

Reconciling breast-feeding and early food introduction guidelines in the prevention and management of food allergy



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Mothers are bombarded with information from a variety of sources regarding how to best feed their infants in the first year of life. Sources of information include expert-based recommendations, advice from family and community members, and cultural feeding practices. For first-time mothers, this can be confusing and anxiety provoking, particularly if guidelines from expert bodies vary. We are concerned about confusion in infant feeding guidelines and review some of the reasons about why these discrepancies exist.

For a variety of social, economic, environmental, and health reasons, breast-feeding is the optimal way to feed babies. Breast-feeding provides immediate and long-term benefits to both mother and child; however, despite the known benefits of breast milk, breast-feeding rates in many countries are low.¹ Many factors contribute to initiation and continuation of breast-feeding (Fig 1),² and because breast-feeding is both an emotive and political issue and research is limited, development of guidelines relating to breast-feeding is complex, involving many stakeholders.

Global infant feeding recommendations from the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) are described in their "Global strategy for infant and young child feeding" and advise exclusive breast-feeding for 6 months (180 days) with introduction of nutritionally adequate and safe complementary feeding starting from the age of 6 months and continued breast-feeding up to 2 years of age or beyond.³ Exclusive breast-feeding is defined as only breast milk, with no other liquids or solids (even water), with the exception of oral rehydration solutions, vitamin and mineral supplements, or medicines.³

In the context of these global recommendations, many countries have locally relevant, evidence-based infant feeding

guidelines. Our recent review of international infant feeding guidelines highlighted the extraordinary variance in interpretation of and compliance with WHO/UNICEF recommendations.⁴ These variations can occur within the same country but across different health authorities and result in significant consumer and even health practitioner confusion.

In this article we review the evidence base for breast-feeding in the prevention of food allergy and argue that confusion in guideline interpretation is a basis for concern if we are to optimize global breast-feeding practices, particularly because the increase in food allergy has occurred unabated and infant feeding recommendations are believed to play a key role in this increasing prevalence in developed countries.⁵ We also discuss the role of maternal allergen exclusion in the management of food allergy in the breast-fed infant.

BREAST-FEEDING AND FOOD ALLERGY PREVENTION

Current evidence, based on the results of systematic reviews and meta-analyses, indicates that breast-feeding does not prevent or enhance the risk of food allergy.⁶ Because breast-feeding conveys other important benefits to both the mother and the child, it is promoted in infant feeding guidelines for prevention of food allergy.⁷⁻⁹

When comparing breast-feeding with other intervention studies, results can be difficult to interpret because it would be unethical to randomize to a non-breast-feeding arm. Additionally, the qualitative properties of breast milk are highly variable from subject to subject, and unlike infant formula, the macronutrient composition of breast milk changes with gestational age and varies throughout the course of one feed. Breast milk contains multiple nonnutritive compounds, including immunomodulatory factors that facilitate development of host defense mechanisms, oligosaccharides, and a unique breast milk microbiota, which promote establishment of the infant gut microbiome.^{1,10} Furthermore, early studies investigating breast-feeding and allergy prevention did not adequately control for family history of allergy and infant allergy symptoms. This is problematic because previous recommendations to families with allergy recommended breast-feeding as protective against allergy. Therefore studies that do not adequately control for bias by allergy history might inadvertently introduce bias or reverse causation.

TIMING OF INTRODUCTION TO SOLID FOODS AND FOOD ALLERGY PREVENTION

It is important to note that breast-feeding, use of complementary infant formula, and introduction to solid foods all interrelate,

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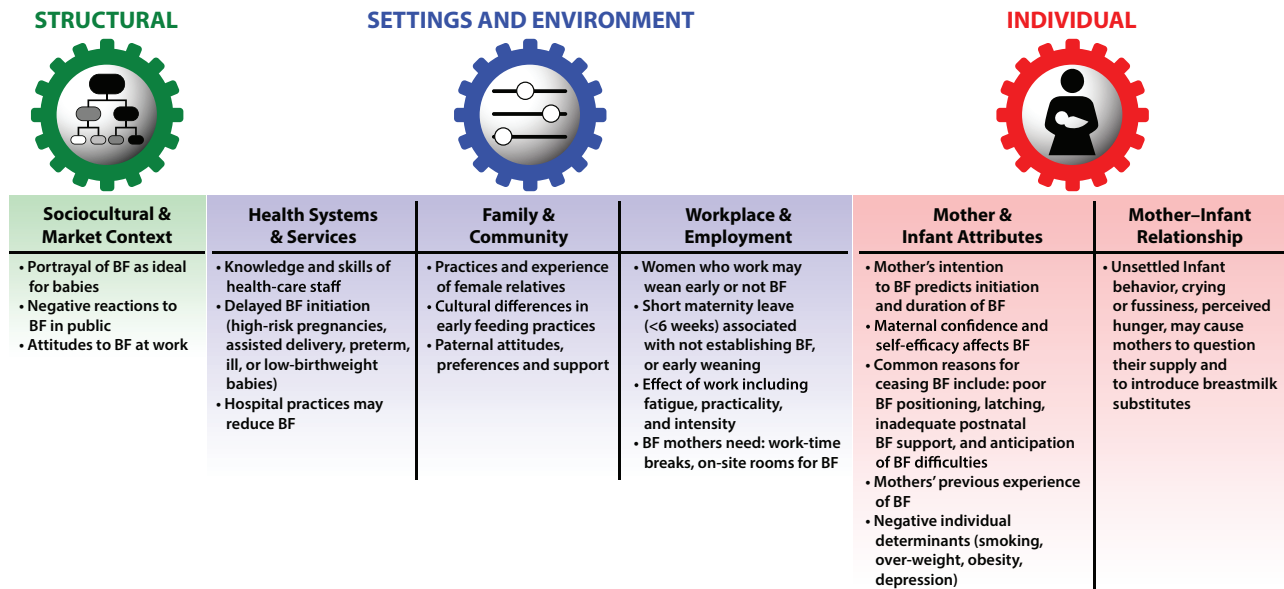


