

Support breastfeeding in premature infants in the neonatal intensive care unit

Abstract

The multiple benefits of human milk in newborns are known, especially in preterm newborns by reducing the rates of neonatal sepsis, necrotizing enterocolitis, retinopathy of prematurity and better results in neurodevelopment. However, rates of exclusive breast milk use remain low.

To achieve higher percentages of successful breastfeeding, strategies must be applied from the NICU, such as expressed within the first 6 hours of life, skin-to-skin contact and administration of colostrum in the cheeks, all well, in order to have sufficient volume of breast milk since this is the main barrier they face, not having enough milk.

There are very few studies that evaluate when to initiate suction directly to the maternal breast, using the empty breast as non-nutritive suction could improve the performance of VLBW to the maternal breast.

Keywords: breastfeeding, premature babies, neonatal intensive care, non nutritive suction, breastfeeding performance, very low birth weight, late preterm

Volume 14 Issue 2 - 2024

Carla Isabel Gonzalez Gordillo,¹ Daniela Horta Carpinteyro,² Hector Zavaleta Vazquez,¹ Alejandra Prián Gaudiano²

¹Neonatologist and Pediatrician, Centro Médico ABC Campus Santa Fe, México

²Pediatrician, Centro Médico ABC Campus Santa Fe, México

Correspondence: Carla Isabel Gonzalez Gordillo, Neonatologist and Pediatrician, Centro Médico ABC Campus Santa Fe, Vasco de Quiroga 4299 CP 05370, Ciudad de México, México, Tel 5541875305, Email dra.carlagonzalezne@gmail.com

Received: May 24, 2024 | **Published:** June 07, 2024

Abbreviations: AAP, American academy of pediatrics; WHO, world health organization; CDC, Center for disease control and prevention; VLBW, very low birth weight; ESPGHAN, the European society for pediatric gastroenterology hepatology and nutrition; BFHI, baby-friendly hospital initiative; NICU, neonatal intensive care unit

Introduction

The benefits of feeding human milk in premature babies are closely associated with its immunomodulatory and nutritional properties. The American Academy of Pediatrics (AAP) recommends that preferably, all premature newborns should receive homologous human milk or pasteurized donated human milk, based on results in multiple studies where a decrease in the incidence of neonatal sepsis (early and late), necrotizing enterocolitis, premature retinopathy and the ones who are also breast-milk-fed have better cognitive outcomes.¹ In addition, a positive impact has been demonstrated in the social sphere, since it decreases parents anxiety by generating a socio-affective bond with newborns, which will later favor attachment.²

In 2018, the World Health Organization (WHO) estimated that approximately 15 million premature infants are born every year.³ During 2017 in the United States, the Center for Disease Control and Prevention (CDC), reported a prevalence of 83.9% of human-milk-fed premature newborns who required hospitalization.⁴

Considering the multiple benefits of feeding human milk and knowing the potential side effects of using human milk substitutes in premature infants, it is our obligation as health personnel to promote the consumption of human milk and support breastfeeding in the Neonatal Intensive Care Unit (NICU).

The objective of this review is to establish strategies for the initiation of breastfeeding and human milk feeding in premature newborns, from the NICU.

Human milk in premature infants

According to the European Society for Pediatric Gastroenterology Hepatology and Nutrition (ESPGHAN), homologous human milk is

the best feeding option in premature newborns, if it is not available, then pasteurized donated human milk should be chosen.⁵

Postnatal nutritional supply in premature infants must ensure a similar growth rate to the intrauterine growth.⁶ By achieving these nutritional goals, positive neurodevelopment is ensured.⁷

High protein requirement in the first three days after birth is related to the physiological needs of the premature newborn. This is the primary cause it is so important to obtain colostrum through early extractions and harness its benefits.

It is set that the supply of variable amounts of human colostrum in the infant's mouth, optimizes the oral microbiota significantly decreasing gastrointestinal pathologies incidence such as necrotizing enterocolitis and is directly related to shortening the time to achieve full tolerance for enteral feeding, reduction in the number of hospital days and optimization of growth rate.^{8,9}

Unfortunately, and despite all the known benefits, human milk lacks adequate nutritional properties to ensure the optimal growth rate in Very low birth weight (VLBW) infants that is why to guarantee nutritional needs, human milk fortifiers must be used. Whose objective is to increase its amount of protein, calcium and phosphorus. In this way, the intrauterine growth rate can be equalized.⁷

Particularly, human milk made for premature newborns, modifies in its amount of IgA immunoglobulin, which together with lactoferrin, lysozymes and oligosaccharides, had been shown to be the components with the greatest impact in decreasing of necrotizing enterocolitis.¹⁰

