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Impact of Exclusive Breastfeeding on Incidence of Childhood Infections

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Exclusive breastfeeding; Childhood infections; Respiratory tract infections; Diarrheal diseases; Hospitalization; Infant nutrition; Child health; Infection morbidity.

ABSTRACT:

Background: Exclusive breastfeeding (EBF) for the first six months of life is recommended by the World Health Organization as an effective strategy for promoting infant health and preventing infectious diseases. Breast milk provides essential nutrients and immunological protection that may reduce childhood morbidity and hospitalization. **Aim:** To assess the impact of exclusive breastfeeding on the incidence of childhood infections among children attending a tertiary care hospital. **Materials and Methods:** A hospital-based observational cross-sectional study was conducted in the Department of Paediatrics, MM Institute of Medical Sciences and Research, Mullana, Ambala, Haryana, India, over a period of 18 months. A total of 100 children aged 6 months to 5 years were enrolled. Information regarding breastfeeding practices, infection history, frequency of illness episodes, and hospitalization due to infections was collected from caregivers. Data were analyzed using appropriate statistical tests, and p-values <0.05 were considered statistically significant. **Results:** Among the study participants, 62% were exclusively breastfed and 38% were non-exclusively breastfed. Childhood infections occurred in 38.7% of exclusively breastfed children compared with 73.7% of non-exclusively breastfed children ($p=0.001$). Acute respiratory tract infections were the most common infection (46.2%), followed by diarrheal diseases (23.1%). Recurrent infections were significantly less frequent among exclusively breastfed children ($p<0.001$). Hospitalization due to infectious illnesses was observed in 9.7% of exclusively breastfed children compared with 31.6% of non-exclusively breastfed children ($p=0.006$). **Conclusion:** Exclusive breastfeeding significantly reduces the incidence, recurrence, and severity of childhood infections and lowers hospitalization rates. Promotion of exclusive breastfeeding should remain a priority public health intervention to improve child health outcomes and reduce infection-related morbidity.

INTRODUCTION:

Exclusive breastfeeding (EBF), defined by the World Health Organization (WHO) as feeding infants only breast milk for the first six months of life without any additional food or drink except prescribed medications, vitamins, or oral rehydration solutions, is widely recognized as one of the most effective interventions for promoting child

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survival and health.¹ Breast milk provides optimal nutrition tailored to the infant's developmental needs and contains a complex array of bioactive substances, including immunoglobulins, lactoferrin, lysozyme, oligosaccharides, cytokines, growth factors, and living immune cells that offer protection against infectious diseases.² Despite the proven benefits of breastfeeding, the prevalence of exclusive breastfeeding remains suboptimal in many developing and developed countries, exposing millions of children to preventable illnesses and mortality.³

Childhood infections continue to be a major public health concern globally, accounting for a substantial proportion of morbidity, hospitalization, and mortality among children under five years of age. Acute respiratory infections, diarrheal diseases, otitis media, urinary tract infections, and other communicable illnesses are among the leading causes of childhood sickness and death, particularly in low- and middle-income countries.⁴ Numerous epidemiological studies have demonstrated that infants who are exclusively breastfed experience significantly lower rates of infectious diseases compared to those who are partially breastfed or formula-fed.⁵ The protective effect of breast milk is attributed not only to passive transfer of maternal antibodies but also to its ability to promote maturation of the infant immune system and establish a healthy gut microbiome, thereby enhancing resistance to pathogens.⁶

Exclusive breastfeeding plays a critical role in preventing gastrointestinal infections by minimizing exposure to contaminated food, water, and feeding utensils. Breastfed infants exhibit lower incidences of diarrhea and dehydration-related complications, which remain important causes of hospitalization in early childhood.⁷ Similarly, breast milk contributes to respiratory health by reducing the frequency and severity of upper and lower respiratory tract infections, including pneumonia and bronchiolitis. Evidence suggests that the duration of exclusive breastfeeding is inversely related to the risk of respiratory illnesses, emphasizing the importance of maintaining exclusive breastfeeding for the recommended six-month period.⁸

