

Maternal & Infant Nutrition Briefs



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- What are Infants and Toddlers Eating?**
- Comparison of Feeding Patterns to Recommendations**
- Preventing Excessive Weight Gain during Pregnancy**

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



What are Infants and Toddlers Eating?

This month's newsletter is primarily devoted to summarizing the key findings from the Feeding Infants and Toddlers Study (FITS), which were published in the January 2004 supplement of the Journal of the American Dietetic Association.

Background Recent national data on the nutrient intake and food patterns of the youngest Americans has been relatively limited. Although infants and toddlers are included in the 1994-96 and 1998 Continuing Survey of the Food Intakes of Individuals (CSFII) and the 1988-94 and 1999-00 National Health and Nutrition Survey (NHANES), the sample size for these groups is small. Moreover, published articles often omit the breastfed infants. The Ross Mother's Survey tracks breastfeeding trends but does not capture infant food patterns in detail. The purpose of FITS, sponsored by the Gerber Products Company, is to examine the nutrient intake and eating patterns of infants and toddlers, from 4 to 24 months of age. This information may be important in establishing dietary guidelines and goals and improving nutrition programs that target infants and toddlers.

Study Design FITS is a cross-sectional study of 3022 infants and toddlers, randomly selected from a national database. The New Parent Database, from Esperian, contains contact information on 3.1 million families with newborns. The database is updated weekly from hospital records, maternity and infant apparel/supplies stores, and other sources. The researchers recruited and interviewed by phone the parents of infants and children, ages 4-24 months. Overall response rate was 46%. Because the researchers used a commercial database to recruit subjects, the socioeconomic status of the FITS sample is higher, compared to that of all U.S. infants and toddlers of the same age. For example, infant participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is 27%, compared to about 47% for the nation as a whole. Thus, the researchers applied procedures to adjust the sample, so that the findings might be generalized to the U.S. population.

One useful aspect of this study is the application of the new Dietary Reference Intakes (DRIs) to the interpretation of the nutrient data. Using two-dimensional food portion guides, parents and day care providers gave detailed 24-hour recalls for the infants and children. The distribution and mean intakes of each nutrient were compared to either the Estimated Average Requirement (EAR) and Upper Tolerable Level (UL) or the Adequate Intake (AI), if an EAR and UL has not yet been established for a particular age group. The recalls included intakes of all beverages, solid foods, and vitamin/mineral supplements. A limitation to the data was the need to rely on published data to estimate breast milk intakes. For instance, exclusively breastfed 4-6 month-old infants were assumed to consume 780 ml of breast milk a day. Those babies who were fed both breast milk and formula were assumed to have intakes that totaled 780 ml a day if younger than 7 months and 600 ml a day if 7 months or older. As will be apparent later, many parents may have overreported dietary intakes for their children. Perhaps parents do not want to be perceived as underfeeding their children. Alternatively, estimating how much is spilled or smeared over the baby's face and clothing versus actually consumed may be quite a challenge.

The articles included in this supplement also provide information on the types of foods consumed at each age (4-6 months; 7-8 months; 9-11 months; 12-14 months; 15-18 months, and 19-24 months). Here, the tables present the percentage of infants and children consuming key food groups at least once a day. However, because the data are derived from a cross-sectional sample, the important questions of whether type and timing of early foods introduced influence later food patterns of toddlers cannot be answered from this dataset. Nevertheless, some useful comparisons are made between WIC and non-WIC participants and picky and normal eaters.

Highlights of the Findings

Nutrient Adequacy

- Among infants (4-11 months), most nutrient intakes appear to be adequate. These nutrients included vitamin C, vitamin E, thiamin, B6, riboflavin, niacin, folate, calcium, phosphorus, magnesium, vitamin D, vitamin A, and vitamin K. Among older infants, about 7.5% had intakes of iron and 4.2%, of zinc below the EAR. Even picky eaters had mean nutrient intakes that exceeded the AI. Interestingly, older WIC infants were more likely than non-WIC infants to have adequate intakes of iron (only 1% < EAR for WIC vs. 10% < EAR for non-WIC babies). The latter may be due to greater consumption of formula among WIC (89%) vs. non-WIC (73%) babies.

- Among toddlers (12-24 months), the prevalence of inadequate nutrient intakes was also low for most nutrients, except vitamin E (58% <EAR). Mean intake of fiber was also low relative to the AI (8 vs. 17 g/day). Percentage of toddlers exceeding the UL was relatively high for vitamin A (25%) and zinc (43%). Data were not presented on nutrient adequacy of the diets among picky eaters. No significant differences were noted between WIC and non-WIC toddlers in the percentages meeting the priority nutrients for the WIC program, namely protein, vitamin C, vitamin A, iron, and calcium.

Energy Intakes

- Mean energy intakes of both infants and toddlers were above the Estimated Energy Requirement (EER). The EER factors in energy needed for growth, as well as maintenance of energy balance given an individual's weight and age. Mean energy intakes of infants were 10-

23% above the EER; those of toddlers were 31% above the EER. The gap between usual intakes and needs was greater for WIC- than non-WIC toddlers (WIC: 40% > EER vs. non-WIC: 29% >EER). Differences were also noted between the exclusively breastfed (EBF), partially breastfed (PBF), and formula-fed 4-6 month old infants (FF). EBF infants had intakes below the EER; PBF intakes were at the EER, and FF intakes were above the EER. Further research is needed to determine how methodological issues might affect the accuracy of the dietary data collected in FITS.

