Maternal & Infant Nutrition Briefs

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Nutrition and Growth in Infants with Allergy to Cow's Milk

About 2-3% of infants are allergic to cow's milk protein. After weaning from breast milk these infants are usually given either soy or extensively hydrolyzed whey formulas. Compared to healthy infants, those with food allergies may have an increased need for nutrients to grow normally. This study is the first to use a randomized, controlled trial to compare the long-term effect on nutrition and growth of providing soy or extensively hydrolyzed whey formula to infants with a cow's milk allergy.

The authors conducted this study in Finland, among 168 infants with confirmed cow's milk allergy. Starting around 7 months of age, the infants either received soy or extensively hydrolyzed whey formula. According to general health recommendations in Finland, all babies received vitamin D (240 to 400 IU) and calcium supplements (250-500 mg). Parents avoided giving their babies other foods commonly associated with allergies, such as eggs, fish, citrus fruits, during the first year of life. At the start of the study, duration of breastfeeding was similar in the two groups, and about half the infants were still partially breastfeeding. The researchers collected follow-up dietary intake, biochemical, and growth data on these infants at 1 and 2 years of age.

About 25% of the infants given soy formula and 6% of those given whey formula switched to another formula before 2 years of age. Adverse reactions to the formula occurred in 9% and 2% of the infants receiving the soy and whey formulas, respectively. At 2 years, 70% of the infants still consumed the soy or whey formula (22 and 14% of energy, respectively). Dietary intake of zinc and vitamin E was lower and riboflavin was higher in the infants fed whey, compared to the soy group. The groups had similar hemoglobin, ferritin, mean cell volume, serum alkaline phosphatase, copper, and zinc values at 1 and 2 years of age. A small difference (mean 0.4) in transferrin receptor levels indicates that infants fed soy formula

showed a greater tissue need for iron than the other infants ($p < 0.08$). Growth was similar over the 2-year period but the analyses did not include those infants who switched formulas.

Conclusions and Implications The authors conclude that nutrition and growth were within reference values and similar between the soy and extensively hydrolyzed formula groups. Therefore, in cases of allergy to cow's milk, choice of a soy-based or extensively hydrolyzed whey formula can be largely based upon the infant's tolerance. However, it is important to remember that infants in this study were supplemented with vitamin D and calcium, and many continued to consume formula for the first two years of life.

Source: Seppo L, Korpela R, Lönnerdal B et al. A follow-up study of nutrient intake, nutritional status, and growth in infants with cow milk allergy fed either a soy formula or an extensively hydrolyzed whey formula. A J Clin Nutr 2005; 82:140-5.

Effect of Folic Acid Fortification on Neural Tube Defects in Minorities

Getting enough folic acid before and during pregnancy can reduce the risk of having a baby with a neural tube defect by 50-70%. Because the evidence supporting the need for folic acid to prevent birth defects is so convincing, the Food and Drug Administration has required, as of January 1998, that enriched grain products be fortified with folic acid. Experts estimate that since fortification the number of pregnancies affected by a neural tube defect have dropped from 4000 to 1000 annually. However, racial and ethnic disparities persist in the occurrence of many health problems in the US. Therefore, it is critical to determine the effects of fortification on pregnancy outcomes within subgroups of the population. This paper examines the impact of folic acid fortification on the rate of neural tube defects in Latino, white, and African American pregnancies.

The authors were able to link birth defect surveillance records from 21 separate state systems. To be included in the overall analysis, each data source had to provide accurate identification of cases (beyond birth certificates), the quarter and year of birth, and racial/ethnic data. The researchers calculated and compared rates of neural tube defects, including both spina bifida and anencephaly, for three periods: 1) before fortification (January 1995 through December 1996); 2) optional or voluntary fortification (January 1997 through September 1998); and 3) mandatory fortification (October 1998 through December 2002).

The combined dataset captured birth outcomes for 35 to 40% of all Latino and African American births from 1995 to 2002. Before fortification, the rate of neural tube defects was highest in Latino women (6.49 per 10,000), lowest among African American mothers (3.57 per 10,000), and in-between for white mothers (5.13 per 10,000). After fortification was fully implemented, the rate of neural tube defects dropped significantly in the two groups with the highest rates initially (Latino and white mothers). Among African American women, rates of spina bifida decreased slightly but no change occurred in rates of anencephaly.

Conclusion and Implications: The impact of folic acid fortification on neural tube defects has been the greatest among those racial/ethnic groups, Latino and white, who had the highest initial rates of these birth defects. The underlying reasons for the racial/ethnic disparities in risk of neural tube defects are unknown but probably involve some combination of genetic and environmental factors. Getting a better handle on these factors is important to prevent birth defects in all populations.

