



# Maternal and Infant Nutrition Briefs

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## **Do pregnant teens need to get their calcium from the dairy group?**

The recommended amount of calcium for pregnant teens is 1300 mg per day. That requirement can be met when a MyPyramid diet plan of 2000 or more calories including 3 servings from the dairy group is followed. Although milk and dairy products are good sources of calcium, vitamin D and other nutrients, some pregnant women find it difficult to consume even 3 servings of dairy products and choose calcium-fortified juice or supplements instead. The purpose of this study was to evaluate the effects of different calcium sources on pregnancy outcomes in teenagers.

The study involved a randomized, controlled trial, where 72 pregnant teens were assigned to one of the following groups: 1) control (usual diet); 2) dairy products (4 servings a day, at least 1200 mg calcium); or 3) calcium-fortified juice (4 cups a day, at least 1200 mg calcium). The teens, ages 15-17 years and free of chronic health problems, enrolled by the 20<sup>th</sup> week of pregnancy and continued in the study until delivery. Most of the teens (86%) were white and the remainder was Latino. At baseline, 6 months, and delivery, the researchers collected 2-day diet records and maternal weight, height, and blood pressure. At delivery, they collected blood samples from the mother and the umbilical cord to analyze for calcium, vitamin D, and other nutrients. Other data included the infant's birth weight, length, blood pressure, and total body composition (measured by X-ray absorptiometry). During the study, the juice group found it very difficult to drink 4 cups a day of juice, so the researchers began to provide calcium supplements to meet the daily target of 1200 mg.

At baseline, the teen mothers in the three groups were similar in body mass index, blood pressure, and age. Mothers in the dairy and juice groups consumed significantly more calcium at six months and delivery than control mothers (dairy: 1771 mg; Ca-fortified juice: 1474 mg; controls, 862 mg;  $p < 0.001$ ). Dairy group mothers also consumed more vitamin D than the other two groups ( $p < 0.001$ ). Moreover, serum vitamin D and folate levels were significantly higher in dairy group mothers than in the other groups ( $p < 0.001$ ). Although calorie and protein intakes and weight gain of the groups were similar, mean birth weight of the infants in the dairy group was significantly higher than that of the juice and control groups infants (dairy: 3517 g; Ca-fortified juice: 3292 g; controls: 3277 g;  $p < 0.001$ ). Total body calcium was also higher in the dairy group infants than in controls.

*Conclusions and Implications: This randomized, controlled trial provides some evidence that substituting calcium-fortified juice for dairy products may not have the same*

*beneficial effect on pregnancy outcomes of pregnant teens. The article does not state whether any of the teens were taking other vitamin or mineral supplements nor what the sources of calcium were in the control diet. Thus, it is still unclear whether a MyPyramid diet plan with 3 servings from the dairy group or an altered plan with 4 servings of dairy products is needed. The study needs to be repeated in a larger, more ethnically diverse population.*

**Source: Chan GM, McElligott, McNaught T, Gurmail G. Effects of dietary calcium intervention on adolescent mothers and newborns. *Obstet and Gynecol* 2006; 108 (3):565-571.**

## **Fruit juice is related to weight gain in young children**

Since the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) reaches about 25% of the young children in the U.S., specific foods and nutrition advice provided through WIC have important public health implications for early obesity prevention. Studies about the relationship of juice intake to excessive weight gain have yielded conflicting results. Parent feeding practices, although well-studied in white middle-class families, have not been sufficiently examined in ethnically diverse, low-income populations. The purpose of this study was to determine the effects of food and beverage intakes, parental feeding practices, and nutrition education on changes in adiposity (or body fatness) in young children enrolled in the WIC program.

The study collected data on children, ages one to five, who participated in the New York WIC program, from 1999 to 2002. At each WIC site, parents completed questionnaires in English or Spanish, providing details on their children's usual daily servings of whole fruit, juice, milk, carrots, potatoes, and other vegetables. Parents also reported how often they try to limit how much their children eat and if they have tried offering more fruit and vegetables. A subsample was asked if they had received advice from WIC about serving low-fat milk and more fruits and vegetables. The authors used multiple regression to see how eating patterns, parent feeding practices, and WIC advice were related to adiposity gain, as measured by changes in body mass index (BMI)-for-age over time. The analysis included only those children with at least three weight and height measurements, taken in the clinic, after two years of age (n=971).

In this sample, 15.6% of the children were at risk of overweight, and 17.3% were overweight at the beginning of the study. Increased juice intake was associated greater increase in adiposity but only in those children who were initially at risk of overweight or overweight ( $p < 0.01$ ). None of the other food or beverage intake variables were related to adiposity change. Parental effort to offer more fruit was marginally associated with slower gain in adiposity ( $p < 0.06$ ) but again, only in children initially at risk or overweight. WIC advice was not related to changes in adiposity.

*Conclusions and Implications The authors conclude that reducing intake of fruit juice and increasing whole fruit may be a promising strategy for early obesity prevention in the WIC program. There are many limitations to this study, particularly its dependence on parental report of feeding practices and children's dietary intakes. Nevertheless, this study does provide some support for recent proposed changes in the WIC food packages.*

Source: Faith MS, Dennison BA, Edmunds LS, Stratton HH. Fruit juice intake predicts increased adiposity gain in children from low-income families: weight status by environment interaction. *Pediatrics* 2006; 118: 2066-2075.