Initiating breastfeeding since hospital

The Baby-friendly Hospital Initiative (BFHI), in its extension for preterm newborns, promotes breastfeeding or with a high rate of human milk intake at hospital discharge. The strategies necessary to achieve this goal include early, frequent and prolonged skin-to-skin contact, early onset of suction directly from the maternal breast, start of breastfeeding partially on-demand, only until achieving the complete transition from oral feeding, close counseling of breastfeeding by

a health professional and establishing a correct support network to attain this important step.¹¹

Milk production sufficiency may be the main barrier that mothers face to start breastfeeding in premature babies. Even underestimating the importance of feeding their babies, since in most cases, they are due to clinical states that require transient fasting. However, it is of the utmost importance to start stimulation with extractions as close as possible to birth; Parker LA and associates found that starting stimulation in the first hour of life compared to starting at 6 hours, produces twice as much milk in the first 3 weeks. Twelve other interventions to optimize milk production are: establishing extraction schedules, reducing maternal stress (accompaniment and counseling), ensuring the proper nutritional status of the mother, proper hydration and sleep.

Domperidone has been used as a galactagogue in situations where the amount of human milk is insufficient, with moderate quality of evidence, it can increase the volume of milk extracted in mothers with insufficient amounts of breast milk.

All these interventions must be carried out in combination with the intensive management of the newborn to favor the early start of human milk feeding and subsequently reach sufficient volumes according to requirements.¹²

Assessment of the premature newborn suitable for breastfeeding

High degree evidence show that enteral feeding should be started as soon as possible for the baby with VLBW.¹³ During first days after birth, trophic stimulation and total parenteral nutrition are advised. After adequate tolerance to specific volume is achieved, gradual increments should be made until reaching full enteral feeding.¹⁴

Oral feeding requires coordination of suction, swallowing and breathing.¹⁵ Sucking feeding may not be best option prior to 32 weeks of gestation since the proper coordination between swallowing and sucking is still developing. This is acquired and matures between weeks 34 and 36 postnatal.¹⁶

The Premature Infant Oral Motor Intervention (PIOMI) helps strengthen the oral feeding of premature babies. According to the literature, premature babies that were given oral stimulation starting at 29 weeks of corrected gestational age, showed an improved coordination of suction, oral motor function and oral feeding skills.¹⁷

When is the best moment for premature infants with VLBW to start breastfeeding?

Starting non-nutritive sucking directly to maternal breast as early as possible, empowers and encourages mothers to continue breastfeeding. Oral movements of premature initially correspond to sucking and recognition, focusing on the grasp is not as important because it has no discernible nutritional impact. Subsequently, they evolve into intermittent suction that gradually mature until coordinated and effective actions are achieved.¹⁸

A quasi-experimental study carried out in Thailand and published in 2022, compared the performance of 34 weeks premature newborns breastfeeding. The experimental group sucked the empty breast for a few minutes, in comparison to the control group, better rates of breastfeeding were found a discharge.¹⁹ A randomized controlled trial of 2019, concluded that non-nutritive suction to the maternal breast is a safe option and facilitates the maturation of the suction.²⁰

Since one of the prerequisites for discharge is the ability to feed by suction and have an adequate growth speed, health professionals caring for premature babies are concerned direct suction into breast may not be effective enough to transfer milk and ensure enough intake. Levels of intraoral void, tongue movement, and milk intake were measured in a cross-sectional prospective observational study conducted in Australia. The study found that while tongue movement was similar in both groups, the intraoral vacuum was weaker in the premature newborns, resulting in longer feeding times.²¹ Anatomical variations of the mother's nipple, newborn's mouth anatomy, the volume of breast milk at the time of suction, among other variables can affect the transfer of milk. Because of this when starting nutritional suction breastfeeding, we must assess the newborn's performance and determine whether to do semi-demand nursing by supplementing, reaching nutritional goals are met to ensure adequate growth.

Preterm Infant Breastfeeding Behavior Scale (PIBBS) is an existing clinical tool, it can be used by both health personnel and parents for suction development evaluation. It assesses from tongue's motion while exploring the nipple to the drinks while suctioning. It may be applied to objectively evaluate the need to supplement the feeding.¹⁸

Late premature newborns

Despite being between weeks 34 and 36 and having more developed suction-swallowing reflexes, sometimes they face problems when feeding directly from the chest. These issues arise from relative hypotonia, difficulties achieving effective suction, and incoordination of the suction and swallowing reflex.

For this age group, oral rehabilitation is vital to establish appropriate breastfeeding as soon as possible and thus not delay hospital discharge. Some of the strategies to improve breastfeeding rates, include feeding human milk through a cup (avoiding bottle) technique and non-nutritive suction using pacifier or empty breast, the latter proven to be the best strategy to favors maturation of the suction-swallowing reflex in premature newborns.¹⁹ In 2021, the cochrane Avoidance of bottles during the establishment of breastfeeds in preterm infants, concluded that breastfeeding prevalence an duration increases when a cup is used rather than a bottle, especially for premature newborns.²²

Conclusion

When it comes to premature newborns, breastfeeding should not be delayed until right before hospital discharge. Instead, techniques including skin-to-skin contact and colostrum extraction should be started as soon as possible after birth.

