

# Breastfeeding very low birthweight infants in Brazil: a successful experience

Breastfeeding has multiple benefits for all infants, including very low birthweight infants. Mothers face many difficulties when initiating and maintaining milk production throughout hospitalisation yet our experiences show that it is possible to maintain milk production, even over long stays, and that most preterm babies can be breastfed at discharge.

## Mariana González de Oliveira

MD, MSc, PhD

Professor of Neonatology, Federal University of Health Sciences of Porto Alegre, and Neonatologist, Hospital Moinhos de Vento, Porto Alegre, RS, Brazil  
marianagz@ufscpa.edu.br

## Desirée de Freitas Valle Volkmer

MD

Chief Neonatologist, Hospital Moinhos de Vento, Porto Alegre, RS, Brazil

Human milk is the preferred choice of feed for both term and preterm infants, especially in developing countries,<sup>1</sup> and mother's own milk (MOM) is recommended for hospitalised preterm infants. Many studies demonstrate its biological, nutritional and developmental advantages over any other type of feed for this highly vulnerable population.<sup>2-4</sup> Furthermore, breast milk has antioxidant properties that might protect very low birthweight (VLBW) infants from oxidative stress.<sup>5-7</sup> Interventions to improve breastfeeding are also likely to improve short- and long-term health benefits and have a positive impact on both morbidity and mortality levels. Results from epidemiological studies have helped better understanding of the roles of epigenetics, stem cells and the developmental origins of health and disease behind breastfeeding. By promoting breastfeeding, we are also promoting the 'human capital', which includes reducing infant morbidity and mortality, increasing intelligence and school achievements and promoting adult earnings.<sup>8</sup>

## The challenges of maintaining MOM production in the NICU

Despite being the wisest choice, preterm mothers face many challenges in initiating and maintaining milk production in the neonatal intensive care unit (NICU). They rely on milk expression to provide feeds for their infants and therefore become dependent on expression devices and the support of healthcare professionals to succeed in this task. Some of the difficulties mothers face include biological issues, financial constraints, physical limitations, hospital providers and social barriers.<sup>9</sup>

Accordingly, these factors influence the prevalence of breastfeeding VLBW infants at discharge. The Hill-Aldag lactation model<sup>10</sup> attempted to understand those factors that could increase the chances of successful breastfeeding. The following factors were identified as secondary mediators that could positively influence milk output – importantly, they are factors we could act on to stimulate milk production in preterm mothers:

- time of initiation and early frequency of breast stimulation
- early milk output
- skin-to-skin contact.

## Breastfeeding VLBW infants: the literature

Reports from the USA and Europe show rates of MOM availability for VLBW infants at discharge vary from 50 to 86%, with wide variations regarding gestational ages and NICU practices.<sup>11-14</sup> The Vermont-Oxford Network (VON) average rate of any human milk at the time of discharge from 2009 to 2016 ranged from 51 to 60% across all participating centres. When analysing data from specific regions, South America reached up to 85% (the highest average). When considering the use of exclusive human milk at discharge, Africa had the highest rates, reaching a surprisingly high 49%.<sup>15</sup>

There are very few Brazilian reports regarding human milk feeds at the time of discharge of VLBW infants. The Brazilian Network of Neonatal Research is a group of tertiary public hospitals linked to federal universities. It gathers data regarding neonatal care with the objective of improving quality of care. In 2015, its report showed that 30% of preterm babies (from 23 to 33

## Keywords

human milk; low birthweight infant; breastfeeding; preterm

## Key points

### Oliveira M.G., Volkmer D.F.V.

Breastfeeding very low birthweight infants in Brazil: a successful experience. *Infant* 2018; 14(4): 149-52.

1. Mother's own milk (MOM) is best for preterm infants but there are many challenges to maintaining milk production throughout hospitalisation.
2. Time of initiation and early frequency of breast stimulation, early milk output and skin-to-skin contact are secondary mediators that could positively influence milk output.
3. Knowing that even extremely preterm infants are capable of breastfeeding at discharge may help planning strategies to increase the number of infants receiving MOM during the hospital stay.

weeks' gestational age) were discharged on human milk.<sup>16</sup> However, it is not possible to know how many of these babies were breastfed because some of the hospitals offer donor human milk. More recently, Martins-Celini et al,<sup>17</sup> while assessing the association between the type of feeding at discharge and the nutritional status of VLBW infants, reported 50% for any human milk at discharge in a single-centre, university hospital. Similarly, they did not differentiate between babies receiving MOM or donor human milk.

The question is, if we know what to do why aren't we doing it?

