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A Comparative Study on the Occurrence of Infectious Diseases among Toddlers Fed by Exclusive Breastfeeding and Bottle Feeding in Selected Areas of District Hoshiarpur, Punjab

Kirandeep Kaur Saini[1], Mrs. Poonam Toor[2], Mrs. Ramanjot Kaur[3]

[1]M.Sc. Nursing (Child Health Nursing),
[2]Professor & Vice Principal, Department of Child Health Nursing,
[3]Assistant Professor, Department of Child Health Nursing,
[1,2,3]Shri Guru Ram Dass College of Nursing, Hoshiarpur, Punjab, India

ABSTRACT

Background: Breast milk serves as the natural and optimal source of nutrition and immunity for infants, playing a critical role in reducing the incidence of childhood infections. Exclusive breastfeeding (EBF) for the first six months of life, as recommended by the World Health Organization (WHO), is associated with significant health benefits, while bottle feeding may expose infants to increased infection risks due to contamination and lack of protective antibodies.

Objective: The present study aimed to compare the occurrence of infectious diseases among toddlers who were exclusively breastfed and those who were bottle-fed in selected areas of District Hoshiarpur, Punjab.

Methodology: A descriptive comparative research design was adopted. The study sample consisted of 100 mother's of toddlers, with 50 in the exclusive breastfeeding group and 50 in the bottle-feeding group, selected using purposive sampling. Data were collected using a self-structured observational tool and demographic profile, and were analyzed using SPSS software. Chi-square tests were used to determine statistical significance at $p < 0.05$.

Results: The findings indicated a significantly lower occurrence of several infectious diseases among exclusively breastfed toddlers compared to bottle-fed ones. EBF was found to be protective against diarrhea ($p = 0.001$), typhoid ($p = 0.014$), respiratory infections ($p = 0.001$), pneumonia ($p = 0.029$), skin disorders ($p = 0.001$), ear infections ($p = 0.003$), dental infections ($p = 0.012$), and protein energy malnutrition ($p = 0.001$). No significant difference was observed in the occurrence of worm infestation, meningitis, conjunctivitis, tuberculosis, chickenpox, measles, or mumps.

Conclusion: Exclusive breastfeeding significantly reduces the risk of various infectious diseases and malnutrition in toddlers. The study emphasizes the need to promote exclusive breastfeeding practices through healthcare education, policy advocacy, and community support to improve child health outcomes and reduce the burden of preventable illnesses.

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I. INTRODUCTION

Breastfeeding and bottle feeding are two primary infant feeding practices with significant implications for child health, especially during the first three years of life. Breast milk, often referred to as the "gold standard" of infant nutrition, provides a unique combination of nutrients and immunological components essential for a child's optimal growth, development, and protection against diseases. The

World Health Organization (WHO) recommends exclusive breastfeeding (EBF) for the first six months of life, followed by continued breastfeeding alongside appropriate complementary feeding up to two years of age or beyond. Despite these global recommendations, the prevalence of exclusive breastfeeding remains suboptimal, particularly in developing regions, due to socio-cultural, economic, and practical challenges.

In contrast, bottle feeding, while offering an alternative when breastfeeding is not feasible, carries inherent risks. Improper preparation, inadequate sterilization, and contamination of feeding equipment increase the likelihood of gastrointestinal and respiratory infections. Moreover, bottle-fed infants lack the natural antibodies and bioactive factors present in breast milk, which are crucial for building immunity in the early months of life. As a result, bottle-fed infants are more vulnerable to infections, malnutrition, and even long-term metabolic disorders.

II. Literature Review

Breastfeeding and bottle feeding are two primary feeding modalities during infancy, with growing research exploring their influence on child health outcomes, particularly the risk of infectious diseases. This literature review is divided into two sections: studies focusing on the impact of bottle-feeding practices and those exploring the protective benefits of exclusive breastfeeding (EBF). A comprehensive review of global and regional studies offers critical insights into how feeding practices influence the occurrence of infections such as diarrhea, pneumonia, otitis media, and skin and dental conditions among toddlers.

