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Reasons for failure to initiate, persist with breast-feeding

Many mothers either fail to initiate breast-feeding following the birth of their child or, once initiated, fail to breast-feed exclusively for six months, as is currently recommended by many expert committees.

Wayne Millar, MSc, Health Statistics Division, Statistics Canada, Ottawa, Ontario, and Heather Maclean, EdD, Founding Director, Centre for Research in Women's Health, Toronto, Ontario,¹ found that based on interviews carried out with 7266 Canadian women who had given birth in the previous five years, the majority (85%) had attempted to breast-feed. Among those who had stopped, "fewer than half had breast-fed for at least six months and of these, fewer than half again had done so exclusively," they added. Only 17% of the women interviewed for this analysis met the 2001 World Health Organization—as well as 2004 recommendations from Health Canada—to exclusively breast-feed for at least six months.

The most frequently cited reasons for not initiating breast-feeding included a sense that breast-feeding was "unappealing" or "disgusting" (23%) and that "bottle-feeding was easier" (20%). Twenty per cent of the mothers said they didn't breast-feed because of a medical condition and 4% because they smoked. Interestingly, only about 5% of the women surveyed said that the need to return to work or school prevented them from breast-feeding. "Overall, the most common reasons for stopping were not enough milk (23%), child weaned itself (17%), mother returned to work or school (14%) and inconvenience/fatigue (12%)," the authors noted.

The authors also noted that the proportion of women who started breast-feeding tended to rise with age, education and household income. Women in urban areas were also more likely to initiate breast-feeding than women in rural areas, as were mothers who identified themselves as immigrants. Data from the National Longitudinal Survey of Children and Youth² issued in 2008 also found that mothers who had their first child at the age of 35 or older were more likely to breast-feed for at least six months (43%) than younger mothers (15% to 20%).

Below Healthy People 2010 goals

Canadian women are not alone in failing to meet recommendations to exclusively breast-feed for six months. In their policy statement on breast-feeding, the American Academy of Pediatrics³ (AAP) noted that rates of initiation and duration of breast-feeding in the US are well below the Healthy People 2010 goals, where they

hoped 75% of women would initiate breast-feeding and 50% would continue out to six months by the year 2010. In 2001, 70% of all women in the US initiated some form of breast-feeding while at six months, 33% persisted with some breast-feeding but only 17% had breast-fed their infant exclusively.

Among the obstacles cited by the AAP to initiate and continue breast-feeding were insufficient prenatal education about breast-feeding; disruptive hospital policies and practices; inappropriate interruption of breast-feeding; early hospital discharge in some populations; lack of timely routine follow-up care and postpartum home health visits; maternal employment; and lack of family and social support.

"Breast is best" paradox

Paradoxically, some authors⁴ argue that promoting "breast as best" may have obscured the importance of breast-feeding in infant and maternal health. Indeed, focus-group research in the US found that women did not believe that there were disadvantages associated with not breast-feeding; rather, they viewed breast-feeding much like supplementing a standard diet with vitamins. "A significant proportion of women who have heard the message that breast-feeding is 'best' for their babies do not realize that this means there are negative health sequelae associated with premature weaning from breast-feeding," the authors wrote, "and it is this ignorance of the risks associated with artificial feeding that has led women and many health professionals to view the use of infant formula as benign."

In the meantime, practitioners need to distinguish between real and purported contraindications to breast-feeding. Real contraindications largely include serious medical conditions such as mothers with active untreated tuberculosis or those who are receiving chemotherapy. In the US, HIV-positive mothers have also been advised not to breast-feed. In contrast, breast-feeding is not contraindicated in the setting of hepatitis B or C or in mothers who smoke.

Supplementation of breast-feeding may in turn be a medical necessity in breast-fed infants with failure to thrive (FTT). As demonstrated by Dr. Irena Hren, University Medical Centre, Ljubljana, Slovenia, and multicentre colleagues⁵, one month of formula feeding successfully improved growth in almost three-quarters of breast-fed infants with FTT and breast-feeding was maintained in 81% of infants as well. The authors, however, concluded that "the observation of 31 infants with marked FTT during full breast-feeding, without underlying disease, raises concerns that many infants with inadequate weight gain

are not diagnosed early, that is, before developing marked growth failure... and pediatric practitioners are obligated to confront the reality of breast-feeding failure, identify associated risk factors and implement intervention strategies to prevent morbidity.”

