

Assessment of the Effects of Breastfeed and Bottle Feed on Health in Children

Humaira Ramzan*, Fozia Parveen, Sadaf Parveen, Aqsa Rehman, Khudija Mushtaq, Khawer Saeeda

Department of Nursing, College of Nursing and Midwifery Fatima Jinnah Medical University Lahore, Pakistan

*Corresponding author's email address: hramzan581@gmail.com

(Received, 14th September 2025, Accepted 22nd November 2025, Published 30th November 2025)

Abstract: Infant feeding practices play a critical role in determining childhood health and developmental outcomes. Although the World Health Organization recommends exclusive breastfeeding for the first six months of life, bottle feeding and mixed feeding remain common in low- and middle-income countries, including Pakistan, potentially increasing the risk of childhood morbidity and developmental delay. **Objective:** To assess the association between breastfeeding, partial feeding, and bottle feeding with childhood illnesses and developmental outcomes among children aged 18 to 36 months attending a tertiary care hospital in Lahore, Pakistan. **Methods:** This cross-sectional analytical study was conducted in the pediatric unit of Sir Ganga Ram Hospital, Lahore, from March 2025 to August 2025. A total of 384 children aged 18–36 months were enrolled using convenience sampling. Data on feeding practices during the first six months of life, sociodemographic characteristics, childhood illnesses, and developmental outcomes were collected through a structured and validated questionnaire. Cognitive, gross motor, and fine motor development were assessed using standardized developmental tools. Data were analyzed using SPSS version 26. Associations between feeding practices and outcome variables were evaluated using the chi-square test, with $p < 0.05$ considered statistically significant. **Results:** Of the 384 children, 43.0% were exclusively breastfed, 43.5% received partial feeding, and 13.5% were bottle-fed. Bottle-fed children had significantly higher rates of pneumonia (69.4%), diarrhea (59.5%), vomiting (67.5%), and seizures (67.2%) compared with breastfed children ($p < 0.001$). Exclusively breastfed children demonstrated superior developmental outcomes, with 87.9% achieving above-average scores in cognitive, gross motor, and fine motor domains and none scoring below average. In contrast, bottle-fed children showed higher proportions of below-average developmental scores across all domains. Parental or caregiver ratings were consistent with objective developmental assessments ($p < 0.001$). **Conclusion:** Exclusive breastfeeding is strongly associated with reduced childhood morbidity and significantly better cognitive and motor development. Bottle feeding is linked to increased infectious illnesses and poorer developmental outcomes. These findings emphasize the need to strengthen breastfeeding promotion and support strategies to improve child health outcomes in Pakistan.

Keywords: Breastfeeding; Bottle feeding; Child health; Cognitive development; Motor development; Childhood illnesses

[How to Cite: Ramzan H, Parveen F, Parveen S, Rehman A, Mushtaq K, Saeeda K. Assessment of the effects of breastfeed and bottle feed on health in children. *Biol. Clin. Sci. Res. J.*, 2025; 6(11):14-18. doi: <https://doi.org/10.54112/bcsrj.v6i11.2094>

Introduction

The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life, emphasizing its role in reducing infant mortality and promoting optimal growth and development (1). However, the rising prevalence of bottle-feeding across different cultures raises critical concerns regarding infant nutrition, growth, and health outcomes (2).

Breastfeeding has been associated with numerous health benefits, including improved nutritional status, enhanced immune responses, and lower incidences of various childhood diseases (1, 3). In direct contrast, bottle feeding, particularly with formula, has been linked to increased risks of dental caries, obesity, and gastrointestinal infections in infants (4, 5, 6). The method of feeding influences not only physical health but also broader developmental trajectories and maternal-child bonding experiences. Healthcare providers must address appropriate feeding practices and educate mothers about potential risks associated with bottle feeding (7, 8).

The choice of feeding method is influenced by a range of factors, including socioeconomic status, cultural practices, maternal education, and access to healthcare information. In particular, studies highlight that working mothers tend to rely more on bottle feeding due to time constraints and perceived convenience (9). This trend is concerning, especially in low and middle-income countries like Pakistan, where variations in feeding practices can lead to disparities in health outcomes (3, 10). Research indicates that maternal education levels correlate significantly with breastfeeding rates; more educated mothers are more

likely to practice exclusive breastfeeding and are aware of the adverse effects of bottle feeding (11, 12).

