

# Breastfeeding on Food Allergies

Subjects: **Nursing**

Contributor: Zoi Koukou , Eleftheria Papadopoulou , Eleftherios Panteris , Styliani Papadopoulou , Anna Skordou , Maria Karamaliki , Elisavet Diamanti

Breastfeeding is the preferred method of infant feeding and its establishment is one of the primary goals for the infant. Allergic diseases are common in childhood, with increased morbidity. Food allergies are also associated with a strong negative impact on health-related quality of life and is a major public health problem. In addition, maternal exclusion of common allergens during pregnancy and/or lactation suggests that supplementation with regular cow's milk formula during the first week of life should be avoided. Breast milk contains many active immune factors, such as cytokines, inflammatory mediators, signaling molecules and soluble receptors, which may also reduce the risk of allergic disease.

breastmilk

colostrum

breast feeding duration

allergies

## 1. Introduction

Food allergies are caused by repeated exposure to a food substance that triggers a specific immune response that can lead to severe health effects such anaphylactic shock. During fetal life, a large array of food antigens cross the transplacental barrier and enter the body of the fetus, with the possibility of intrauterine sensitization <sup>[1][2]</sup>. Later, after birth, food allergens are differentiated according to the immunoglobulin response against target cells, with a high degree of sensitivity up to the first 24 months of life <sup>[1][3]</sup>. In addition, due to the unknown intrauterine or extrauterine sensitization of the fetus and later the infant, mothers continue their diet without specific hypoallergenic dietary instructions until symptoms appear <sup>[2][4]</sup>. Demographic data from the National Institute of Allergy and Infectious Diseases (NIAID) indicate that food allergies occur in 5% of children presenting with eczema, rhinitis and gastrointestinal problems <sup>[3]</sup>, with increasing morbidity over the last 10–15 years <sup>[5]</sup>.

Breastfeeding has been advocated as an solution to many a problem, from pain management in NICU infants <sup>[6]</sup>, to negating some of the negative effects of the congenital Zika virus syndrome, that cause microcephaly <sup>[7]</sup>.

Exclusive breastfeeding is essential for at least the first 6 months of life, with continued complementary breastfeeding for the first two years of the child's life as per WHO guidelines <sup>[2][8]</sup>.

## 2. Breastfeeding and Allergies

Breastmilk is immunologically the most relevant and essential food for the development of the newborn and the consequent maturation of immuno-defensive mechanisms <sup>[4][5]</sup>. It confers active and passive immunity, through

maturation of the system and also provides bioactive components, like secretory IgA and IgG [5], with a proven prophylactic effect against food allergies [4]. In particular, colostrum contains the highest concentrations of bioactive components with immunological and anti-inflammatory activity. These are influenced by maternal and obstetric factors such as age, maternal diet and age of first pregnancy for the mother, while growth factor  $\beta$  (TGF- $\beta$ ) limits the development of allergies through the intestinal immune system [9]. It seems that breastmilk quality can be affected by the number of previous children [9]. In a very recent study, breastmilk samples were taken from 42 mothers to assess the levels and influence of TGF-1, TGF-2 (dominant type), and IgA in colostrum and, later, mature milk in primiparous and multiparous women [9]. TGF-1 and TGF-2 concentrations were greater in primiparous women, despite decreased colostrum production in the first hours. Furthermore, caesarean section seems to have a role in boosting TGF- factors secreted during breastfeeding due to the healing effects of the incision site, while postponing the start of lactation due to stress on the body [9]. Thus, it could be inferred that the next children of a primiparous mother are more likely to develop allergies in the future [9]. A contentious conclusion, given that a mother's medical history, nutrition, stress, and stage of lactation all have an impact on the composition of milk at all phases [10].

The intestinal microbiota system is unique, as it strengthens the intestinal barrier through bacteria colonization, protecting the neonate immune system [4]. Due to immunological specialization, the manner and type of nutrition of the neonate have a significant impact on the gut-intestinal flora system [4]. Breastmilk is also known to provide the necessary foundation for safe colonization, so the relationship between the infant's gut microbiota and the development of allergies may be affected [4].