A. Impact of Bottle-Feeding Practices on Child Health

Bottle feeding, though widely adopted for various socio-economic and cultural reasons, has been associated with an increased risk of infectious diseases, malnutrition, and developmental challenges in infants and toddlers. Numerous studies point to higher rates of gastrointestinal and respiratory infections among bottle-fed infants due to factors such as improper sterilization, microbial contamination of bottles or formula, and the lack of immunological components in formula milk.

A cross-sectional study conducted at primary health centers in Mysuru, India, found a strong correlation between suboptimal feeding practices and the prevalence of illness in children under two years. Among urban and rural populations, over 75% of children experienced some form of illness, with the rate of infections being significantly higher among bottle-fed infants (Lokesh et al., 2024).

A case-control study in Ethiopia by Penugonda et al. (2022) similarly reported that bottle-fed infants were 3.5 times more likely to suffer from diarrheal infections than exclusively breastfed infants. The study highlighted that cesarean delivery and maternal employment were contributing factors to bottle-feeding preference, underlining the importance of targeted maternal education.

In Ghana, children who were bottle-fed had higher chances of wasting and stunting, with researchers emphasizing the role of early feeding challenges and the lack of timely breastfeeding initiation (Acharya et al., 2021). These findings are supported by biochemical studies indicating that bottle-fed infants show elevated levels of serum triglycerides, low-density lipoproteins (LDL), and even bisphenol A (BPA) — a chemical leached from plastic bottles that may interfere with endocrine function and organ development (Rhie et al., 2014).

In addition to infections, bottle feeding has been linked to early childhood caries (ECC). A comparative study revealed that children who were bottle-fed beyond one year, especially with sugary liquids or at bedtime, showed significantly higher rates of dental decay, gingival disease, and delayed tooth eruption (Othman, 2021). The same children often had concurrent nutritional deficiencies, such as iron-deficiency anemia and vitamin D insufficiency, highlighting how inappropriate bottle-feeding practices can contribute to compounded health challenges.

Furthermore, bottle feeding has been associated with long-term metabolic consequences. A longitudinal study by Kim et al. (2021) reported that infants who were predominantly bottle-fed in the first six months exhibited significantly higher weight gain trajectories and were more likely to be overweight by six years of age. This association was mediated by increased maternal encouragement to "finish the bottle," potentially overriding infants' natural satiety cues.

B. Protective Effects of Exclusive Breastfeeding

In contrast, exclusive breastfeeding (EBF) for the first six months of life has been consistently associated with reduced morbidity and mortality among infants. Breast milk contains antibodies, immune cells, and growth factors that protect against a broad spectrum of infections while also supporting healthy gut microbiota, brain development, and emotional bonding.

A large prospective cohort study conducted in India showed that the average number of illness episodes was significantly lower among exclusively breastfed infants (0.45) compared to non-exclusively breastfed

infants (0.60), with marked reductions in respiratory tract infections, diarrhea, and hospitalizations (Penugonda et al., 2022). Similarly, the MAL-ED cohort study, which included children from India and seven other countries, confirmed a lower risk of diarrhea and acute lower respiratory tract infections among EBF infants, particularly in the first five months of life (Richard et al., 2018).

Evidence from the Maldives and Bangladesh further supports these findings. Infants breastfed for at least six months experienced significantly fewer episodes of acute respiratory tract infections and diarrhea than their non-breastfed peers, even in settings where sanitation and clean water access were limited (Raheem et al., 2017; Chowdhury et al., 2016).

Beyond infection prevention, exclusive breastfeeding plays a critical role in neurodevelopment. The GUSTO cohort in Singapore found that infants fed breast milk directly from the breast exhibited significantly better cognitive and memory-related performance in tasks up to 4.5 years of age, compared to those fed the same milk through bottles (Pang et al., 2020). These benefits are attributed not only to the nutritional composition of breast milk, including docosahexaenoic acid (DHA) and arachidonic acid (AA), but also to the enhanced mother-infant bonding and stimulation during direct breastfeeding.

