

## Complementary feeding in preterm infants



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More than 15 million infants worldwide are born preterm every year, and complications related to preterm birth are a leading cause of death for children younger than 5 years.<sup>1</sup> Incidence of preterm birth is increasing in most countries, with substantial long-term costs to survivors, their families, and society. Breastfeeding by the mother improves a range of short and long-term outcomes, but most preterm infants exhibit poor growth during initial hospital stay and in the post-discharge period. Some evidence suggests that this poor growth is associated with worse neuro-developmental outcomes in later infancy and childhood, but the optimal nutritional strategy and pattern of growth is uncertain. In a trial across 3 hospitals in India, Shuchita Gupta and colleagues<sup>2</sup> examined the effect of introducing complementary feeding (defined as semisolid, soft, or solid foods other than breast, formula, or animal milk) at 4 months compared to 6 months corrected age. This is an area of management with little high quality data, but where the higher nutrient density provided by complementary feeding might theoretically improve measures of growth, body composition, and brain growth. They show that earlier introduction of complementary feeding had no measurable impact on growth, metabolic or neuro-development at 12 months of age, but did result in an increased rate of hospital admission primarily due to infectious disease.

Complementary feeding is a complex intervention with multiple potential biological and behavioural effects over the life-course.<sup>3</sup> Despite counselling and the provision of written materials to parents, less than two thirds of the infants in the study achieved a minimal acceptable diet, leading the authors to comment that innovative approaches are required to supplement the counselling in order to achieve the recommended dietary standards in this population. In this context, the lack of beneficial effect of the intervention is perhaps not surprising since milk (whether breast milk or formula) might have been displaced by complementary feeding with inferior nutritional value. Furthermore, the secondary outcome of a significantly increased rate of hospital admission in the 4 month group (18.1%) compared to the 6 month group (9.4%, risk ratio 1.9, 95% CI 1.0–3.3) in combination with earlier hospital admissions in the 4 month group, suggests

the intervention might have resulted in an increased risk of pathogen exposure due to poor hygiene in semi-solid food preparation, although decreased ingestion of beneficial breast milk components in the 4 month group should also be considered.

Out of 1677 infants who were eligible at birth, 578 (34%) died prior to discharge, and of those discharged alive, 114 (10%) died before 4 months of age, emphasising that the risk of death from preterm birth is much higher than in higher income country settings.<sup>4</sup> Infants who were enrolled lost 1 weight-for-age Z score (WAZ) between birth and discharge, and a further 1 WAZ between discharge and 40 weeks post-menstrual age. This early and dramatic growth failure occurred at a stage of development when brain growth is rapid and when poor nutritional status (manifested by poor growth) might impair long-term outcomes.<sup>5,6</sup> However, given the absence of effect of the complementary feeding intervention on growth, it is not surprising that there was no effect on body composition or neuro-development at 12 months corrected age, or on markers of the metabolic syndrome.

In addition to the potential for adverse effects of poor growth on brain outcomes in this cohort, the prevalence of iron deficiency was also alarmingly high. All the hospitals recommended iron supplements at discharge and throughout the intervention period, but levels of compliance could not be determined, and almost three quarters of infants were iron deficient (serum ferritin <12 ug/dL) at 12 months. As the authors state, this might relate to the vegetarian diets received by most infants, co-consumption of phytates and oxalates, low ascorbic acid levels, or poor iron bio-availability in the supplements used. Furthermore, delayed umbilical cord clamping was not routine. Iron deficiency has important and long lasting effects on brain development<sup>7</sup> and the high prevalence of iron deficiency observed in this study suggests this must be an important priority for further work in this population.

Although these findings support a recommendation to delay introduction of complementary feeding until 6 months corrected age in this population, there are important differences between this setting and that in higher income countries, including the high mortality rate, environmental conditions, and predominantly

vegetarian dietary practices. Generalisability is therefore uncertain, and further trials in other settings are important. In this population, attempting to address early, severe growth failure and improving the nutritional quality of complementary feeding received by infants, particularly with regard to iron status, seem to be important priorities that might also affect mortality rates and other clinical outcomes.

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We declare no competing interests

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