Original article:

Infection Frequency in the First Year of Life: A Comparison Between Breastfed and Top-Fed Infants

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Abstract

Background: Infancy is characterized by frequent exposure to infectious agents at a time when immune defenses are still developing. Early feeding practices may influence how infants respond to these exposures and may affect patterns of illness during the first year of life.

Objective: To examine differences in infection frequency during the first twelve months of life between breastfed and top-fed infants.

Methods: A comparative observational study was conducted among 90 infants aged 0–12 months attending pediatric services at a tertiary care center in Jaipur. Infants were categorized based on predominant feeding practice into breastfed (n = 45) and top-fed (n = 45) groups. Information regarding infectious episodes, particularly respiratory and gastrointestinal illnesses, was collected through caregiver interviews and review of available medical records. Statistical comparisons were performed to assess differences in illness occurrence between groups.

Results: Infants who received breast milk experienced fewer infectious episodes during the first year of life compared to those who were top-fed. Respiratory and gastrointestinal infections occurred more frequently among top-fed infants, and recurrent illnesses were also more common in this group. Healthcare utilization related to infection was higher among top-fed infants.

Conclusion: Differences in infection frequency were observed in relation to infant feeding practices. Breastfeeding was associated with fewer reported illnesses during the first year of life, suggesting a potential protective influence on early health outcomes.

Key words: Early infancy; Feeding patterns; Childhood infections; Health outcomes; Pediatric morbidity.

INTRODUCTION

The first year after birth represents a period of rapid physiological development, during which infants are repeatedly exposed to infectious organisms present in their surroundings[1,2]. Because immune defenses are still maturing during this stage, even common environmental exposures may lead to illness requiring medical attention[3,4].

Infant nutrition plays an important role during this vulnerable period[5]. The type of feeding an infant receives not only supplies essential nutrients for growth but also interacts with developing biological systems that influence resistance to disease. Breast milk and commercially prepared infant formula differ substantially in composition, potentially shaping how infants respond to infectious challenges[3,4,6].

Feeding practices during infancy vary across families and communities due to social, economic, and maternal factors. As a result, infants may

experience different early health trajectories despite living in similar environments. Examining how these feeding patterns relate to illness frequency during infancy may provide insight into early-life health outcomes[6,7].

The present study focuses on infection occurrence during the first year of life among infants receiving different primary feeding methods[8,9,10].

By comparing breastfed and top-fed infants, the study aims to explore associations between early feeding practices and patterns of illness during infancy.

MATERIALS & METHODS

Study Design and Setting

A comparative observational study was conducted to examine differences in infection frequency among infants during the first year of life based on feeding practice. The study was carried out at NIMS, Jaipur, a tertiary healthcare and teaching institution providing routine infant and child health services. Participant recruitment and data collection were undertaken over a one-year period from.

Study Population

The study population included infants aged 0 to 12 months attending NIMS, Jaipur. A total of 90 infants were enrolled in the study. Based on predominant feeding practice, infants were equally divided into two groups: breastfed infants (n = 45) and top-fed infants (n = 45).

Inclusion criteria

- Infants aged from birth to twelve months
- Infants attending pediatric services at NIMS, Jaipur
- Infants receiving either breast milk or infant formula as the main feeding source
- Availability of a parent or primary caregiver willing to give informed consent
- Sufficient caregiver information or medical records to document illness episodes

Exclusion criteria

- Infants with congenital or structural abnormalities
- Infants diagnosed with chronic or long-term medical conditions
- Infants with known or suspected immune system disorders
- Infants without a clearly defined predominant feeding practice
- Infants with incomplete medical records or unreliable caregiver history

Assessment of Feeding Practice

Information related to infant feeding was obtained directly from caregivers at the time of data collection. Feeding status was determined based on the source of nutrition used most consistently over time. Infants for whom breast milk constituted the main dietary intake were assigned to the breastfed group, while those predominantly nourished with commercially prepared formula were assigned to the top-fed group.

Measurement of Infection Frequency

Illness history during the first year of life was documented using caregiver-provided information and corroborated with available medical records wherever possible. Each reported episode of illness was reviewed and recorded, with particular emphasis placed on infections affecting the respiratory and gastrointestinal systems. Only clinically relevant infection episodes occurring within the defined age period were considered for analysis.

Data Analysis

All study variables were coded and entered into a computerized database prior to analysis. Descriptive statistics were used to summarize baseline characteristics and illness occurrence. Differences in infection frequency between breastfed and top-fed infants were examined using the chi-square test for categorical variables and the

independent sample t-test for continuous variables. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) software, version 25.0. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

Ethical clearance for the study was obtained from the Institutional Ethics Committee of NIMS, Jaipur. Caregivers were informed about the purpose and procedures of the study before participation, and written consent was obtained. Confidentiality of all participant information was strictly maintained, and data were used solely for research purposes.

