

# Tackling Obesity

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IN ITS INFANCY



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## In it's infancy

**O**besity is the nutritional disorder coming into picture more commonly in every age group. Childhood obesity is seen setting the ground for many of the adult diseases. It is an important risk factor for cardiovascular disease and diabetes in adulthood.

Preventing obesity should be a public health concerns and assumes importance because weight loss interventions in obese children are not only costly but rarely successful. While short-term benefits of breastfeeding have been well established, more recently possible long-term benefits beyond two years of age have also been documented. Some of these are related to obesity and provided in this document.

There is compelling evidence to suggest that breastfeeding reduces the risk of obesity during childhood. Breastfeeding's beneficial effects on later cardiovascular risk factors including blood pressure and plasma lipid profile also assume great importance. Recent research has in fact produced important information on primary prevention of obesity as with every month of breastfeeding reduced the risk of childhood overweight by 4 percent. This knowledge could be translated to action as the fundamental first step for reducing a child's risk of obesity and related long-term consequences in the form of diseases such as type 2 diabetes. (Mayer-Davis; *Diabetes Care*, 2006)

This is a brief information on the role of breastfeeding in tackling obesity while in its infancy. Emphasis is important, as there is a dose related response with increasing breastfeeding duration. Fairly consistent results are available from recent studies where baby's breastfed for nine months had a 31 percent overall reduction in risk of obesity. This evidence clearly justifies targeting infancy since it is going to be the key while designing interventions for prevention of obesity. Ensuring optimal breastfeeding practices\* could be the first on this list and avoidance of any artificial feeding during infancy will stand critical in these efforts. The aim should be optimizing infant growth.

### How Does Breastfeeding Play A Role In Prevention of Obesity?

It is possible that the apparently protective effect of breastfeeding on obesity is related to the lower nutrient intakes and slower weight gain of breastfed infants early in life, and this is currently being investigated by a number of groups. The new WHO growth curves are expected to provide a single international standard that represents the best description of physiological growth for all children from birth to five years of age and establish the breastfed infant as the normative model for growth and development.

*There are several factors to be considered:*

- **Breastmilk is the physiological standard** for normal human infant growth and development. All mammals produce milk, and each milk is specifically nutritionally composed to meet the needs of that animal. Humans are designed to grow at a certain rate, to develop in certain ways. The use of infant formula is still in it's 'infancy'- two may be three generations? We are still finding out about the long-term effects that this radical change in infant's diet has had on the health of our population.
- **Disturbed metabolism in infancy** - It is now considered that exposure to excessive calories in infancy, can lead the human infant's metabolism to respond by increasing the number of fat cells it lays down in the infant's body. Thus in the future, extra fat can be stored in more cells than otherwise would have been available.
- **Programming of leptin physiology** - A recently found protein in human milk, leptin, serves to regulate energy expenditure, and may act as a counter-regulatory hormone to insulin. It may also act as a circulating satiety factor. The amount of milk a baby takes in is not mediated by the parent or caregiver, who is tempted to get the baby to "drink it all up", or "eat everything on the plate". Leptin, and the baby's reactions to his/her milk intake, functions to ensure that only what is needed is drunk.

\* According to WHO/UNICEF "Global Strategy for Infant and Young Child Feeding" optimal breastfeeding includes exclusive breastfeeding for the first six months and adequate complementary feeding after 6 months with continued breastfeeding for two years or beyond.

- **Breastfeeding is an adjustable process** - Baby's feeding intakes vary according to individual needs, and the mother's supply adjusts automatically to meet these needs, provided the baby has easy and at-need access to the breast. The breastfed baby self regulates during complementary feeding as well. Mothers of breastfed babies have a more relaxed attitude to their toddlers' intake of solid food and their toddlers consequently eat a wider range of solids and are taller and leaner than their bottle-fed counterparts.
- **Breastmilk is a live fluid**, impossible to replicate, full of activity, taste and with subtle differences in composition from feed to feed.

### The Scientific Evidence

Here are some abstracts of the scientific evidence available on this issue:

*Elizabeth J. Mayer-Davis, Sheryl L. Rifas-Shiman, Li Zhou, Frank B. Hu, Graham A. Colditz, and Matthew W. Gillman. Breast-Feeding and Risk for Childhood Obesity Does maternal diabetes or obesity status matter? DIABETES CARE 29:2231-2237, 2006*

Authors sought to evaluate whether maternal diabetes or weight status attenuates a previously reported beneficial effect of breast-feeding on childhood obesity and found that for all subjects combined, breast-feeding was associated with reduced overweight (compared with normal weight) in childhood. Compared with exclusive use of formula, the odds ratio (OR) for exclusive breast-feeding was 0.66 (95% CI 0.53– 0.82), adjusted for age, sex, and Tanner stage. Results did not differ according to maternal status (non-diabetes/normal weight OR 0.73 [95% CI 0.49 – 1.09]; nondiabetes/overweight 0.75 [0.57– 0.99]; and diabetes 0.62 [0.24 –1.60]). Further adjustment for potential confounders attenuated results, but results remained consistent across strata of maternal status (P value for interaction was 0.50). They concluded that breast-feeding was inversely associated with childhood obesity regardless of maternal diabetes status or weight status and these data provide support for all mothers to breastfeed their infants to reduce the risk for childhood overweight. They also said that it is possible that the beneficial effects of breastfeeding may contribute to breaking the cycle of overweight and diabetes, which may occur among offspring of diabetic mothers.

