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AGE-AND NUTRITION-DEPENDENT COURSE OF ALLERGIC DISEASES IN CHILDREN

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Abstract: Allergic diseases represent a major pediatric health concern worldwide, with rising prevalence linked to environmental, genetic, and nutritional factors. Among these, the type of nutrition in infancy—exclusive breastfeeding, mixed feeding, or formula feeding—plays a critical role in shaping the clinical course of allergic conditions. This article analyzes the relationship between nutritional practices and the course of allergic diseases in children, highlighting immunological mechanisms, clinical manifestations, and preventive strategies.

Key words: Allergic diseases, nutrition type, breastfeeding, mixed feeding, formula feeding, IgE, childhood allergy.

Introduction

The prevalence of allergic diseases in children, including atopic dermatitis, allergic rhinitis, food allergy, and bronchial asthma, has increased significantly over the past decades. Nutrition in early life is one of the most modifiable factors influencing the risk and course of these conditions. While genetic predisposition remains a cornerstone of allergic susceptibility, the immune-modulatory role of breast milk, formula composition, and complementary feeding patterns has become central to pediatric allergy research.

Methods of Literature Review

This review was based on clinical trials, meta-analyses, and observational cohort studies published in PubMed, Scopus, and Web of Science between 2010 and 2025. Special attention was given to studies comparing the incidence and severity of allergic diseases in exclusively breastfed infants, mixed-fed infants, and those fed with standard or hydrolyzed formulas.

Results and Discussion

Exclusive Breastfeeding

Breast milk is rich in immunoglobulin A (IgA), lactoferrin, oligosaccharides, and cytokines that promote mucosal immunity and tolerance. Evidence indicates that exclusive breastfeeding for at least 4–6 months reduces the risk of atopic dermatitis and early food allergy. However, the protective effect against asthma and allergic rhinitis in later childhood remains debated.

Mixed Feeding

Mixed feeding (combination of breast milk and formula) often occurs due to insufficient lactation or maternal choice. Studies suggest that mixed feeding may partially reduce the protective role of breast milk, as early exposure to cow's milk proteins in formula can sensitize infants with a genetic predisposition. On the other hand, controlled introduction of allergenic proteins in small amounts may facilitate tolerance development in some cases.

Formula Feeding

Exclusive formula feeding, especially with standard cow's milk–based formula, is associated with higher rates of food allergy and atopic manifestations. Extensively hydrolyzed or amino acid–based formulas, however, are recommended for infants at high risk of allergy or those with proven cow's

milk protein allergy. Despite this, formula cannot fully replicate the immunological benefits of human milk.

Clinical Course

Breastfed infants tend to have milder allergic symptoms, delayed onset, and better long-term tolerance acquisition. Mixed-fed infants show intermediate patterns, with variability depending on timing and proportion of formula introduced. Formula-fed infants often present with earlier, more severe allergic manifestations and may require long-term dietary interventions.

Immunological Mechanisms

Breast milk promotes gut microbiota diversity and enhances regulatory T-cell development, critical for immune tolerance. Formula-fed infants often have altered gut microbiota composition, with reduced Bifidobacterium species, potentially contributing to immune dysregulation and allergic sensitization.

Preventive and Clinical Implications

Exclusive breastfeeding should be encouraged for at least 6 months as the most effective nutritional strategy in allergy prevention. For high-risk infants unable to breastfeed, hydrolyzed formulas may reduce sensitization risk. Early introduction of allergenic foods (e.g., peanuts, eggs) under medical supervision may reduce the incidence of food allergies. Long-term follow-up and nutritional counseling are essential for families with allergic children.

Conclusion

The type of infant nutrition significantly influences the onset, severity, and long-term outcome of allergic diseases in children. Exclusive breastfeeding provides the strongest protective effect, whereas formula feeding increases the risk of allergy development. Mixed feeding occupies an intermediate position, with potential benefits or risks depending on timing and composition. A personalized, evidence-based approach to infant nutrition can play a crucial role in preventing and managing pediatric allergic diseases.

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