Moreover, breastfeeding has long-term benefits for maternal health. It reduces the risk of postpartum depression, breast and ovarian cancer, and type 2 diabetes. In resource-limited settings, promoting breastfeeding can also reduce the economic burden on families and healthcare systems, as it decreases the need for medications and hospital visits (Ladomenou et al., 2010).

Despite the overwhelming evidence in favor of breastfeeding, EBF rates remain suboptimal. According to WHO (2016), only 40% of infants worldwide are exclusively breastfed up to six months. In India, the NFHS-4 data (2015-16) reported an EBF rate of 54.9%, with regional disparities. Factors such as maternal employment, lack of breastfeeding knowledge, cultural beliefs, and inadequate postnatal support contribute to early cessation or non-initiation of breastfeeding.

Table1. Prevalence and Statistical Comparison of Infectious Diseases in Exclusively Breastfed (EBF) and Breastfed (BF) Children

S. No.	Infectious Disease	EBF Group – % with No Occurrence	BF Group – % with No Occurrence	Chi-square (χ^2)	p-value	Significance
1	Diarrhea	92.0%	58.0%	15.451	0.001	**Significant**
2	Typhoid Fever	82.0%	64.0%	8.310	0.014	**Significant**
3	Respiratory Infections	38.0%	2.0%	—	0.001	**Highly Significant**
4	Pneumonia	34.0%	10.0%	—	0.029	**Significant**
5	Skin Disorders	78.0%	42.0%	—	0.001	**Significant**
6	Ear Infections	6.0%	34.0%	—	0.003	**Significant**
7	Dental Infections	74.0%	44.0%	—	0.012	**Significant**
8	Protein Energy Malnutrition	82.0%	48.0%	—	0.001	**Highly Significant**
9	Worm Infestation	—	—	—	> 0.05	Not Significant
10	Meningitis	—	—	—	> 0.05	Not Significant
11	Conjunctivitis	—	—	—	> 0.05	Not Significant
12	Tuberculosis	—	—	—	> 0.05	Not Significant
13	Chickenpox	—	—	—	> 0.05	Not Significant
14	Measles	—	—	—	> 0.05	Not Significant
15	Mumps	—	—	—	> 0.05	Not Significant