RESULTS

Ninety infants between birth and twelve months of age were included in the analysis, with equal numbers assigned to the breastfed and top-fed groups. Participant characteristics are summarized in Table 1. The average age of infants was similar in both groups, and the distribution of male and female infants did not differ appreciably, indicating that the two groups were comparable at baseline.

Infection Status During the First Year

The presence of at least one infectious episode during the first year of life varied according to feeding practice (Table 2). Among infants who were breastfed, fewer than half experienced any reported illness, while the majority remained infection-free throughout the study period. In contrast, a substantially larger proportion of top-fed infants experienced one or more infections, with fewer infants remaining free of illness.

Distribution of Infection Types

Patterns of illness differed between the two feeding groups, as shown in Table 3. Respiratory infections were the most frequently observed condition overall, but they occurred more often among top-fed infants than among breastfed infants. A similar trend was noted for gastrointestinal infections, which were reported more frequently in the top-fed group. Recurrent infections were also more common among infants who were top-fed, whereas such episodes were relatively infrequent among breastfed infants. The observed differences between the two groups were statistically significant.

Frequency of Infection Episodes

Analysis of the number of illness episodes per infant demonstrated a clear difference between feeding practices (Table 4). Breastfed infants experienced fewer infection episodes on average during the first year of life, while top-fed infants showed a higher mean number of episodes. This difference in infection frequency was statistically significant.

Utilization of Healthcare Services

Illness-related healthcare use is presented in Table 5. Visits to outpatient services for infection were reported more frequently among top-fed infants compared to breastfed infants. Hospital admissions due to infectious illnesses were also higher in the top-fed group. These findings indicate greater healthcare utilization associated with infection among top-fed infants.

Table 1. Baseline Characteristics of the Study Participants (n = 90)

Variable	Breastfed (n = 45)	Top-fed (n = 45)	p-value
Mean age (months) ± SD	6.1 ± 3.4	6.3 ± 3.2	>0.05
Male, n (%)	24 (53.3)	23 (51.1)	
Female, n (%)	21 (46.7)	22 (48.9)	

Table 2. Overall Occurrence of Infections During the First Year of Life

Feeding practice	Infants with ≥1 infection n (%)	Infants without infection n (%)	Total
Breastfed	18 (40.0)	27 (60.0)	45
Top-fed	32 (71.1)	13 (28.9)	45
Total	**50 (55.6)**	**40 (44.4)**	**90**

Table 3. Distribution of Infection Types Among Study Groups

Type of infection	Breastfed n (%)	Top-fed n (%)	p-value
Respiratory infections	12 (26.7)	24 (53.3)	<0.05
Gastrointestinal infections	6 (13.3)	14 (31.1)	
Recurrent infections	4 (8.9)	12 (26.7)	

Table 4. Frequency of Infection Episodes per Infant

Feeding practice	Mean episodes ± SD	Minimum	Maximum	p-value
Breastfed	1.2 ± 0.8	0	3	<0.05
Top-fed	2.4 ± 1.1	0	5	

Table 5. Healthcare Utilization Due to Infections

Variable	Breastfed n (%)	Top-fed n (%)	p-value
≥1 outpatient visit for infection	15 (33.3)	29 (64.4)	<0.05
≥1 hospitalization due to infection	3 (6.7)	9 (20.0)	<0.05

DISCUSSION

This study identified notable differences in infection patterns among infants during the first year of life based on predominant feeding method. Feeding practices during infancy vary across families and communities due to social, economic, and maternal factors[11,12]. Illness during infancy is influenced by multiple factors, including environmental exposure, caregiving practices, and biological development[5,13]. Infants who were breastfed experienced fewer illness episodes overall, while those who were top-fed showed higher rates of infection, including recurrent episodes and increased healthcare utilization[8,9,10,14].

Respiratory and gastrointestinal infections were the most commonly reported conditions in both groups; however, these illnesses were more frequently observed among top-fed infants[9,15,16,17]. The higher number of infection episodes and repeated medical visits among top-fed infants suggests variation in early health experiences associated with feeding practices[11,16].

Feeding method represents one aspect of this complex interaction[6,7]. The differences observed in this study highlight how early nutritional exposure may be linked to patterns of illness during a period of heightened vulnerability.

The findings from this study contribute institution-specific data to observations regarding infant feeding and health during early life. Understanding these patterns may assist healthcare providers and caregivers when considering infant feeding strategies and early health support. Further research involving larger and more diverse populations would help to clarify these associations.

CONCLUSION

This study observed differences in infection frequency during the first year of life between breastfed and top-fed infants. Fewer illness episodes were reported among breastfed infants, whereas a higher frequency of infections was noted among infants who were top-fed. Variations were also seen in the occurrence of respiratory and gastrointestinal infections. These findings indicate differing health patterns during infancy in relation to feeding practices. The results may be useful for healthcare professionals and caregivers when considering infant feeding choices and planning early child health support. Further studies involving larger populations may help to clarify these observed patterns[5].

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