ENCYCLOPEDIA
on Early Childhood
Development

Facilitating Improved Nutrition for Pregnant and Lactating Women, and Children 0–5 Years of Age Commenting: Black, Reifsnider, and Devaney

Kathryn G. Dewey, PhD

University of California, Davis, USA

September 2003

Introduction

The three papers on this theme provide an excellent overview of several key topics related to improving nutrition among childbearing women and their children. As Reifsnider points out, it is important to take a life cycle approach to this issue, rather than focusing solely on nutrition *during* pregnancy and the postpartum period. Nutrition during childhood and adolescence influence a woman's pre-conceptional nutritional status, which subsequently influences the outcome of pregnancy and the health of her child. Malnutrition is perpetuated across generations via this cycle. For this reason, programs to improve the nutrition of women and

©2003-2026 ABILIO | NUTRITION – PREGNANCY

children must be comprehensive, targeting all stages of the life cycle. This commentary will focus on some of the issues not covered by the three papers, such as the lack of dietary guidelines specifically designed for pregnant and lactating women and young children, the importance of breastfeeding for both mother and infant, and the emerging crisis accompanying increased rates of child and adult obesity.

Subject

Why are maternal and child nutrition important in the context of early childhood development? There are numerous linkages between adequate prenatal and postnatal nutrition and a child's physical, cognitive, emotional, and motor development. For example, low birthweight resulting from intrauterine malnutrition is a key predictor of developmental delay, among other adverse outcomes.[1] Duration of breastfeeding has been positively associated with a child's cognitive[2] and motor[3,4] development. Maternal nutritional status, such as iron-deficiency anaemia, may affect the degree and quality of child caregiving. Lastly, maternal dietary practices and weight status are strongly related to a child's risk of being overweight,[5] a condition that can have lasting consequences on emotional and physical development.

Problems

One of the barriers to improving maternal and child nutrition is the lack of consistent, evidence-based dietary guidelines targeted specifically at pregnant and lactating women, infants, and young children. Although nutrition during pregnancy and lactation was the topic of two comprehensive documents published by the U.S. Institute of Medicine,[6,7] and guidelines for maternal nutrition have been developed by various agencies, states, and countries, no critical scientific review or systematic consolidation of these recommendations has taken place. Consequently, there has been a duplication of efforts and inefficient targeting of resources. Efforts are underway to develop dietary guidelines for children, although most agencies have not yet grappled with recommendations for children under 2 years of age (apart from providing advice on breastfeeding). One exception is the Pan American Health Organization (under the aegis of the World Health Organization), which recently issued guiding principles for complementary feeding (6–24 months) of breastfed children.[8]

Research Context

Despite decades of interest in improving maternal and child nutrition, there is relatively little evidence regarding the efficacy (biological impact under ideal conditions) and effectiveness (effect of programs implemented on a large scale) of various strategies and programs. Previous studies have rarely assessed child development as one of the outcomes.

Key Research Questions

The three papers on this theme list several research questions that warrant attention. In the context of early childhood development, other important questions include the following:

1. *What is the relative contribution of pre-conceptional, peri-conceptional, prenatal, and postnatal nutrition to subsequent child growth and development, and which nutrients are most critical at each of these stages?*
   Some outcomes appear to be influenced by a mother's general nutritional status (eg, body mass index), whereas others may be affected by specific micronutrient deficiencies occurring at critical times, such as during organogenesis (the development of organs) or during myelination (the formation of the lipid substance [fat] that surrounds parts of some nerve cells, sometimes used as an index of maturation).

2. *How do we explain observed associations between the duration of breastfeeding and child cognitive and motor development?*
   Are these associations attributable to certain constituents in human milk, such as docosohexanoic acid (a long-chain polyunsaturated fatty acid important for brain development), the act of breastfeeding itself (via the enhancement of the maternal–infant relationship), or residual confounding by attributes of the family environment that have not been adequately measured in most studies?

3. *What is the most cost-effective mix of strategies to improve maternal and child nutrition, including nutrition education or counselling, food subsidies or supplements for low-income women, and micronutrient fortification or supplementation?*
   During pregnancy, it is very difficult to achieve the recommended intakes of certain nutrients (such as iron) without the use of fortified products or vitamin-mineral supplements. On the other hand, most nutritionists believe that focusing on food choices is the best long-term approach for improving nutrition.

Recent Research Results

Significant advances have been made in our understanding of maternal and child nutrition within the past several years. Key findings include the following:

1. *The global reproductive and developmental consequences of micronutrient deficiencies*
   These include impaired cognitive development (linked with deficiencies of iron, iodine, and zinc), impaired immunity (associated with lack of iron, vitamin A, and zinc), adverse reproductive outcomes, and maternal health problems (attributable to deficiencies of iron, iodine, vitamin A, zinc, folate, and calcium), and poor bone status in infants and children (related to low intakes of calcium, other minerals, and vitamin D).[9]

2. *The link between fetal/early postnatal nutrition and chronic health problems in adulthood*
   An avalanche of research papers has provided evidence for the "fetal programming" hypothesis which purports that the nutritional conditions experienced by the fetus and young infant result in permanent metabolic changes that alter the risk of hypertension, obesity, diabetes, heart disease, and mortality in later life.[10,11]

3. *The beneficial effects of breastfeeding for both mother and infant*
   The list of outcomes associated with breastfeeding grows longer each year. It includes enhanced maternal postpartum health (emotional well-being, weight loss, reduced risk of anaemia), lower risk of maternal ovarian and breast cancer, reduced infant morbidity (gastrointestinal illness, severe respiratory illness, ear infections, allergies), lower risk of child obesity, diabetes, cancer and other chronic health problems, and enhanced cognitive and motor development.