In Pakistan, the practice of bottle feeding remains prevalent amid sociocultural traditions and economic pressures, affecting children's health at large (13). A recent study indicates that mothers face a lack of adequate breastfeeding support and often resort to bottle feeding due to cultural beliefs and immediate practical needs (7, 13). The shifts towards bottle feeding, especially in urban settings, are alarming given their association with malnutrition and increased susceptibility to infections among children (3, 14). Given these factors, it is crucial to understand the impact of feeding practices on child health in Pakistan.

The rationale for this study stems from the imperative to assess and elucidate the health impacts of breastfeeding versus bottle feeding in the Pakistani context. Exploring these aspects is vital for developing targeted interventions that can enhance maternal knowledge and influence feeding practices, thereby promoting better health outcomes among children in the region (13, 12). The findings of this study could significantly inform policy recommendations and healthcare strategies to improve child nutrition and health in Pakistan.

Methodology

This cross-sectional analytical study evaluated the association between infant feeding practices and health and developmental outcomes in young children. The study was carried out in the pediatric unit of Sir Ganga Ram Hospital, Lahore, a major tertiary care teaching hospital affiliated with



Fatima Jinnah Medical University. Data collection was completed over six months from March 2025 to August 2025.

The study population comprised infants and young children aged 18 to 36 months who attended the pediatric unit during the study period. Children were eligible for inclusion if they were born at full term (≥ 37 weeks of gestation) and had a documented history of exclusive breastfeeding, partial feeding, or bottle feeding during the first six months of life. Mothers or primary caregivers were required to be willing to provide informed consent and accurate information regarding feeding practices, illness history, and developmental milestones. Children with congenital anomalies such as cleft lip or palate, congenital heart disease, Down syndrome, or other major structural or genetic disorders were excluded. Preterm infants and children whose caregivers declined participation were also excluded.

The sample size was calculated using Cochran's formula for cross-sectional studies, assuming a 95% confidence level, an expected prevalence of 48.4%, and a margin of error of 5%. Based on this calculation, a minimum sample size of 384 children was required and achieved. A convenience sampling technique was employed, whereby all eligible children presenting to the pediatric unit during the study period were consecutively enrolled until the required sample size was reached.

Data were collected using a structured and pre-tested questionnaire administered to mothers or primary caregivers. The questionnaire captured information on sociodemographic characteristics, infant feeding practices during the first six months of life, and the occurrence of common childhood illnesses, including pneumonia, diarrhea, vomiting, fever, rashes, jaundice, seizures, cold, and ear infections. Feeding practices were operationally categorized into exclusive breastfeeding, partial feeding, and bottle feeding based on caregiver reports. To minimize misunderstanding, the questionnaire was explained in simple language, and assistance was provided to caregivers with limited literacy.

Developmental outcomes were assessed across cognitive, gross motor, and fine motor domains using standardized developmental assessment tools, including relevant components of the Bayley Scales of Infant Development and a Developmental Milestone Table appropriate for the study age group. Cognitive development was evaluated using age-appropriate items that assessed learning, memory, and problem-solving abilities. Gross motor development was assessed by milestones involving large-muscle activities such as sitting, standing, walking, and balance. In contrast, fine motor development focused on hand-eye coordination and precision tasks involving small-muscle groups. Developmental scores were categorized as below average, average, or above average based on established scoring criteria. In addition, overall child development was subjectively rated by parents or caregivers using structured items reflecting daily functional performance and developmental progress.

The questionnaire and assessment tools underwent expert review by pediatric and nursing faculty to establish content and face validity. A pilot study was conducted on a small subset of participants to ensure clarity, relevance, and feasibility of the instruments. Reliability testing demonstrated acceptable internal consistency, with Cronbach's alpha values exceeding 0.70 across the tool's major sections. Data collection procedures were standardized to reduce interviewer bias and enhance reliability.

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics, including frequencies and percentages, were used to summarize sociodemographic variables, feeding practices, illness patterns, and developmental outcomes. Inferential analysis was performed using the chi-square test to examine

associations between feeding practices and categorical outcome variables. A p-value of less than 0.05 was considered statistically significant.

