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Advice to Bottle-feeding Parents could Defer Obesity

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Letter to Editor

Fast early growth may be related to the process of bottle feeding rather than solely the type of milk fed. Bottle-feeding parents should be advised on the amount of milk to feed and how to feed their child responsively.

The seeds of obesity are often sown in infancy and fast early growth is associated with obesity in childhood. There is conflicting evidence about whether being breastfed protects children against obesity. Formula milk has been designed to mimic breastmilk as far as possible chemically but it cannot mimic the mode of delivery of breastmilk. Perhaps this important difference is one of its problems.

Many studies have compared breast and formula-fed infants but only a few have assessed the actual amounts of breast, formula or other milks fed or the contribution to energy intake of complementary foods and drinks and very few have investigated the effect of using a bottle for milk-feeding.

One study which has investigated infant feeding in detail is the Avon Longitudinal Study of Parents and Children (ALSPAC) in the UK where dietary diary data was recorded by parents at 4, 8 and 18 months in around 1000 children and their growth followed up to 10 years of age. The nutrition group lead by Pauline Emmett has investigated the contribution of different milks and complementary foods to energy intake and growth [1, 2]. When diet was assessed at 4 months of age higher energy intake predicted greater weight gain between birth and age 1, 2 and 3 years and larger body weight and BMI at 5 years of age in formula or mixed-fed children but there was no association in breastfed children [1]. Assessing diet at 8 months showed that where infants were fed more than the recommended amount (600 mL or 21 ounces/day) of formula (or cows' milk) they grew faster in the first 2 years, and beyond in the case of cows' milk, both in weight and height than breastfed infants [2]. The dietary data revealed that the energy contribution from foods and drinks other than milk was lower in both formula and cow's milk groups fed more than 600mL of milk than in their counterparts fed less than 600 mL of milk, however, this did not compensate fully for the extra energy obtained from the milk feeds. These data suggest that dysregulation of intake and/or over feeding may be a problem in bottle-fed infants.

The Infant Feeding Practices Study II in USA, a longitudinal study of around 2000 new mothers and their infants, collected information by questionnaire about milk feeding and current weight 10 times during the first year of the infant's life. Details of the frequency and mode of delivery of feeds and the types of milk fed were collected [3]. Although 83% of mothers' breast fed initially only 50% still did so when their infant was 6 months old and in the second 6 months of life up to 70% of infants were fed formula [3]. At 10 months of age 40% of formula drinkers were taking 7 ounces or more per feed and an average of 4 feeds per day (possibly up to 28 ounces/day).

The authors led by Sara Fein and Lawrence Grummer-Strawn carefully investigated the differences in weight gain associated with the mode of delivery of the milk and found that compared with infants fed only at the breast, both those fed formula only or breast milk by bottle gained more weight per month [4]. In infants fed only breast milk weight gain increased as numbers of feedings by bottle increased. A further detailed analysis looked at bottle emptying by infants. This showed that for infants who were exclusively fed from the breast in early infancy 27% emptied the bottle in late infancy where as 54% of infants fed both breast and bottle and 68% of infants fed only by bottle did so [5]. The intensity of early breastfeeding was also important; if over 80% of feeds were from the breast the infant was less likely to have excess weight gain in the second 6 months of life [6]. There was an independent relationship between infants who often emptied the bottle in early infancy and risk of excess weight gain which was not mediated by parental encouragement [6]. It seems that bottle-feeding may have a distinct effect on infants' dysregulation of milk intake compared with feeding from the breast.

Alison Ventura followed up on this work with an experimental approach in 21 formula-feeding mother and infant pairs [7]. In one group the mothers continued with their usual feeding practices and in the other group mothers were helped to be very responsive to infant cues of hunger and satiety. Mothers also completed a questionnaire about their feeding styles and infant's temperament. Infants in the mother-led group consumed around 42% more formula than infants in the infant-led group. Greater intakes in the mother-led group were predicted by both feeding style (less restriction and less responsiveness) and infant temperament (more positive mood). A longitudinal study of growth in twins, the UK Gemini study

started by Jane Wardle, also looked at maternal feeding styles in relation to bottle-feeding [8]. The general appetite of the child was rated along with the use of restrictive feeding practices. Of the 1920 twin infants studied 70% were bottle-fed at 3 months. In bottle-fed but not breastfed infants there was an association between large appetite and more use of restriction by the mother (Odds Ratio=1.52, 95% Confidence Interval: 1.13–2.04, $p=0.006$). It is likely therefore that both maternal and child factors are important in determining the amount of milk ingested by bottle-fed infants.

In addition to the necessary support for breastfeeding parents, bottle-feeding parents should be advised not to encourage their infant to finish milk offered in a bottle/cup, to gradually decrease the amount of milk offered at each bottle/cup feed as complementary feeding is established and to be responsive to their child's cues of hunger and satiety. The UK recommendation of not more than 600mL (21 ounces) of milk per day in late infancy seems sensible.

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