Maternal & Infant Nutrition Briefs

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Are Breastfed Infants Less Likely to Become Overweight?

Although there are several reasons why breastfeeding might reduce the chances of childhood overweight, the research on the topic has not led to a clear-cut answer. In this article, the author revisits the question by examining the findings from 11 studies meeting certain criteria. All of the studies included at least 100 per group and follow-up measurements after 3 years of age. However, not all of them were able to take into account the mother's body size, which is strongly linked to the child's weight status.

Eight of the 11 studies found a significant relationship between breastfeeding and overweight. Although breastfeeding was defined differently across the studies, children who had been breastfed were 21 to 34% less likely to be overweight at follow-up than formula-fed individuals. Longer duration of exclusive breastfeeding was associated with a stronger effect on overweight in some, but not all, studies. Later follow-up of the children seemed to show the greatest effect, suggesting that any early programming due to breastfeeding may not become apparent until the adolescent growth spurt occurs.

How might breastfeeding influence weight status during childhood? One possibility is that breast-fed infants may learn to self-regulate their energy intakes better than formula-fed infants. More research is needed to determine whether such differences in self-regulation exist between breast- and formula-fed infants and persist into childhood. Another possibility is that early mode of feeding may affect plasma levels of insulin and/or leptin and have implications for appetite, fat deposition, and weight gain. Finally, one cannot rule out the possibility that the mother's decision to breastfeed is a marker for an overall healthier lifestyle or a family environment that helps support a more normal pattern of child growth.

In conclusion, breastfeeding appears to reduce the risk of childhood overweight to a moderate extent. Although the effect may be small in comparison to other factors that

influence overweight, the role of breastfeeding is important to consider in interventions to prevent overweight in children.

Source: Dewey KG. Is breastfeeding protective against childhood obesity? *J Hum Lact* 2003; 19 (1): 9-18.

What Predicts Prenatal Weight Gain?

Although prenatal weight gain within the Institute of Medicine (IOM) guidelines is associated with the best pregnancy outcomes, only 30-40% of women gain accordingly. Few studies have examined the reasons why women gain outside the recommended ranges. The purpose of this study was to examine the influence on weight gain of modifiable factors, such as physical activity, smoking, and food patterns, along with biological and demographic characteristics.

This study is particularly interesting, because it is the first to examine the predictors of prenatal weight gain using a population-based approach. Data collection began in 10 counties of Upstate New York in 1994-96. Women who received prenatal care in the health care system were eligible if they were healthy and mentally competent; 18 years or older; planned to deliver in the local hospital and keep the baby; and entered prenatal care before the third trimester. The final sample of 622 mothers was socioeconomically diverse but mostly rural and white. The women completed questionnaires midway during pregnancy. Additional data, including measured weight and height and pregnancy outcomes, came from their medical records.

What health practitioners might find useful about this study is the inclusion of some lifestyle questions that have been validated and are easy to explore in a clinical setting. For example, women were asked how the amount of food they eat has changed during pregnancy, with responses being: “a lot more”; “a little more”; “a little less”; “ a lot less” and “unknown”. A similarly worded question examined the amount of physical activity. Consuming “much more food” and getting less physical activity were significantly related to greater weight gain, whereas consuming three or more fruits and vegetables a day were related to lower weight gains.

Only 38% of the women actually gained within the IOM guidelines, and as might be expected, excessive weight gain was twice as common as inadequate weight gain. When considered together, biological, demographic, and behavioral factors explained about 27% of the variation in prenatal weight gain. The psychosocial variables included in the questionnaire (i.e., feelings about motherhood, career orientation, and social support) were not as strongly related to weight gain as the other variables. Factors that increased the risk of excessive weight gain included: high or obese body mass index (BMI: 26-29 or >29); consuming “a lot more food intake” (vs. a little more); and decreasing physical activity. Factors that increased the risk of inadequate weight gain included: low BMI (<19.8); “ a little or a lot less food intake”; and smoking more than 1.5 packs a day. The authors did not elaborate much on the income variable, which was somewhat complicated. Among low-income women (less 185% of poverty line), those who consumed a lot more food were less likely to have excessive weight gains. Further work exploring the role of food insecurity and participation in food assistance programs needs to be done to explain this finding. More research is also needed in ethnically diverse populations.

