatas menjadi keterbatasan dalam menarik kesimpulan sebab-akibat dan generalisasi hasil.

Kata Kunci: ASI eksklusif, balita, pekerjaan, status gizi

Introduction

Nutritional problems among toddlers remain a major global public health issue with long-term consequences for physical growth, cognitive development, immunity, and risk of chronic diseases in adulthood (Soliman et al., 2021). International organizations report that approximately 45% of child deaths are associated with malnutrition, particularly in developing countries that continue to face challenges in meeting young children's nutritional needs. This condition reflects broader inequalities in social, economic, and health systems that directly influence nutritional outcomes in children (UNICEF, 2022).

At the global level, malnutrition persists in many countries with high vulnerability, including Africa and Asia. Reports from the FAO show that some countries have a prevalence of underweight populations exceeding 40%, highlighting serious issues in food security, dietary patterns and healthcare systems (FAO, 2020). Indonesia remains in a concerning position in Southeast Asia, with an estimated 17.7 million underweight people in recent years. This situation underscores that malnutrition continues to be a major challenge for the government in its efforts to achieve sustainable development goals, particularly those related to reducing nutritional deficiencies (Muharram et al., 2025).

At the national level, findings from the Indonesia Health Survey (SKI, 2023) and the Indonesia Nutritional Status Survey (SSGI, 2024) indicate that Aceh Province continues to face relatively high prevalence rates of stunting and wasting, despite a gradual decline. The prevalence of stunting decreased from 33.2% in 2021 to 28.6% in 2024 (Kemenkes RI, 2024). However, this figure remains above the national target, indicating persistent and unresolved challenges in child nutrition.

Specifically, in Banda Aceh City, the nutritional status of toddlers varies across primary health care centers. The Primary Health Centers (PHC) of Puskesmas Meuraxa, Banda Raya, and Ulee Kareng reported relatively higher percentages of underweight toddlers than other areas. In the Lampaseh Health Center, the prevalence of undernutrition reached 4.8%, which, although not the highest, still highlights the need for targeted interventions to improve child nutrition (Aceh Provincial Health Office, 2023). These variations emphasize the importance of considering local characteristics and socioeconomic conditions when designing strategies to improve the nutritional status of toddlers.

To better understand this issue, toddler nutritional status is influenced by several direct factors, such as food intake and infectious diseases, as well as indirect factors, including household food security, caregiving practices, sanitation, maternal education and knowledge, employment status, and breastfeeding practices (Atoloye et al., 2024; Forh et al., 2022). Exclusive breastfeeding is a critical determinant of optimal infant nutrition during the first six months of life. However, the rate of exclusive breastfeeding in Indonesia remains low, partly due to insufficient maternal knowledge, cultural influences, and time limitations, especially among working mothers (Karina et al., 2023; Syahri et al., 2024).

Maternal employment status is an important determinant of childcare and toddler nutrition. Working mothers often have limited time to care for their children, monitor their feeding practices, and prepare nutritious meals (Ketema et al., 2022). These constraints may affect the quality of care and consequently influence a child's nutritional status. In contrast, mothers who do not work generally have more time to focus on childcare, although economic conditions can also affect access to nutritious food (Liebe et al., 2024; Sawitri & Desti, 2023).

Initial field observations in the Lampaseh PHC area revealed suboptimal infant feeding practices, including the early introduction of complementary foods due to maternal employment constraints and cultural beliefs. These practices are recognized as risk factors for inadequate nutrient intake and undernutrition (Brugaillères et al., 2024). In addition, working mothers often delegate childcare responsibilities to relatives or informal caregivers who may have limited knowledge of appropriate child feeding practices, potentially resulting in inappropriate dietary decisions that compromise the nutritional status of children (Kalhor et al., 2025).

Although exclusive breastfeeding and maternal employment have been extensively studied as determinants of child nutrition, most existing research in Indonesia has examined these factors in isolation or at broader regional or national levels. There is limited empirical evidence that simultaneously analyzes these factors within a localized primary health care

context, particularly in socioculturally unique regions such as Aceh. Furthermore, the interaction between maternal employment constraints and breastfeeding practices and their combined effect on toddlers' nutritional status has not been sufficiently investigated. This gap limits the ability to develop context-specific and integrated intervention strategies (Ijaiya et al., 2024). Moreover, previous studies have rarely explored how maternal employment and breastfeeding practices interact within specific community contexts characterized by strong cultural norms and limited childcare support systems (Brugaillères et al., 2024; Kalhor et al., 2025; Syahri et al., 2024; Weber et al., 2023).

