

CLINICAL INQUIRIES

Evidence Based Answers
from the Family Physicians
Inquiries Network

Which factors increase the risk of an infant becoming an overweight child?

Evidence-based answer

Variables that increase the risk of overweight in childhood include formula feeding, high birth weight, high rate of weight gain in the first 4 months of life, low socioeconomic status, and maternal

obesity (strength of recommendation [SOR]: **A**, systematic reviews and consistent cohort studies). No single risk factor predicts overweight, and not all infants with risk factors become overweight children.

Evidence summary

The Centers for Disease Control and Prevention defines overweight in children as weight-for-length greater than the 95th percentile for sex in children younger than 24 months and body mass index (BMI) greater than the 95th percentile for age and sex in children >24 months.

Breastfeeding is protective

Breastfed infants are less likely to be overweight later in life than infants fed formula. A meta-analysis of 9 studies found that 7 showed a significantly lower risk of overweight among children who were breastfed (odds ratio [OR]=0.78; 95% confidence interval [CI], 0.71-0.85).¹

Four of the studies demonstrated that longer duration of breastfeeding offered greater protection than shorter duration. Two of the 4 studies defined longer duration as more than 6 months, 1 defined it as more than 3 months, and 1 examined breastfeeding for periods of less than 1 week, 1 week to 1 month, 2 to 3 months, 4 to 6 months, 7 to 9 months, and longer than 9 months, showing a duration-

dependent decrease in risk. The other studies in the meta-analysis evaluated never-breastfed vs ever-breastfed infants.¹

Higher birth weight increases risk

Several meta-analyses report that birth weight is an early risk factor for later overweight. One found a positive association between birth weight and overweight in childhood in 9 of 11 studies.² Another meta-analysis found a positive association in 25 of 28 studies that examined birth weight and BMI in childhood.³ These descriptive meta-analyses didn't calculate pooled odds ratios (ORs) because of heterogeneity of the ages included and methods used to measure obesity.

A high rate of weight gain in infancy is also a risk factor for later overweight. One descriptive meta-analysis reported that 13 of 15 studies found a positive association between weight gain in the first year of life and overweight later in childhood, although overall OR and relative risk weren't reported.⁴ A large cohort study found that each 100 g per month increase in weight gain above the mean

Kate Rowland, MD
University of Chicago

Rick Wallace, MSLS
East Tennessee State University,
Johnson City

FAST TRACK

Risk factors for overweight in childhood include formula feeding, high birth weight, low socioeconomic status, and maternal obesity.

(820 g per month) during the first 4 months of life increased the odds of overweight at 7 years of age by 38% (OR=1.38; 95% CI, 1.32-1.44).⁵

Socioeconomic status is a factor

Low socioeconomic status in infancy or early childhood increases the risk of childhood overweight, perhaps because of less breastfeeding and more smoking, among other factors.^{6,7} Socioeconomic status was determined using the International Standard Classification of Occupations; children whose parents worked at unskilled manual labor jobs or were unemployed were considered in the lowest socioeconomic group.^{6,7}

A Brazilian study found that children born in the lowest socioeconomic group had BMI measurements at 18 years of age that were an average of 1.21 kg/m² higher than children in the highest socioeconomic group ($P < .05$). The study controlled for birth weight, maternal smoking, gestational age, and level of schooling eventually achieved by the child.⁸

Maternal overweight or obesity during the child's infancy also increases the risk of childhood overweight.^{9,10} Infants of obese parents were more likely to be overweight at 7 years, compared with children whose mothers were normal weight (OR=10.44; 95% CI, 5.11-21.23).⁹

Recommendations

The American Academy of Pediatrics (AAP) cites prevention of overweight as a potential benefit of breastfeeding.¹¹ The American Academy of Family Physi-

cians notes that obese mothers should be especially encouraged to breastfeed.¹² The American Medical Association-AAP Expert Panel recommends breastfeeding; safe, free movement; and no television for infants to decrease the risk of later overweight.¹³ ■

References

1. Arenz S, Ruckerl R, Koletzko B, et al. Breast-feeding and childhood obesity—a systematic review. *Int J Obes Relat Metab Disord*. 2004;28:1247-1256.
2. Parsons TJ, Power C, Logan S, et al. Childhood predictors of adult obesity: a systematic review. *Int J Obes Relat Metab Disord*. 1999;23(suppl 8):S1-S107.
3. Rogers I, EURO-BLCS Study Group. The influence of birthweight and intrauterine environment on adiposity and fat distribution in later life. *Int J Obes Relat Metab Disord*. 2003;27:755-777.
4. Monteiro PO, Victora CG. Rapid growth in infancy and childhood and obesity in later life—a systematic review. *Obes Rev*. 2005;6:143-154.
5. Stettler N, Zemel BS, Kumanyika S, et al. Infant weight gain and childhood overweight status in a multicenter, cohort study. *Pediatrics*. 2002;109:194-199.
6. Bergmann KE, Bergmann RL, Von Kries R, et al. Early determinants of childhood overweight and adiposity in a birth cohort study: role of breast-feeding. *Int J Obes Relat Metab Disord*. 2003;27:162-172.
7. Dubois L, Girard M. Early determinants of overweight at 4.5 years in a population-based longitudinal study. *Int J Obes*. 2006;30:610-617.
8. Goldani MZ, Haefner LS, Agranonik M, et al. Do early life factors influence body mass index in adolescents? *Braz J Med Biol Res*. 2007;40:1231-1236.
9. Reilly JJ, Armstrong J, Dorosty AR, et al. Early life risk factors for obesity in childhood: cohort study. *BMJ*. 2005;330:1357.
10. Whitaker RC. Predicting preschooler obesity at birth: the role of maternal obesity in early pregnancy. *Pediatrics*. 2004;114:e29-e36.
11. Gartner LM, Morton J, Lawrence RA, et al, for the American Academy of Pediatrics Section on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics*. 2005;115:496-506.
12. American Academy of Family Physicians. Breast-feeding, family physicians supporting (position paper). Available at: www.aafp.org/online/en/home/policy/policies/b/breastfeedingpositionpaper.html. Accessed February 12, 2008.
13. Barlow SE, The Expert Committee. Expert Committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007;120(suppl 4):S164-S192.

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