Food Patterns

- Juice consumption for many infants deviates from the American Academy of Pediatrics (AAP) recommendations. AAP recommends that juice not be offered to infants less than 6 months and that amounts provided to older infants and young children be limited to 4-6 ounces a day. However, 21% of the 4-6 month infants drank juice on the day of the recall. Mean juice intake of 4-6 month infants was 4.1 ounces and increased to 9.5 ounces a day among toddlers. Ten percent of toddlers drank more than 14 ounces of juice a day. Juice and fruit-flavored drink consumption was higher at every age for WIC, compared to non-WIC infants and toddlers, $p < 0.01$.
- Many older infants and toddlers are not eating any fruit or vegetables on a daily basis. Of the older infants, 27% did not consume vegetables, not counting the small amounts in mixed dishes or baby food dinners. Among toddlers, 18-23% ate no vegetables on the recall day. No differences were observed in vegetable intake between WIC and non-WIC groups. Fruit intake dropped off considerably after 18 months of age; 33% of the toddlers ate no fruit on the recall day. Fruit consumption was significantly lower among WIC- vs. non-WIC toddlers, $p < 0.01$.
- Frequency of consuming of desserts, sweets, and/or sweetened beverages increased from 10% among 4-6 month infants to 91% among the 19-24 month toddlers. WIC-infants consumed desserts and sweets significantly more often than the non-WIC group did, $p < 0.01$.

Comparison of Feeding Patterns to Recommendations

- A goal of Healthy People 2010 is that at least 75% of infants are breastfed in the early postpartum period, 50% at 6 months, and 25% at 12 months. Among the infants in this study, 76% ever breastfed, 30% were breastfeeding at 6 months, and 12% at 12 months. Fewer infants (68%) were ever breastfed among the WIC sample, compared to the non-WIC infants (83%), $p < 0.01$.
- AAP recommends that parents introduce solid foods when infants are developmentally ready, typically between 4-6 months of age. About 29% were introduced to infant cereal or pureed foods before 4 months of age. No differences were found between the WIC and non-WIC groups.

Conclusions and Implications: The FITS findings suggest that most infants and toddlers in the U.S. appear to be getting enough nutrients without getting too much. However, the possibility that parents may have overreported dietary intakes needs to be explored further. Finally, improvement is needed in meeting general nutrition recommendations, including food patterns and breastfeeding goals, to optimize short- and long-term health outcomes.

Sources:

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- Fox et al. Feeding Infants and Toddlers Study: What foods are infants and toddlers eating? J Am Diet Assoc. 2004; 104: S22-S30
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Preventing Excessive Weight Gain during Pregnancy

Prenatal weight gain within the Institute of Medicine (IOM) guidelines leads to the best outcomes, yet 36% of women in the U.S. exceed the IOM recommendations. Weight gain above the IOM recommended ranges and a failure to return to pre-pregnancy weight within 6 months increase the risk of obesity. However, the challenge is how to intervene safely. The purpose of this study was to develop and test the effects of a behavioral intervention to reduce excessive weight gain during pregnancy.

Using a randomized, controlled trial design, the authors assigned 110 pregnant women, recruited before 20 weeks gestation, to either a control group who received standard care or a "stepped" behavioral intervention group. Women in the intervention group received guidance on appropriate weight gain goals, exercise, and healthy eating (such as substituting fruit and vegetables for fast food) during pregnancy. If they exceeded the IOM guideline at any point, they were progressively given more advice using feedback, goal setting, and structured meal plans, if necessary. Women who were underweight before pregnancy, under 18 years of age, or at high-risk were not included in the study. The main outcome was the proportion of women who gained weight within the IOM recommended range. The authors also considered effects on total weight gain and postpartum weight loss and retention at 8 week after delivery.

The results differed, depending on the women's weight status before pregnancy. Women of normal pregravid weight were more likely than overweight women to respond as expected to the intervention. Among normal weight women, 94 % of the controls exceeded the IOM guidelines at any point during their pregnancies, compared to only 63% of the intervention women ($p < 0.05$). Total weight gain of the intervention group was also less likely to be above IOM ranges, compared to controls. Although not significant, there was a trend for the intervention women to have retained less weight than the intervention group at the postpartum visit (4.4 vs. 6.2 kg). In contrast, the intervention was not effective for the women who were overweight or obese before pregnancy. In fact, there was a tendency--although not significant--for more women in the intervention than control group, to exceed IOM guidelines (74% vs. 63%, not significant). One possible explanation is that the intervention may not have been intensive enough for women with long-standing weight issues. Alternatively, the intervention may have imposed a level of dietary restraint, leading to overeating among the overweight women. The sample size was too small to detect any differences in pregnancy complications, birth weight, and other fetal outcomes.

Conclusion and Implications: Preventing excessive prenatal weight gain may be more

successful in women of normal pregravid weight than in overweight women. More research is needed on the safety and efficacy of efforts to prevent excessive prenatal weight gain, particularly in women who were overweight or obese before pregnancy.

Source: Polley BA, Wing RR, Sims CJ. Randomized controlled trial to prevent weight gain in pregnant women. *Int J Obesity* 2002; 26: 1494-1502.

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