The novelty of this study lies in its context-specific and integrated analysis of exclusive breastfeeding and maternal employment as determinants of toddler nutritional status at the primary healthcare level. This approach allows for a more nuanced understanding of how maternal roles and feeding decisions influence child nutrition outcomes in urban Aceh, where such data are still limited.

The importance of conducting this study is underscored by the persistent burden of child undernutrition in Aceh Province despite ongoing national nutrition programs (Sufri et al., 2023). Identifying modifiable maternal and caregiving factors associated with poor nutritional outcomes is essential for designing targeted and culturally appropriate interventions. The findings of this study are expected to inform local health authorities and policymakers to strengthen breastfeeding promotion programs, improve nutritional education for caregivers, and develop support mechanisms for working mothers to ensure optimal child nutrition during the critical early years of life (Syahri et al., 2024).

Based on this background and the identified research gap, this study aimed to examine the association between exclusive breastfeeding and maternal employment status with toddler nutritional status in the working area of the Lampaseh Primary Health Center, Banda Aceh City.

The findings of this study are expected to provide evidence-based insights for policymakers and health practitioners in designing targeted interventions to improve toddler nutrition, particularly by strengthening breastfeeding promotion and supporting working mothers.

Methods

Study Design and Setting

This study employed an analytical cross-sectional design to examine the association between exclusive breastfeeding, maternal employment status, and nutritional status of toddlers in the working area of the UPTD Lampaseh Health Center, Banda Aceh City. Data collection was conducted in July 2025. The discrepancy between the manuscript submission year and the data collection period reflects the updated dataset used for this revised version of the manuscript.

Population and Sample

The study population consisted of all mothers with toddlers aged 0–59 months in the Lampaseh Health Center working area during January–February 2025 (N = 89). The sample size was calculated using Slovin's formula: Based on this calculation, the minimum required sample size was 47. A simple random sampling technique using a lottery method was used to select the participants.

Participants were selected using a sampling technique with the lottery method. The lottery gave each mother a chance to be selected for the program. We included mothers who lived permanently in the Lampaseh Health Center's working area. We included mothers with toddlers aged 0–59 months. We included mothers who were willing to participate in the study. We excluded mothers who were not available during the data collection period. We excluded toddlers with illnesses. We excluded toddlers with conditions that could affect their status.

Research Variables and Operational Definitions

The primary independent variables were exclusive breastfeeding (yes or no) and maternal employment status (employed or unemployed). Additional variables, including maternal education, maternal age, birth weight, and maternal knowledge were collected as potential confounders. The research established breastfeeding as "Yes" when infants received breast milk exclusively during their first six months without any solid foods or liquids. The classification becomes "No" when the child consumes any substance, except breast milk, during the first six months of life. The research

study divides maternal employment into two categories: "employed" for mothers who work paid jobs and "unemployed" for those who do not work.

Education level is divided into two categories: the first includes mothers who have completed junior high school or lower, and the second includes those who have completed senior high school or higher. The research divided maternal age into two categories: women under 30 years old and women who were 30 years or older, based on the age pattern of the study participants.

Birth history was assessed by examining the child's birth weight as recorded in the Maternal and Child Health (MCH/KIA) Book or health center records. The medical field divides birth weight into two categories: low birth weight (less than 2,500 g) and normal birth weight (2,500 g or more).

Maternal knowledge of child nutrition was measured using a structured questionnaire developed from the existing literature on infant and young child feeding practices. The survey assessed how mothers understand breastfeeding techniques, child eating practices, and the complete nutritional needs of their children. The knowledge score was calculated and categorized as either "good" or "poor" based on the score distribution.

In this study, the nutritional status of toddlers was assessed using the Weight-for-Age Z-score (WAZ) based on the WHO Child Growth Standards. Children were classified as underweight if WAZ < −2 standard deviations (SD) and normal if WAZ ≥ −2 SD to +2 SD. Body weight measurements were obtained from standardized records in the Maternal and Child Health (MCH) Book and verified using health center or Posyandu records. Measurements were conducted by trained health personnel using calibrated weighing scales, following standard procedures.