Beyond infancy, the protective effects of exclusive breastfeeding may extend into later childhood. Studies have reported reduced susceptibility to recurrent infections, improved immune competence, and decreased healthcare utilization among children who were exclusively breastfed during early life.⁹ Furthermore, breastfeeding contributes to socioeconomic benefits by reducing medical expenditures and caregiver burden associated with childhood illnesses. Recognizing these advantages, international organizations such as WHO and UNICEF strongly advocate exclusive breastfeeding as a cornerstone strategy for achieving sustainable improvements in child health outcomes.¹⁰

Given the substantial burden of infectious diseases during childhood and the well-established immunological properties of breast milk, evaluating the impact of exclusive breastfeeding on the incidence of childhood infections remains highly relevant. Understanding this relationship can support evidence-based policies, strengthen breastfeeding promotion programs, and ultimately contribute to reducing childhood morbidity and improving long-term health outcomes.

The aim of this study was to evaluate the impact of exclusive breastfeeding on the incidence of childhood infections. The objectives were to determine the frequency of common infectious illnesses among children, compare infection rates between exclusively and non-exclusively breastfed children, and assess the protective role of exclusive breastfeeding against childhood morbidity.

MATERIALS AND METHODS:

Study Design: Hospital-based observational cross-sectional study.

Study Population:

- Children attending the Department of Paediatrics, MM Institute of Medical Sciences and Research, Mullana, Ambala, Haryana, India.
- Mothers/caregivers accompanying the children were interviewed regarding infant feeding practices and history of childhood infections.

Sample Size: A total of 100 children were included in the study.

Study Duration: The study was conducted over a period of 18 months (1.5 years).

Study Place: Department of Paediatrics, MM Institute of Medical Sciences and Research (MMIMSR), Mullana, Ambala, Haryana, India.

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Inclusion Criteria:

- Children aged 6 months to 5 years attending the pediatric outpatient department or admitted to the pediatric ward during the study period.
- Availability of a reliable caregiver capable of providing information regarding breastfeeding practices and infection history.
- Children whose mothers/caregivers provided written informed consent for participation.
- Children with documented or recalled feeding history during the first six months of life.

Exclusion Criteria:

- Children with congenital anomalies or genetic syndromes affecting growth, immunity, or feeding practices.
- Children diagnosed with primary or secondary immunodeficiency disorders.
- Children with chronic systemic illnesses such as congenital heart disease, chronic kidney disease, chronic liver disease, or malignancy.
- Children whose breastfeeding history could not be reliably ascertained.
- Caregivers unwilling to participate or provide informed consent.
- Incomplete clinical records or missing essential study data.

Statistical Analysis: We put the data into Microsoft Excel and then used SPSS software version 27.0 (SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5 to look at it. Mean ± standard deviation was used to show continuous variables, and frequencies and percentages were used to show categorical variables. The unpaired t-test was utilized to examine continuous variables between independent groups, whereas the paired t-test was employed for comparisons within the same group. The Chi-square test or Fisher's exact test was used to look at categorical variables, depending on which one was better. A p-value of less than 0.05 was seen to be statistically important.

RESULT

Table 1. Age-wise Distribution of Children in the Study (n = 100)

Parameters		Number of Children	Percentage (%)	P-value
Age Group (Months)	6-12	28	28%	0.021
	13-24	32	32%	
	25-36	20	20%	
	37-48	12	12%	
	49-60	8	8%	
	Total	100	100%	
Gender	Male	58	58%	0.118
	Female	42	42%	
	Total	100	100%	

Table 2. Distribution According to Breastfeeding Status (n = 100)

Feeding Pattern During First 6 Months	Number of Children	Percentage (%)	P-value
Exclusively Breastfed	62	62%	0.009
Non-Exclusively Breastfed	38	38%	
Total	100	100%	

Table 3. Incidence of Childhood Infections According to Breastfeeding Status (n = 100)