Ethical approval for the study was obtained from the Ethical Review Committee of Fatima Jinnah Medical University, Lahore. The hospital administration of Sir Ganga Ram Hospital granted permission to conduct the study. Written informed consent was obtained from all participating mothers or caregivers before data collection.

Results

A total of 384 children aged 18–36 months were included in the analysis. The largest proportion of children was aged 2 years (40.4%), followed by 3 years (32.6%), 2.5 years (21.2%), and 1.5 years (5.7%). Female children constituted the majority of the sample (75.4%), while males accounted for 24.6%. Regarding maternal education, most mothers were either illiterate (37.3%) or had primary education (38.6%), whereas smaller proportions had secondary (7.3%), intermediate (7.0%), or bachelor-level education (9.8%) (Table 1).

Three feeding patterns were identified. Partial feeding was the most common practice (43.5%), followed closely by exclusive breastfeeding (43.0%). Bottle feeding was reported in 13.5% of children (Table 2).

A significant association was observed between feeding type and several childhood illnesses. Bottle-fed children exhibited markedly higher proportions of pneumonia (69.4%), diarrhea (59.5%), vomiting (67.5%), and seizures (67.2%), with all associations being statistically significant ($p < 0.001$). In contrast, no statistically significant associations were observed for cold, ear infection, fever, rashes, or jaundice ($p > 0.05$). Overall, bottle feeding was consistently associated with a higher burden of infectious and neurological illnesses compared to exclusive and partial breastfeeding (Table 3).

Cognitive development differed significantly across feeding groups ($p < 0.001$). Among exclusively breastfed children, 87.9% demonstrated above-average cognitive performance, and none fell below average. In the partial feeding group, 40.4% scored above average, 48.1% average, and 11.5% below average. Bottle-fed children showed comparatively poorer outcomes, with 47.9% above average, 41.3% average, and 10.8% below average (Table 4).

Gross motor development was strongly associated with feeding practices ($p < 0.001$). The majority of breastfed children (87.9%) achieved above-average gross motor scores, with virtually no below-average performance. Partial-fed children demonstrated predominantly average performance (53.8%), while bottle-fed children showed lower proportions of above-average performance (46.7%) and higher rates of below-average scores (7.2%) (Table 5).

Fine motor outcomes followed a similar pattern ($p < 0.001$). None of the breastfed children exhibited below-average fine motor development, and 87.9% scored above average. In contrast, partial-fed children showed 13.5% below-average scores, while bottle-fed children demonstrated 7.2% below-average fine motor performance (Table 6).

Parental or caregiver ratings were consistent with objective developmental assessments. A large majority of breastfed children were rated as having above-average development (87.9%), compared with 30.8% in the partial feeding group and 44.3% in the bottle-feeding group. Below-average ratings were most common among partially fed children (23.1%), followed by bottle-fed children (12.0%). The association between feeding type and caregiver rating was statistically significant ($p < 0.001$) (Table 7).

Table 1. Sociodemographic Characteristics of Children and Mothers (N = 384)

Variable	Frequency	Percentage
Child Age		
1.5 years	22	5.7
2 years	156	40.4
2.5 years	82	21.2

3 years	126	32.6
Child Gender		
Male	95	24.6
Female	291	75.4
Maternal Education		
Illiterate	144	37.3
Primary	149	38.6
Secondary	28	7.3
Intermediate	27	7.0
Bachelor	38	9.8

Table 2. Distribution of Feeding Practices

Feeding Practice	Frequency	Percentage
Exclusive breastfeeding	165	43.0
Partial feeding	167	43.5
Bottle feeding	52	13.5

Table 3. Association between Feeding Type and Childhood Illnesses

Illness	Breastfeeding	Partial Feeding	Bottle Feeding	p-value
Cold	138 (43.0%)	47 (14.6%)	136 (42.4%)	0.314
Pneumonia	11 (5.9%)	46 (24.7%)	129 (69.4%)	<0.001
Diarrhea	43 (19.4%)	47 (21.1%)	132 (59.5%)	<0.001
Ear infection	157 (44.0%)	49 (13.7%)	151 (42.3%)	0.224
Fever	143 (41.9%)	50 (14.7%)	148 (43.4%)	0.166
Seizures	16 (8.1%)	49 (24.7%)	133 (67.2%)	<0.001
Vomiting	13 (6.7%)	50 (25.8%)	131 (67.5%)	<0.001
Rashes	155 (42.7%)	51 (14.0%)	157 (43.3%)	0.481
Jaundice	16 (44.4%)	6 (16.7%)	14 (38.9%)	0.779

