

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



Should Nursing Mothers Diet *and* Exercise to Lose Weight?

Many breast-feeding mothers, eager to shed those extra pounds gained during pregnancy, seek information on how to do so safely. The Institute of Medicine (IOM) states that losing a pound per week is probably safe for overweight breast-feeding women. Studies in animals and humans show that more severe energy restriction (40% or more) reduces milk volume. Relatively few controlled studies have examined the effects of dieting and exercise on breast-feeding. Therefore, this study sought to answer the following questions: 1) how do energy restrictions of 35% affect breast-feeding? and 2) what are the effects of dieting plus exercise on breast-feeding?

At 8-16 weeks postpartum, 67 healthy, exclusively breast-feeding mothers were randomly assigned to one of three groups: 1) diet only (35% energy deficit); 2) diet + exercise (35% energy deficit); and 3) control (no restriction). In the diet + exercise group, the women chose any type of aerobic exercise and set their own schedules so that they averaged about 86 minutes per session on 9 of the 11-day intervention period. The staff provided preweighed meals and snacks to all mothers in the diet and diet + exercise groups. For the diet + exercise group, about 60% of the energy deficit came from dieting and 40%, through exercise. Data were collected at baseline and at 5, 6, 9, and 10 days into the study. Staff measured weight, height, and body composition of the women; milk composition and volume; breast-feeding frequency; maternal dietary intake and activity; resting metabolic rate; energy expenditure through heart rate monitoring; and plasma prolactin.

After 11 days, mothers in the diet and diet + exercise groups lost similar amounts of weight but significantly more than did the controls (diet, -1.9 kg; diet + exercise, - 1.6 kg; and controls, - 0.2 kg, $p < 0.05$). However, women who dieted and exercised lost more fat than women who only dieted (diet + exercise, -1.6 and diet, - 1.3; $p < 0.05$). There were no differences among the three groups in milk volume, milk composition, breast-feeding frequency, total breast-feeding time, or infant weight gain. However, in the diet group only,

heavier women increased their milk energy output over time, whereas thinner mothers experienced a drop in milk energy output. This finding fits with the notion that moderate-to-severe energy restriction affects breast-feeding adversely mainly in relatively thin or undernourished women. The authors suggest that exercise might actually have a protective effect on breast-feeding during energy restriction, possibly by increasing insulin sensitivity and burning fat more efficiently. However, given the variability in milk energy output seen in this study, more research is needed to confirm that possibility.

In the meantime, short-term weight loss through dieting and exercise appears to be safe for breast-feeding women and helps them lose more fat, compared to dieting only. Finally, while relatively large energy restrictions (i.e., up to 35%) may be safe in heavier women, more moderate restrictions will probably be easier to maintain in the long-run.

Source: McCrory MA, LA Nommsen-Rivers, PA Molé, B Lönnerdal, and KG Dewey. 1999. Randomized trial of the short-term effects of dieting compared with dieting plus aerobic exercise on lactation performance. *AJCN* 69: 959-67.

An Update on Feeding Strategies for Premies

Last December, *Maternal and Infant Nutrition Briefs* reviewed an article examining the effects of early enteral feeding on increased lactase activity in premature infants. In that study, higher lactase activity was associated with more rapid progression to full oral feeding and fewer abnormal abdominal x-rays. In this article, the same authors present other data from that study examining the effects of different feeding strategies on infant growth, mineral balance, bone mineralization, and feeding tolerance.

At birth, 171 premature babies were randomly assigned to one of the following four groups: 1) early, continuous feeding; 2) early, bolus feeding; 3) standard, continuous feeding; and 4) standard, bolus feeding. The study included only infants who were appropriate weight-for-gestational-age (AGA), without major birth defects, and born between 26-30 weeks of gestation. These infants were assigned to the groups so that roughly equal numbers of breast-fed vs. formula-fed babies were placed in each group. "Early" enteral feeding began at 4 days of age with 20 ml/kg/day of breast milk or premature formula, with the rest coming from parenteral feeding. "Standard" feeding began with the same amount of breast milk or formula but introduced later, at 15 days of age. "Bolus" feeding was given via tube-feeding every three hours, compared to continuous tube-feeding. Thus, by 15 days, all infants were receiving small amounts of breast milk or formula, which was gradually increased until complete enteral feeding (150 ml/kg/day) was achieved. Care was taken so that intakes of fluid, energy, and nutrients would be similar among the groups. Data collected included the following: infant weight, length, skinfolds; nitrogen, calcium, phosphorus, magnesium, copper, and zinc retention; bone mineral content of the radius; and indicators of feeding tolerance.

