

Maternal & Infant Nutrition Briefs



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A research-based newsletter prepared by the University of California for professionals interested in maternal and infant nutrition



Recent Trends in Breast-feeding Rates

The Ross Laboratories Mothers Survey (RLMS) is an on-going survey of infant feeding practices in the U.S. Since 1954, the RLMS has documented the rise and fall of breast-feeding rates among a large sample of mothers who complete a mail-in survey. According to this source, national breast-feeding rates increased from the early 70's to early 80's but declined from 1984-1989. Thereafter, breast-feeding rates began to climb again. In this paper, data from 2001 indicate breast-feeding rates have reached at all-time high, with 69.5% of mothers breast-feeding in the hospital and 32.5% of mothers continuing to breastfeed at six months postpartum.

The RLMS is mailed annually to 1.4 million mothers selected from a large database compiled from 2500 different sources, including hospitals, magazine subscriptions, and maternity shops. In this survey, breast-feeding is defined as "any breast-feeding", and exclusive breast-feeding is defined as only receiving breast milk (no cow's milk or supplemental formula) No data are collected on intake of solid foods. Participation in the Supplemental Nutrition program for Women, Infants, and Children (WIC) is determined by a single question that asks whether the mother or youngest child has participated in WIC since birth of that child.

The RLMS also found significant increases in breast-feeding across almost all demographic groups (i.e., ethnicity, age of mother, parity, WIC participants, region of the U.S.) The greatest increases were observed among those groups with low breast-feeding rates in 1996, specifically black women, teenagers, mothers with less than a high school education, primiparas, WIC participants, and women living in the West South Central region of the U.S. For example, among black women, in-hospital breast-feeding rates increased by 42%, from 37.1% in 1996 to 52.9% in 2001. Breast-feeding rates at 6 months postpartum increased by 93% for black women, from 11.3% to 21.9%. While there may be plenty to celebrate about the data, much of the increase in rates appears to be among women who provide both breast milk and formula to their babies. Twenty years ago, 55% of the in-hospital breast-feeding

was exclusive breast-feeding, whereas in 2001, 46.3% was exclusive breast-feeding.

Although the survey was mailed to 1.4 million women, the authors never mention exactly how many women responded to the survey in 2001 nor how response rates may have differed over time. Lack of this information poses problems in interpreting changes in breast-feeding rates, particularly among ethnic subgroups of the population. The authors conclude that more efforts are needed to increase duration of breast-feeding, particularly through changes in the workplace, physician education in the area of breast-feeding management, and breast-feeding promotion. Implementation of the "Baby Friendly" Hospital initiative, although not specifically mentioned in the article, is also likely to be an important step in increasing rates of exclusive breast-feeding and extending duration to at least six months or more.

Source: Ryan AS, Wenjun Z, Acosta A. Breast-feeding continues to increase into the new millennium. *Pediatrics* 2002; 110: 1103-1109.

Do Early Food Experiences Make a Difference?

Children who like and eat a variety of foods, especially fruits and vegetables, are more likely to be getting enough vitamins and minerals in their diets. While food experiences during infancy and early childhood are thought to be important in teaching children to like a variety of fruits and vegetables, no long-term research on the topic has been done. The purpose of this paper was to examine the effects of early experiences with fruits and vegetables on later food patterns during childhood.

The data come from a small, longitudinal study of 70 infant-mother pairs who were interviewed during infancy and again 6 to 8 years later. All of the subjects were from white, middle to upper-middle income families. The mothers provided one 24 hour dietary recall for their youngest child at 2, 3, 4, 6, 8, 10, 12, 16, 20, 24, 28, 32, and 36 months of age. Starting when the child was 3.5 years, the mothers completed a two-day food record and a 24-hour diet recall of the child's intake every six months until the child was eight years old. The researchers used the data from the infant/toddler period to calculate the total months of breast-feeding, age of introduction to fruits and vegetables, early variety scores for fruits and vegetables (total # of different items eaten daily), and early exposure scores (total # of times fruits/vegetables eaten daily). Dietary data from the children were used to calculate a dietary variety index that takes into account both the amount and variety of fruits and vegetables consumed. The mothers' food preferences for fruits and vegetables were assessed twice--at 28-36 months and again at 8 years.

Different factors were related to the variety of vegetables and fruit consumed during childhood. For vegetables, the only factor related to the variety of vegetables consumed was the number of vegetables liked by the mother when the child was 28 to 36 months old ($p < 0.014$). For fruit, early variety ($p < 0.0005$) and exposure to fruit ($p < 0.0007$), as well as duration of breast-feeding ($p < 0.0148$), were related to the variety of fruit consumed during childhood. However, even though a relationship was found between early food experiences and later food patterns, the factors examined here only accounted for 8 to 25% of the variability in dietary variety during childhood. Thus, many other factors not included in the study determine dietary variety during childhood.

This study is the first to examine the influence of early food experiences on later dietary variety using a longitudinal design. However, since the sample included only white, middle to

upper-middle income families, more research is needed among other segments of the population.