Source: Williams LJ, Rasmussen SA, Flores A, Kirby RS, Edmonds LD. Decline in the prevalence of spina bifida and anencephaly by race/ethnicity: 1995-2002. Pediatrics 116 (3): 580-586

Early Risk Factors for Childhood Obesity

Many efforts to prevent obesity have focused on preschoolers and school children but the evidence for earlier prevention is increasing. Long-term follow-up studies with are particularly valuable in identifying which factors are independently related to health problems later in life. The purpose of this study was to identify early risk factors for childhood obesity, using data from the Avon longitudinal study.

This research, underway in the U.K. has been following children born to pregnant women who were enrolled in the Avon study in 1991-92. In a large sample of children (n=7758), the researchers have been able to examine the combined effects of 25 potential risk factors on obesity at 7 years of age, using data derived from medical records, questionnaires, and measured weights and heights. Variables included intrauterine/perinatal factors; infant feeding and weaning practices; family characteristics; and lifestyle during childhood. For a randomly selected subgroup of 909 children, measured length or height and weights are also available at 8 months and 18 months.

Eight of the 25 risk factors were significantly and independently related to obesity at 7 years of age. These factors included: higher birth weight; maternal smoking during pregnancy; parental obesity; less nighttime sleep at 30 months and older (< 11 hrs); TV viewing (> 4 hrs. a week); and early rapid growth (catch-up growth, weight gain in infancy, early adiposity rebound). Breastfeeding reduced the risk of obesity but only in nonsmoking mothers. Evidence was lacking for an independent effect on childhood obesity of the following: parity, gender, gestational age, number of fetuses, timing of introduction to solid foods, number of siblings, ethnicity, maternal age and time spent in the car. The relationship between consumption of junk food at 3 years of age and obesity at 7 years was marginal but a more accurate assessment of dietary patterns might have yielded stronger results (a food frequency questionnaire was used in this study).

Conclusions and Implications: Early life influences the risk of childhood obesity. Since several of the risk factors, such as smoking during pregnancy, infant weight gain, catch-up growth between birth and 2 years, occur very early in life, prevention efforts targeting older children may be less successful. Since ethnic minority groups are underrepresented in the Avon longitudinal study, other risk factors may emerge as significant in those groups.

Sources: Reilly JJ, Armstrong J, Dorosty AR, Emmett PM, Ness A, Rogers I, Steer C, Sherriff A, et al. Early life risk factors for obesity in childhood: cohort study. BMJ 2005;330:1357 Available at http://bmj.com/cgi/content/full/330/7504/1357

Childhood Obesity: Another Reason Not to Smoke

American Indian children are at particularly high risk of becoming overweight during childhood and adolescence. Using data from the pediatric and pregnancy nutrition surveillance systems, the authors of this study did a retrospective analysis to identify risk factors for overweight in the American Indian population. In Wisconsin, where the study was conducted, all of the data in these two surveillance systems are from the Special

Supplemental Nutrition Program for Women, Infants, and Children (WIC). Complete data were available for 252 mother-infant pairs. Smoking at the first prenatal visit was significantly associated with risk of overweight and overweight in children at three years of age. Smaller at birth, children of smoking mothers gained weight more rapidly, relative to length, than children of nonsmoking women. Growth among children whose mothers began smoking after delivery was not different from that of children whose mothers remained nonsmokers. Breastfeeding tended to be protective but was not significantly related to overweight at three years. The authors did not specifically mention whether the breastfeeding results might have varied among smokers and nonsmokers, as they did in Avon study (reviewed in this same issue of Maternal and Infant Nutrition Briefs).

Conclusions and Implications: This retrospective study is the first to report a significant relationship between smoking during pregnancy and overweight in American Indian children. The effects seem confined to the prenatal period, supporting the notion that prenatal programming of growth may be involved. Given the limitations of the datasets, the findings need to be confirmed in longitudinal studies. In the meantime, however, mothers, specifically those from high risk populations, have another good reason to quit smoking during pregnancy.

Source: Adams AK, Harvey HE, Prince RJ. Association of maternal smoking with overweight at age 3 y in American Indian children. Am J Clin Nutr 2005; 82:393-8.

Perchlorate in the News

In the 2005 May/June issue of Maternal and Infant Nutrition Briefs, an article discussed iodine nutrition and thyroid function during pregnancy and breastfeeding. The two recent research papers reviewed in that article both have serious methodological limitations. In particular, readers may want to see the points raised in an editorial published in Journal of Human Lactation about the perils of drawing inferences from nonrandom sampling in the perchlorate paper. The observation that perchlorate has been detected in human milk samples should not be used as a reason for avoiding breastfeeding. It might, however, be a reason for investing more attention to environmental clean-up and protection.

Source: Heinig MJ. Perchlorate in human milk: separating the science from sensationalism J Hum Lact 2005; 21(2): 115-117.

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.