Source: Olson C.M. and Strawderman M.S. Modifiable behavioral factors in a biopsychosocial

model predict inadequate and excessive gestational weight gain. *J Am Diet Assoc*. 2003; 103(1): 48-54.

Portion Size Influences Food Intake of Young Children

Supersized portions--and their contribution to the obesity epidemic—have recently become a topic of much discussion among nutritionists. At fast food restaurants, current portion sizes are two to five times larger than original portion sizes when the foods were first introduced. Marketplace portions tend to be two to eight times larger than standard portion sizes. Since one out of every three food dollars is spent on foods eaten away from home, the impact of changes in portion size on energy intake may be significant. Few have examined the effects of serving large portion sizes to young children. In one study, older preschool children ate more of a food when served a large portion, but younger preschoolers tended to eat the same amounts, regardless of portion size. The purpose of this study is to determine whether preschoolers will begin to consume food over time, after being repeatedly exposed to larger portion sizes.

To answer this question, the researchers conducted an experiment among 30 children in a day care setting. In a cross-over design, all children had the opportunity to serve themselves a particular food after four days of being served a regular portion and four days of being served a large portion of that same entrée. In this way, each child served as his or her own control. The same foods were used at all meals-- macaroni and cheese, carrots, applesauce, milk, and sugar cookies. Being served these same foods for up to four days in a row apparently did not affect the children's food intake over time. In a second phase, the researchers examined whether children would choose to eat a tasty snack when the children had just eaten lunch and reportedly was not hungry. The results included the following:

· Doubling the size of the entrée increased intake of that food by 25% and total energy intake of the meal by 15%. This effect was not related to the child's age or gender. However, we do not know whether the children compensated by eating less at the next meal.

· When given the opportunity to serve themselves, the preschoolers did not consume more food, even after being served large portions for four days.

· Children who ate more of the tasty snacks when they were not hungry also ate more of the entrée when served a large portion. There was a trend for heavier children to eat more when served the large portion.

The authors conclude that allowing young children to serve themselves may a useful strategy to counter the trend in supersize portions. However, there appears to be a group of preschool children who are less sensitive to satiety cues. Additional strategies may be needed to help this group to learn to eat appropriate amounts of food.

Source: Fisher JO, Rolls BF, and Birch LL. Children's bite size and intake of an entrée are greater with larger portions than with age-appropriate or self-selected portions. *Am J Clin Nutr.* 2003; 77: 1164-70.

Formula Intake and Blood Pressure in Young Adults

A growing number of studies have reported that early nutrition appears to have long-term implications for health. Birth size, a reflection of prenatal nutrition, has been linked to effects

on blood pressure later in life. A longitudinal study has recently found that early postnatal nutrition also has an effect on blood pressure of young adults, independently of birth weight.

The data come from the Barry Caerphilly Growth study, which was a prenatal intervention carried out in two towns in Wales from 1972-74. The intervention provided tokens to 1163 pregnant women to purchase milk. The intervention had no effect on birth outcomes nor on early child growth. However, the data provided the basis for a follow-up study of those individuals, 25 years after the original intervention was over. The researchers were able to locate 679 of the young adults and measure current blood pressure, weights, and heights. They also collected data on alcohol intake, smoking, and other lifestyle factors. From the original dataset, they were able to extract ounces of formula consumed at 10 days, 6 weeks, and 3 months of life, although actual breastfeeding data were not available.

Therefore, they were able to calculate the adverse effects of greater formula intakes on blood pressure in young adults. In this population, about 67% were receiving mixed feedings by 6 weeks of age, and there was a tendency for mothers from low-socioeconomic levels to give less formula (and presumably more breast milk). Those individuals who had the highest formula intakes at 3 months of age also had higher systolic blood pressure and greater body mass index in young adulthood. Accounting for the effects of birth weight, social class, current smoking and alcohol use, and current body mass index did not significantly change the results.

Although the composition of formula has changed since the 1970's to become more similar to breast milk, human milk naturally varies in composition during the first year of life and contains many other substances—not found in formula- that may affect early growth and development.

Source: Martin RM, McCarthy A, Smith GD, Davies DP, Ben-Shlomo Y. Infant nutrition and blood pressure in early adulthood: the Barry Caerphilly Growth study. *Am J Clin Nutr* 2003; 77: 1489-97.

Maternal and Infant Nutrition Briefs is a research-based newsletter prepared by Dr. Lucia Kaiser (*llkaiser@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.