The main outcome--days needed to progress to full oral feeding--did not differ among the groups. Early milk feeding, or "gastrointestinal priming", was not associated with any adverse effects, including hyperbilirubinemia. At 6 days of age, early feeding significantly increased retention of calcium, phosphorus, and copper, compared to the standard-fed groups. The rate of weight gain was slower in the continuously-fed premies, compared to the bolus-fed groups ($p = 0.02$). However there were no differences in bone mineralization or other anthropometric measurements among the groups. Some measures of feeding intolerance were greater in the continuously-fed vs. bolus-fed premies. In addition, more babies had to be switched from continuous feeding to bolus -feeding during the study because their

intolerance precluded following the protocol. Finally, the more breast milk given, the lower the incidence of necrotizing enterocolitis (NEC), $p < 0.003$.

This study is important because outcomes related to the most common feeding strategies were examined in a large, randomized sample. Based on the findings of this study, the authors conclude that early feeding with small amounts of human milk, using a bolus tube-feeding method, may be the best feeding approach for premature infants. Until further research is done, these recommendations apply mainly to appropriate-for-age premature infants without major birth defects.

Source: Schanler RJ, Shulman C, Lau E, O'Brien MM, Heitkemper. 1999. Feeding strategies for premature infants: randomized trial of gastrointestinal priming and tube-feeding method. *Pediatrics*. 103 (2): 434-439.

Who Influences African-American Women to Breast-feed?

Pregnant women who plan to breast-feed are nine times more likely to try breast-feeding than women who plan to formula-feed. A study targeting African-American women through the Women, Infant, and Child (WIC) nutrition program found that peer counseling and motivational videos were only able to sway 18% of the pregnant women to change their infant feeding plans. Therefore, to be able to increase breast-feeding rates, health providers need to look very closely at what influences a woman's decision to breast-feed vs. formula-feed.

As part of the WIC study referred to above, the researchers interviewed 548 African-American women who were 10-24 weeks along in their pregnancies. Through these interviews, data were collected on the breast-feeding attitudes of the women's friends, relatives, and partner, as well as advice received from her doctor. At 24 weeks, 43% of the women had definite plans to breast-feed and 57%, to formula-feed. The strongest factors influencing the mother's plans were the opinions of her doctor and the baby's father and her previous experience breast-feeding. While the grandmother's opinions were also influential, their importance diminished after considering the opinion of the baby's father. In contrast, opinions and experiences of female friends were not associated with plans to breast-feed.

Many doctors may be missing opportunities to promote breast-feeding, since 57% of the women did not know whether or not their doctors encouraged breast-feeding. However, since some women were interviewed relatively early in their pregnancies, we do not know how many may have discussed infant feeding plans later on. Nevertheless, to turn around the low rates of breast-feeding in this population, providers should plan to discuss breast-feeding early and seek effective ways of getting this message to fathers and grandmothers as well.

Source: Bentley ME, Caulfield LE, Gross SM, Bronner Y, Jensen J, Kessler LA, Paige DM. 1999. Sources of influence on intention to breast-feed among African-American women at entry to WIC. *J Hum Lact* 15:27-34.

Weight Gain in the Second or Third Trimester and Low Birth Weight

Many studies have shown that low weight gain throughout pregnancy increases the risk of poor fetal growth. Much less is known about the risks associated with brief periods of inadequate weight gain, especially in mid-to-late pregnancy. Using two large datasets collected from 1959-1976, some researchers have recently reported that low weight gain in

either the second or third trimester almost doubles the risk of poor fetal growth.

Data for this study came from the National Collaborative Perinatal Project (NCP) and the Child Health and Development Study (CHDS). NCP followed a racially mixed population from urban areas, whereas CHDS mostly included white women from the San Francisco Bay Area. After excluding infants with birth defects, multiple births and premature births, the researchers selected 10,696 mother-infant records for the analysis. Weight gain during the second or third trimester was calculated as the average weekly weight gain between the start and end of that trimester. Inadequate weight gain was defined as less than 0.3 kg per week for the second or third trimester, and less than 0.1 kg per week, for the first trimester. Poor fetal growth (i.e., intrauterine growth retardation) was defined as weight at term less than 2500 gm.

About 75% of the women with low weight gains in the second or third trimester had normal weight gains overall (i.e., within the Institute of Medicine guidelines). Low weight gain in the first trimester only did not increase the risk of poor fetal growth. Low weight gain occurring only in the second trimester increased risk of poor fetal growth by 1.75-2.31 times. In the third trimester, low weight gains increased the risk by 1.69-2.30 times. The association between low weight gain during second or third trimester and poor fetal growth was observed for all women, regardless of their prepregnancy weight. Despite differences in the populations followed in the NCP and CHDS studies, the isolated periods of inadequate prenatal weight gain had similar effects on fetal growth. The important finding from this study was that normal weight gain overall may not be able to compensate for low weight gains in the second or third trimester.

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