International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Review Article

Human Breast Milk Bank

Sankalp Yadav[1], Gautam Rawal[2]

[1]General Duty Medical Officer-II, Chest Clinic Moti Nagar, North Delhi Municipal Corporation, New Delhi, India.
[2]Attending Consultant, Critical Care, Rockland Hospital, Qutab Institutional Area, New Delhi, India.

Corresponding Author: Sankalp Yadav

Received: 16/04/2015 *Revised: 05/05/2015* *Accepted: 15/05/2015*

ABSTRACT

The breast milk is the most important source of nutrition for the infants. The developing countries like India are having high infant mortality and malnutrition. The novel concept of human breast milk is absolutely important to solve such grave problems. The human breast milk banks can work efficiently and are cost effective. Besides, not much of human workforce has to be involved into such banks. The various studies from all over the world have emphasized on the importance of human breast milk banks in the management of premature infants. This paper highlights the importance of the human breast milk banks and also gives insights about various factors associated with it.

Keywords: Breast milk bank, Breastfeeding, Breast milk, Infant.

INTRODUCTION

The WHO and UNICEF, made a joint statement in 1980: "Where it is not possible for the biological mother to breast feed, the first alternative, if available, should be the use of human milk from other sources. Human milk banks should be made available in appropriate situations". [1,2] Breast milk is the normal way to feed infants; it is accepted worldwide as the optimal exclusive first source of nutrition. [3-8] Human milk is recognized for its numerous benefits including inducing tolerance to allergens, providing passive immunization, improving lipid profiles, and controlling blood pressure. [9] In studies conducted in neonatal units, infants who were fed human breast milk had fewer severe infections, less necrotizing enterocolitis, and less colonization by pathogenic organisms. [10] The majority of mothers is encouraged to breastfeed their babies, however the problem with breastfeeding arise when the baby is sick or is admitted to the hospital, particularly in cases of premature infants. Also, the mothers may be unable to provide a full volume of milk due to numerous physical and emotional barriers to breastfeeding. These at risk infants will benefit a lot from the breast milk nutrients and in case the mother is unable to provide the breast milk, then the pasteurized donor milk from a healthy mother should be the first consideration for supplementation. [8] In such cases the role of breast milk banks becomes very important as these are the place where the donor breast milk is stored

and is made available, for use in vulnerable populations. India is a developing country where the neonatal mortality is very alarming. The breast milk banks are very essential for the control of the cases of neonatal mortality and malnutrition. This commentary will briefly review the importance of breast milk banking in India , as well as the best available evidence for donor milk use in the vulnerable population, including available economic analyses, with a view to advocate for its use in these vulnerable infants.

Indian scenario

The first human milk bank opened in Vienna, Austria in 1909 and the first in North America opened in 1919 in Boston, USA. [11,12] There are around 517 breast milk banks all over the globe.[13] However the first breast milk bank in Asia came into existence in Mumbai, India in 1989 at the Sion Hospital. [13] Presently, there are around 14 such banks in India. [14] However, the first public sector breast milk bank came into existence in 2013 in Kolkata. [15]

The objectives

The objectives of breast milk banks are to ensure that every baby born or admitted to the hospital receives mother's milk, to avoid bottle, animal and formula milk, to heighten breastfeeding awareness, to give ancillary support to breastfeeding practices and to promote Baby Friendly Hospital care. [16]