4. *The causes and consequences of maternal and child obesity*
   Alarming increases in the prevalence of adult and child obesity have occurred not only in the US[12] and other industrialized countries, but also in developing countries.[13] Maternal obesity has recently been linked to greater risk of complications during pregnancy and delivery and of congenital anomalies in offspring.[9] Child obesity increases the risk of type II diabetes and other adverse health outcomes. Our understanding of the genetics of obesity are is improving, but genetics do not explain the recent trends. The relative contribution of environmental factors, such as sedentary lifestyles and dietary habits, is the subject of intense research.

Conclusions

Improving maternal and child nutrition requires multiple strategies, with interventions aimed at various critical points during the life cycle. Ensuring adequate diets prior to pregnancy, during pregnancy and lactation, and during early childhood (particularly the first two years) is essential. Such interventions have the potential to substantially enhance child development, as well as the general health of women and children. There is a need for interdisciplinary teams of experts in fields such as reproductive health, nutrition and child development to work together to assess the efficacy and effectiveness of various approaches.

Implications for Policy and Services

Policy makers and service providers can take action by making maternal and child nutrition an integral part of comprehensive programs that serve women and children. A recent report by the March of Dimes provides the rationale and a blueprint for how to achieve this goal.[9] In addition, program planners and managers can stimulate further progress by requesting evidence-based dietary guidelines for pregnant and lactating women, and young children, and by advocating for the research required to increase our understanding of the most critical needs and the interventions most effective in addressing these needs.

References

1. Grantham-McGregor SM. Small for gestational age, term babies, in the first six years of life. *European Journal of Clinical Nutrition* 1998;52 (Supp 1):S59-S64.
2. Jain A, Concato J, Leventhal JM. How good is the evidence linking breastfeeding and intelligence? *Pediatrics* 2002;109(6):1044-1053.
3. Vestergaard M, Obel C, Henriksen TB, Sorensen HT, Skajaa E, Ostergaard J. Duration of breastfeeding and developmental milestones during the latter half of infancy. *Acta Paediatrica* 1999;88(12):1327-1332.
4. Dewey KG, Cohen RJ, Brown KH, Rivera LL. Effects of exclusive breastfeeding for four versus six months on maternal nutritional status and infant motor development: Results of two randomized trials in Honduras. *Journal of Nutrition* 2001;131(2):262-267.
5. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine* 1997;337(13):869-873.
6. Institute of Medicine. Subcommittee on Nutritional Status and Weight Gain during Pregnancy. *Nutrition during pregnancy: part I, weight gain : part II, nutrient supplements / Subcommittee on Nutritional Status and Weight Gain during Pregnancy, Subcommittee on Dietary Intake and Nutrient Supplements during Pregnancy, Committee on Nutritional Status during Pregnancy and Lactation, Food and Nutrition Board, Institute of Medicine, National Academy of Sciences*. Washington, DC: National Academy Press; 1990.
7. Institute of Medicine. Subcommittee on Nutrition during Lactation. *Nutrition during lactation/ Subcommittee on Nutrition during Lactation, Committee on Nutritional Status during Pregnancy and Lactation, Food and Nutrition Board,*

Institute of Medicine, National Academy of Sciences. Washington, DC: National Academy Press; 1991.

8. Pam American Health Organization / World Health Organization. *Guiding principles for complementary feeding of the breastfed child*. Washington, DC: Pan American Health Organization; 2003. Available at: http://www.paho.org/English/AD/FCH/NU/Guiding_Principles_CF.htm. Accessed September 09, 2003.
9. March of Dimes. *Nutrition today matters tomorrow: a report from The March of Dimes Task Force on Nutrition and Optimal Human Development.* Wilkes-Barre, Pa: March of Dimes; 2002.
10. Morley R, Dwyer T. Early exposures and later health and development. In: Black RE, Michaelsen KF, eds. *Public health issues in infant and child nutrition*. Philadelphia, Pa: Lippincott, Williams & Wilkins; 2002:257-278. *Nestle Nutrition Workshop Series*; vol. 48.
11. Joseph KS. Validating the fetal origins hypothesis: an epidemiologic challenge. In: Black RE, Michaelsen KF, eds. *Public health issues in infant and child nutrition*. Philadelphia, Pa: Lippincott, Williams & Wilkins; 2002:295-316. *Nestle Nutrition Workshop Series*; vol. 48.
12. Ogden CL, Flegal KM, Carroll MD, Johnson CL. Prevalence and trends in overweight among US children and adolescents, 1999-2000. *JAMA -Journal of the American Medical Association* 2002;288(14):1728-1732.
13. Caballero B, Popkin BM, eds. *The nutrition transition: Diet and disease in the developing world*. New York, NY: Academic Press; 2002.