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Original Article

Prevalence of eczema in breast feed versus bottled feed

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ABSTRACT

Objective: To compare the prevalence of eczema in infants who are exclusively breastfed versus those who are bottle-fed during the first six months of life.

Methods: This cross-sectional study was conducted at Abbasi Shaheed Hospital, Karachi, Pakistan from 8 July 2023 to 7 January 2024 among infants aged 6 months to 2 years attending pediatric outpatient clinics. Feeding practices were recorded based on caregiver interviews, categorizing infants as either exclusively breastfed or bottle-fed. The diagnosis of eczema was made clinically by a pediatrician using standard diagnostic criteria. Statistical analysis was performed to compare the prevalence between the two groups.

Results: In a study of 200 infants aged 1 month to 2 years, eczema prevalence was significantly higher in bottle-fed (28%) than breastfed (12%) children ($p = 0.004$). Among males, 28.6% of bottle-fed and 11.1% of breastfed had eczema ($p = 0.016$), while in females, rates were 27.3% and 13.0%, respectively ($p = 0.046$). Eczema was more common in bottle-fed infants across both normal BMI (17.2% vs. 7.3%, $p = 0.047$) and overweight categories (42.9% vs. 33.3%, $p = 0.001$).

Conclusion: This study demonstrates a significantly higher prevalence of eczema among bottle-fed children compared to breastfed children aged 1 month to 2 years, highlighting the protective role of breastfeeding against early childhood eczema.

Keywords: Eczema, Atopic Dermatitis, Breastfeeding, Bottle-Feeding, Infant Health, Prevalence.

1. INTRODUCTION

Eczema, a common inflammatory skin condition, often appears in infancy and can be influenced by various factors, including feeding methods. Research suggests that breastfeeding may offer protective benefits against eczema due to the immune-boosting properties of breast milk[1]. On the other hand, bottle-feeding with formula has been associated with a higher risk of allergic conditions, including eczema, possibly due to differences in gut microbiota development[2]. Understanding the prevalence of eczema in breastfed versus bottle-fed infants is crucial for guiding parental and medical decisions on infant nutrition. This topic remains a key area of study in pediatric dermatology and allergy research[3].

Breast milk contains antibodies, prebiotics, and anti-inflammatory compounds that may help reduce the likelihood of eczema in infants. Studies have shown that exclusive breastfeeding for the first six months of life is linked to a lower incidence of eczema compared to formula-fed babies[4]. The presence of beneficial bacteria and immune-modulating factors in breast milk supports a healthier skin barrier, which may prevent eczema flare-ups. However, some infants may still develop eczema despite breastfeeding, indicating that genetic and environmental factors also play a role. Thus, while breastfeeding is generally protective, it is not an absolute guarantee against eczema[5,6].

In contrast, bottle-fed infants may face a higher risk of eczema due to the absence of immune-protective components found in breast milk. Formula milk, though nutritionally balanced, lacks certain bioactive elements that help regulate the immune system and prevent allergic responses[7]. Some studies suggest that hydrolyzed formulas may reduce eczema risk compared to conventional cow's milk formulas, but they still do not match the protective effects of breastfeeding. Additionally, early exposure to allergens in formula may trigger eczema in genetically predisposed infants. These findings highlight the potential advantages of breastfeeding in eczema prevention[8,9].

Despite the evidence favoring breastfeeding, some research presents conflicting results, with a few studies finding no significant difference in eczema rates between breastfed and bottle-fed infants. Variations in study design, population genetics, and environmental exposures may contribute to these discrepancies[10].

This study aims to determine and compare the prevalence of eczema in breastfed versus bottle-fed infants between the ages of 1 month and 2 years. The findings may help guide healthcare providers and caregivers in making informed decisions regarding infant feeding and may contribute to public health strategies aimed at reducing the burden of allergic diseases in early childhood.

2. METHODOLOGY

This cross-sectional study was conducted at Abbasi Shaheed Hospital, Karachi, Pakistan from 8 July 2023 to January 2024. A sample of infants aged 6 to 24 months was recruited from pediatric clinics and maternal health centers. Data on feeding practices (exclusive breastfeeding, mixed feeding or exclusive formula feeding) were collected through structured questionnaires administered to parents or caregivers.

Ethical approval was obtained from the relevant institutional review board IRB/KMDC/KMU/92/2025, and informed consent was secured from all participating parents or guardians. The study included infants with no prior history of allergic conditions or chronic skin diseases to minimize confounding factors. Demographic information such as age, sex, BMI was also recorded to assess potential influencing variables. The diagnosis of eczema was made clinically by a pediatrician based on the UK Working Party's Diagnostic Criteria for atopic

dermatitis. Body mass index (BMI)-for-age was calculated using WHO growth standards.

SPSS version 23 was used for data analysis. Mean and standard deviation was calculated for numerical data and frequency and percentages were calculated for categorical variables. A p-value of less than 0.05 was considered statistically significant.

