

### Correspondence

To the Editors

## **Does early breast feeding in preterm babies lead to better long-term neurodevelopmental outcome?**

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(Key words: Preterm feeding, Neurological outcome, Necrotising enterocolitis, Breast milk)

Dear Editors,

I am a regular reader of your journal, and you are maintaining a high standard of clinical research. I read the study published in your journal, entitled "Does breast feeding preterm babies in the first 24 hours lead to a better outcome?" conducted by Hassan *et al.* (2022)<sup>1</sup>, with great interest. This correspondence is in reference to the above study published in your journal. Nice work done by the team, great efforts and a very good study.

This study showed that early breast feeding leads to significant weight gain, requires less time to achieve full feed, shortens hospital stay and decreases feed intolerance in babies. It was found that there was no significant difference in the outcome of necrotizing enterocolitis (NEC) in early feeding (n = 32 out of 34) and in the late feeding group (n = 23 out of 24), while a poor outcome was seen in 2 and 1 patient, respectively, in the two groups without any significant correlation (p= 0.771). Here, the question arises about the protective role of breast milk in the prevention of NEC if the incidence is the same. The incidence should have been less in the early feeding group as various studies have shown that early breast feeding has been found to be protective and decreases the incidence of NEC in preterm babies<sup>2</sup>. This point needs elaboration.

This study showed that one baby stayed in the neonatal intensive care unit (NICU) for a total of 70 days. The baby must have stayed longer due to insufficient weight gain, which is a common problem with preterm babies, as we cannot discharge such babies until satisfactory weight gain is achieved and the mother is confident. Poor weight growth, particularly in preterm newborns, occurs when these babies do not acquire weight at a sufficient rate despite adequate calorie and protein supplements. Despite good interventions and the best neonatal care, low birth weight babies are more likely to have infections, have a longer stay, have poor weight growth, malnutrition, and a higher risk of mortality.

Human milk is best for the infant, but if it is not accessible, expressed breast milk should be used. If

neither is available, pasteurised donor human milk can be used instead. Formula milk is found to be associated with a two-fold increase in the risk of NEC, more sepsis, delayed stomach emptying time, and feed intolerance; hence it is not recommended for newborns in the NICU. Early breast feeding is the best method for reducing mortality and morbidity as well as improving neurological outcomes<sup>3</sup>. It has been speculated that human milk alone in preterm babies may not meet the requirements of all micronutrients and the deficiency may hamper short-term and long-term growth and cognitive development. So, babies should be supplemented with all the nutrients along with proper calories and with milk fortifiers if needed<sup>4</sup>. The pattern of weight gain in a baby is affected by many factors, like maturity of the baby, birth weight, nutritional stores, underlying illness, breast feeding, stay in NICU, and type of feeding.

My other suggestion is that if all these babies could be followed up in the future for growth and neurodevelopmental outcomes, at least till 2 years of age and if we could correlate their outcomes in these two respective groups, then it would be a very good prospective follow-up comparative study. Various studies have shown that early feeding and extra-uterine growth of babies have a positive impact on long-term linear growth, neurodevelopmental outcome, and intelligence quotient in later parts of their lives<sup>5</sup>. Extra-uterine growth retardation is very common in low-birth-weight babies and is linked to poor neuro-developmental outcomes. Early feeding in preterm babies prevents infection, bronchopulmonary dysplasia, and necrotising enterocolitis. Their growth in the extra-uterine phase is directly related to their brain development and neurological outcome at two years of age. A study done by Franz AR, *et al*<sup>6</sup> has shown that intra-uterine weight gain, increase in head circumference after birth, and weight gain from birth till discharge and at home are associated with good neurological and cognitive outcomes at around 5 years of age<sup>6</sup>.

The growth and neurodevelopmental outcomes of preterm and low birth weight babies in neonatal units are mainly affected by proper, adequate feeding. Preterm brain development is influenced

not just by calorie intake but also by a combination of other neonatal care strategies, nutrients, and overall growth and development. So, it becomes necessary to provide adequate calories along with nutrients to preterm babies in adequate, recommended proportions in the early neonatal period.

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## Response by authors of article

Dear Editors,

*Regarding the protective role of breast milk regarding necrotizing enterocolitis.*

All babies included in this study were exclusively breastfed with their own mother's breast milk. None of the babies received any other type of milk. The 'early' group comprised babies who received their own mother's breast milk within the first 24 hours whereas the 'late' group comprised babies who received their own mother's breast milk after the first 24 hours, because the mother had not sent any expressed breast milk within the first 24 hours.