Additionally, genetic factors control the release of anti-inflammatory and anti-allergic substances (immunoglobulins, oligosaccharides, growth, lysozyme, and lactoferrin) expressed by the mammary gland [4]. Of course, the main antigen transporter is not the permeability of the mammary gland, but most likely the intestinal transport of parental antigens, during milk production at the gland [4]. Due to its complexity and diversity, the anti-allergic effect of breastmilk is stronger compared to formula milk products [2], but is still at moderate level of evidence when compared within a meta-analysis of 17 studies. In infants, breastfeeding is associated with a reduction in asthma in later adulthood [3].

The most common form of food allergy in infants and young children under 3 years of age is sensitization to cow's milk protein (casein or serum beta-lactoglobulin) [11]. The most common allergens are casein, alpha-lactalbumin, and beta-lactalbumin, the latter of which is extracted from breastmilk and is the trigger [12]. It has a 50–65% chance of being converted into an offending antigen, altering the intestinal flora and the concentration of bioactive compounds in the body [13]. The natural development of an infant's gastrointestinal tract is essential for the metabolism of non-dairy foods, and its disruption can lead to future allergic manifestations [14]. It should be noted that only 0.5–1% of exclusively breastfed infants may later develop an allergy to cow's milk protein [13] although there is a significant tendency to over diagnosis [15]. At the same time, it is difficult to diagnose because of its generic symptoms and is often differentially diagnosed as gastroesophageal reflux disease (GERD), abdominal pain, and gastrointestinal disorders [11]. The presence of blood in the stools (allergic proctocolitis [13]) immediately raises the suspicion of a food allergy, but in 65% of cases it is usually due to sensitivity to cow milk proteins [13][15].

The time of onset for allergic symptoms varies from within the first 2 min after ingestion to the first 48 h, with expression in the gastrointestinal and/or respiratory system and/or skin; the combination of systems implies IgE sensitization <sup>[11]</sup>, whereas the later onset of symptoms up to 2 weeks after contact corresponds to eosinophil or T-cell sensitization <sup>[12]</sup>. The European Society for Paediatric Gastroenterology Hepatology and Nutrition (ESPGHAN) guidelines differentiate according to the severity of symptoms and the presence of breastfeeding. In particular, in breastfed infants with mild or moderate symptoms, overt and covert products containing cow's milk protein are removed from the mother's diet for 3 to 6 days; if delayed onset of symptoms is suspected, calcium supplementation is recommended for 2 weeks; while in severe symptoms (severe anemia), the mother's milk is expressed and the newborn is given an improved anti-allergy formula <sup>[14]</sup>. In non-breastfed infants, animal protein sources and cow's-milk-based formula should be removed. A hydrolyzed protein formula with proven results in this type of allergy is recommended. If this fails or is refused, either a soya formula (with proven tolerance) or an amino-acid-free formula is given to improve nitrogen supply <sup>[11][15]</sup>.

The American Academy of Breastfeeding Medicine (ABM) protocol provides a universal protocol in case of allergic symptoms <sup>[13]</sup>. More specifically, it emphasizes the complete and correct recording of the family allergic medical history (for a parent or sibling) to determine the possibility of hereditary allergy by a qualified allergologist. The symptoms and their severity also create the need to assess the patient's body weight, cardiac and respiratory status in order to choose a rapid or slow treatment modality. The ABM recommends the continuation of breastfeeding with the first step being the removal of cow's milk derivatives (cheese, milk, yoghurt) from the mother's diet <sup>[13]</sup>. In addition, foods with high allergenicity such as soy, chocolate, strawberries, nuts, and eggs are removed and attention should be paid to packaged products containing allergens for at least 2 to 4 weeks, with improvement within 72–96 h <sup>[13]</sup>. Otherwise, with severe symptoms, the withdrawn foods should be added back in weekly intervals and fish and gluten foods should be withdrawn as directed by a maternal dietitian with low-allergenic substitutes <sup>[13]</sup>.

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