Infection Status	Exclusively Breastfed (n=62)	Non-Exclusively Breastfed (n=38)	Total	P-value
No Infection Episodes	38 (61.3%)	10 (26.3%)	48 (48.0%)	0.001
≥1 Infection Episode	24 (38.7%)	28 (73.7%)	52 (52.0%)	
Total	62 (100%)	38 (100%)	100 (100%)	

Table 4. Pattern of Childhood Infections Observed Among Study Participants (n = 52)

Type of Infection	Number of Cases	Percentage (%)	P-value
Acute Respiratory Tract Infection	24	46.20%	0.014
Diarrheal Disease	12	23.10%	
Otitis Media	6	11.50%	
Fever of Infectious Origin	7	13.50%	
Urinary Tract Infection	3	5.70%	
Total	52	100%	

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Table 5. Frequency of Infection Episodes During the Previous One Year (n = 100)

Number of Infection Episodes	Exclusively Breastfed (n=62)	Non-Exclusively Breastfed (n=38)	Total	P-value
None	38 (61.3%)	10 (26.3%)	48 (48.0%)	<0.001
1–2 Episodes	18 (29.0%)	12 (31.6%)	30 (30.0%)	
3–4 Episodes	5 (8.1%)	11 (28.9%)	16 (16.0%)	
>4 Episodes	1 (1.6%)	5 (13.2%)	6 (6.0%)	
Total	62 (100%)	38 (100%)	100 (100%)	

Table 6. Hospitalization Due to Childhood Infections According to Breastfeeding Status (n = 100)

Hospitalization for Infection	Exclusively Breastfed (n=62)	Non-Exclusively Breastfed (n=38)	Total	P-value
Yes	6 (9.7%)	12 (31.6%)	18 (18.0%)	0.006
No	56 (90.3%)	26 (68.4%)	82 (82.0%)	
Total	62 (100%)	38 (100%)	100 (100%)	