### Overcoming the challenges

At Hospital Moinhos de Vento, a private hospital in Southern Brazil with a 27-bed, level 3 NICU, the rate of initiation of MOM expression is close to 100%.

Breastfeeding is the preferred method of initial feed for most mothers in Brazil, regardless of socioeconomic status. There is a strong cultural tradition of breastfeeding and a mother's desire to provide milk for her infants is a cultural trait. There are only a few instances where mothers decide not to do so.

Recognising the importance of human milk to preterm babies, our NICU implemented a programme to facilitate milk expression by preterm mothers throughout the hospital stay. We have a multidisciplinary team, including nurses, neonatologists, nutritionists and psychologists, to assist preterm mothers who wish to breastfeed. The nurses care for the mothers soon after delivery and are responsible for the first contact and initial orientations. Our programme includes evidence-based practices known to improve MOM production, in particular:

- parent education
- early initiation
- pumping devices
- skin-to-skin contact
- non-nutritive breast sucking
- support with the transition to breastfeeding.<sup>9</sup>

Mothers are given a daily schedule for sharing the milk expression equipment. We offer four hospital grade breast pumps, located in a common lactation room inside the NICU (FIGURE 1). At orientation, all mothers are told about the importance of mother's milk, the milk pumping process (positioning, caution related to contamination, etc) and given information about how much milk is collected and how it is



FIGURE 1 The lactation room with breast pumps and other equipment for milk expression.



FIGURE 2 A preterm baby born at 29 weeks' gestation. (A) At 10 days of age the baby receives skin-to-skin care prior to mother's milk expression. (B) At 14 days of age it begins a non-nutritive breast sucking routine.

handled and stored. The mothers can stay at the NICU for as long as they wish, but they are encouraged to take breaks during the day and go home at night to rest. They are given meals while they are at the hospital.

At our NICU, only unpasteurised MOM is offered to preterm infants – our institution does not provide donor human milk. Enteral feeds are started as soon as colostrum is available, according to the attending neonatologist's prescription. Mothers are oriented to begin mechanical expression of colostrum and breast milk as soon after delivery as possible. If the mother has a medical complication and is recovering elsewhere in the hospital, a lactation team is assigned to collect

and store her milk.

As soon as the baby is clinically stable, skin-to-skin contact is offered before pumping (FIGURE 2). When her preterm infant reaches 1,700g the mother is given the opportunity to start breastfeeding. Prior to this, the mother expresses her milk and then commences a non-nutritive breast sucking routine (FIGURE 2). When the baby shows a more consistent sucking pattern, the mother can offer her breast without prior expression. The mothers are assisted during this transition and whenever necessary, fathers are encouraged to offer a complementary bottle. Ideally this would be MOM or formula if MOM is not available. The father offers the bottle so that the baby associates the mother with

the breastfeeding process. If the mother will be the only person caring for the infant at home and/or the baby is not being exclusively breastfed it is acceptable for the mother to offer a bottle.

