



Maternal and Infant Nutrition Briefs

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Does Catch-up Growth Increase Health Risks?

Being born small-for-gestational age increases the risk of cardiovascular disease in adulthood. However, less is known about the extent to which early catch-up growth contributes to health problems later in life. The purpose of this study to examine the effect of early rapid catch-up growth on blood pressure among children who were born small-for gestational age (SGA).

Carried out in the United Kingdom between 1993-95, the study involved a randomized, controlled intervention of SGA infants into a group fed enriched infant formula (n=152) or a control group fed standard formula (n=147). The enriched formula provided 28% more protein and additional calories, calcium, potassium, and other nutrients, compared to the standard formula. Infants consumed the formula from birth until nine months of age. The main outcome tracked was blood pressure measured in the children at ages six to eight years. About half of the children could not be located at that time, but the socioeconomic characteristics of the original and follow-up populations were similar.

Six to eight years later, mean arterial pressure and diastolic blood pressure were lower in children who had been fed the standard formula as infants. There was a trend for more adverse effects on blood pressure among those individuals born with lower weight-for-gestational age. The authors also found that catch-up growth, or upward crossing of weight percentiles, was associated with greater diastolic blood pressure. In a comparison group of SGA infants who were breastfed, faster weight gain was similarly found to be associated with higher blood pressure (diastolic and systolic) in childhood. Whether these infants also received some formula was not mentioned in the paper.

Conclusions and Implications: The findings from this study provide evidence that faster weight gain in infancy, specifically related to catch-up growth, has adverse effects on later blood pressure. Since the study was carried out among small-for-gestational age infants, we do not know whether similar results would be seen in babies of normal birthweight.

Source: Singhal A, Cole TJ, Fewtrell M, Kennedy K, Stephenson T, Elias-Jones A, and Lucas A. Promotion of faster weight gain in infants born small-for-gestational age: is there an adverse effect on later blood pressure? *Circulation*. 2007; 115: 213-220.

Infant Feeding Practices of WIC Mothers

The purpose of this study was to examine adherence to American Academy of Pediatrics (AAP) infant feeding recommendations among mothers participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

The study involved a cross-sectional comparison of infant feeding practices among WIC participants and income-eligible, non-WIC mothers of infants. Using data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), the authors were able to control for many socioeconomic characteristics that differ between WIC and eligible non-WIC mothers. The final sample for the analysis included 5,276 infant (4221 WIC and 1055 non-WIC) who were born in 2001. At the time of the data collection, the infants were between 8 and 18 months of age. Therefore, the authors were able to examine the rates of exclusive breastfeeding until four and six months; delay in introducing of solid food until four and six months; and delay in introducing cow's milk until after eight months. Note: the AAP recommends providing breast milk or iron-fortified infant formula during the first year of life but due to the age of the infants at the time of the study, the cut point of eight months was used in this analysis.

Compared to eligible non-WIC mothers, WIC participants were less likely to be white and more likely to live in the South and be disadvantaged (lower education, unmarried, lower income). At one month of age, 44% of the WIC and 59% of the non-WIC babies were exclusively breastfeeding. These rates continued to decline thereafter to only 5% of the WIC and 10% of the non-WIC infants being exclusively breastfed until six months of age. After controlling for socioeconomic differences in the groups, WIC infants were 5.9% and 1.9% less likely than non-WIC babies to be exclusively breastfed until four and six months, respectively. WIC mothers were 4.5% and 8.5% less likely than non-WIC mothers to delay introducing solids until four and six months, respectively. However, WIC mothers were also 2.5% more likely wait longer than eight months to give cow's milk, compared to non-WIC women.

Conclusions and Implications: With the exception of when to introduce cow's milk, WIC mothers were less likely than income eligible non-WIC mothers to follow several other AAP infant feeding guidelines. As with many other cross-sectional studies comparing WIC and non-WIC mothers, WIC participation does not necessarily cause lower compliance with pediatric recommendations. In other words, there may be other characteristics of the mothers (beyond those accounted for in the analysis) that determine infant feeding practices. If changes in the WIC food packages are implemented as proposed by the US Department of Agriculture Food and Nutrition Service, opportunities to pilot-test these changes would enable us to more accurately assess the impact of WIC on infant feeding practices.

Source: Jackowitz A, Novillo D, Tiehen L. Special Supplemental Nutrition Program for Women, Infants, and Children and infant feeding practices. *Pediatrics*. 2007; 119: 281-289.

Does a Paradox in Hispanic Birth Outcomes Truly Exist?