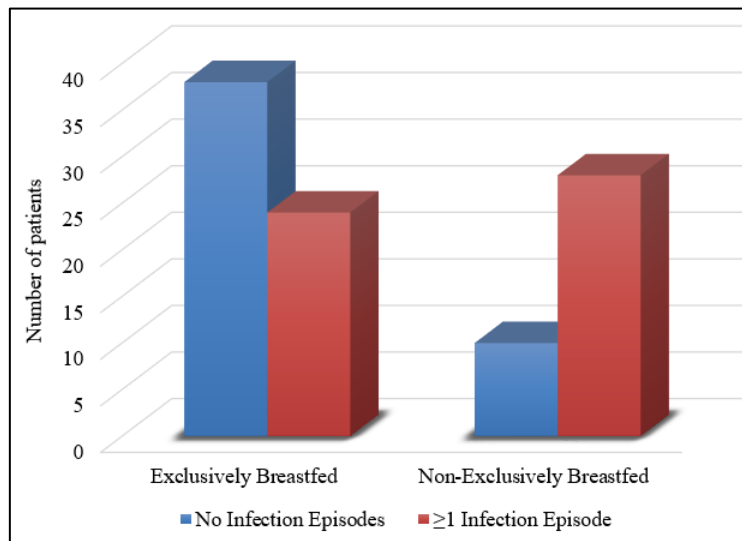


Figure: 1. Incidence of Childhood Infections According to Breastfeeding Status

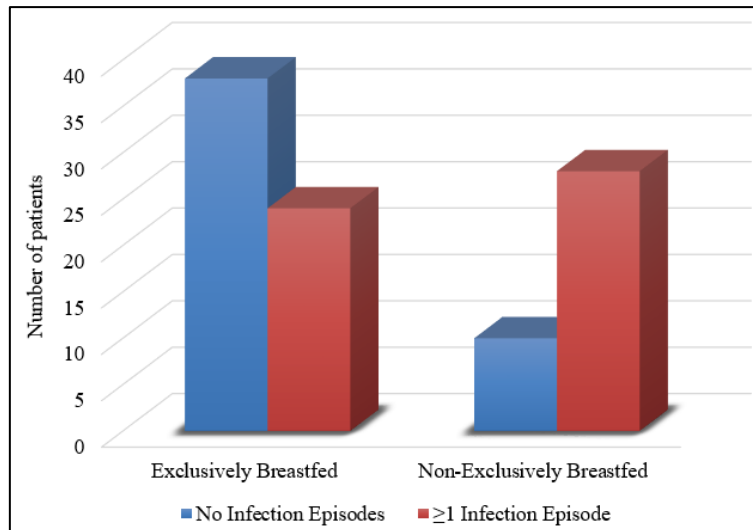
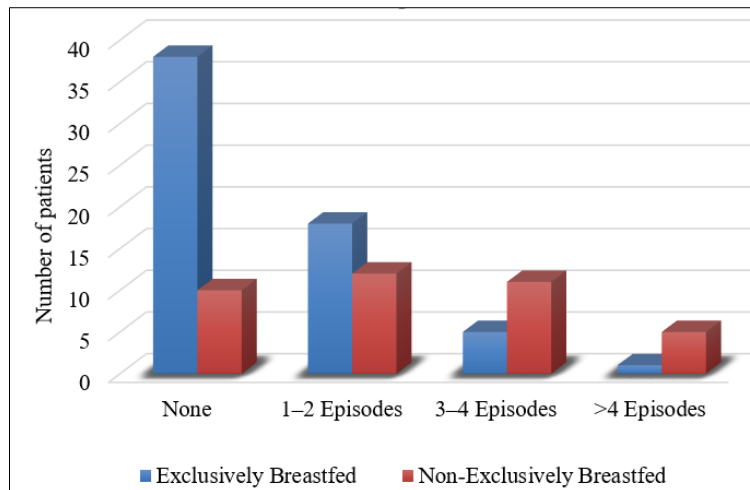


Figure: 2. Frequency of Infection Episodes During the Previous One Year

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A total of 100 children were enrolled in the study. The majority of participants belonged to the 13–24 months age group (32%), followed by 6–12 months (28%), 25–36 months (20%), 37–48 months (12%), and 49–60 months (8%). The distribution of children across age groups showed a statistically significant variation ($p = 0.021$), indicating a higher representation of younger children in the study population.

Among the 100 children included in the study, 58 (58%) were males and 42 (42%) were females, resulting in a male-to-female ratio of approximately 1.38:1. Although male children constituted a greater proportion of the study population, the difference in gender distribution was not statistically significant ($p = 0.118$).

Assessment of infant feeding practices revealed that 62 children (62%) were exclusively breastfed for the first six months of life, whereas 38 children (38%) were not exclusively breastfed. The prevalence of exclusive breastfeeding was significantly higher than non-exclusive breastfeeding within the study cohort ($p = 0.009$), indicating satisfactory breastfeeding practices among the majority of participants.

A significant association was observed between breastfeeding status and occurrence of childhood infections ($p = 0.001$). Among exclusively breastfed children, 38 (61.3%) had no infection episodes, while 24 (38.7%) experienced one or more infections. In contrast, among non-exclusively breastfed children, only 10 (26.3%) remained infection-free, whereas 28 (73.7%) suffered at least one infectious episode. These findings suggest that exclusive breastfeeding substantially reduced the incidence of childhood infections.

Among the 52 children who experienced infectious illnesses, acute respiratory tract infections (ARTIs) were the most common, accounting for 24 cases (46.2%). This was followed by diarrheal diseases in 12 cases (23.1%), fever of infectious origin in 7 cases (13.5%), otitis media in 6 cases (11.5%), and urinary tract infections in 3 cases (5.7%). The distribution of infection types was statistically significant ($p = 0.014$), with respiratory infections representing the predominant childhood illness.

