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EDITORIAL

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Summarising the health effects of breastfeeding

This supplement to *Acta Paediatrica* presents a series of meta-analyses and systematic literature reviews examining a variety of health effects potentially related to breastfeeding. The authors carefully study a wide breadth of the literature to describe current knowledge on the benefits of breastfeeding, or put differently, the harms from not breastfeeding, and the effectiveness of interventions to promote breastfeeding. Five key messages emerge from the analyses presented.

First, the health benefits of breastfeeding are substantial. Traditionally, the importance of breastfeeding has been thought of in terms of the protection from infectious diseases or malnutrition caused by contaminated water or overdilution of breastmilk substitutes. The papers presented here clearly demonstrate that breastfeeding protects against a spectrum of adverse health outcomes over and above these traditional perspectives. Sankar et al. (1) document substantially higher rates of mortality among infants never breastfed compared to those exclusively breastfed in the first six months of life and receiving continued breastfeeding beyond. Otitis media occurs nearly twice as frequently among those not exclusively breastfed in the first six months (2). The papers in this supplement demonstrate that many of the benefits of breastfeeding are experienced well beyond the period that breastfeeding is stopped. Children who were breastfed have lower risk of obesity (3), higher intelligence quotients (4), reduced malocclusion (5) and less asthma (6). Breastfeeding mothers likewise benefit from having breastfed, with lower rates of breast cancer, ovarian cancer, type II diabetes and postpartum depression (7). These multiple benefits of breastfeeding demonstrate the contribution and relevance of breastfeeding as a global public health issue, for low- and high-income populations alike.

Second, it is critical to examine the breadth of the literature on an outcome of interest before drawing any conclusions. Claims that breastfeeding is beneficial for a certain outcome of interest based on a single study may not be borne out by other studies. For example, Giugliani et al. (8) find that, when considering the full set of literature, there is little to no difference in the weight or height gain of breastfed vs. nonbreastfed children. Some studies show faster growth, and others show slower growth. Similarly, studies show mixed results for the effect of breastfeeding on eczema, food allergies (6), maternal bone density and postpartum weight retention (7). Even when the vast majority of studies show significant health benefits, there are some studies that find null effects or even effects in the opposite direction. The public health community should not jump to conclusions on the basis of a single study.

Third, the mechanisms by which breastfeeding affect health are extremely varied, and this variation implies that different metrics of breastfeeding behaviour must be utilised to truly understand the relationships of interest. Rarely is it adequate to group all breastfeeding behaviour into a single category regardless of duration, intensity, feedings per day, mode of delivering milk to the infant or timing of feedings. For example, many of the maternal benefits of breastfeeding are likely related to the hormonal effects of producing milk over a long period. For some outcomes in the child, the composition of the milk itself is likely important. Long-chain polyunsaturated fatty acids may be important for intellectual development, ghrelin and leptin in the milk may be important for appetite regulation, pathogen-specific antibodies may be important for protection against otitis media, and nonspecific immune factors may be important for asthma. On the other hand, the feeding of breast milk from a bottle or cup rather than feeding directly from the breast may be more important for outcomes such as malocclusion or obesity. Even when most of the infant's diet comes from breastfeeding, small amounts of breastmilk substitutes can substantially alter the intestinal flora, with health outcomes yet to be fully elucidated. Tham et al. report that dental caries are more prevalent in children who were breastfed more than a year, but suggest that this may reflect a higher rate of night feeding among breastfed toddlers, indicating that timing of feedings is important for some health effects. While the papers in this supplement attempt to assess different aspects of breastfeeding (e.g. exclusive vs. nonexclusive, longer vs. shorter, 'more' vs. 'less'), the extant literature often ignores key details of the feeding behaviour.

Fourth, many of the articles these meta-analyses are based on suffer from methodological weaknesses that limit the ability to make firm conclusions. Most of the literature on health effects of breastfeeding is based on cross-sectional retrospective studies, because it is considered unethical to randomise the feeding mode of infants. Group randomised trials of breastfeeding promotion interventions offer an alternative design, but are expensive and require very large sample sizes. Cross-sectional studies must be careful to account for confounding of various characteristics associated with both feeding decisions and health outcomes. While socio-economic status is routinely controlled for, the possibility remains for residual confounding. Other characteristics may be particularly important for specific outcomes, such as maternal weight status for childhood obesity, parental IQ for intellectual development or child-care arrangements for otitis media. Meta-analyses that are limited to studies controlling for all key confounders typically find only a small number of studies. Other key

methodological considerations such as length of recall, unclear definitions of breastfeeding, combining together dissimilar outcomes or not clearly defining comparison groups add to the difficulty of combining together the results of multiple studies.

Fifth, breastfeeding practices are responsive to interventions delivered in health systems, communities and homes. The largest effects are achieved when interventions are delivered in combination (9).

The authors of the papers in this supplement are to be congratulated for their skill in synthesising such a vast and complex literature on the importance of breastfeeding worldwide. Yet there is still much to be learned about the impact and mechanisms of effect of breastfeeding and breastmilk on complex physiological systems such as the microbiome, immune system and brain development – and the disadvantages for children who are not breastfed. Together, they demonstrate again the major contribution that breastfeeding makes to maternal and child health, and the strong justification for investment and commitment to protect, promote, and support breastfeeding.

DISCLAIMER

The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the World Health Organization.

Laurence M. Grummer-Strawn (grummerstrawnl@who.int), Nigel Rollins
World Health Organization, Genève, Switzerland

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