Table 4. Cognitive Development Outcomes by Feeding Type

Feeding Type	Below Average	Average	Above Average	p-value
Breastfeeding	0 (0.0%)	20 (12.1%)	145 (87.9%)	<0.001
Partial feeding	6 (11.5%)	25 (48.1%)	21 (40.4%)	<0.001
Bottle feeding	18 (10.8%)	69 (41.3%)	80 (47.9%)	<0.001

Table 5. Gross Motor Development Outcomes by Feeding Type

Feeding Type	Below Average	Average	Above Average	p-value
Breastfeeding	1 (0.0%)	19 (11.5%)	145 (87.9%)	<0.001
Partial feeding	4 (7.7%)	28 (53.8%)	20 (38.5%)	<0.001
Bottle feeding	12 (7.2%)	77 (46.1%)	78 (46.7%)	<0.001

Table 6. Fine Motor Development Outcomes by Feeding Type

Feeding Type	Below Average	Average	Above Average	p-value
Breastfeeding	0 (0.0%)	20 (12.1%)	145 (87.9%)	<0.001
Partial feeding	7 (13.5%)	25 (48.1%)	20 (38.5%)	<0.001
Bottle feeding	12 (7.2%)	79 (47.3%)	76 (45.5%)	<0.001

Table 7. Parental or Caregiver Rating of Child Development

Feeding Type	Below Average	Average	Above Average	p-value
Breastfeeding	1 (0.6%)	19 (11.5%)	145 (87.9%)	<0.001
Partial feeding	12 (23.1%)	24 (46.2%)	16 (30.8%)	<0.001
Bottle feeding	20 (12.0%)	73 (43.7%)	74 (44.3%)	<0.001

Discussion

The discussion section of this study evaluates the implications of feeding practices for child health, drawing comparisons with the existing literature from the last five years. Our analysis is grounded in a dataset in which feeding type variations correlate with significant health and

developmental outcomes among 384 children, highlighting stark differences among exclusive breastfeeding, partial feeding, and bottle-feeding practices.

Starting with the association between feeding types and illness rates, our findings show that bottle-fed children had notably higher incidence rates of infections such as pneumonia, diarrhea, vomiting, and seizures

compared to those exclusively breastfed. This aligns with research by Meng et al. (15) which shows that breastfeeding is linked to lower rates of respiratory infections and gastrointestinal diseases in young children due to its immunological properties. Their study highlights that breast milk provides essential fatty acids crucial for child immunity, corroborating our assertion that exclusive breastfeeding significantly reduces viral and bacterial infections. In contrast, children who received mixed or bottle feeding faced increased morbidity, attributed to the absence of maternal antibodies found in breast milk (16).

Our results also underscore the differences in cognitive and motor development noted across feeding practices. We observed that a significant proportion of exclusively breastfed children demonstrated above-average cognitive performance. This finding is consistent with a meta-analysis by Talbert et al. (17). Which concluded that exclusive breastfeeding positively influences cognitive outcomes and supports better developmental trajectories in early childhood. Furthermore, extensive evidence suggests that the nutrients in breast milk, including essential fatty acids and growth factors, play a crucial role in brain development, significantly benefiting cognitive and motor skills in infants (18). Children in the partial feeding category had diverse outcomes, with only a portion scoring above average in mental performance, indicating a potential gap that aligns with findings from Prosper et al. (19). Who noted that mixed feeding can compromise overall developmental outcomes.

The disparity between feeding types extends to motor development as well. In our assessment, gross and fine motor skills exhibited clear advantages for exclusively breastfed children, with negligible below-average performances. This finding is supported in the literature by Keir et al. 18, who suggested that the physical growth trajectory related to breastfeeding is often superior to that of bottle-fed infants, attributed to the inherent nutritional composition of breast milk, which supports optimal motor function development.

In terms of subjective developmental assessments, parental ratings were consistent with those obtained through standard testing procedures, indicating a higher perceived developmental capacity among breastfed children. The substantial difference in perceptions correlates with findings from Okwen et al. (20). Who emphasized the role of caregiver education in influencing perceptions regarding child health. Their findings argue for the necessity of enhancing maternal education around breastfeeding to improve both perceptions and actual health outcomes among children.

