

# Improved outcomes after the introduction of donor breast milk

## Abstract

Premature infants are at considerable risk of increased morbidity and mortality. They have a higher risk of learning disabilities, cerebral palsy, sensory deficits, respiratory illnesses, and gastrointestinal illnesses.<sup>1,2</sup> Providing mother's own milk to the preterm infant has nutritional, gastrointestinal, immunological, developmental, and psychological benefits. Breastfed preterm infants have a lower rate of ear infections, respiratory infections, or infection-related events. They have lower rates of gastrointestinal infections, necrotizing enterocolitis, and mortality. When milk from the mother is not available, human donor milk is an important option, because it maintains many of its health benefits. This article shines light on the improved outcomes of premature infants after the introduction of donor breast milk and also discusses the multiple challenges faced by a level three NICU of a tertiary care hospital during the implementation of Donor Breast Milk program.

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## Introduction

Human milk confers numerous health benefits for all newborn infants but is of particular importance for high-risk infants, especially those born with very low birth weight (<1500 grams).<sup>1,2</sup>

The beneficial effects of human milk for premature infants have been clearly demonstrated, including improved feeding tolerance and a reduction in necrotizing enterocolitis (NEC).<sup>3</sup>

The WHO and AAP recommend donor breast milk (DBM) as the optimal feeding choice for premature infants whenever mothers' own milk is unavailable.<sup>4,5</sup>

DBM is available for hospital use in pasteurized and thermal sterilized products. Thermal sterilized donor milk is a shelf-stable product that provides ready-to-feed milk with guaranteed caloric composition.<sup>6</sup>

## Objective

To assess the feasibility of providing thermal sterilized DBM to premature infants and to evaluate the impact of DBM provision on feeding tolerance as demonstrated by the number of parenteral nutrition (PN) days and on the incidence of NEC.

## Materials and methods

On July 1<sup>st</sup>, 2021, our institution introduced the standard practice of providing DBM feedings to high-risk premature infants born at <32 weeks gestation or with a birth weight of <1500 grams.

A retrospective cohort study approved by our Institutional review board (IRB) was conducted to evaluate the feasibility of use in our NICU and to compare feeding tolerance, represented by the number of days needed on PN and the incidence of NEC. The study group included premature infants who were offered DBM born between July 2021 –March 2022, in comparison to those born in 2019, prior to the availability of DBM.

## Results

A total of 67 premature infants were offered DBM feedings due to the unavailability of the mother's own milk. These three infants were refused DBM due to religious beliefs.

The duration of PN use was decreased with a mean number of 13.4 days in the DBM group as compared to 17, with a P value of 0.2229.

The incidence of NEC was lower in the DBM group at 3.5% as compared to 9.3%, although also not significant with an OR of 0.5111(CI 0.1497 to 1.745), and a P value of 0.384.

The lack of statistical significance may be attributed to a small sample size, which was the limiting factor in this study Refer to Table 1 and 2.

**Table 1** Donor breast milk vs milk supplement

Outcome	Odds Ratio (Confidence interval)	P-Value
NEC	0.511 (0.1497 to 1.745)	0.384

**Table 2** PN Days

TPN Days	DBM	Formula	P value
Mean	13.4	17	0.2229
Median	11	13.5	

No critical incidents, feeding errors, or non-compliance with the protocol were reported. Nursing survey results demonstrated the ease of preparation and administration with minimal waste.

## Implementation, challenges, outcomes

The importance of breast milk for infants' growth, development and overall health is widely recognized. Moreover, breast milk is of special importance for preterm, low birth weight and other vulnerable infants.<sup>1,2</sup>

The World Health Organization (WHO) recommends that for infants who cannot receive breast milk from their own mothers, the following preferred option is donated breast milk (donor milk).

Expressed, pasteurized donor breast milk is not identical to fresh mother's milk, owing to some loss of micronutrients and anti-infective factors during pasteurization, decomposition over time, and normal variations in the makeup of breast milk. Still, enough of its bioactivity and immunological properties remain to ensure that - particularly when the gestational age of the donor's infant can be matched with that of the recipient infant - donated breast milk is superior to formula.<sup>5,6</sup>

Initially, when the idea of donor breast milk was presented to the NICU team there was reluctance to its implementation due to multiple bottlenecks. Shortage of staff, few lactational consultants, lack of nutritionist and diet technicians within the department, and proper handling and storage facility for the donor milk are some of the obvious ones. In addition, there were some religious concerns as well from the patient's families. The wooden countertop in the feeding preparation room was replaced with stainless steel countertops in order to maintain sterility and hygiene standards in the designated preparation area. The infant feeding preparation room is also at a distance from the babies area that is also one of the problems which nurses are facing. The type of DBM used in the hospital is commercially sterile, shelf-stable, offers guaranteed independently verified nutrition and is ready to be used without thawing. This type of DBM is more expensive than the one provided by HMBANA due to some restrictions, including staff education, storage of frozen breast milk, delivery, and access. Cost vs benefits were analyzed and we overcame this challenge by significantly reducing the TPN days and overall length of stay.

Having few lactation experts in NICU was also one of the challenges faced by the department. Nurses and physicians made extra effort in this context and worked together to motivate the mothers for adequate pumping efforts. Implementation of Donor breast milk resulted in significantly improved outcomes in the babies that include a significantly decreased rate of NEC, Retinopathy of prematurity, sepsis and chronic lung disease. Feeding tolerance is more as compared to formula feeds. The overall rate of TPN days is also significantly decreased so as the length of stay in the hospital.

## Limitations

Our sample was small with less than 100 babies in each comparing groups and insufficient for statistical analysis, also our sample group was from a single center study, results can be debated that they can be transferable to the general population. Scope of discussion was narrow and limited to only the babies with DBM use in prematurity.

## Future steps/ suggestions

Our research will highlight a number of new avenues that could be explored in future studies. We can look at some other outcomes including overall hospital stay, birth weight vs discharge weight, splitting the babies according to the gestation ages etc. We can also Reassess and expand our research by including more babies and offering the DBM to the premature infants > 32 weeks.

## Conclusion

We concluded that feeding thermal sterilized DBM is a safe and feasible practice in the NICU and may reduce morbidity with the potential to improve outcomes. Approaches for this change included the creation of consent and educational information for parents, policy, and protocol for use, and a cost versus benefit analysis.

The incidence of NEC was lower, and the duration of PN use was shorter in the group receiving DBM. However, due to the limited sample size, this study was not sufficiently powered to detect a statistically significant difference.

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None.

## Authors' contribution

Dr. Shaheen has contributed to the concept, data collection, analysis and writing. Dr. Javed, Dr. Neh and Dr. Asif have contributed in data collection. Dr. Bhat contributed mainly in writing the article.

## Authors' disclosure

All the authors disclosed no financial relationships relevant to this article. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

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## Conflicts of interest

The authors declare that there are no conflicts of interest.

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