Breastmilk is protective against necrotising enterocolitis<sup>1,2</sup> and its protective effect is common to both 'early' and 'late' groups, the only difference being in the timing of commencement. Our sample size of 34 in the 'early' group and 24 in the 'late' group may not have an adequate power to demonstrate the beneficial effect of early commencement of breast milk by a significant reduction of necrotising enterocolitis in the 'early' group.

*Baby who stayed for 70 days*

The study showed that all 3 babies who required a hospital stay for 61-70 days were in the 'late' group highlighting the importance of commencing expressed breast milk 'early' within the first 24 hours of life to ensure a shorter hospital stay.

*Ensuring availability of mother's own milk for her baby is the clinician's responsibility*

The youngest preterm babies do not have the suckling reflex and rely upon expressed breastmilk from their mother. Every mother makes milk that specifically caters to the nutritional requirements of her own baby. Preterm milk is higher in protein, fat energy, sodium, chloride, calcium, potassium, iron and magnesium<sup>3</sup> in line with the requirements of the preterm baby. Almost all women can provide

breastmilk for their babies provided they are given skilled support at the time of birth<sup>4</sup>.

All preterm babies 1500g or less and 32 weeks or less are commenced on parenteral nutrition at the time of birth in addition to own mother's breastmilk ensuring that all nutritional requirements are fulfilled<sup>5</sup>. Mother's own breastmilk fulfils all the nutritional requirements needed by the preterm baby when fed at 160-180ml/kg/day<sup>3</sup>, which is usually reached by about 4-5 days after birth, if expression of breastmilk is started soon after birth, especially within the first 6 hours of birth<sup>6</sup>.

Donor milk is less beneficial for preterm babies, as donor milk is frequently obtained from women who produce breastmilk for older children<sup>7</sup> i.e., 1-2-year-old babies, where the composition of breastmilk is different, due to the lower protein and mineral content present in more mature milk produced for 1-2-year-old babies. Therefore, donor milk will not fulfil the nutritional requirements of preterm babies, thereby necessitating further nutritional supplementation.

Speculation that human milk alone is not sufficient to meet the nutritional requirements of preterm babies are based on studies where donor milk from older babies have been fed to preterm infants, where the composition of donor milk obtained from breastmilk produced for older children do not match the nutritional composition of preterm breast milk produced by the baby's own mother.

Human milk fortifiers are predominantly cow's milk-based products (40% whey, 45% casein and 15% amino acids)<sup>5</sup> which are used to bridge the gap in nutritional requirements when nutritionally inferior donor milk obtained from breast milk produced for older children are used to replace preterm baby's mother's own breast milk. Growth and biochemical profiles on human milk fortifier are comparable to those receiving high-caloric-density formula with only 10% nutrient enrichment<sup>5</sup>. Preterm babies who receive human milk fortifiers have a higher fat deposition as well as a different amino acid profile<sup>7,8</sup>. There is only low-quality evidence that multi-nutrient fortification of breast milk increases in-hospital rates of growth<sup>9</sup>.

Therefore, it is of vital importance that neonatologists / paediatricians caring for the preterm baby ensures provision of the necessary skilled support and emotional support for women who deliver preterm babies to ensure expression of breast milk soon after birth, to ensure that all preterm babies receive their mother's own milk which is specifically made to cater to their nutritional requirement, thus eliminating the need for fortifiers and other forms of artificial/animal milk

supplementation. We in Sri Lanka, take all steps to ensure that women who give birth prematurely are provided the necessary skilled and emotional support to express their own breast milk for their preterm baby, so that it can be commenced as soon as possible after birth, preferably within the first 24 hours.

#### *Neurodevelopmental outcome*

We agree that it would be very useful to follow up these groups regarding their neurodevelopmental outcomes. The apparent breastfeeding paradox in very preterm infants demonstrates better neurodevelopment despite suboptimal initial weight gain<sup>11</sup>. We advise caution with attempting to increase weight gain, outside their birth trajectory in preterm babies due to the higher incidence of obesity and metabolic syndrome that has been described in preterm children with rapid weight gain. The presence of overweight / obesity at 2 years of age have been described as early warning signs for hypertension and metabolic syndrome in very low birth weight preterm infants<sup>12</sup>.

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