The importance of breastfeeding

Breast milk feeding decreases the incidence of many infectious diseases in infancy, including bacterial meningitis, bacteremia, diarrhea, respiratory tract infections, otitis media and urinary tract infections. [17-30] Nevertheless, it has been shown that human breast milk-fed infants in the neonatal intensive care unit have less severe infections, less necrotizing enterocolitis (NEC) and a reduction in colonization by pathogenic organisms. [31-36] The results of a study conducted in Spain show that each additional month of exclusive breastfeeding may reduce hospital admissions secondary to infection by as much as 30% in the first year of life. [37] Breastfeeding has also been linked to a decrease in Sudden Infant Death Syndrome. [38] Breast milk has also been associated with enhanced performance on neurocognitive testing. [39-42] Breastfeeding is also an important preventative health measure for the lactating mother, as it is associated with a decrease in the incidence of both breast and ovarian cancers, and a delay in the return of ovulation and greater postpartum weight loss. [43-46] Breastfeeding is economical for families, with no need to purchase bottles and formula. Cost analyses indicate further savings to society in general; by improving the health of both mothers and infants, breastfeeding reduces loss of productivity due to illness. [47] The benefits of breastfeeding are manifold and extensively cited by the WHO, UNICEF and many others. [48–51]

How much will it roughly cost to set up a milk bank in a hospital? What are the logistics?

Setting up a milk bank is very cost effective and the equipment, like shaker bath, freezer and pumps cost very little. It would cost around 4-5 lakh INR at the most. [52] If there are not enough nurses at the hospital, then one would have to spend on a separate nurse to help the donors and a part-time technician. [52] And this would probably need an 800 square foot room. [52]

How much milk one gets from donors in a day? Does all of it get consumed?

Mothers donate around 50 ml of milk. [52] A normal baby needs around 80 to 150 ml of milk per kg of his/her weight, sometimes one feed is enough and sometimes several are required. [52] The discard rates are less than 0.1 per cent because the demand is always more than

supply. [52] Moreover, the donated milk has a shelf life of up to six months, thus further reducing the chances of wastage. [52]

Who can donate?

A National Consultative Meet for framing guidelines was summoned by the Infant and Young Child Feeding Chapter, Indian Academy of Pediatrics and the Union Ministry of Health and Family Welfare in Gurgaon, India with representations from various stakeholders. [14] The guidelines were drafted after an extensive literature review and discussions. As per the guidelines, only those women are allowed to donate their milk that are in good health and have enough milk after feeding their babies satisfactorily. [14] The donor should be willing to undergo blood testing for, screening of infections. A woman who takes more than two ounces of alcohol regularly or three caffeinated drinks per day is disqualified as a donor. [14] Thus, the donors can be mothers with surplus milk after feeding their infants, mothers who have lost their babies, mothers whose babies are either premature, sick or having a cleft lip/palate. [13] Also, these mothers are screened for the Hepatitis B and C, HIV, Tuberculosis, Syphilis, etc.

Who is the beneficiary?

The beneficiaries can be premature infants or those who require gastrointestinal surgery as a newborn; babies who have lost their mothers or whose mothers are separated due to any severe medical condition like PPH; infants admitted from an orphanage or any other abandoned infant. [13] Also, mothers without breast milk secretion, inverted or flat nipples, or in cases of multiple pregnancies like twins, triplets, etc. [13]

The benefits of breast milk banks are that it ensures continuous supply of safe human milk for sick and preterm babies. It reduces infection rates in hospitalized babies. The frequent expression helps maintain lactation. Also, there is reduction in long term morbidity and mortality and positive influence on breastfeeding practices in hospital and community. [16] Although pasteurization does affect some of the nutritional and immunologic components of human milk, but many immunoglobulins, enzymes, hormones, and growth factors are unchanged or minimally decreased.

CONCLUSIONS

As the state of infant mortality is very high in India the best way to control is to increase the number of breast milk banks. The role of optimizing nutrition for preterm infants is of critical importance in promoting their health and improving their long term neurodevelopmental outcome. The breast milk banks are really essential, as these are cost effective and can be managed easily. The role of Government and communities are very important in encouraging the hospitals and NGO's to work towards opening more number of breast milk banks. There are certain financial considerations in the use of donor breast milk. Operating a milk bank, including donor testing as well as processing, testing, and shipping donor milk entail a cost. However, in comparison with the cost of medical or surgical management of even one case of the NEC or a resulting case of short bowel syndrome, this cost is nominal. However, the rate of neonatal intensive care units opening in India is very fast, but there are hardly 14 breast milk banks at present and their growth has been very slow.

