Infant Feeding and Obesity

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Introduction

Increasing prevalence of obesity is a major and growing concern in both developing and industrialized countries. Obesity is associated with increases in nearly all chronic diseases, morbidity and mortality. It has long been recognized that genetic and behavioural predisposition, excess caloric intake and insufficient exercise are directly associated with obesity. There are conflicting views, however, as to whether early childhood practices could have any lasting impact on body composition in later childhood and adulthood.

More light is being shed on this issue thanks to recent research. This review includes recent studies that help define and clarify the relationship between infant feeding practices and later obesity in childhood and beyond. This review will not include the literature that demonstrates that maternal obesity at the time of pregnancy and lactation is negatively associated with breastfeeding success.

Is there an association of infant feeding patterns and obesity?

One of the largest and most recent studies on obesity in the US asked, “Does breastfeeding protect against paediatric overweight?” While findings for the larger population did not achieve significance, the study found that the duration of breastfeeding showed a dose-response protective relationship against the risk of overweight in non-Hispanic white four year old children. This finding confirmed the similar results of a meta-analysis which concluded that, among 11 studies that examined prevalence of overweight in children older than three years of age and that had a sample size of ≥100 per feeding group, eight showed a lower risk of overweight in children who had been breastfed, after controlling for potential confounders. The three "negative" studies lacked information on the exclusivity of breastfeeding. A dose-response relationship with duration of breastfeeding was observed in some, but not all, of the "positive" studies.

Does this association hold at different ages and in different settings?

A study in Scotland of 32,200 children assessed at ages 39-42 months found the odds ratio (OR) for BMI ≥98 percentile to be 0.70 (95% CI 0.61-0.80) for breastfed children.

In a German study of 9,206 children five to six years old, the prevalence of obesity in never breastfed children was 4.5% when compared to 2.8% in those ever breastfed children. A clear dose-response effect for the duration of breast-feeding on the prevalence of obesity was found to be 3.8%, 2.3%, 1.7% and 0.8% for exclusive breastfeeding in children 2, 3-5, 6-12 and >12 months, respectively. The results for overweight were very similar. The protective effect of breastfeeding on overweight and obesity could not be explained by differences in social class or lifestyle. The adjusted OR of breastfeeding for any length of time was 0.71 (95% CI, 0.56-0.90) for obesity and 0.77 (95% CI, 0.66-0.88) for overweight.

A Czech study of 33,768 school-children aged 6-14 years included multiple logistic regression analyses to assess the association between breastfeeding and BMI. They found that the overall prevalence of overweight was lower in breastfed children. The effect of breastfeeding on overweight and obesity did not diminish with age in children 6-14 years old, controlling for parental education, parental obesity, maternal smoking, high birthweight, watching television, number of siblings, and physical activity. Adjusted OR for breastfeeding were for overweight 0.80 (95% CI, 0.71-0.90) and for obesity 0.80 (95% CI, 0.66-0.96).

In another study in two German cities, 9-14 year olds were observed to have a markedly lower overweight prevalence among children who were breastfed than those non-breastfed. Controlling for age, sex and city, breastfed children were substantially less likely to be overweight at 9-10 years of age (OR 0.55, 95% CI 0.41-0.74). Results were slightly attenuated after adjustment for nationality, socioeconomic status, number of siblings, parental smoking (OR 0.66, 95% CI, 0.52-0.87). A longer overall duration of exclusive breastfeeding was associated significantly with decreasing prevalence of overweight.

Finally, a study in the US (Gillman) assessed more than 15,000 children aged 9-14 years by their breastfeeding pattern in the first six months of life. Among subjects who had been only or mostly breastfed compared with those only or mostly formulafed, the OR for being overweight was 0.78 (95% CI, 0.66-
0.91), after adjustment for age, sex, sexual maturity, energy intake, time watching television, physical activity, mother’s body mass index, and other variables reflecting social, economic, and lifestyle factors.

These OR across age groups and countries are quite similar, reflecting about a 20% reduction in overweight and obesity with breastfeeding.

Not all studies looking at the impact of infant feeding on obesity in childhood or adults achieved significance, and others found only some parameters to achieve significance—such as a Brazilian study that found significance only in medium durations of breastfeeding and a linear decreasing trend in obesity with increasing duration of predominant breastfeeding (p=0.03). Those studies with outcomes measured during 4-8 months of life often found the expected slower growth with breastfeeding during this period, although all report that there is catch-up growth during early childhood. Lack of breastfeeding during that period (after 3 months) in fact may be associated with later obesity. Most studies, whether achieving significance or not, showed a trend towards protection by breastfeeding.

Two recent literature reviews concur the probability that breastfeeding is associated with less obesity. One review by physical activity and nutrition researchers in Melbourne concluded that protective factors against obesity included: regular physical activity (convincing); a high intake of dietary non-starch polysaccharides/fibre (convincing); supportive home and school environments for children (probable); and breastfeeding (probable). A second review noted inconsistent findings. The author postulated that this might be due to common issues in the study of breastfeeding, including inability to blind or randomize, retrospective recall, inconsistent definitions of breastfeeding patterns, insufficient sample size in prospective studies, statistical methodology, varying controls, and variable outcome measures. The reviewer concludes with the comment that “the possibility remains that even if the effect of breastfeeding on future obesity is small the public health impact can be tremendous,” and calls for increased public funding for research in this area.

As exclusive breastfeeding seemed to be associated with less obesity in some studies, it is interesting that Brazilian researchers examined energy intake in exclusively and partially breastfed infants. They found a significant difference in human milk intake between exclusively and partially breastfed infants, but those who received cow or formula milk in addition to human milk tended to have an energy intake 20% above the latest recommendations (1996) for breastfed and 9% above those for formula-fed infants. The authors postulate that if high intakes are maintained, this may result in obesity later in life.

Singhal et al. explored some biological markers more in-depth. These researchers examined the issue of breastfeeding and lower cholesterol levels later in life by assigning preterm infants to breastmilk or standard formula, along with preterm formula in both groups. At age 13-15 years, those with a greater proportion of human milk intake had better LDL/HDL ratios, independent of gestation and potential confounding variables, as well as better apolipoprotein ratios.

Conclusions

The findings of this set of studies, which included subjects from age four to adulthood, were consistent: the more breastfeeding and human milk provided—the less overweight. Even when studies did not achieve statistical significance, this increasing body of evidence showing a protective effect of breastfeeding against obesity adds yet another indication of the risks of not breastfeeding—ie, negative impacts on health and survival in infancy and childhood, lack of immune protection in infancy and beyond, reduced cognitive and neurological development, and increased incidence of cancers in children and their mothers who breastfed. If the child is not breastfed, this list of risks now should include the lifelong consequences of overweight and an increased incidence of the many diseases that result from obesity and cardiac risk.
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References


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