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References


Commentary: Does breastfeeding for longer cause children to be shorter?

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Historically, prolonged lactation has been a traditional practice in many communities, reportedly reaching 15 years amongst Eskimos in 19th century King William Land.1 Nevertheless, there has long been speculation that extended breastfeeding adversely impacts on maternal and child health. A note in the *Lancet* in 1842 records the case of a woman who breastfed her child for over 15 years and then developed epilepsy.1 The attending physician wrote: ‘The worst symptoms of debility at last attended this monstrous proceeding’.

More recently an association between prolonged breastfeeding, typically defined as any breastfeeding beyond the first year of life, and malnutrition has been reported.2,3 At face value this finding calls into question current advice that children should continue to be breastfed, while receiving appropriate and adequate complementary foods, until at least 2 years of age.4 However, a

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non-causal explanation for the observed association, namely that poorly growing children continue to be breastfed, is investigated by Simondon et al. in a study published in the current edition of this journal.

**Public health significance**

Establishing the nature of the association between prolonged breastfeeding and childhood growth is an important public health issue. Firstly, breastfeeding offers anti-microbial, nutritional, hygienic, economic and psychological benefits to infants and mothers. Breastfeeding also acts as a contraceptive and may indirectly improve the food supply to the child by reducing pressure on family resources. Infectious diseases account for the majority of the 12 million deaths annually in children under 5 years of age in less developed countries, and in rural Senegal where Simondon et al. conducted their investigation the under-5 mortality rate is 182 per 1000. There is clear evidence that prolonged breastfeeding protects against serious morbidity and mortality from gastrointestinal and respiratory infections into the second year of life, with higher levels of protection seen in populations with high child mortality.

Secondly, the prevalence of prolonged breastfeeding is high in many less developed countries, particularly in sub-Saharan Africa (Figure 1). Therefore any causal association between breastfeeding and impaired growth may imply a large absolute risk of malnutrition related to prolonged breastfeeding, depending on the strength of the association. Thirdly, there are policy implications for infant-feeding education and health promotion. Contrary to widespread expectation, the duration of breastfeeding is increasing in many less developed countries, perhaps reflecting the simplicity of the ‘breast is best’ message. Reports that prolonged breastfeeding is associated with poor growth have created controversy concerning the messages that should be given to women about feeding methods. Saying that some breastfeeding is good but breastfeeding for too long is bad may be inconsistently interpreted by different health workers and breastfeeding mothers leading overall to greater risk of suboptimum nutrition.

**Inconsistencies in results**

In a review of 13 studies by Grummer-Strawn in 1993, 8 reported inverse associations between prolonged breastfeeding and growth, 2 found a positive relationship and 3 showed mixed results. Since then a case-control and a cross-sectional study have both found positive associations between extended breastfeeding and nutritional status. These two studies suggest opposite conclusions to those reached by earlier workers, namely that either prolonged breastfeeding protects against malnutrition or that malnutrition leads mothers to stop breastfeeding.

Inconsistencies in results between studies have been attributed to variations in the quantity and quality of weaning...
foods used to supplement breast milk, differences in the definition of malnutrition, or because of inadequate control of the potential confounding influences of adverse social conditions. Selection bias is another potential explanation for the finding of poor growth amongst children breastfed into their second year. This would occur if a beneficial survival effect was operating, whereby breastfed maldnourished children are more likely to survive than those who were weaned, perhaps mediated by immune factors conveyed from mother to child.

**Reverse causality**

Another explanation is that childhood size is related to the decision to wean. However, studies that have shown an association between breastfeeding and malnutrition are generally cross-sectional and do not allow investigation of the direction of the relationship between prolonged breastfeeding and nutritional status. It is likely that a complex interplay of factors determine patterns of childhood feeding and weaning as well as children’s growth and development. Clearly, an understanding of malnutrition in a particular community requires knowledge of the cultural context within which feeding and weaning decisions are made in that community.

The study by Simondon et al. published in this journal investigated maternal reasons for early and late weaning amongst 485 rural Senegalese children. Planned reasons for weaning were the child’s age if still breastfed and under 2 years old, and a ‘tall, strong child’ if the child was still breastfed after 24 months. The most frequent reasons for actual weaning were that the ‘child ate family food well’, the child was ‘tall and strong’ and maternal pregnancy. Maternal reasons for prolonging breastfeeding were if the child was ‘too little or weak’, there was a food shortage and current or frequent morbidity. Children whose breastfeeding was prolonged because of perceived small stature were more likely to be stunted than those in whom breastfeeding was prolonged for other reasons.

Other authors have shown that age, general development and health are important considerations in decisions about breastfeeding duration. Simondon et al.’s study is the first to directly support the suggestion by Caulfield et al. that mothers take into account a child’s size in weaning decisions. This hypothesis was first proposed to explain an interaction between age and duration of breastfeeding on nutritional status in a large multinational study in developing countries. In those countries outside sub-Saharan Africa older, still breastfed children were shorter and lighter than those no longer breastfed, an association which did not appear until 12–18 months of age and became greater over time. In contrast, in sub-Saharan Africa younger still breastfed children were shorter and lighter than those no longer breastfed, but differences largely diminished over time. A unifying interpretation of the observed association is that in sub-Saharan Africa the biggest children were weaned first, whereas in countries outside sub-Saharan Africa the smallest children were weaned last.

Doubt about the nature of the association remains since to effectively identify reverse causality will require a long-term longitudinal study to determine accurately the temporal ordering of weaning and growth faltering. Nevertheless there are other data which suggest that the inverse association between breastfeeding and growth is likely to be non-causal. Firstly, a prospective study of the relationship between breastfeeding in Britain in the 1920s and 1930s and growth in childhood through to adulthood found that breastfeeding was positively associated with childhood stature, and that this positive association appeared to persist into adulthood. Secondly, a study from New Zealand showed that breastfed children were significantly taller than formula-fed children at age 7 years. The effect disappeared when skeletal maturity was included in a multivariable model, suggesting that breastfeeding may influence growth tempo, the rate at which a child matures. Finally, breastfeeding positively influences various hormones affecting growth.

**Remote effects of breastfeeding**

As long ago as 1938 Spence wrote in the British Medical Journal, ‘It is possible that some of the serious degenerative diseases of adult life have their origins in the artificial feeding of infancy’. Any public health assessment of the risks and benefits of breastfeeding must also consider the potential beneficial impact of breastfeeding on adult chronic diseases, such as coronary heart disease and diabetes.

**Conclusion**

Clearly, further studies are needed to clarify whether prolonged breastfeeding is a response to poor growth and ill health, or is a precursor of inadequate energy intake, malnutrition and/or diarrhoeal diseases. Frankel et al. have drawn attention to a system of lay epidemiology, where people interpret health risks by integrating information from their observation of cases of illness and death within personal networks. It is likely that, by drawing upon personal knowledge of benefits and risk, mothers in Senegal have developed weaning strategies which optimize child survival, i.e. they continue to breastfed children who are undernourished or ill because of an awareness of the high mortality risk among weaned children. In the absence of clear evidence that the association between breastfeeding and malnutrition is likely to be causal, the traditional custom of prolonged breastfeeding should be encouraged.

**References**

7. Murray CJL, Lopez AD. The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries and Risk