

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



Infant Weight Gain and Later Childhood Overweight

To prevent overweight and obesity, efforts to identify critical stages that influence weight status have become more important than ever. At least three critical periods appear to exist for the development of overweight in children or teens: 1) gestation; 2) the timing of "adiposity rebound"(between 3 to 6 years of age); and 3) puberty. Some research suggests rapid weight gain during infancy may also play a role in the development of weight problems later on, but less is known about that period.

Recently, the results of a large multicenter study in the U.S. suggest that a pattern of rapid weight gain in the first 4 months may be associated with a greater risk of overweight at 7 years of age. The 27,899 infants enrolled in the study were born between 1959-65 at one of 12 sites participating in the National Collaborative Perinatal Project. About half (49%) of the infants were African American, and 47.9% were Caucasian. Weight and length or height data were collected on the subjects at birth and at ages 4 months, 1 year, and 7 years. The relationship of average monthly weight gain (from 0-4 mos.) to risk of overweight at 7 years was examined after accounting for any effects due to birth weight, gender, birth order (i.e., first-born status), race, mother's body mass index, and mother's education. Rapid early weight gain from 0-4 months increased the risk of later overweight status by 38% ($p < 0.001$). Later infant weight gain rate (4-12 months) increased the risk of later overweight by 60%, independently of early weight gain rate.

Unfortunately, almost no information was collected on infant feeding practices. For some of the sites, whether or not the mother initiated breastfeeding in the hospital was recorded, but duration of breastfeeding, extent of exclusive breastfeeding, and age of introduction to solids were not known nor considered in the analysis. Since the data were collected 30 years ago when infant feeding practices were different, the application to today's generation of babies is unclear. Thus, the study raises more questions than it answers. While infancy may be another critical period for later development of overweight in children, additional longitudinal studies

incorporating infant feeding practices are needed.

Source: Stettler N, Zemel BS, Kumanyika S, Stallings VA. Infant weight gain and childhood overweight status in a multicenter, cohort study. *Pediatrics* 2002; 109 (2): 194-99.

Risk Factors for Mastitis

Mastitis is a breast infection, associated with flu-like symptoms and ranging in severity from local inflammation to an abscess in the breast or septicemia. Staphylococci are most commonly found when bacterial cultures are examined. Due to the pain and discomfort associated with mastitis, some mothers with mastitis may choose to stop nursing. Understanding the factors that increase the risk of mastitis may help lactation consultants and other health professionals provide better advice to nursing mothers.

A recently published telephone survey was designed to examine the incidence of and risk factors for mastitis among 946 breastfeeding mothers. The mothers, who were enrolled in the study during pregnancy, were mostly white (90%) and married (95%) and lived in Michigan or Nebraska. In addition to socioeconomic and medical history data, the interviewers collected information from the mothers on breastfeeding practices, breast care, and sleeping habits at 3, 6, 9, and 12 weeks postpartum. The main outcome was occurrence of mastitis that, according to the mother, had been diagnosed by a health professional.

In this population, the overall incidence of mastitis was 9.5%. Mastitis appeared most often within the first 4 weeks postpartum, with frequency dropping off gradually thereafter. In 65% of the cases, health professionals diagnosed mastitis over the phone. The most common advice given was to take antibiotics (86%), use hot compresses (83%), feed baby more often (74%), and empty the breast during a feeding (65%). Women who had previously had mastitis were four times more likely to experience a bout of mastitis during the study ($p < 0.0000$). Other factors associated with three-fold higher risk of mastitis included the following: nipple cracks or sores appearing in the same week as the mastitis; use of antifungal nipple creams in the same three week interval as the mastitis; and among women without a history of mastitis, use of a manual breast pump. Feeding the baby less often (less than 10 times a day) reduced the risk of mastitis. Other behaviors, such as rinsing the breast before or after a feeding, using nursing pads, wearing a nursing bra, socioeconomic status, and the mother's sleep patterns were not associated with incidence of mastitis.

Since very few studies have examined risk factors related to mastitis, this study makes an important contribution to lactation research. However, because some of the findings run counter to conventional advice (i.e., more frequent breastfeeding increases risk), additional studies are needed to verify and explain the relationship before changing the advice given to mothers. The increased risk of mastitis among women with a history of mastitis may mean that these women harbor colonies of the bacteria involved or have a breastfeeding style that puts them at increased risk. Future research should compare other factors, such as hand-washing and presence of specific pathogens, in mothers with and without mastitis.

Sources:

Foxman B, D'Arcy H, Gillespie B, Bobo JK, Schwartz K. Lactation mastitis: occurrence and medical management among 946 breastfeeding women in the United States. *Am J Epidemiol* 2002; 155(2): 103-114

Lawrence RA. Invited commentary: mastitis while breastfeeding: old theories and new

evidence. *Am J Epidemiol* 2002; 155 (2): 115-116.