Research Instrument

Data were collected using a structured questionnaire developed based on the literature on infant feeding and maternal characteristics. The instrument was reviewed by public health and nutrition experts to ensure its content validity. A pilot test was conducted prior to data collection to improve the clarity and reliability of the questionnaire.

The researchers based the questionnaire on the literature and studies on breastfeeding practices and maternal employment in child nutrition. The questionnaire included sections on characteristics, exclusive breastfeeding history, and employment status. Before data collection, health and nutrition experts reviewed the questionnaire to ensure that it was valid and clear. We collected nutritional status data from toddler weight measurements. The nutritional status data were obtained from the toddler weight measurements recorded in the Maternal and Child Health (MCH/KIA) Book or in official Posyandu and health center records. Trained health personnel measured the weights. Documented the results.

Data Collection Procedures

Data collection will be conducted from July 22 to July 26, 2025. The data collection staff approached mothers who met the inclusion criteria during Posyandu or home visits. The data collection staff explained the study objectives to the mothers. After the mothers provided consent, they completed the questionnaire with the help of trained data collectors. The data collection staff verified the nutritional status data of toddlers using health records to ensure that the data were accurate and reliable. The data collection staff checked all collected data for completeness and consistency before analysis.

Given that exclusive breastfeeding was assessed retrospectively for children aged up to 59 months, there is a potential risk of recall bias, particularly among mothers of older children. To minimize this bias, the breastfeeding history was cross-checked with available health records whenever possible.

Data Analysis

Data were analyzed using SPSS version 22. Descriptive statistics were used to summarize the variable distributions. Bivariate analysis was conducted using the chi-square test to assess the associations between independent variables and nutritional status. Effect sizes were reported using odds ratios (OR) with 95% confidence intervals (CI).

To control for potential confounding variables, multivariable logistic regression analysis was performed, including maternal education, age, birth weight, and maternal knowledge. Statistical significance was set at $p < 0.05$.

Result and Discussion

The characteristics of the respondents and study subjects are presented in Table 1. Among the 47 toddlers, 46.8% were classified as undernourished and 53.2% had a normal nutritional status. The majority of mothers were unemployed (68.1%), and 55.3% of the children received exclusive breastfeeding. A history of low birth weight was observed in 36.2% of the children.

Table 1. Characteristics of respondents (mothers) and study subjects (toddlers) (n = 47)

Variable	Category / Statistic	n	%
Maternal Characteristics			
Maternal Age Group	< 30 years	25	53.2
	≥ 30 years	22	46.8
Maternal Education Level	Low (≤ Junior High School)	23	48.9
	High (≥ Senior High School)	24	51.1
Maternal Employment Status	Unemployed	32	68.1
	Employed	15	31.9
Maternal Knowledge Level	Poor	23	48.9
	Good	24	51.1
Child Characteristics			
Child Sex	Male	24	51.1
	Female	23	48.9
Toddler Age Group	0–11 months	18	38.3
	12–35 months	27	57.4
	36–59 months	2	4.3
Birth Weight History	Low Birth Weight (<2,500 g)	17	36.2
	Normal Birth Weight (≥2,500 g)	30	63.8
Child Age (months)	Mean ± SD	24.8 ± 14.6	–
Current Weight (kg)	Mean ± SD	10.4 ± 2.1	–
Height/Length (cm)	Mean ± SD	79.6 ± 12.4	–

The characteristics of the respondents and subjects in Table 1 show that this study was conducted on a population with a high prevalence of malnutrition. This study is relevant for examining the factors that determine toddlers' nutritional status. The proportion of mothers who do not work is quite large, but this condition does not automatically guarantee good nutritional status for toddlers, especially if it is not accompanied by adequate maternal education and knowledge of nutrition. International research confirms that maternal education plays an important role in improving health literacy, quality of care, and decisions about feeding children, which ultimately affects the nutritional status of toddlers (Mardani et al., 2024; Prasetyo et al., 2023).

In addition to formal education, mothers' nutritional knowledge can be easily changed through effort. Research shows that when mothers' nutritional knowledge increases, feeding practices improve, and the risk of child malnutrition decreases (Al Rahmad et al., 2020; Katoch, 2022). Thus, many mothers in this study had poor nutritional knowledge. This emphasizes the importance of community-based nutritional education.

Maternal employment characteristics are important for breastfeeding practices. A study in Indonesia found that the success of exclusive breastfeeding among working mothers is influenced by maternal factors and environmental support (Syahri et al., 2024). The proportion of toddlers with a history of low birth weight indicates biological vulnerability from early age. Biological vulnerability can affect growth rates.