In summary, our findings resonate with recent global studies that consistently document the critical role of exclusive breastfeeding as a cornerstone for reducing childhood morbidity and fostering cognitive and motor development—evidence presented by Lande et al. Lande et al (21). Confirms that, despite known advantages, exclusive breastfeeding rates remain low in various regions, underscoring the urgent need for public health strategies to promote breastfeeding.

In the context of Pakistan, where socioeconomic and cultural factors influence dietary practices, our results indicate a pressing need for targeted interventions that promote exclusive breastfeeding and educate mothers on its benefits. By reducing reliance on bottle feeding through informed practices and community support, health outcomes for children can be significantly improved, reflecting a necessary alignment with international health standards set forth by the WHO (16). Community outreach, maternal education, and supportive healthcare policies will be vital to address the existing disparities in feeding practices and resultant health outcomes among Pakistani children.

Conclusion

This study demonstrates a strong and consistent association between infant feeding practices and childhood health and developmental outcomes. Exclusive breastfeeding was associated with markedly lower rates of serious childhood illnesses and superior cognitive, gross motor, and fine motor development. At the same time, bottle feeding was linked to increased morbidity and developmental delays. The findings reinforce

the critical role of exclusive breastfeeding during early infancy and highlight the urgent need for targeted public health interventions, maternal education, and breastfeeding support programs to reduce preventable childhood illnesses and optimize child development in Pakistan.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-MMNCS-0331d-24)

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

HR

Manuscript drafting, Study Design,

FP

Review of Literature, Data entry, Data analysis, and drafting article.

SP

Conception of Study, Development of Research Methodology Design,

AR

Study Design, manuscript review, critical input.

KM (Principal)

Manuscript drafting, Study Design,

KS (Assistant Nursing Instructor)

Review of Literature, Data entry, Data analysis, and drafting article.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

References

1. Brockway M. The role of antibiotic exposure and the effects of breastmilk and human milk feeding on the developing infant gut microbiome. *Frontiers in Public Health* 2024;12. <https://doi.org/10.3389/fpubh.2024.1408246>
2. Getachew D., Getachew E., Yirsaw A., Ayele H., Andargie G., Lakew A.et al.. Prevalence of bottle-feeding practice and associated factors among mothers of children under five in the world, 2024: systematic review and meta-analysis. *Reproductive Female and Child Health* 2024;3(4). <https://doi.org/10.1002/rfc2.70002>
3. Mughis W., Ahmed S., Umrani F., Jakhro S., Qureshi K., Mangrio A.et al.. Association of feeding practices with growth in infants: a longitudinal observational study in a rural district of pakistan. 2024. <https://doi.org/10.21203/rs.3.rs-4805767/v1>
4. Yousaf M., Aslam T., Saeed S., Sarfraz A., Sarfraz Z., & Chérrez-Ojeda I. Individual, family, and socioeconomic contributors to dental caries in children from low- and middle-income countries. *International Journal of Environmental Research and Public Health* 2022;19(12):7114. <https://doi.org/10.3390/ijerph19127114>
5. Malviya N... Evaluation and correlation of mothers' feeding practices in the rural population of the Vidarbha region with the presence of early childhood caries in their children. *Dmims Journal of Dental Research* 2021;5(1):15-20. <https://doi.org/10.54054/jodr.2021514>
6. Mavuta C., Mutombo A., Lubala T., Mukuku O., Nyenga A., Shongo M.et al.. Impact of feeding practices on nutritional status of

infants aged 12 to 23 months in Lubumbashi, DRC: a community-based cross-sectional study. *Theory and Clinical Practice in Pediatrics* 2022;4(1):106-113. <https://doi.org/10.25082/tcpp.2022.01.002>

7. Amer F., Rizvi D., Sadiq M., Aldhafaeri R., Alanazi Z., Alenzi T., et al.. Knowledge about the negative effects of bottle feeding on babies' dental tissues amongst mothers. *PJMHS* 2022;16(12):238-241. <https://doi.org/10.53350/pjmhs20221612238>

8. Ventura A., García K., Meza M., Rodríguez E., Martínez C., & Whaley S. Promoting responsive bottle-feeding within WIC: evaluation of a policy, systems, and environmental change approach. *Journal of the Academy of Nutrition and Dietetics* 2022;122(1):99-109.e2. <https://doi.org/10.1016/j.jand.2021.05.003>