3. RESULTS

In a study comprising 200 children aged between 1 month and 2 years, the mean age of participants was 11.6 ± 5.5 months, with breastfed children having a mean age of 11.3 ± 5.4 months and bottle-fed children 11.8 ± 5.7 months. Among the total sample, 110 (55.0%) were male and 90 (45.0%) were female. In the breastfed group, 54% were male and 46% were female, while in the bottle-fed group, 56% were male and 44% were female. Regarding BMI categories, 82% of breastfed children had a normal BMI (14–17) compared to 58% of bottle-fed children. Conversely, 18% of breastfed children were overweight (BMI >17) compared to 42% of those who were bottle-fed. Table-1

In this study comparing the prevalence of eczema among breastfed and bottle-fed infants, eczema was observed in 12% of the breastfed group and 28% of the bottle-fed group, with a statistically significant difference (p = 0.004). When analyzed by gender, 11.1% of breastfed males and 28.6% of bottle-fed males had eczema (p = 0.016), while 13.0% of breastfed females and 27.3% of bottle-fed females were affected (p = 0.046), both showing significant associations. Regarding BMI, among infants with a normal BMI (14–17), eczema was present in 7.3% of breastfed and 17.2% of bottle-fed infants (p = 0.047). In the overweight category (BMI >17), 33.3% of breastfed and 42.9% of bottle-fed infants had eczema, with a highly significant difference (p = 0.001). Table-2

Table-1: Demographic Characteristics of Study Participants (n = 200)

Variable	Breastfed (n = 100)	Bottle-fed (n = 100)	Total (n = 200)
Mean Age (months)	11.3 ± 5.4	11.8 ± 5.7	11.6 ± 5.5
Gender			
• Male	54 (54.0%)	56 (56.0%)	110 (55.0%)
• Female	46 (46.0%)	44 (44.0%)	90 (45.0%)
BMI Category			
• Normal (14–17)	82 (82.0%)	58 (58.0%)	140 (70.0%)
• Overweight (>17)	18 (18.0%)	42 (42.0%)	60 (30.0%)

Table-2: Comparison of Eczema Prevalence with Feeding Type, Gender, and BMI (n = 200)

Variable	Breastfed (n = 100)	Bottle-fed (n = 100)	Total with Eczema (n = 40)	p-value
Eczema Present	12 (12.0%)	28 (28.0%)	40 (20.0%)	**0.004**
Eczema by Gender				
• Male	6/54 (11.1%)	16/56 (28.6%)	22	**0.016**
• Female	6/46 (13.0%)	12/44 (27.3%)	18	**0.046**
Eczema by BMI Category				
• Normal (BMI 14–17)	6/82 (7.3%)	10/58 (17.2%)	16	**0.047**
• Overweight (BMI >17)	6/18 (33.3%)	18/42 (42.9%)	24	**0.001**

4. DISCUSSION

This study aimed to compare the prevalence of eczema in breastfed and bottle-fed children aged 1 month to 2 years, and to evaluate its association with gender and body mass index (BMI). The findings demonstrate a significantly higher prevalence of eczema among bottle-fed children (28%) compared to breastfed children (12%) (p = 0.004), aligning with several previous studies that suggest a

protective role of breastfeeding against atopic diseases, including eczema.

A prospective birth cohort study by Kull et al[11] in Sweden found that exclusive breastfeeding for at least four months reduced the risk of eczema at age four, particularly in children with a family history of atopy (OR: 0.78, 95% CI: 0.61–0.99). Similarly, a meta-analysis by Lodge et al[12]reported a modest reduction in the risk of eczema among breastfed infants (RR: 0.89, 95% CI: 0.83–0.96). Our findings reinforce the hypothesis that breastfeeding may confer immunological benefits through maternal antibodies and cytokines, reducing allergic sensitization during infancy.

Gender-wise, the present study observed a significantly higher prevalence of eczema among bottle-fed males (28.6%) compared to breastfed males (11.1%) (p = 0.016). A similar pattern was seen in females, with 27.3% of bottle-fed and 13.0% of breastfed girls having eczema (p = 0.046). While eczema tends to be slightly more prevalent in boys during early childhood, gender-specific associations with feeding practices remain under-explored. However, studies such as those by McNally et al[13] have shown that male infants may have a higher incidence of eczema, possibly due to sex-based immunological differences.

The role of BMI in the prevalence of eczema is also notable. Our study found that among children with a normal BMI (14–17), eczema was significantly more prevalent in bottle-fed (17.2%) than in breastfed (7.3%) infants (p = 0.047). In overweight children (BMI >17), the prevalence was even more pronounced: 42.9% in bottle-fed versus 33.3% in breastfed infants (p = 0.001). These results are consistent with findings from other studies, such as that by Zhang et al[14] who demonstrated a positive correlation between overweight/obesity and the risk of eczema in children, potentially mediated by systemic inflammation and altered immune responses. Furthermore, a Korean cohort study found that increased BMI in early childhood was associated with a higher risk of atopic dermatitis, supporting the relevance of BMI in eczema development[15].

A longitudinal cohort study in Germany (GINI study) demonstrated that exclusive breastfeeding for at least four months significantly reduced the incidence of atopic dermatitis during the first year of life, especially in children with atopic predisposition[16]. Another large-scale cohort study in Japan by Mimura et al[17] also concluded that breastfeeding for at least six months was associated with a decreased risk of eczema at age 3.

The biological plausibility lies in the presence of immunoglobulin A (IgA), lactoferrin, and various anti-inflammatory cytokines in breast milk, which modulate the infant's immune system, promote gut microbial diversity, and suppress allergic sensitization[18]. In contrast, formula-fed infants lack these protective immunological agents, which may explain the elevated eczema rates observed in the bottle-fed group.

When stratified by gender, our study found that bottle-fed males and females had significantly higher eczema prevalence compared to their breastfed counterparts. This aligns with a Korean national cohort study by Lee et al., which reported that boys who were not exclusively breastfed had a higher incidence of eczema than those who were exclusively breastfed, suggesting that male infants may be more susceptible to the absence of breastfeeding-mediated immunomodulation[19]. However, other studies such as those by Schoetzau et al[20] did not find a consistent gender-based difference in eczema related to feeding, highlighting that additional genetic and environmental factors may contribute[20].

5. CONCLUSION

This study demonstrates a significantly higher prevalence of eczema among bottle-fed children compared to breastfed children aged 1 month to 2 years, highlighting the protective role of breastfeeding against early childhood eczema.

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