The frequency of infection episodes differed significantly between the two breastfeeding groups ($p < 0.001$). Among exclusively breastfed children, 38 (61.3%) had no infections, 18 (29.0%) experienced 1–2 episodes, 5 (8.1%) had 3–4 episodes, and only 1 child (1.6%) reported more than four episodes during the previous year. Conversely, among non-exclusively breastfed children, only 10 (26.3%) remained infection-free, while 12 (31.6%) experienced 1–2 episodes, 11 (28.9%) had 3–4 episodes, and 5 (13.2%) reported more than four episodes. These findings indicate a markedly lower burden of recurrent infections among exclusively breastfed children. Hospitalization resulting from childhood infections was significantly associated with breastfeeding practices ($p = 0.006$). Among exclusively breastfed children, only 6 (9.7%) required hospitalization, whereas 56 (90.3%) did not require inpatient care. In comparison, 12 (31.6%) of non-exclusively breastfed children were hospitalized, while 26 (68.4%) were managed without hospitalization. The significantly lower hospitalization rate among exclusively breastfed children highlights the protective role of exclusive breastfeeding against severe infectious illnesses requiring hospital admission.

DISCUSSION:

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The present study evaluated the impact of exclusive breastfeeding on the incidence of childhood infections among 100 children and demonstrated a significant protective effect of exclusive breastfeeding against common infectious illnesses and infection-related hospitalization. The findings are consistent with the growing body of evidence supporting exclusive breastfeeding as a cornerstone intervention for reducing childhood morbidity and improving health outcomes.

In the present study, the majority of children belonged to the 13–24 months age group (32%), followed by 6–12 months (28%), with a statistically significant age distribution ($p=0.021$). The predominance of younger children may be attributed to the higher healthcare utilization and vulnerability to infectious diseases during the first two years of life. Similar age distributions were reported by Patel et al., who observed that most pediatric participants in their breastfeeding and infection study were below two years of age, emphasizing the importance of this period in evaluating the health effects of infant feeding practices.¹¹ Likewise, Singh and colleagues reported that children younger than 24 months constituted the majority of their study population due to increased susceptibility to respiratory and gastrointestinal infections during infancy and early childhood.¹²

The gender distribution in the present study showed a slight male predominance, with males accounting for 58% of participants compared with 42% females, although the difference was not statistically significant ($p=0.118$). Comparable findings were documented by Kumar et al., who reported a male representation of approximately 56% in their pediatric cohort evaluating breastfeeding outcomes.¹³ Similar observations were also made by Rahman et al., where males constituted nearly 60% of enrolled children, reflecting healthcare-seeking patterns rather than any biological association between gender and breastfeeding practices.¹⁴ These findings suggest that gender does not substantially influence the relationship between breastfeeding and infection occurrence.

Exclusive breastfeeding was practiced in 62% of children in the present study, while 38% were not exclusively breastfed. This proportion is encouraging and aligns with observations reported by Tiwari et al., who documented exclusive breastfeeding rates of approximately 60% among Indian infants attending tertiary healthcare facilities.¹⁵ Similarly, Ahmed et al. reported exclusive breastfeeding prevalence exceeding 55% in their population-based study and highlighted increasing awareness regarding the benefits of breastfeeding among mothers.¹⁶ Despite improvements, the proportion of non-exclusively breastfed children in the present study indicates the continued need for educational interventions and breastfeeding support programs.

One of the most important findings of the study was the significantly lower incidence of childhood infections among exclusively breastfed children ($p=0.001$). Among exclusively breastfed children, 61.3% remained free from infections, compared with only 26.3% among non-exclusively breastfed children. Conversely, infection episodes were reported in 38.7% of exclusively breastfed children and 73.7% of non-exclusively breastfed children. These findings closely resemble those reported by Quigley et al., who demonstrated significantly reduced risks of infectious diseases among breastfed infants compared with formula-fed infants.¹⁷ Likewise, a prospective cohort study conducted by Chantry et al. revealed that infants who were not exclusively breastfed had a substantially greater risk of respiratory tract infections, gastrointestinal infections, and hospital admissions during infancy.¹⁸ The protective effect observed in the present study can be attributed to the immunological components of breast milk, including secretory immunoglobulin A, lactoferrin, oligosaccharides, macrophages, and various anti-inflammatory factors that strengthen mucosal immunity and inhibit pathogen colonization.