## **Dietary intake at 4 months of life predicts risk of overweight**

Recent studies have linked rapid weight gain during infancy to later risk of obesity. Growth during the first two years of life varies widely. The purpose of this study was to determine factors influencing early energy intake and whether greater energy intake is associated with rapid weight gain and overweight in childhood.

The data are from the Avon Longitudinal Study of Parents and Children (ALSPAC), which recruited 13,971 expectant mothers in the United Kingdom between 1990-1992. At four weeks and six months after delivery, the mothers completed questionnaires on weaning foods. At four months of age, a random subsample of mothers kept a one-day food record for their infants. Estimates of energy intake among the breast-fed group are not very good since the researchers only recorded number of minutes breastfed and did not weigh the babies before and after a feeding. However, dietary intake of formula-fed babies was easy to assess, so better estimates of their energy intakes are available. The researchers also recorded birth weights from the hospital chart and weighed and measured the children 10 times between 4 to 61 months. The main outcomes were rapid weight gain from birth to 2 years and body mass index (BMI)-for-age above the 85<sup>th</sup> percentile at 3-5 years of age (at risk of overweight or overweight).

At 4 months of age, 33.9% were breastfeeding (not given formula); 56.6% were fed formula (not given breast milk); and the remainder, 9.4% were fed both breast milk and formula (mixed). *Energy intake at 4 months* was greatest in those formula-fed and mixed-fed infants who had been introduced to solid foods earlier (at 0-1 mo: 670 calories; at 2-3 mos.: 635 calories; at 4 or more mos. 618 calories,  $p=0.001$ ). Other factors related to higher energy intakes were gender (boys consumed more than girls) and birth order (first-born infants consumed the most energy). Among formula-fed mixed-fed infants, higher energy intake at 4 months, adjusted for both gender and weight, was positively associated with a more rapid weight gain from birth to 3 years and risk of being overweight at 3 years of life (odds ratio 1.46, 95% CI 1.20-1.78).

*Conclusions and Implications: The authors conclude that higher energy intakes at 4 months of age among formula- and mixed-fed infants predict greater weight gain and risk of being overweight in early childhood. Early introduction to solid food may be a factor influencing greater energy intake. From the design of the study, one cannot tell whether the timing of weaning was due to parent's choice or to the parent's perception that the child was hungry and needed more food.*

Source: Ong KK, Emmett PM, Noble S, Ness A, Dunger DB, and the ALSPAC Study Team. *Pediatrics* 2006; 117: 503-508.

## A mother's perspective on insufficient milk

One of the most frequently cited reasons for early supplementation or stopping breastfeeding is *perceived insufficient milk*. Perceived insufficient milk is very common in Mexico, where only 44% of infants at 1 month of age are exclusively breastfed. Although others have examined factors related to perceived insufficient milk, but this study is the first to describe cultural aspects of perceived insufficient milk in a sample of women who are not necessarily experiencing the phenomenon themselves.

The study was conducted in Mexico, among 207 women receiving care from a Baby-Friendly, government hospital and/or clinic. All women were either pregnant primiparas or nursing a first-born infant less than 6 months old. Nurses conducted either longer, semistructured, open-ended interviews or administered a shorter version simply asking women to list and rank the signs, causes, treatments, and coping strategies related to perceived insufficient milk. The researchers used qualitative methods to determine the most salient themes and construct a ranking system across the two types of interviews.

Findings include the following:

- Signs: The chief symptoms of perceived insufficient milk were crying and “baby doesn’t get full”. Less often mentioned were concepts related to milk output and breast and nipple characteristics (empty breast or cracked nipple).
- Causes: The main causes were related to the mother’s diet (eat too many snack or street foods, too little meat/fruit/vegetables) and the mother’s liquid intake (does not drink enough). Only 2 women saw a connection between supplementing the infant’s diet and decreased milk production
- Treatment: Improving the mother’s diet (drink more and eat better) was mentioned most often as a treatment option. Drinking atole (cornstarch or corn flour gruels), milk, and water were commonly recommended. Few mentioned getting the infant to latch-on to stimulate the breast.
- Coping strategies: Giving formula was the most commonly mentioned strategy, followed by going to the doctor for advice as to which formula, pap, or juice to offer. Keep on trying to nurse was mentioned less often.

*Conclusions and Implications: Making the connection between infrequent removal of milk from the breast and milk production clearer to women may help promote exclusive breastfeeding.*

Source: Sacco LM, Caulfield LE, Gittelsohn J, Martinez H. The conceptualization of perceived insufficient milk among Mexican mothers. *J Hum Lact* 2006; 22(3):277-286.

*Maternal and Infant Nutrition Briefs* is a research-based newsletter prepared by Dr. Lucia Kaiser, 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. Back issues of this newsletter are available on-line at: <http://nutrition.ucdavis.edu/briefs/>. The University of California, in commonplac with the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and the Rehabilitation Act of 1973, does not discriminate on the basis of race, creed, religion, color, national origin, sex, or mental or physical handicap in any of its programs or activities, or with respect to any of its employment policies, practices, or procedures. The University of California does not discriminate on the basis of age, ancestry, sexual orientation, marital status, citizenship, medical condition (as defined in section 12926 of the California Government Code), nor because individuals are disabled or Vietnam era veterans. Inquires regarding this policy maybe directed to the Director, Office of the Affirmative Action, Division of Agriculture and Natural Resources, 300 Lakeside Drive, Oakland, CA 94612-3550. (510) 987-0097.