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Maternal feeding/weaning practices and their impact on food hypersensitivities in infants

Maternal dietary intake, as well as infant feeding and weaning practices, have a variable impact on the development of food hypersensitivities in the infant and women need to be advised accordingly.

Prof. Carina Venter, University of Portsmouth, UK, and multicentre colleagues¹ administered a validated food frequency questionnaire to pregnant women at multiple time points, including at one and three years’ post-delivery. “Of the 969 families recruited... 60% of the pregnant women reported a history of allergic disease,” they stated. Children also underwent skin-prick testing at one, two and three years to a panel of pre-specified food allergens. The median duration of breast-feeding was 42 days, while the median time to the introduction of formula feed was 14 days.

Interestingly, there was no significant association between breast-feeding practices and sensitization to food allergens on the development of food hypersensitivity in infants at either 1 or 3 years of age. In contrast, rates of sensitization to foods and food hypersensitivity at 1 year of age were lower in infants weaned before 16 weeks. Similarly, at 1 and at 3 years of age, all children sensitized to a particular food had been exposed to the food before the age of 6 months; importantly, over 80% of mothers had introduced solids before the infant was 17 weeks old.

Women with a history of allergic disease also differed very little in terms of dietary, feeding and weaning practices than women without a history of atopy.

Hydrolyzed formulas in allergy prevention

Whether or not feeding infants hydrolyzed formulas exclusively helps prevent future allergies was the focus of a systematic review of articles published between 1985 through 2005.² The studies compared hydrolyzed formulas with breast-feeding, cow’s milk formulas, soy formulas and various combinations thereof. As registered dietitian Tiffani Hays, MSc, and Dr. Robert Wood,

Johns Hopkins University School of Medicine, Baltimore, Maryland, pointed out, extensively hydrolyzed formulas meet the American Academy of Allergy and Immunology’s definition of hypoallergenicity and they have been shown to effectively relieve symptoms in over 90% of infants with cow’s milk allergy.

In contrast, partially hydrolyzed formulas do not meet the AAP’s definition of hypoallergenicity because they have not been shown to relieve symptoms in most infants with cow’s milk allergy, nor are they recommended for its treatment. Nevertheless, the studies reviewed in this analysis did demonstrate significant reductions in the cumulative incidence of atopic disease through the first one to five years of life with both extensively hydrolyzed casein formulas as well as partially hydrolyzed whey formulas.

Because extensively hydrolyzed formulas usually supplement breast-feeding, evidence of their role in allergy prevention falls short of the AAP’s criteria, as the authors indicated, while partially hydrolyzed formulas similarly do not meet the AAP’s criteria for allergy prevention.

No convincing evidence

There is no convincing evidence supporting a protective effect of a maternal exclusion diet during pregnancy on the subsequent development of atopic disease in infants, according to the AAP’s Committee on Nutrition updated recommendations.³ Nor is there any convincing evidence that antigen avoidance during lactation prevents atopic disease in childhood, with the possible exception of atopic eczema. The AAP also issued the following statements:

AAP 2008 Committee on Nutrition Recommendations
<p>Exclusive breastfeeding for at least 4 months compared with feeding infants intact cow milk protein formula decreases the cumulative incidence of atopic dermatitis and cow milk allergy in the first 2 years of life.</p> <p>Exclusive breastfeeding for at least 3 months protects against wheezing in early life but evidence that exclusive breastfeeding protects against allergic asthma occurring beyond 6 years is not convincing.</p> <p>There are insufficient data to support a protective effect of any dietary intervention against atopic disease after 4-6 months of age.</p>
<p>There is a lack of evidence that maternal dietary restrictions during pregnancy play a significant role in the prevention of atopic disease in infants. Antigen avoidance during lactation does not prevent atopic disease either, with the possible exception of atopic eczema (although more data are needed to substantiate this).</p>
<p>For infants who are not breastfed exclusively for 4-6 months or who are formula-fed, there is modest evidence that atopic dermatitis may be delayed or prevented by the use of extensively or partially hydrolyzed formulas compared with cow milk formula in early childhood.</p>
<p>Extensively hydrolyzed formulas may be more effective than partially hydrolyzed formulas in the prevention of atopic disease.</p>
<p>Solid foods should not be introduced before 4-6 months of age but there is no convincing evidence that delaying their introduction beyond this period has a significant protective effect on the development of atopic disease. This includes foods considered to be highly allergic, including fish, eggs and foods containing peanut protein.</p>
<p>For a child who has developed an atopic disease that may be precipitated or exacerbated by ingested proteins via human milk, infant formula or specific complementary foods, treatment may require specific identification and restriction of cause food proteins.</p>