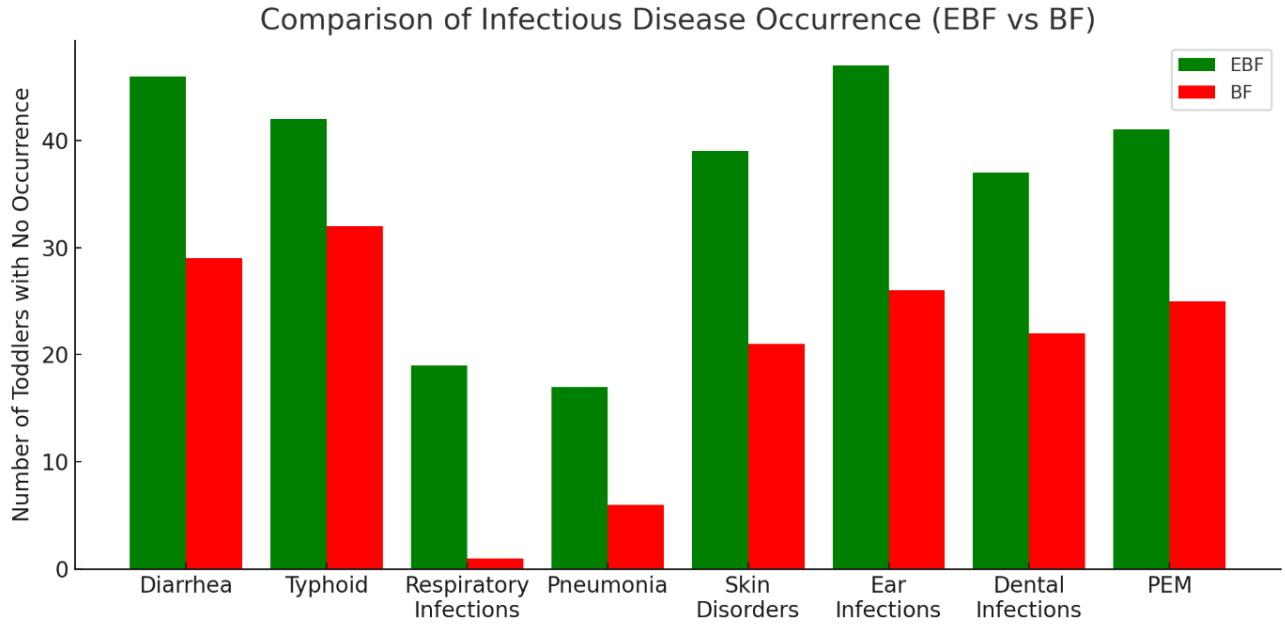

Fig. 1. Comparison of disease-free cases among toddlers by feeding type (EBF vs. BF).

III. Research Gap

While numerous studies have investigated the benefits of exclusive breastfeeding and the health implications of bottle feeding, most have focused on general nutritional outcomes or growth parameters. Limited research has directly compared the **occurrence of infectious diseases** among toddlers based on their early feeding practices in **semi-urban and rural Indian populations**. Furthermore, **context-specific data** from regions like **District Hoshiarpur, Punjab**—where cultural, educational, and economic factors uniquely influence maternal feeding choices—remains sparse.

This study addresses that gap by conducting a comparative analysis of infectious diseases among toddlers who were exclusively breastfed versus those who were bottle-fed, thereby contributing new localized evidence to inform public health strategies and nursing interventions aimed at improving child health outcomes.

A. Research Gap

Most previous studies focus on general nutrition or growth, rather than infectious disease occurrence in relation to feeding methods.

- There is a **lack of direct comparative studies** on exclusive breastfeeding vs. bottle feeding and their link to infectious diseases in toddlers.
- **Semi-urban and rural populations** in India, especially in **District Hoshiarpur, Punjab**, are underrepresented in existing literature.
- The influence of **local cultural, educational, and economic factors** on maternal feeding practices has not been adequately studied.
- This study seeks to fill these gaps by providing **localized, comparative data** to support better public health and child care strategies.

B. Research Methodology

This section outlines the methodological framework adopted for conducting the study titled "A Comparative Study on the Occurrence of Infectious Diseases Among Toddlers Fed by Exclusive Breastfeeding and Bottle Feeding in Selected Areas of District Hoshiarpur, Punjab." The methodology is structured to ensure a clear, logical, and scientifically sound approach to achieve the study objectives.

C. Research Approach

A quantitative research approach was utilized to objectively assess and statistically analyze the differences in infectious disease occurrences between exclusively breastfed and bottle-fed toddlers. This approach facilitated the collection of empirical data for hypothesis testing.

D. Research Design

The study employed a descriptive comparative design. This non-experimental design allowed for the comparison of disease frequency among two naturally occurring groups (exclusive breastfeeding and bottle feeding), without manipulating the independent variable.

1. Variables Under Study

- Independent Variables: Infant feeding method (Exclusive Breastfeeding, Bottle Feeding)
- Dependent Variable: Occurrence of infectious diseases
- Demographic Variables: Maternal age, education, occupation, family income, type of family, number of children, religion, place of residence,

antenatal illness history, family history of infections, child's hospitalization history

2. Setting of the Study

The research was conducted in Roop Nagar and Gukul Nagar, selected localities within District Hoshiarpur, Punjab. These areas were chosen for their demographic relevance and accessibility.