Source: Skinner JD, Carruth BR, Bounds B, Ziegler P, Reidy K. Do food-related experiences in the first 2 years of life predict dietary variety in school-aged children? *J Nutr Educ Behav* 2002; 34: 310-315.

Should Breast-fed Infants be Given Iron?

In the U.S., the Institute of Medicine routinely recommends iron drops for breast-fed infants between the ages of four to six months. While iron is an essential nutrient, there are potential risks in prescribing iron for breast-fed infants who are not iron deficient. For example, some have argued that lactoferrin, a protein in human milk, could become saturated in the presence of too much iron and thus offer less protection to the infant from infections. Excess iron might also stimulate the production of free radicals, which could potentially affect gene expression and impair growth. The purpose of this paper is to determine the effects of iron supplementation on growth and morbidity of breast-fed infants.

The study was carried out in Sweden and Honduras, two countries where the prevalence of iron deficiency anemia might be expected to differ greatly. Previously, the authors reported that iron supplementation to breast-fed infants was only beneficial in reducing anemia in Honduras, where the problem is more prevalent. Starting at four months of age, healthy, full-term breast-fed infants were randomly assigned to one of the following groups: 1) iron drops given from 4 to 9 months; 2) iron drops given from 6 to 9 months; 3) placebo given from 4 to 9 months. All supplemented infants received 1 mg of iron per kg body weight daily. The researchers measured growth and collected morbidity data every 2 weeks. Blood samples were collected by venipuncture.

Iron supplementation had no effect on weight gain. However, particularly in Sweden, iron had a negative effect on length and head circumference gain. A similar effect on linear growth was seen in Honduras but only among younger infants whose initial hemoglobin values were greater than 110 g/L. The effect of iron supplements on episodes of diarrhea also depended on baseline iron status. Diarrhea was less common in supplemented infants compared to controls, if hemoglobin value at 4 months was less than 110 g/L. Just the opposite was true, if initial hemoglobin was greater than 110 g/L.

This study is the first to report the effects of iron supplements on infant growth and illness, based on a randomized, double-blind, controlled, clinical trial. The results suggest that routine iron supplements benefit infants with low hemoglobin values but may pose risks in other populations of well-nourished, breast-fed infants.

Source: Dewey KG, Domellöf M, Cohen RJ, Rivera LL, Hernell O, Lönnerdal B. Iron supplementation affects growth and morbidity of breast-fed infants: results of a randomized trial in Sweden and Honduras. *J Nutr* 132; 3249-3255.

Iron Supplements for Pregnant Women: Weekly or Daily?

Based on the high prevalence of anemia in developing countries, the World Health Organization currently recommends routine daily iron supplementation of 60 mg per day during 6 months of pregnancy. However, there are many barriers to implementing that recommendation, with low compliance being a major hurdle. Some have argued that weekly

iron supplements may actually be better absorbed than daily supplements, because daily supplements might load the intestinal mucosa with iron, blocking further absorption. In making recommendations, both biological and social issues must be considered. Nutritionists must determine whether an intervention is efficacious or, in other words, will work under the best of conditions. Equally important is whether the intervention is effective or works under “real world” conditions.

The authors of this study have attempted to examine both efficacy and effectiveness of daily vs. weekly iron supplements in Bangladesh, where about 50% of the pregnant women are anemic. To measure compliance precisely, the researchers gave the subjects supplements in bottles fitted with microchips to record the time and date the bottles were opened. Fifty prenatal clinics were randomly assigned to administer either 60 mg of iron daily or 120 mg of iron weekly. Complete data were available for 140 women who began taking the supplements around 18 to 24 weeks of pregnancy. Venous blood samples were collected at baseline and 12 weeks later.

In measuring efficacy, the effect of iron per tablet on hemoglobin was the same for the weekly vs. daily supplement regimen. This observation implies that mucosal build-up of iron is not very important in reducing iron absorption in humans, as proponents of daily supplementation have argued. Despite much lower compliance rates (68% for daily vs. >100% weekly supplements), daily iron supplements were more effective in increasing hemoglobin levels faster in these women.

The authors suggested that some advantage is gained in recommending daily supplements over weekly supplements since the earlier anemia is treated, the better the pregnancy outcome. They also present evidence that, even in Bangladesh, the WHO recommendation of 60 mg daily for 6 months may be too high. Alternatively, they suggest that after about 12 weeks of daily iron supplementation, no further increases in hemoglobin levels are observed. More research is still needed to determine the best strategy to deliver the amount of iron needed while reducing the gastrointestinal side effects.

Source: Ekström EC, Ziauddin SM, Mushtaque A, Chowdhury R, Chowdhury SA, Lönnerdal B, Habicht JP, Persson LA. Efficacy and trial effectiveness of weekly and daily iron supplementation among pregnant women in rural Bangladesh: disentangling the issues. *AJCN* 2002; 76; 1392-1400.

Maternal and Infant Nutrition Briefs is a research-based newsletter prepared by Dr. Lucia Kaiser (lkaiser@ucdavis.edu), a Cooperative Extension Specialist in the Department of Nutrition, University of California at Davis. This newsletter is written for health professionals interested in nutrition of mothers and young children.

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