FIG 1. Determinants of breast-feeding. Adapted from Rollins et al.²

and a full review of the optimal timing for introduction to solid foods is beyond the scope of this current breast-feeding review. The Australian National Health and Medical Research Council–funded Centre of Excellence in Food and Allergy Research recently undertook an exhaustive review of the evidence base informing infant feeding guidelines.⁷

The WHO recommends exclusive breast-feeding until 6 months, and there are public health concerns that introduction to solid foods before 6 months might undermine the mother's potential to continue breast-feeding. However, it is worth noting that in the Enquiring About Tolerance study, this effect did not occur.^{E1} This randomized controlled study investigated whether early introduction (3 months of age) of common allergens to breast-fed infants was more effective in preventing food allergy than introduction at 6 months of age. Participants in both arms of this study maintained their breast-feeding rates above the norm for the United Kingdom.^{E2}

Breast-feeding is promoted in international infant feeding guidelines specific to allergy prevention (Box 1).^{7-9,E3,E4} These guidelines all recommend early exclusive breast-feeding, but in contrast to the WHO, 4 of the guidelines recommend introduction to solid foods at around 6 months but not before 4 months rather than delaying introduction of solids until after 6 months, and one recommends introduction to solids at around 6 months. These minor differences in wording might result in delayed solid food introduction, thus leading to increased allergic sensitization. Discrepancies in these important messages is confusing for parents because they decide which infant feeding guidelines to follow.

BREAST-FEEDING INFANTS WITH DIAGNOSED FOOD ALLERGIES

Management of breast-fed infants with diagnosed food allergy requires special attention because manipulation of the maternal diet might be required, and therapeutic trials of infant formula might result in earlier cessation of breast-feeding than planned. Contemporary guidelines from the American Academy of

Allergy, Asthma & Immunology⁸ and the European Academy of Allergy and Clinical Immunology^{E5} discuss management of breast-fed infants with food allergy by using maternal allergen avoidance to manage IgE-mediated (immediate) and non-IgE-mediated allergies (usually delayed gut symptoms) in breast-fed infants.

Feeding infants with food allergy needs to take into account allergen exposure through breast milk in breast-fed babies. The maternal diet directly influences breast milk nutrient composition,^{E6} and proteins and peptides from the maternal diet can be transferred into the breast milk in sufficient quantities to evoke immune responses in the infant.^{E7} However, the effectiveness of maternal allergen avoidance for management of infants with food allergy has not been fully evaluated.^{E8}

Of concern is the issue of self-diagnosis and implementation of restricted diets by breast-feeding mothers to manage a variety of symptoms in their infants. Unfortunately, some alternate health practitioners do not use a scientific framework of management, which can result in highly restricted maternal diets in inappropriate settings, such as gastroesophageal reflux and colic.^{E9} Improved guidelines and evidence to inform red flags for referral for these common conditions are urgently required.

IgE-mediated food allergy

Food allergens (including β -lactoglobulin [cow's milk], ovalbumin, ovomucoid [egg], gliadin [wheat], and Ara h 1 and Ara h 2 [peanut]) have been isolated from human breast milk.^{E7} Despite this, not all breast-fed infants with food allergy require manipulation of their mother's diet. It is not well understood why some infants allergic to cow's milk and other food proteins react when exposed to these proteins through breast milk and others do not. Anaphylaxis in breast-fed infants resulting from maternal ingestion of an allergen is very rare, suggesting either that there is an immunoprotective agent in breast milk or that the allergen dose is too low to illicit a clinical reaction.

Box 1. Wording of guidelines relating to breast-feeding and prevention of food allergy

Australian infant feeding consensus/Australasian Society of Clinical Immunology and Allergy guidelines⁷

- When your infant is ready, at around 6 months but not before 4 months, start to introduce a variety of solid foods, starting with iron-rich foods, while continuing breast-feeding.
- All infants should be given allergenic solid foods, including peanut butter, cooked egg, and dairy and wheat products, in the first year of life. This includes infants at high risk of allergy.

