

## Commentary

## Improving the Diets of the Young: Considerations for Intervention Design

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**B**reastfeeding and appropriate complementary food introduction during infancy are related to positive health and cognitive outcomes in childhood and later life. The benefits of breastfeeding to infant nutrition, gastrointestinal and immune function, neurodevelopment, and psychological well-being are well documented (1,2) and are enhanced with exclusive breastfeeding and breastfeeding for 12 months and beyond (3,4). Furthermore, appropriate feeding of complementary and table foods to young children may ensure normal growth, promote healthful eating habits, and help prevent obesity and other health problems during and after childhood (5).

Findings from the 2002 Feeding Infants and Toddlers Study (FITS) on breastfeeding rates and diet quality of children 0 to 24 months old (6-8) indicate that many parents and caregivers could benefit from guidance about feeding infants and young children. Specifically, the FITS data suggest that caregivers be advised on introducing appropriate complementary foods, offering a healthful variety of foods in place of energy-dense items into their children's diet, and breastfeeding as long as possible throughout the first year (8). In this supplement to the *Journal*, Hendricks and colleagues (9) extend these earlier observations by identifying the specific population subgroups within the FITS sample that might be particularly in need of counsel.

Although a variety of demographic and social factors influencing the initiation and duration of breastfeeding have been identified (ie, maternal age, education level, ethnicity, and family income) (10-13), the study by Hendricks and colleagues (9) furthers the literature by examining maternal demographic and socioeconomic correlates related to exclusivity of breastfeeding and adherence to complementary feeding recommendations and transitions to complementary and table foods and beverages. Strengths of the study include the large sample size and the random selection of study subjects from among 3 million families with newborns in the United States. Based on population data at the time of the study, the FITS sample was reasonably

representative of all US infants and toddlers, with ethnic distributions close to national rates (14). The FITS food intake data represent one 24-hour recall for each child given by caregivers. Limitations of grouping children into those who consume or do not consume fruits, vegetables, salty snacks, and sweetened beverages based on this mode of dietary assessment should be noted. The findings of Hendricks and colleagues (9) indicate that breastfeeding initiation and duration improve with the mother's education level and marital status, whereas participation in day care and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) were detractors to breastfeeding longer. Delaying complementary food introduction until 4 months of age and including fruit to the exclusion of sweetened beverages and candy (at least on the day of the recall) in the diets of children were related to the mother's age and education level; day care participation was associated with consumption of salty snacks. Although it is clear that findings from this study need to be confirmed with more days of infant food data and consideration given to quantity of food eaten, the results suggest that initiatives to improve infant feeding practices should focus on assisting mothers who are younger, less educated, unmarried, and whose children are in day care or enrolled in WIC.

These findings exemplify how population subgroups may differ, and they serve as a reminder to be sensitive to group patterns and attributes. Contemporary thinking suggests that focusing on the social environment in addition to intra-individual factors such as a person's knowledge and skills can enhance the chance of successful interventions (15). Behavioral theories can guide the search to understand a person's eating pattern and also suggest ways to effectively influence and change behavior. For example, the Stages of Change model (16) can be used to help understand a mother's readiness to change; mothers who are less educated may be reticent to alter current infant feeding practices compared with more highly educated mothers, and this knowledge can lead to the selection of appropriate counseling and motivational strategies. Likewise, the social cognitive theory (17) recognizes environmental influences in determining behavior; a child who is in day care may be exposed to certain foods such as salty snacks, thus changes in the environment may be needed to promote more healthful behaviors. Therefore, theories may help one orient complex social, environmental, and personal factors, such as those elucidated in the FITS survey, into a useable framework for comprehensive intervention design.

New evidence-based guidelines on feeding infants and toddlers contain a plethora of valuable information to assist health care professionals in the development of programs directed at child feeding practices. The Start Healthy Feeding Guidelines for Infants and Toddlers (18) focus not only

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on when and what to feed the very young child, but also on how to introduce complementary and table foods for the first time. Based on findings from Hendricks and colleagues (9) and others (6-8), even in the best social and environmental circumstances among the FITS sample, fruit and vegetable consumption was fairly low on the day of the diet assessment. If, in fact, this reflects true dietary inadequacy, it is likely that these early eating habits will contribute to poor diet quality in later years. Confirmation of usual intake of different foods in the diets of very young children in a longitudinal design is needed. Nonetheless, early exposure of a child to a variety of healthful foods is a parent's role in fostering healthful eating habits early on. Parents need to be attuned to their child's developmental transitions, such as changes in appetite, food preferences, and ability to self-feed. Interventions that promote positive parent-child feeding interactions and strategies will likely engender healthful eating habits in early life. Toward this end, the Start Healthy Feeding Guidelines for Infants and Toddlers (18) provide a wealth of well-referenced, practical information supporting strategies parents can use to introduce new foods, create a positive feeding environment for their child, interpret and respond to hunger cues, assist children with picky eating and food jags, and generally establish a healthful feeding relationship. As educational materials related to these guidelines are being developed for the general public, targeting materials that address the unique dietary circumstances and child-feeding issues of particularly hard-to-reach or at-risk families would be a logical next step in disseminating these guidelines for general use. The findings of Hendricks and colleagues (9) may be particularly useful in this regard.