Does Exercise During Late Pregnancy Affect Birth Outcomes?

The most recent statement of the American College of Obstetricians and Gynecologists (ACOG) recommends 30 minutes or more of moderate exercise a day on most, if not all, days of the week for pregnant women without medical or obstetric complications. Certain types of physical activity, such as scuba diving, contact sports or activities with a high risk of falling or trauma (especially to the abdomen), are not suitable for pregnant women. Whether pregnant women can engage safely in other types of activities at vigorous levels is more controversial. The purpose of this study was to examine the relationship of different levels of exercise during pregnancy to birth outcomes in a low-risk population of women.

The main advantage of this observational study was having access to a large population of physically fit, healthy, low-risk women, namely active-duty military personnel. The 750 women in the study were primarily employed in nursing, legal, clerical, religious, or administrative support positions. None of the women developed complications during pregnancy that resulted in medical discharge from service. For the analysis, the women were classified into one of the following groups: 1) little or no exercise; 2) light exercise; 3) moderate exercise; and 4) heavy exercise. However, these categories seem to refer more to the frequency (times per week) and duration of exercise (stopping before or after 28 weeks of pregnancy) than intensity level per se. For example, "heavy exercise" meant that women continued exercising on most or all days of the week beyond the 28th week of pregnancy. Multiple logistics regression or analysis of variance was then used to examine the risk of poor pregnancy outcomes by level of exercise.

Level of exercise had no influence on miscarriage, pregnancy-induced hypertension, gestational diabetes, or anemia, but overall rates were very low in this population. Likewise, exercise level did not increase risk of preterm labor or delivery, intrauterine growth restriction, or any other adverse infant outcome. The authors claim that women who did more exercise were more likely to experience a cold or flu, have longer first-stage labor, to need induction of labor, and to deliver lighter infants. However, women engaging in heavy exercise were also older, had higher incomes, and continued to work full-time longer than women in the other groups. Although several confounding variables were supposedly accounted for in the analysis, the paper does not clarify whether these latter differences among the groups were fully considered.

Overall, one might argue that clinically significant adverse outcomes were not found in this population of low-risk healthy women, who continued daily exercise beyond 28 weeks of pregnancy.

Source:

ACOG Committee Opinion No. 267. Exercise during pregnancy and the postpartum period. *Obstet Gynecol* 2002; 99: 171-173.

Magann EF, Evans SF, Weitz B, Newham J. Antepartum, intrapartum, and neonatal significance of exercise on healthy low-risk pregnant working women. *Obstet Gynecol* 2002; 99: 466-72.

Long-term Follow-up of Very Low Birth Weight Infants

With improvements in neonatal intensive care, many very low birth weight (less than 1500 g)

infants born in the late 1970's were reportedly free of major handicaps. Now, this generation of infants is coming of age, and data are available on their health status, educational achievement, and risk-taking behaviors during adolescence. The purpose of a recent article in the New England Journal of Medicine was to examine outcomes in young adults who had participated in a longitudinal follow-up of very low birth weight infants.

The study, conducted in Cleveland, followed two groups of individuals from 8 years to 20 years of age: 242 individuals with very low birth weight (VLBW) and 233 with normal birth weight (controls). The authors interviewed the young adults and their parents to collect data on educational achievement; health problems; use of alcohol, tobacco, or illegal substances; contact with police; and teenage pregnancy. To measure academic skills and IQ, the young adults took a battery of standardized tests. The data were analyzed, controlling for parental socioeconomic status (maternal race, education, and marital status). At 20 years of age, the young adults in the VLBW group still lagged behind the controls in various measures. Compared to controls, fewer VLBW adults had graduated from high school (74% vs. 83%, $p < 0.04$) or were enrolled in college or other postsecondary schools (30% vs. 53%, $p < 0.002$). VLBW adults also had significantly lower scores on the IQ (87 vs. 92) and academic achievement tests, compared to controls ($p < 0.001$). The VLBW group also had higher rates than controls of neurological problems (cerebral palsy, blindness, deafness, etc.).

However, especially among females, use of alcohol and illegal drugs was lower in the VLBW group than in controls. The VLBW group also had had fewer contacts with police and pregnancies than controls. Thus, although VLBW adults continued to lag behind academically compared to controls, they also engaged less often in risk-taking behaviors. This latter difference may be due to greater parental monitoring of VLBW offspring.

Source: Hack M, Flannery DJ, Schluchter M, Cartar L, Borawski E, Klein N. Outcomes in young adulthood for very low birth weight infants. *N Engl J Med.* 2002; 346: 149-57.

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.

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