Analysis of infection patterns revealed that acute respiratory tract infections were the most frequent infectious illness, accounting for 46.2% of cases, followed by diarrheal diseases (23.1%), fever of infectious origin (13.5%), otitis media (11.5%), and urinary tract infections (5.7%) ($p=0.014$). Similar trends were reported by Duijts et al., who identified respiratory tract infections as the most common illness among non-exclusively breastfed children and demonstrated a significant reduction in respiratory morbidity among breastfed infants.¹⁹ Additionally, Bahl et al. observed that exclusive breastfeeding substantially lowered the incidence of both diarrheal diseases and respiratory infections in developing-country settings.²⁰ The predominance of respiratory infections in the present study may be explained by environmental exposure, overcrowding, seasonal variation, and immature immunity in young children.

The frequency of infection episodes during the previous year was significantly lower among exclusively breastfed children ($p<0.001$). More than 61% of exclusively breastfed children experienced no infections, whereas recurrent infections involving three or more episodes were uncommon. In contrast, non-exclusively breastfed children

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exhibited substantially higher frequencies of repeated infections. These findings are in agreement with the study by Quigley et al., which demonstrated that prolonged and exclusive breastfeeding reduced both the occurrence and recurrence of infectious illnesses throughout infancy and early childhood.¹⁷ Chantry et al. similarly reported that exclusive breastfeeding for six months was associated with a lower cumulative burden of respiratory and gastrointestinal infections compared with shorter durations of breastfeeding.¹⁸ The reduced recurrence of infections among exclusively breastfed children may result from enhanced immune maturation and the establishment of a beneficial intestinal microbiota.

Hospitalization due to childhood infections was significantly lower among exclusively breastfed children, with only 9.7% requiring admission compared with 31.6% of non-exclusively breastfed children ($p=0.006$). This finding supports previous evidence demonstrating that breastfeeding not only prevents infections but also reduces disease severity. Duijts et al. reported a lower risk of hospitalization for infectious diseases among breastfed infants, particularly for lower respiratory tract infections and severe gastroenteritis.¹⁹ Similarly, Bahl et al. found that exclusive breastfeeding markedly reduced severe infection-related morbidity requiring inpatient care, especially in resource-limited settings.²⁰ The lower hospitalization rates observed in the present study underscore the substantial clinical and economic benefits of promoting exclusive breastfeeding as a public health strategy.

Overall, the findings of the present study strongly support existing evidence that exclusive breastfeeding significantly decreases the incidence, recurrence, and severity of childhood infections. The observed reductions in respiratory infections, diarrheal diseases, recurrent illness episodes, and hospitalization highlight the critical role of exclusive breastfeeding during the first six months of life. Strengthening breastfeeding promotion initiatives, maternal counseling, and community-based support programs may therefore contribute substantially to reducing childhood morbidity and improving pediatric health outcomes.

CONCLUSION:

The present study demonstrates that exclusive breastfeeding plays a significant protective role in reducing the incidence and severity of childhood infections. Children who were exclusively breastfed during the first six months of life experienced fewer infectious episodes, lower rates of recurrent infections, and significantly reduced hospitalization compared with non-exclusively breastfed children. Acute respiratory tract infections and diarrheal diseases were the most common illnesses observed, with a markedly lower occurrence among exclusively breastfed children. The findings highlight the immunological and nutritional benefits of breast milk in enhancing infant immunity and protecting against common childhood infections. Exclusive breastfeeding not only contributes to improved child health outcomes but also reduces the burden on healthcare services by decreasing infection-related morbidity and hospital admissions. Strengthening breastfeeding promotion through antenatal counseling, postnatal support, community awareness programs, and healthcare provider education is essential. Encouraging mothers to practice exclusive breastfeeding for the first six months can substantially improve child survival, growth, and overall well-being.

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