Importantly, data from FITS support the fact that adherence to different recommendations is interrelated. That is, mothers who breastfed their children tended to be those who delayed introduction of complementary foods and cow's milk until the child was developmentally ready, and included a healthful variety of foods such as fruits in the child's daily diet to the exclusion of sweetened beverages and desserts (9). These findings suggest that good support for breastfeeding during pregnancy or early after birth is critical and that communicating and supporting optimal infant and child feeding practices along with breastfeeding may be an effective means of enhancing compliance with infant and toddler feeding recommendations. New guidelines on the role of the pediatrician and other health professionals in promoting and supporting breastfeeding focus heavily on the individual and encourage teaching, modeling, and provision of supportive structures (1,2). Learning about child feeding through behavioral modeling, as well as through acquisition of knowledge and social support, may work well to teach mothers about new food-related child-care behaviors. Developing comprehensive interventions that provide guidance not just on breastfeeding but also on the entire infant- and child-feeding continuum will be one of the significant challenges for improving infant and child nutrition in the future.

## References

1. American Academy of Pediatrics. Breastfeeding and the use of human milk. *Pediatrics*. 1997;100:1035-1039.
2. American Dietetic Association. Position of the Amer-

- ican Dietetic Association: Promoting and supporting breastfeeding. *J Am Diet Assoc*. 2005;105:810-818.
3. Bellagio Child Survival Study Group. Child Survival V: Knowledge into action for child survival. *Lancet*. 2003;362:323-327.
4. World Health Organization, United Nations Children's Fund. *Global Strategy for Infant and Young Child Feeding*. Geneva, Switzerland: World Health Organization; 2003.
5. Pac S, McMahon K, Ripple M, Reidy K, Ziegler P, Myers E. Development of the Start Healthy Feeding Guidelines for Infants and Toddlers. *J Am Diet Assoc*. 2004;104:455-467.
6. Devaney B, Ziegler P, Pac S, Karwe V, Barr SI. Nutrient intakes of infants and toddlers. *J Am Diet Assoc*. 2004;104(suppl 1):S14-S21.
7. Fox MK, Pac S, Devaney B, Jankowski L. Feeding Infants and Toddlers Study: What foods are infants and toddlers eating? *J Am Diet Assoc*. 2004;104(suppl 1):S22-S30.
8. Briefel RR, Reidy K, Karwe V, Devaney B. Feeding Infants and Toddlers Study: Improvements needed in meeting infant feeding recommendations. *J Am Diet Assoc*. 2004;104(suppl 1): S31-S37.
9. Hendricks K, Briefel R, Novak T, Ziegler P. Maternal and child characteristics associated with infant and toddler feeding practices. *J Am Diet Assoc*. 2006;106(suppl 1):S135-S148.
10. Rassin DK, Richardson CJ, Baranowski T. Incidence of breastfeeding in a low socioeconomic group of mothers in the US: Ethnic patterns. *Pediatrics*. 1984; 73:132-137.
11. Wright AL, Holberg C, Taussig LM. Infant feeding practices among middle-class Anglos and Hispanics. *Pediatrics*. 1988;82:496-503.
12. Hirschman C, Butler M. Trends and differentials in breastfeeding. *Demography*. 1981;18:39-54.
13. Scott JA, Binns CW. Factors associated with the initiation and duration of breastfeeding: A review of the literature. *Breastfeeding Rev*. 1999;7:5-16.
14. Devaney B, Kalb L, Briefel R, Zavitsky-Novak T, Clusen N, Ziegler P. Feeding Infants and Toddlers Study: Overview of the study design. *J Am Diet Assoc*. 2004;104(suppl 1):S8-S13.
15. Glanz K. Current theoretical bases for nutrition intervention and their uses. In: Coulston AM, Rock CL, Monsen ER, eds. *Nutrition in the Prevention and Treatment of Disease*. San Diego, CA: Academic Press; 2001:83-91.
16. Prochaska JO, Redding C, Evers K. The transtheoretical model of behavior change. In: Glanz K, Lewis FM, Rimer BK, eds. *Health Behavior and Health Education: Theory, Research, and Practice*. 2nd ed. San Francisco, CA: Jossey-Bass; 1992:60-84.
17. Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall; 1986.
18. Butte N, Cobb K, Dwyer J, Graney L, Heird W, Rickard K. The Start Healthy Feeding Guidelines for Infants and Toddlers. *J Am Diet Assoc*. 2004;104:442-454.