US National Institute of Allergy and Infectious Diseases Guidelines, 2010⁸

- Restriction of maternal diet during pregnancy or lactation is not recommended as a strategy for preventing the development of food allergy.
- It is recommended that all infants be exclusively breast-fed until 4 to 6 months of age (unless contraindicated for medical reasons).
- It is recommended that introduction of solid food should not be delayed beyond 4 to 6 months. Potentially allergenic foods can be introduced at this time as well.

US National Institute of Allergy and Infectious Diseases Addendum Guidelines for Introduction to Peanut, 2017^{E3}

Addendum guideline 1: For infants with severe eczema, egg allergy, or both

- Strongly consider evaluation by specific peanut IgE measurement and/or skin prick testing and, if necessary, an oral food challenge. Based on test results, introduce peanut-containing foods.
- Earliest age of peanut introduction: 4 to 6 months.

US National Academy of Sciences Expert Committee on Food Allergy, 2017^{E4}

- The committee recommends that public health authorities and clinical practice guidelines include consistent, clear, and evidence-based advice for families and health care providers, including dietitians, about the potential benefits of introducing allergenic foods (eg, peanut products, egg, dairy, and wheat) in the first year of life to infants when an infant is developmentally ready (around 6 months of age) but not before 4 months of age, particularly to those at high risk of allergy.
- Guidelines also should include information about the circumstances in which health care providers should advise their patients about the safest way to introduce peanut products to the diet (and/or other foods, as determined by the results of ongoing research).

United Kingdom: Joint Scientific Advisory Committee on Nutrition/Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment Working Group on the timing of introduction of allergenic foods into the infant diet, 2018⁹

The government should continue to recommend:

- exclusive breast-feeding for around the first 6 months of life;
- advice on complementary feeding should state that foods containing peanut and hen's egg need not be differentiated from other complementary foods; and
- complementary foods should be introduced in an age-appropriate form from around 6 months of age, alongside continued breast-feeding at a time and in a manner to suited to both the family and individual child.

Infants with severe eczema can be sensitized to food allergens, and some clinicians might trial an empiric 2-week period, eliminating suspect allergens from the maternal diet only after optimization of skin care by moisturizer and steroid use.⁸ If maternal allergen elimination is trialed to manage severe infantile eczema, it is imperative that a period of reintroduction is used to re-elicite symptoms and confirm the diagnosis before longer periods of dietary restriction.

Non-IgE-mediated food allergy

Manifestations of non-IgE-mediated food allergy managed by maternal dietary allergen avoidance include food protein-induced allergic proctocolitis and, less commonly, food protein-induced enterocolitis syndrome.^{E10,E11} There have been attempts to prevent or manage non-IgE-mediated food allergy by using maternal dietary avoidance with insufficient evidence of success. If trialed on formula, infants with non-IgE-mediated cow's milk allergy requiring maternal milk-free diets are more likely to require amino acid-based formula,^{E12} suggesting they are more sensitive to peptide fragments.

Allergists must be aware of implications of dietary manipulation of the breast-feeding infant/mother pair. Mothers should be referred to a registered dietitian for nutritional support, and rechallenge with the suspect allergen should be ensured (Box 2).^{8,E5,E10,E12,E13} Clinicians should ensure mothers only

Box 2. Practical considerations: Managing the breast-fed infant with food allergy

- For infants with severe eczema, skin care should be optimized before considering avoidance of suspect allergens from the maternal diet.⁸ If maternal allergen elimination is trialed, it is imperative that a period of reintroduction is used to re-elicite symptoms and confirm the diagnosis before longer periods of dietary restriction.^{E13}
- If a breast-fed infant is suspected to have a non-IgE-mediated milk allergy, a trial of a maternal cow's milk-free diet is recommended for a 1- to 2-week period, followed by rechallenge to assess whether symptom re-elicitation occurs.^{E10}
- Requests for mothers to stop breast-feeding and express (pump) breast milk while a baby trials an infant formula might result in earlier cessation of breast-feeding than planned
- Refer breast-feeding mothers requiring modified diets to a registered dietitian trained in food allergy. Attention to energy and nutrient requirements is important, particularly where multiple food allergens are eliminated.^{E5,E10,E12,E13}

avoid the necessary allergens in their own diet and avoid the temptation to progress to highly restrictive diets that could compromise their ability to breast-feed.

FINAL POINTS AND CONCLUSION

Ultimately, feeding guidelines are interpreted and acted on by an infant's caregiver in the context of cultural, societal, and economic circumstances and expectations. Although wording can differ slightly regarding timing of introduction to solid foods and thus the implied length of exclusive breast-feeding, small differences in wording are confusing. We call for the development of infant feeding guidelines for allergy prevention that are harmonized and free from commercial and vested interest.

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