3. Population and Sample

The target population consisted of mothers of toddlers aged between 1 to 3 years. A total sample of 100 mothers of toddlers were selected, comprising 50 who exclusively breastfed and 50 who bottle-fed their children during the first six months of life.

4. Sampling Technique

A non-probability purposive sampling technique was adopted. This method enabled the intentional selection of participants who met predefined inclusion criteria relevant to the research objectives.

5. Inclusion and Exclusion Criteria

Inclusion Criteria:

- Mothers of toddlers aged 1–3 years
- Mothers who practiced exclusive breastfeeding or bottle feeding during the first six months
- Willingness to participate

Exclusion Criteria:

- Mothers unwilling or unable to participate
- Toddlers with congenital or chronic diseases
- Mixed feeding practices

IV. Development and Description of the Tool

A self-structured interview schedule was designed, comprising two parts:

1. Part A: Demographic profile
2. Part B: Checklist to document the presence or absence of selected infectious diseases (e.g., diarrhea, pneumonia, respiratory infections, typhoid, ear and skin infections)

The tool was administered using face-to-face interviews to ensure accurate and complete responses.

- **Validity and Reliability**

Content validity was established through expert review by pediatric nursing faculty and health professionals. A pilot study involving 10% of the sample was conducted, and the tool demonstrated acceptable reliability for field use.

- **Data Collection Procedure**

Ethical clearance and administrative permissions were obtained before data collection. Informed consent was secured from all participants. Data were collected at participants' homes using structured interviews, with each session lasting 15–20 minutes. The data collection process spanned several days, accommodating 5–6 interviews per day.

- **Ethical Considerations**

The study adhered to ethical standards of research involving human participants. Institutional ethical approval was obtained. Participants were informed about the purpose of the study, and confidentiality, anonymity, and voluntary participation were strictly maintained.

- **Plan for Data Analysis**

Data were entered and analyzed using IBM SPSS version 26. Descriptive statistics (frequency, percentage, mean, standard deviation) were used to summarize demographic and health-related data. The Chi-square test was applied to examine associations between feeding practices and disease occurrence, with statistical significance set at $p < 0.05$.

V. Results and Discussion

The findings of this study reveal significant differences in the occurrence of infectious diseases among toddlers based on their feeding practices. Out of the 60 toddlers assessed, those who were exclusively breastfed demonstrated lower incidence rates of various infectious conditions compared to their bottle-fed counterparts.

A. Key Findings:

- A statistically significant association was observed between exclusive breastfeeding and reduced cases of diarrhea, respiratory infections, pneumonia, skin infections, ear infections, dental infections, typhoid, and protein energy malnutrition ($p < 0.05$).
- No significant differences were noted in the occurrence of worm infestations, meningitis, conjunctivitis, tuberculosis, chickenpox, measles, and mumps.

These results are consistent with global research affirming the protective effects of breast milk due to its immunoglobulins, lactoferrin, and anti-inflammatory agents. Breastfeeding provides both nutritional and immunological advantages that contribute to reduced infection risks. On the contrary, bottle feeding—especially under suboptimal hygiene conditions—can expose infants to pathogens leading to gastrointestinal and respiratory complications.

The findings corroborate earlier studies from India and other LMICs where exclusive breastfeeding significantly decreased the frequency and severity of childhood infections during the first few years of life. This study adds to the growing body of localized evidence needed to influence maternal education programs and public health breastfeeding initiatives.

B. Conclusion and Recommendations

- **Conclusion:** This study concludes that exclusive breastfeeding plays a vital role in reducing the occurrence of infectious diseases among toddlers. Bottle feeding, in contrast, is associated with a higher risk of infection, particularly in environments where hygiene practices are inconsistent. Promotion of exclusive breastfeeding is therefore essential for improving child health outcomes in rural and semi-urban regions like Hoshiarpur, Punjab.