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Infantile anorexia, picky eating, associated with lower mental health development scores than healthy eaters

Infants with infantile anorexia, as well as “picky eaters” have significantly lower Mental Development Index (MDI) scores than normal-weight healthy eaters even though both groups performed within the normal range of cognitive function.

Dr. Irene Chatoor, Children’s National Medical Center, Washington DC, and other colleagues including Dr. Benny Kerzner, examined the relative contributions of growth deficiency or failure to thrive as well as psychosocial factors—maternal education, socioeconomic status (SES) and the quality of mother-child interaction—on cognitive development in infants in all three groups.¹ A total of 88 toddlers between the ages of 12 and 33 months were evaluated by two child psychiatrists and placed in one of three study groups: an infantile anorexia group; a normal-weight picky-eater group and normal weight healthy eaters. “All three groups were matched for age, race, gender and SES,” the authors noted.

The main research question was whether infantile anorexia is associated with lower MDI scores than those seen in infants who were picky eaters or those with healthy eating behaviours? At the same time, the authors assessed the impact of psychosocial variables on the infants’ cognitive development. Cognitive development was assessed using the Bayley Scales of Infant Development, while trained observers blind to the diagnostic group rated the quality of mother-toddler interactions during videotaped sessions.

Results showed that, on average, toddlers with infantile anorexia had MDI scores that were 11 points lower than those of healthy eaters, while MDI scores in normal-weight picky eaters were 14 points below those of infants with normal eating behaviour. Specifically, average MDI scores were 99 among infants with infantile anorexia, 96 among normal-weight picky eaters and 110 for the healthy eating group. Results also indicated that the correlation between MDI scores and the toddlers’ percentage of ideal body weight approached statistical significance.

The picky-eater group also showed a positive association between percentage of ideal body weight and MDI scores but the association did not approach statistical significance. Regardless of the diagnostic group, toddlers’ MDI scores were strongly influenced by all three psychosocial factors. Indeed, the quality of the mother-child interaction, SES status and maternal education

level explained 22% of the variance in MDI scores observed across the three groups, investigators reported.

It is also worth noting that several feeding subscales including problematic and conflictual mother-toddler feeding and play interactions were negatively associated with the MDI scores. “This study revealed two important findings,” the authors suggested. Firstly, toddlers with infantile anorexia exhibited growth deficiency but they still performed within the normal range of cognitive development.

Secondly, the MDI scores of these same toddlers were 11 points lower than those of healthy eaters while MDI scores of normal-weight picky eaters were 14 points below those of healthy eaters. The authors also pointed out that findings from their study emphasize the importance of distinguishing between non-organic forms of growth deficiency related to maternal neglect and growth deficiency that is related to conflict during feeding. “Parents become worried about the future cognitive development of their infants [and] they resort to coercive feeding,” the authors noted.

This ultimately intensifies parent-child conflict during feeding, they added, as concern over the effect of poor weight gain on subsequent cognitive development often overrides the management of feeding difficulties.

Findings from this study therefore indicate that parental concern for the nutritional needs of their young children must be balanced against the need to better manage feeding difficulties in toddlers and young children.

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Infant formulas aiming to achieve functional effects of breast milk

Research in improving the quality of infant milk formulas over the years did not necessarily aim at mimicking the exact composition of breast milk but at achieving the same functional effects, according to several literature reviews.