The results of the bivariate analysis are shown in Table 2. The analysis demonstrated that several maternal factors were significantly associated with an increased risk of undernutrition in toddlers. The highest risk was observed among children who were not exclusively breastfed, of whom nearly three-quarters experienced undernutrition. These children had more than tenfold higher odds of being underweight compared with those who received exclusive breastfeeding (OR = 10.77;

95% CI: 2.79–41.52; p = 0.001), underscoring exclusive breastfeeding as a critical protective factor in early childhood nutrition.

Maternal employment status was also significantly associated with nutritional outcome. Toddlers of employed mothers showed a substantially higher prevalence of undernutrition, with over 70% affected, and were five times more likely to be underweight than those whose mothers were unemployed (OR = 5.25; 95% CI: 1.32–21.52; p = 0.029). This finding suggests that limited caregiving time and insufficient childcare support may adversely affect feeding practices of working mothers.

Table 2. Association between maternal and child factors and toddler nutritional status (n = 47)

Variable	Category	Underweight n (%)	Normal n (%)	OR	95% CI	p-value
Maternal Employment	Employed	11 (73.3)	4 (26.7)	5.25	1.32 – 21.52	0.029*
	Unemployed	11 (34.4)	21 (65.6)	1	Ref.	
Exclusive Breastfeeding	No	17 (73.9)	6 (26.1)	10.77	2.79 – 41.52	0.001*
	Yes	5 (20.8)	19 (79.2)	1	Ref.	
Maternal Education	Low (≤ Junior High)	15 (65.2)	8 (34.8)	4.55	1.40 – 14.78	0.021*
	High (≥ Senior High)	7 (29.2)	17 (70.8)	1	Ref.	
Maternal Age	< 30 years	12 (48.0)	13 (52.0)	1.11	0.36 – 3.40	0.781
	≥ 30 years	10 (45.5)	12 (54.5)	1	Ref.	
Birth History	Low	9 (52.9)	8 (47.1)	1.47	0.46 – 4.70	0.503
	Normal	13 (43.3)	17 (56.7)	1	Ref.	
Maternal Knowledge	Poor	16 (69.6)	7 (30.4)	6.86	2.00 – 23.50	0.004*
	Good	6 (25.0)	18 (75.0)	1	Ref.	

Low maternal education was another important risk factor. Approximately two-thirds of children born to mothers with lower educational attainment were undernourished, with an odds of undernutrition more than four times higher than that among children of mothers with higher education (OR = 4.55; 95% CI: 1.40–14.78; p = 0.021).

Similarly, poor maternal nutritional knowledge was strongly associated with undernutrition, affecting nearly 70% of children in this group and increasing the odds of undernutrition by almost sevenfold (OR = 6.86; 95% CI: 2.00–23.50; p = 0.004). In contrast, maternal age and birth history were not significantly associated with nutritional status, as indicated by non-significant p-values and confidence intervals crossing the unity.

This study identified factors that were clearly linked to undernutrition in toddlers. Children who were not exclusively breastfed had a higher risk of undernutrition (OR 10.77 [95% CI 2.79–41.52]; p = 0.001). The findings of this study indicate that exclusive breastfeeding is significantly associated with better nutritional status in toddlers. This association is consistent with previous studies, suggesting that exclusive breastfeeding contributes to adequate nutrient intake and protection against infections that may affect child growth. A study in Sudan found that exclusive breastfeeding (EBF) lowers the rate of protein-energy malnutrition in infants. The study also found that EBF reduces health problems in infants. Researchers have pointed out that EBF protects children's health (Ahmed et al., 2023). The evidence is clear that the World Health Organization recommends exclusive breastfeeding (EBF) for six months as part of good infant nutrition. The World Health Organization (WHO) adds that EBF provides nutrition and immune protection to infants (WHO, 2023).