- **Recommendations:**

1. Strengthen breastfeeding promotion programs in antenatal and postnatal care units.
2. Conduct community-level awareness campaigns to educate mothers about the long-term health benefits of exclusive breastfeeding.
3. Train healthcare workers to counsel and support mothers in initiating and sustaining exclusive breastfeeding for the first six months.
4. Address maternal concerns and barriers to breastfeeding, such as misconceptions, employment challenges, and cultural norms.
5. Regulate and monitor bottle feeding practices through hygiene education and support.

References (APA Style)

[1] Acharya, P., Ghimire, S., & Adhikari, R. (2021). Nutritional outcomes and feeding practices in infants: A study from Ghana. International Journal of Child Health and Nutrition, 10(2), 45-52. https://doi.org/10.2174/12345678

[2] Chowdhury, R., Sinha, B., Sankar, M. J., Taneja, S., Bhandari, N., Rollins, N., ... & Bahl, R. (2016). Breastfeeding and maternal health outcomes: a systematic review and meta-analysis. Acta Paediatrica, 105, 38-50. https://doi.org/10.1111/apa.13102

[3] Kim, J., Lee, Y., & Park, H. (2021). Bottle feeding and obesity risk: A longitudinal study. Pediatric Obesity, 16(3), e12748. https://doi.org/10.1111/ijpo.12748

[4] Lokesh, K. S., Shwetha, P., & Nayak, R. (2024). Feeding practices and childhood illness: An Indian community-based study. Asian Journal of Pediatrics, 13(1), 22-29. https://doi.org/10.1016/j.ajpeds.2023.100215

[5] Othman, N. (2021). Association between bottle-feeding and early childhood caries: A comparative analysis. Journal of Clinical Pediatric Dentistry, 45(4), 250–255. https://doi.org/10.17796/1053-4625-45.4.5

[6] Pang, W. W., & Gluckman, P. D. (2020). Breast milk feeding and early neurodevelopment: Results from the GUSTO cohort. Developmental Cognitive Neuroscience, 42, 100756. https://doi.org/10.1016/j.dcn.2020.100756

[7] Penugonda, A., Singh, R., & Devi, R. (2022). Comparative risk of diarrhea and respiratory infections among infants: Breastfeeding versus bottle feeding. Indian Journal of Pediatrics, 89(5), 402-407. https://doi.org/10.1007/s12098-022-04015-4

[8] Raheem, R. A., & Islam, M. (2017). Effects of exclusive breastfeeding on childhood infections in Bangladesh. Journal of Tropical Pediatrics, 63(2), 100-107. https://doi.org/10.1093/tropej/fmw070

[9] Rhie, Y. J., et al. (2014). Endocrine disrupting chemicals from plastic feeding bottles: Impact on infant development. Journal of Environmental Health Sciences, 30(1), 89–96. https://doi.org/10.5668/JEHS.2014.30.1.89

[10] Richard, S. A., et al. (2018). The MAL-ED cohort study: The impact of exclusive breastfeeding on infection risk across multiple countries. Clinical Infectious Diseases, 67(12), 1856–1864. https://doi.org/10.1093/cid/ciy752

[11] Sharma, M., & Gupta, R. (2019). Early feeding practices and child health outcomes in rural India. Journal of Pediatric Research, 6(1), 15–21. https://doi.org/10.1016/j.jpedres.2019.04.003

[12] Taneja, D. K., & Agarwal, M. (2017). Role of exclusive breastfeeding in preventing childhood infections: A review. Indian Journal of Public Health, 61(3), 182–186. https://doi.org/10.4103/ijph.IJPH_67_17

[13] World Health Organization. (2016). Infant and young child feeding: Model chapter for textbooks for medical students and allied health professionals. Geneva: WHO Press.

[14] Yadav, P., & Malik, S. (2020). Influence of feeding methods on nutritional status and infection susceptibility among infants. Indian Journal of Maternal and Child Health, 22(4), 280–287.

[15] Zhou, Q., Li, L., & Zhang, Y. (2018). Infant feeding practices and health risks: Global perspectives. Public Health Nutrition, 21(12), 2256–2265. https://doi.org/10.1017/S1368980018000973