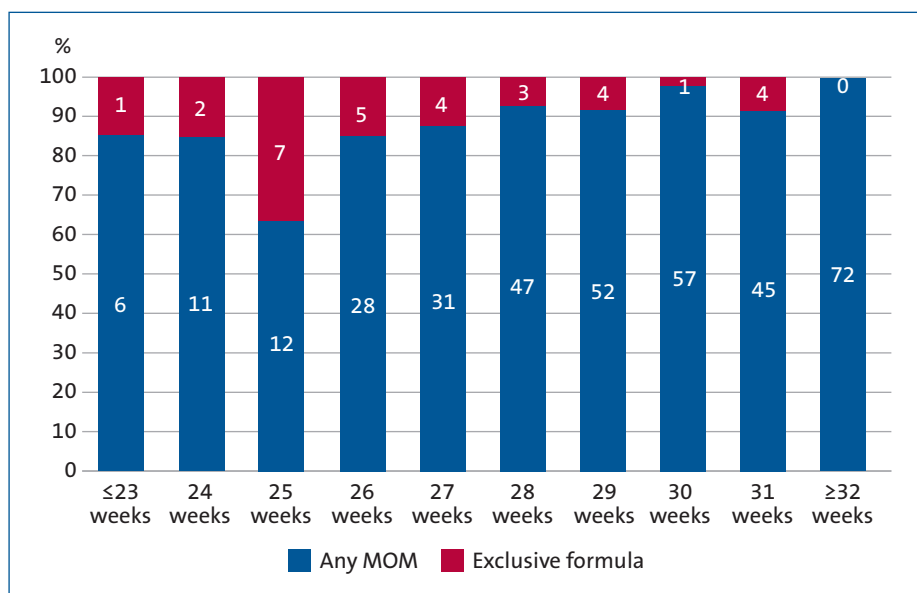
### Our successes

From 2011 to 2017, 447 infants with a birth weight  $\leq 1,500$ g and/or gestational age  $\leq 30$  weeks were admitted to the NICU and 397 (88.8%) survived. Five patients were transferred elsewhere and 392 were followed to discharge. Their type of feed was recorded up to 72 hours prior to the discharge date. Feedings were classified as any MOM or exclusive formula. At discharge, 361 (92%) preterm babies were receiving some MOM and breastfed at least once a day. Prevalence of any MOM at discharge related to gestational age at birth is shown in **FIGURE 3**.

In 2011, the logistical capacity of the milk bank changed, which meant that milk could no longer be pasteurised. Milk expressed at home cannot be brought into the hospital and this restricts expression times to those periods when the mothers are visiting the hospital. Consequently, mothers were instructed to only express milk using the shared hospital grade breast milk pumps during the day. After this change, our exclusive breast milk rates at discharge reduced because of insufficient milk supply and the need for formula supplementation.<sup>18</sup> Prior to 2011, approximately 30% of babies were exclusively breastfed at discharge; after this the rate declined to approximately 11% although the rates of any MOM at discharge were maintained.

Our NICU is in a private hospital and the maternal level of education and socioeconomic status of our population is assumed to be above average for the country's population. This is a very distinct subgroup within a developing country that is characterised by large socioeconomic disparities. These mothers have easy access to the hospital and are often present during the daytime, which contributes to more frequent skin-to-skin contact and orientation by our lactation team.

We are not able to comment on feeding practices at other Brazilian hospitals but Brazilian legislation protects breastfeeding by offering six months maternity leave at public institutions and four months (plus two months paid breastfeeding breaks) at private ones. The Brazilian congress is working on passing a specific law for



**FIGURE 3** Infants receiving any MOM at discharge related to gestational age at birth.

preterm mothers allowing them to add the hospital period to the maternity leave so that they can be present during hospitalisation and stay at home to continue breastfeeding.

### Implications for practice

Many authors have described the challenges of maintaining a MOM supply for infants facing a long hospital stay.<sup>19,21</sup> Our experience shows that even mothers of extremely preterm babies can maintain milk production. For a mother, the experience of providing milk for her infant in the NICU can be very frustrating. The staff must be well trained and prepared to support her through this process. The decision and motivation to artificially pump seems to be based on the belief that her milk could help overcome the infant's specific health vulnerabilities. Maternal perceptions of milk expression during the NICU stay were not evaluated, however it is our impression that when they are able to provide their own milk for their babies, the mothers feel more connected and involved in the care of a child they can hardly touch. We intend to investigate this in future research.

Although conducted in a private facility, which may not reflect the reality of most health services in the country, it is important to stress the need to support breastfeeding in mothers of preterm infants during the hospital stay for maintenance of milk supply, even during prolonged periods of hospitalisation. Knowing that even extremely preterm infants are capable of breastfeeding at

discharge may help planning strategies to increase the numbers of infants receiving MOM during the hospital stay.

It is also important to stress that breastfeeding needs supportive measures, such as legal directives and positive social attitudes, to improve women's working and social conditions. Developing and implementing policies to ensure that mothers receive skilled breastfeeding support while accompanying their babies at the NICU, and providing breast milk for high-risk newborn babies are strongly recommended by Unicef and the World Health Organization.<sup>22</sup> Breastfeeding promotion should be recognised as a collective responsibility at all levels, including the NICU. Health workers should acknowledge that no baby is too small; no hospital stay is too long.

### References

1. WHO. Guidelines on optimal feeding of low birth-weight infants in low- and middle-income countries. Geneva: World Health Organization; 2011.
2. Belfort MB, Anderson PJ, Nowak VA, et al. Breast milk feeding, brain development, and neurocognitive outcomes: a 7-year longitudinal study in infants born at less than 30 weeks' gestation. *J Pediatr* 2016;177:133-39.
3. Lönnerdal B. Bioactive proteins in human milk: potential benefits for preterm infants. *Clin Perinatol* 2017;44:179-91.
4. Hair AB, Peluso AM, Hawthorne KM, et al. Beyond necrotizing enterocolitis prevention: improving outcomes with an exclusive human milk-based diet. *Breastfeed Med* 2016;11:70-74.
5. Spiegler J, Preuß M, Gebauer C, Bendiks M, Herting E, Göpel W, et al. Does breastmilk influence the development of bronchopulmonary dysplasia? *J Pediatr* 2016;169:76-80.