*Ong KK, Emmett PM, Noble S et al. Dietary energy intake at the age of 4 months predicts postnatal weight gain and childhood body mass index. PEDIATRICS 2006;117:503-8*

This birth cohort study conducted in the United Kingdom aimed at determining whether different

feeding patterns and energy intakes in infancy affect body weight and body mass index (BMI) later in childhood. The energy intake at 4 months was estimated from 1-day unweighed dietary records in 881 infants and related to their childhood weight gain and BMI. Among 582 formula- or mixed-fed infants, energy intake at 4 months was higher in infants who were given solid foods earlier. Higher energy intake at 4 months predicted greater weight gain between birth to age 1, 2, or 3 years and larger body weight and BMI at ages 1 to 5 years

*Owen CG, Martin RM, Whincup PH et al. Effect of infant feeding on the risk of obesity across the life course: a quantitative review of published evidence. PEDIATRICS 2005;115:1367-77*

This systematic review examines the influence of initial infant feeding on obesity in later life. Sixty-one studies reported on the relationship of infant feeding to a measure of obesity in later life; of these, 28 (298,900 subjects) provided estimates of risk. In these studies, breastfeeding was associated with 11%-15% reduced risk of obesity, compared with formula feeding. In eleven small studies of less than 500 subjects, the risk reduction was particularly strong (45-67%), but was still apparent in larger studies of 500 or more subjects (10-15%). In six studies that adjusted for all three major potential confounding factors (parental obesity, maternal smoking, and social class), the risk reduction was lower (7-14%), but still present.

*Harder T, Bergmann R, Kallischnigg G, Plagemann A. Duration of breastfeeding and risk of overweight: a meta-analysis. AM J EPIDEMIOL. 2005 Sep 1;162(5):397-403.*

A comprehensive meta-analysis of the existing studies on duration of breastfeeding and risk of overweight shows that the duration of breastfeeding was inversely associated with the risk of overweight. These findings strongly support a dose-dependent association between longer duration of breastfeeding and decrease in risk of overweight.

*Laurie Nommsen-Rivers. More Evidence of the Protective Effect of Breastfeeding Against Childhood Obesity. J HUM LACT 20(2), 2004.*

The study authors did find that the prevalence of underweight was highest in the never-breastfed group (5%), as compared to the other feeding categories. Despite the mean childhood BMI's being virtually identical across the feeding categories (range, 16.1-16.3), the standard deviation (degree of variability around the mean) was largest for the never-breastfed group, and the standard deviation decreased with increasing breastfeeding duration. This suggests that the protective effect of breastfeeding is not a result of an overall downward shift in BMI but rather a decrease in childhood BMI variability with increasing duration of breastfeeding.

**Armstrong J et al. Breastfeeding and lowering the risk of obesity. LANCET 2002; 359: 2003-2004.**

In this study researchers looked at more than 30,000 Scottish children who were either exclusively breastfed or fed on formula. All children were assessed around the ages of 3 to 3 ½ for body mass index and breastfeeding status during infancy. Researchers identified children as obese if their BMI fell in either the top 2% or top 5% of children their age. When obesity was defined as top 2% BMI or higher, children who were breastfed had a 30% reduced incidence of obesity. The reduction was slightly lower when obesity was defined as the top 5%. The findings held true even after the results were adjusted to take factors such as socioeconomic status, sex, and birth weight into account.

**Liese AD et al. Inverse association of overweight and breastfeeding in 9 to 10-years-old children in Germany. INT J OBESITY 2001; 25(11): 1644-50.**

In 1995-96, a study of 2106, nine and ten year olds in Germany found a “markedly lower overweight prevalence among breastfed than non-breastfed children in Dresden and Munich”. The researchers also noted that, “a longer overall duration and duration of exclusive breastfeeding was associated significantly with decreasing prevalence of overweight”.

**Gillman MW et al. Risk of overweight among adolescents who were breastfed as infants. JAMA 2001; 285: 2461-67.**

In the United States of America, a 1996-97 study of 15,341, nine to 14 years olds found “that infants who were predominantly fed breastmilk in the first six months of life had a lower incidence of overweight 9 to 14 years later”-this lower incidence was approximately 22%. The authors concluded that longer the duration of breastfeeding, the greater the protection against obesity.

**Kries R von et al. Breastfeeding and obesity: cross sectional study.: ADV EXP MED BIOL 2000; 478: 29-39.**

In Germany, the authors studied 9,206 Bavarian children at school entry in 1997 and found the prevalence of obesity in children who had never been breastfed to be 4.5% as compared to 2.8% in children who had ever been breastfed. There was a clear reduction in obesity dependent on the length of time these children had been breastfed i.e. 3.8%, 2.3%, 1.7% and 0.8% for breastfeeding up to 2 months, 3 to 5 months, 6 - 12 months, and over 12 months, respectively. Children who had ever been breastfed had a reduction of 20% in their risk of being overweight; if they had been breastfed for six months, this figure was 35%; and there were even more pronounced effects regarding obesity, 25% and 43% respectively.

## Conclusion

Results of these studies provided here support the fact that infants who are exclusively breastfed or breastfed longer had much reduced risk of being overweight during childhood, compared to children exclusively formula-fed. Feeding children with breastmilk substitutes is one of the earliest contributors to obesity. Promotion of breastfeeding thus becomes a starting-point in campaign against obesity. Optimal breastfeeding practices as well as avoiding artificial feeding during infancy is an achievable practice provided mothers are supported at all levels; health care system, community and family, regardless of income, language-barriers or geographic situation. It has been very well documented. Breastfeeding is therefore potentially useful for population-based strategies aimed at obesity prevention, and chronic diseases linked to obesity. This benefit assumes importance in the current times when double burden of malnutrition has been on national and global agenda. Role of breastfeeding in reducing under nutrition and child mortality has been demonstrated beyond any doubts, other side of malnutrition also can be tackled by breastfeeding, is relatively new and should therefore be kept in mind while designing any programmes to tackle the double burden.

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