Maternal employment was associated with nutrition in this study (OR = 5.25; 95% CI: 1.32–21.52; p = 0.029). Maternal employment is also associated with an increased likelihood of undernutrition. This finding may be explained by limited caregiving time and reduced opportunities for direct feeding and supervision among working mothers, particularly in settings with limited child care support. The review shows that maternal employment in unskilled jobs without sufficient maternity leave or childcare support leads to worse child nutrition outcomes, such as underweight and stunting (Waghode et al., 2025). These findings highlight the need for integrated interventions that address both nutritional and socioeconomic

factors. Strengthening breastfeeding support, improving maternal nutrition education, and providing childcare support for working mothers are essential strategies for improving child nutritional outcomes. One explanation is that while employment can raise household income and food security, the loss of caregiving time and lack of workplace support, such as no lactation breaks and no childcare options, can cause poor feeding practices and less frequent breastfeeding (Kyanjo et al., 2025).

Education level has been proven to be a factor in nutritional status. Children of mothers with less than four times the odds of undernutrition compared with children of mothers with a high level of education (OR = 4.55; 95% CI: 1.40–14.78; P = 0.021). Maternal education was significantly associated with the nutritional status of children. Mothers with higher educational attainment are more likely to adopt appropriate feeding practices, access health services, and make informed decisions regarding childcare, which may contribute to improved nutritional outcomes. A recent meta-analysis in eClinicalMedicine found that educated mothers use better feeding practices, access health services more often, and have more say in household decisions. Better feeding practices, frequent access to health services, and greater household decision-making power all help children grow better and lower the risk of undernutrition (Rezaeizadeh et al., 2024). These findings align with the pathways outlined in the UNICEF framework. The UNICEF framework states that maternal education changes factors such as feeding behavior and care practices (UNICEF, 2024).

Education also matters, as maternal nutritional knowledge predicts the nutritional status of children. The odds ratio was 6.86 and the confidence interval was 2.00–23.50. The p value was 0.004. Maternal nutritional knowledge was also significantly associated with the nutritional status. Mothers with better knowledge are more likely to implement appropriate feeding practices, including the timely introduction of complementary foods and dietary diversity, which are essential for optimal child growth. A recent systematic review examined nutritional education. The review found that maternal nutrition education improves knowledge and child nutrition outcomes. The review showed weight gain and better growth measures in children. Maternal nutritional education makes a difference (Prasetyo et al., 2023). Poor maternal knowledge increases the likelihood of undernutrition in children. These findings highlight the need for tailored and culturally appropriate nutritional education programs (Prasticha et al., 2023).

The results did not show a clear link between maternal age and the nutritional outcomes. The missing link between age may be because the sample size was small and the age groups were spread out. Low birth weight is a known risk factor for undernutrition, as shown in large studies. Low birth weight may be affected by feeding and caregiving practices. The analysis did not separate feeding and care practices from the birth history data. No significant association was observed between maternal age, birth weight, and nutritional status. This may be due to the limited sample size and variability of the study population. Further research with larger sample sizes is required to clarify these relationships.

These findings have several implications for future studies. First, the strong protective effect of EBF shows that policies and programs that promote and support breastfeeding for working mothers are needed. Workplace lactation support, flexible work schedules, and community breast-feeding counseling can reduce the impact of employment. Second, maternal education and knowledge are starting points for implementing action. Adding nutrition education to child health services and community health worker programs can improve mothers' ability to make good feeding and care choices.

Evidence shows that childcare infrastructure and social support networks are part of women's economic empowerment initiatives. When supportive environments do not allow working mothers to balance employment and appropriate childcare efforts to improve child nutrition, they fall short. The results indicate that multisectoral approaches are required. Multi-sector approaches must align nutrition interventions, such as breastfeeding promotion and complementary feeding education, with nutrition-sensitive programs, such as women's education, economic strengthening, and childcare support.

This study had several limitations. First, the cross-sectional design limited the ability to

infer causal relationships. Second, the relatively small sample size (n = 47) may have reduced the statistical power and limited the generalizability of the findings. Third, the assessment of exclusive breastfeeding relied on retrospective self-reporting, which introduces potential recall bias, particularly among mothers with older children. Fourth, although several variables were analyzed, residual confounding from unmeasured factors, such as household income, environmental conditions, and access to healthcare, cannot be excluded.

Conclusion

This study found that exclusive breastfeeding, maternal employment, education, and nutritional knowledge were significantly associated with the nutritional status of toddlers, while maternal age and birth history were not. These findings highlight the importance of modifiable maternal factors in child nutrition; however, causal relationships cannot be inferred because of the cross-sectional design.

Practical efforts should focus on strengthening breastfeeding support, enhancing maternal nutrition education, and providing workplace and childcare support for mothers to improve feeding practices and child nutritional outcomes and support maternal and child health programs.

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