6. **Civardi E, Garofoli F, Mazzucchelli I, et al.** Enteral nutrition and infections: the role of human milk. *Early Hum Dev* 2014;90Suppl1:S57-59.
7. **Corpeleijn WE, de Waard M, Christmann V, et al.** Effect of donor milk on severe infections and mortality in very low-birth-weight infants: the early nutrition study randomized clinical trial. *JAMA Pediatr* 2016;170:654-61.
8. **Victora CG, Adair L, Fall C, et al.** Maternal and child undernutrition: consequences for adult health and human capital. *Lancet* 2008;371:340-57.
9. **Parker MG, Patel AL.** Using quality improvement to increase human milk use for preterm infants. *Semin Perinatol* 2017;41:175-86.
10. **Hill PD, Aldag JC, Chatterton RT, Zinaman M.** Primary and secondary mediators' influence on milk output in lactating mothers of preterm and term infants. *J Hum Lact* 2005;21:138-50.
11. **Bonet M, Blondel B, Agostino R, et al.** Variations in breastfeeding rates for very preterm infants between regions and neonatal units in Europe: results from the MOSAIC cohort. *Arch Dis Child Fetal Neonatal Ed* 2011;96:F450-52.
12. **Davanzo R, Ronfani L, Bovedani P, Demarini S, Group BiNICUS.** Breast feeding very-low-birthweight infants at discharge: a multicentre study using WHO definitions. *Paediatr Perinat Epidemiol* 2009;23:591-96.
13. **Lee HC, Gould JB.** Factors influencing breast milk versus formula feeding at discharge for very low birth weight infants in California. *J Pediatr* 2009;155:657-62.
14. **Delfosse NM, Ward L, Lagomarcino AJ, et al.** Donor human milk largely replaces formula-feeding of preterm infants in two urban hospitals. *J Perinatol* 2013;33:446-51.
15. **Gonzalo M.** Infants receiving human milk before discharge varies internationally. *Vermont Oxford Network Informative*; 2017. Online at: [https://public.vtoxford.org/wp-content/uploads/2018/03/NbtN3\\_HumanMilk.pdf](https://public.vtoxford.org/wp-content/uploads/2018/03/NbtN3_HumanMilk.pdf)
16. **RBPB.** Assistência Neonatal na RBPB 2015. Online at: [www.redeneonatal.fiocruz.br/pdf/desempenho\\_rbpn\\_2015.pdf](http://www.redeneonatal.fiocruz.br/pdf/desempenho_rbpn_2015.pdf)
17. **Martins-Celini FP, Gonçalves-Ferri WA, Aragon DC, et al.** Association between type of feeding at discharge from the hospital and nutritional status of very low birth weight preterm infants. *Braz J Med Biol Res* 2018;51:1-6.
18. **Oliveira MG, Schereen MFC, Fiori H, Machry JS.** Feeding VLBW infants with mother's own milk in southern brazil: Every Week Counts - an observational study. *Ann Pediatr Child Health* 2018;6:1147-52.
19. **Roussel C, Razafimahefa H, Shankar-Aguilera S, et al.** Maternal factors influencing breastfeeding on a neonatal intensive care unit. *Arch Pediatr* 2012;19:663-69.
20. **Bonet M, Forcella E, Blondel B, et al.** Approaches to supporting lactation and breastfeeding for very preterm infants in the NICU: a qualitative study in three European regions. *BMJ Open* 2015; 5:e006973.
21. **Maastrup R, Hansen BM, Kronborg H, et al.** Breastfeeding progression in preterm infants is influenced by factors in infants, mothers and clinical practice. *PLoS One* 2014;9:e108208.
22. **Unicef/WHO.** The Baby Friendly Initiative. Online at: [www.unicef.org/uk/babyfriendly/about](http://www.unicef.org/uk/babyfriendly/about)

# Avoid the scrum - get your own copy of *Infant*

Keep up to date with *Infant*  
for just **£35**

*Infant* is the essential journal for neonatal and paediatric healthcare professionals, containing authoritative articles with a clinical or practical bias written by experts in their field.

Printed and online subscriptions for the coming year give instant access to all issues to date, including the full text of over 70 articles published in the past two years, available exclusively to subscribers.

Subscribe online at [www.infantjournal.co.uk](http://www.infantjournal.co.uk)  
or email [subscriptions@infantjournal.co.uk](mailto:subscriptions@infantjournal.co.uk)  
or call Tricia on 01279 714511

**infant**