The NICU must support mothers with information about breastfeeding and establish a support network.

To enhance breastfeeding performance, empty breast suction should be assessed in between weeks 32 and 34 as a non-nutritive sucking technique.

When starting nourishing breastfeeding, always evaluate the need to supplement intakes preferably with cup.

Given the benefits of breast milk in preterm newborns, research should focus on studding milk transfer rates and performance of babies on the breast, to determine the ideal moment to begin breastfeeding.

Acknowledgments

None.

Funding

None.

Conflicts of interest

The authors declare no conflict of interest.

References

- Eidelman IA, Schanler RJ, Johnston M, et al. Breastfeeding and the use of human milk. *Pediatrics*. 2012;129(3):e827–e841.
- Dadhich JP, Dudeja S, Faridi MMA, et al. Breastmilk for preterm neonates. *J Neonatol*. 2020;34(1–2):52–62.
- WHO. *Preterm birth*. 2023.
- Chiang KV, Sharma AJ, Nelson JM, et al. Receipt of breast milk by gestational age - United States, 2017. *MMWR Morb Mortal Wkly Rep*. 2019;68(22):489–493.
- Moro GE, Arslanoglu S, Bertino E, et al. XII. Human milk in feeding premature infants: consensus statement. *J Pediatr Gastroenterol Nutr*. 2015;61(Suppl 1):S16–S19.
- Ziegler EE. Human milk and human milk fortifiers. *World Rev Nutr Diet*. 2014;110:215–227.
- Arslanoglu S, Boquien CY, King C, et al. Fortification of Human Milk for Preterm Infants: Update and Recommendations of the European Milk Bank Association (EMBA) Working Group on Human Milk Fortification. *Front Pediatr*. 2019;7:76.
- Huo M, Liu C, Mei H, et al. Intervention effect of oropharyngeal administration of colostrum in preterm infants: a meta-analysis. *Front Pediatr*. 2022;10:895375.
- Salve S, Abraham S, Aguilar KK, et al. Effects of early administration of buccal colostrum on reducing late onset sepsis among preterm in neonatal intensive care: Quasi-experimental, cohort study. *J Neonatal Nursing*. 2023;29(2):320–325.
- Ballard O, Morrow AL. Human milk composition: nutrients and bioactive factors. *Pediatr Clin North Am*. 2013;60(1):49–74.
- Bhatia J. Human milk and the premature infant. *Ann Nutr Metab*. 2013;62 Suppl 3:8–14.
- Maastrup R, Hansen BM, Kronborg H, et al. Factors associated with exclusive breastfeeding of preterm infants. Results from a prospective national cohort study. *PLoS One*. 2014;9(2):e89077.
- Chitale R, Ferguson K, Talej M, et al. Early enteral feeding for preterm or low birth weight infants: a systematic review and meta-analysis. *Pediatrics*. 2022;150(Suppl 1):e2022057092E.
- Dutta S, Singh B, Chessell L, et al. Guidelines for feeding very low birth weight infants. *Nutrients*. 2015;7(1):423–442.
- Bertoncelli N, Cuomo G, Cattani S, et al. Oral feeding competences of healthy preterm infants: a review. *Int J Pediatr*. 2012;2012:896257.
- Mizuno K, Ueda A. The maturation and coordination of sucking, swallowing, and respiration in preterm infants. *J Pediatr*. 2003;142(1):36–40.
- Huang C-C, Hwang Y-S, Lin Y-C, et al. Effects of oral stimulation on feeding readiness of preterm infants: a randomized controlled study. *J Neonatal Nursing*. 2024;30(2):160–164.
- Lober A, Dodgson J, Kelly L. Using the preterm infant breastfeeding behavior scale with late preterm infants. *Clin Lacta*. 2020;11(3):121–129.
- Bache M, Pizon E, Jacobs J, et al. Effects of pre-feeding oral stimulation on oral feeding in preterm infants: a randomized clinical trial. *Early Hum Dev*. 2014;90(3):125–129.
- John HB, Suraj C, Padankatti SM, et al. Nonnutritive Sucking at the Mother's Breast Facilitates Oral Feeding Skills in Premature Infants: A Pilot Study. *Adv Neonatal Care*. 2019;19(2):110–117.
- Geddes DT, Chooi K, Nancarrow K, et al. Characterisation of sucking dynamics of breastfeeding preterm infants: a cross sectional study. *BMC Pregnancy Childbirth*. 2017;17(1):386.
- Allen E, Rumbold AR, Keir A, et al. Avoidance of bottles during the establishment of breastfeeds in preterm infants. *Cochrane Database Syst Rev*. 2021;10(10):CD005252.