As noted by Dr. William Heird, Baylor College of Medicine, Houston, Texas,¹ the macronutrient composition of infant formulas resembles that of human milk and has changed little in the past few decades. However, several qualitative changes have been made to infant formulas in an attempt to more closely mimic the nutrient and non-nutrient composition of human milk and/or the performance of the breast-fed infant. For example, at least half of the protein content of most formulas today is made up of whey proteins. “Whey-predominant formulas more closely approximate the proteins in human milk,” Dr. Heird observed. Use of iron-fortified formulas is now widespread and has been credited for reducing the incidence of iron-deficiency anemia in infancy, he added.

“Changes in the types of fats used in infant formulas more closely mimic the fatty-acid pattern of human milk and have enhanced fat absorption,” Dr. Heird reported. With the recent addition of long-chain polyunsaturated fatty acids (PUFAs)

to some formulas, the fatty-acid pattern of modern formulas resembles that of human milk more closely than ever before.

There have also been “marked advances” in nutritional care of premature and low-birth-weight (LBW) infants. Formulas tailored to the needs of these infants now contain higher levels of protein, calcium and phosphorus than formulas for term infants. Because LBW infant formulas still lacked the immunological benefits of human milk, breast-milk fortifiers have now been introduced. Other recent additions to infant formulas include the nucleotides. Evidence suggests nucleotide-supplemented formulas may strengthen immune responses in infants and lower the incidence of diarrheal episodes.

Currently, Neosure is the only formula in the pre-term infant category that contains 72 mg/L of nucleotides, levels that best mimic nucleotide levels in human breast milk.

Health benefits of nucleotide supplementation in infant formulas

A meta-analysis² evaluating the potential advantages of adding nucleosides to infant formulas indicates that evidence is sufficiently robust to support the health benefits of supplemented formulas over control formulas and even breast milk.

Dr. Pedro Gutiérrez-Castrellón, Paediatric Health Evidence Analysis Centre, National Institute, Mexico City, Mexico, and colleagues collectively re-analyzed 15 separate, randomized clinical trials in which ribonucleotide-supplemented infant formulas (RSIFs) were compared to either formulas which did not contain nucleotides or to breast milk. End points analyzed included immune responses to common pediatric vaccinations and the incidence of acute respiratory infections and diarrheal episodes.

The new analysis revealed that infants who were fed RSIF-supplemented formulas had more vigorous antibody responses to the *Haemophilus influenzae* vaccine, as well as to diphtheria toxin and to the oral polio vaccine, than infants fed either control formula or breast milk. Similarly, infants who received an RSIF-supplemented formula had fewer episodes of diarrhea than infants fed either the control formula or breast milk. However, the incidence of acute respiratory infections between the supplemented vs. unsupplemented formula and breast milk groups was similar.

The health benefits of nucleotide-enriched formulas are observed once formulas contain at least 1.9 mg/418.4 KJ of

nucleosides, as the authors pointed out. These benefits are either maintained or potentially enhanced when the dose is increased to 10.78 mg/418.4 KJ, as the authors noted: formulas supplemented with nucleosides containing at least 5 mg/418.4 KJ (33 mg/L) can therefore be expected to provide documented health benefits.

There was also evidence that nucleotide-supplemented formulas with considerably higher doses of nucleotides—namely, 10.78 mg/418.4 KJ or 72 mg/L such as found in Neosure—had “considerably greater effects” on end point variables.

Palm olein-free formulas facilitate fat, calcium absorption better

Absorption of fat, palmitic acid and calcium are all superior in infants fed formulas that do not contain palm oil (like similac) and its low melting fraction, palm olein (PO), than PO-containing formulas, according to American research.

Dr. Winston Koo, Wayne State University, Detroit, Michigan, and colleagues carefully reassessed studies in which the physiologic effects of using PO-containing formulas as the dominant lipid source in the fat blend of infant formulas were compared with formulas that did not contain PO³. Infants ranged in age from birth to 192 days. In total, researchers identified nine studies in which groups of infants who received PO-containing vs. non-PO-containing formulas were compared.

“Within each published study, there was some variability in the effect size between non-PO and PO groups,” Dr. Koo reported. “But the overall conclusion is that the use of PO to match the content of palmitic acid in infant formulas to that of human milk has unintended physiological consequences and its avoidance or substitution with synthetic triacylglyceride can prevent this detrimental effect.”

Similac is one example of a PO-free formula and as such, can help ensure optimal absorption of fat, palmitic acid and calcium in infants who are formula-fed.

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