Despite poverty and inadequate prenatal care, low-income women of Mexican descent rarely deliver low birthweight infants. This observation has commonly been cited as an example of the “Hispanic health paradox”. Very likely certain cultural and lifestyle factors play a protective role in the low-income Latino population. However, given the relatively high rates of obesity, pre-diabetes, and type 2 diabetes in Latino women, a closer examination of factors influencing birthweight is needed in this population. The purpose of this prospective, community-based study was to assess the influence of mother’s pre-pregnancy weight and other metabolic factors on birthweight.

The study, carried out in a Michigan health center, recruited all pregnant Latino women who entered care between January 1999 and February 2001. Final complete data were available on 1041 women. Research staff interviewed and weighed the women at the first prenatal visit. Random blood glucose testing was also done at the first visit. Women with levels of 126 mg/dL or higher were sent for additional screening and follow-up. Routine glucose screening was done with a one-hour 50 g oral glucose test at 26 weeks. Those with blood values of 130 mg/dL or higher also received the three-hour oral glucose tolerance test (GTT). Women with gestational diabetes (GDM) received diabetes management, and those with only one abnormal value on the GTT received nutritional counseling from a registered dietitian. The authors examined the influence of sociodemographic factors (eg, education and adequacy of care), maternal weight, and blood glucose on birthweight, adjusting for gestational age.

Key findings from this community-based study are:

- About 42% of the women were overweight or obese before pregnancy; 36% gained more weight than the recommended amounts;
- 27% had abnormal blood glucose values (>130 mg/dL) and 6.8% had GDM;
- Among mothers with GDM, 13.2% of their babies weighed more than 4000 g, compared to 8.8% of mothers without GDM;
- Among mothers without GDM, significant predictors of birthweight were: multiparity, mother’s height and body mass index (BMI), prenatal weight gain, and glucose values from the one-hour screen. Each 10 mg/dL increase in glucose contributed to 16 g more in birthweight; and
- No significant relationship was found between any of the sociodemographic variables (acculturation, education, adequacy of prenatal care, marital status) and birthweight. However, 92% of the women were born in Mexico, so there may not have been enough variation in these variables to capture an effect.

Conclusions and Implications: High blood glucose levels during pregnancy contribute to higher birthweight babies in Latinos, independently of maternal obesity and prenatal weight gain. Thus, Latino women living in poverty without access to care might well be expected to deliver relatively heavy babies. Studies examining birth outcomes in Latinos should consider the effect of maternal glucose levels, as well as obesity and prenatal weight gain.

Source: Kieffer EC, Tabaei BP, Carman WJ, Nolan GH, Guzman JR, Herman WH. The influence of maternal weight and glucose tolerance on infant birthweight in Latino mother-infant pairs. *Am J Public Health* 2006; 96 (12): 2201-2208.

Public Attitudes about Breastfeeding Change for the Worse

Since public opinions about breastfeeding might influence a mother's decision to nurse her baby, this study examined the changes in attitudes about breastfeeding from 1999 to 2003. The authors used data from the HealthStyles national mail survey that is administered by public relations firm, Porter Novelli. The surveys were sent to US households who have agreed to answer questions about products, media, and lifestyles. The survey oversampled low-income and minority groups, and the resulting data were weighted to reflect US population characteristics.

Four questions about breastfeeding were included in both waves of the survey. The most striking change was an increase in agreement with the statement that "infant formula is as good as breastmilk" from 14.3% in 1999 to 25.7% in 2003. Increases in agreement were particularly strong among women, African Americans, adults with a high school degree or less, and adults under 25 or over 64 years. A significant but small increase (only 2.7%) was observed in agreement with the statement that "Feeding a baby formula instead of breastmilk increases the chances the baby will get sick." Although no significant changes occurred overall in agreement the two statements regarding acceptability of breastfeeding in public, negative attitudes did increase among certain subgroups, including low-income and less educated respondents.

Conclusions and Implications: The authors point out that these trends coincide with the introduction to the US market of new infant formulas, supplemented with long-chain fatty acids. These formulas are advertised as being "like breast milk". Expenditures by formula companies on advertising increased from \$29 million in 1999 to more than \$46 million in 2004. In light of these trends, health professionals need to intensify efforts to educate parents and the general public about the benefits of breastfeeding.

Source: Li R, Rock VJ, Grummer-Strawn L. Changes in public attitudes toward breastfeeding in the United States, 1999-2003. *J Am Diet Assoc.* 2007; 107: 122-127.

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 compliance 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.