9. Hoteit M., Ibrahim C., Saadeh D., Al-Jaafari M., Atwi M., Alasmari S. et al.. Correlates of sub-optimal feeding practices among under-5 children amid escalating crises in Lebanon: a national representative cross-sectional study. *Children* 2022;9(6):817. <https://doi.org/10.3390/children9060817>

10. Hina A., Riaz M., Athar T., Hina S., Sehar K., & Majeed M. Breastfeeding practices and knowledge in a semi-urban area of Pakistan. *Annals of Abbasi Shaheed Hospital and Karachi Medical & Dental College* 2022;27(4):152-158. <https://doi.org/10.58397/ashkmdc.v27i4.582>

11. Khalid A., Aman S., Jhatial I., Talreja W., Hussain W., & Wadho S. Factors affecting non-compliance with exclusive breastfeeding among mothers: a survey at the district hospital, Dadu. *PJMHS* 2022;16(11):761-763. <https://doi.org/10.53350/pjmhs20221611761>

12. Arif S., Khan H., Aslam M., & Farooq M. Factors influencing exclusive breastfeeding duration in Pakistan: a population-based cross-sectional study. *BMC Public Health* 2021;21(1). <https://doi.org/10.1186/s12889-021-12075-y>

13. Lal S., Mangi Z., Shaikh A., Sangi R., Kumar S., & Larik S. Assessing feeding practices and bottle-feeding trends: a holistic analysis of infant and child nutrition in the pediatric department of CMCH Larkana. *JHRR* 2024;4(2):370-375. <https://doi.org/10.61919/jhrr.v4i2.845>

14. Hossain S. and Miharshahi S. Effect of exclusive breastfeeding and other infant and young child feeding practices on childhood morbidity outcomes: associations for infants 0–6 months in 5 south Asian countries using demographic and health survey data. *International Breastfeeding Journal* 2024;19(1). <https://doi.org/10.1186/s13006-024-00644-x>

15. Meng Y., Yu H., Zhang M., Li H., Zhou Y., & Liu J. The effects of breastfeeding on childhood behavioral and emotional development: a prospective cohort study in China. *Nutrients* 2024;16(11):1743. <https://doi.org/10.3390/nu16111743>

16. Gómez-Acebo I., Lechosa-Muñoz C., Paz-Zulueta M., Dierssen-Sotos T., Alonso-Molero J., Llorca J. et al. Feeding in the first 6 months of life is associated with an increased risk of bronchiolitis: a cohort study in Spain. *International Breastfeeding Journal* 2021;16(1). <https://doi.org/10.1186/s13006-021-00422-z>

17. Talbert A., Jones C., Matata C., Berkley J., & Mwangome M. Exclusive breastfeeding in first-time mothers in rural Kenya: a longitudinal observational study of feeding patterns in the first six months of life. *International Breastfeeding Journal* 2020;15(1). <https://doi.org/10.1186/s13006-020-00260-5>

18. Keir A., Rumbold A., Collins C., McPhee A., Varghese J., Morris S. et al.. Breastfeeding outcomes in late preterm infants: a multi-centre prospective cohort study. 2022. <https://doi.org/10.1101/2022.06.23.22275849>

19. Prosper A., Soronikpoho S., Bléou T., Kouadio K., Séraphin K., Akj M., et al Knowledge of breastfeeding practices for infants from 0 to 6 months in the commune of Yopougon (Abidjan, Côte d'Ivoire). *International Journal of Biosciences (IJB)* 2022. <https://doi.org/10.12692/ijb/21.4.11-17>

20. Okwen G., Karimuribo E., Ngowi H., & Fombang E. Exclusive breastfeeding and its determinants in Yaoundé, Cameroon: a retrospective

survival analysis. *Journal of Pregnancy* 2022;2022:1-8. <https://doi.org/10.1155/2022/8396586>

21. Lande M., Nedberg I., & Anda E. Factors associated with exclusive breastfeeding at hospital discharge: a study using data from the Georgian birth registry. *International Breastfeeding Journal* 2020;15(1). <https://doi.org/10.1186/s13006-020-00286-9>.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, <http://creativecommons.org/licenses/by/4.0/>. © The Author(s) 2025