It is quite clear that artificial formula cannot match and will never provide the broad range of benefits of human milk. Given the high rate of preterm births in the country and level of malnutrition that ensues in the postnatal growth in such babies after birth, there is an urgent need to establish milk banks across the country, especially in the large neonatal units of all hospitals.

ACKNOWLEDGEMENT

Authors would like to acknowledge the technical support provided by Mr. Ankit Yadav and Mr. Manu Sharma, New Delhi, India

REFERENCES

1. Wight NE. Donor human milk for preterm infants. J Perinatol. 2001 Jun; 21(4):249-54.
2. ESPGHAN Committee on Nutrition. Arslanoglu S, Corpeleijn W, Moro G, Braegger C, Campoy C, et al. Donor human milk for preterm infants: current evidence and research directions. J Pediatr Gastroenterol Nutr. 2013;57(4): 535–42.
3. Boland MC. Canadian paediatric society, nutrition committee: exclusive breastfeeding should continue to six months. Paediatr Child Health. 2005;10: 148.
4. Infant Feeding Joint Working Group. A joint statement of Health Canada, Canadian Paediatric Society, Dietitians of Canada, and Breastfeeding Committee for Canada. Ottawa: Health Canada; 2014. Nutrition for Healthy Term Infants: Recommendations from Birth to Six Months. [cited 2015 April 16]. Available from URL: http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php
5. American Academy of Pediatrics Section on Breastfeeding. Breastfeeding and the use of human milk. Pediatrics. 2012;129(3):e827–e841.
6. World Health Organization. Global strategy for infant and young child feeding - The optimal duration of exclusive breastfeeding. Geneva: World Health Organization; 2001. [cited 2015 April 16]. Available from URL: http://apps.who.int/gb/archive/pdf_files/WHA54/ea54id4.pdf
7. World Health Organization. Promoting proper feeding for infants and young children. Geneva: World Health Organization; 2004. [cited 2015 April 16]. Available from URL: http://www.who.int/nutrition/topics/infantfeeding/en/
8. Panczuk J, Unger S, O'Connor D, Lee SK.Human donor milk for the vulnerable infant: a Canadian perspective. Int Breastfeed J. 2014;9:4.
9. Corpeleijn WE, Vermeulen MJ, van Vliet I, Kruger C, van Goudoever JB. Human milk banking—facts and issues to resolve. Nutrients. 2010;2(7):762–9. Epub 2010 Jul 13.
10. Kim JH, Unger S. Human milk banking. Paediatr Child Health. 2010;15(9):595–602.
11. Jones F. History of North American donor milk banking: One hundred years of progress. J Hum Lact. 2003;19:313–318.
12. Human Milk Banking Association of North America. [cited 2015 April 16]. Available from URL: https://www.hmbana.org/
13. Khadse S, Hiremath A. Human milk bank: where every precious drop counts. Med J Western India. 2013 Feb;41(1):45-7.
14. Kumar A. Policy made for human milk banks. [cited 2015 April 16]. Available from URL: http://www.thehindu.com/news/cities/Delhi/policy-made-for-human-milk-banks/article6206080.ece
15. First public sector breast milk bank inaugurated in Kolkata. [cited 2015 April 16]. Available from URL: http://www.thehindu.com/news/national/other-states/first-public-sector-breast-milk-bank-inaugurated-in-kolkata/article4999460.ece
16. Fernandez A. Indian Experience of Setting a Human Milk Bank. [cited 2015 April 16]. Available from URL: http://worldbreastfeedingconference.org/images/128/DR_%20ARMIDA%20FERNANDZ.pdf
17. Heinig MJ. Host defense benefits of breastfeeding for the infant. Effect of breastfeeding duration and

exclusivity. Pediatr Clin North Am. 2001;48(1):105–23.
18. Cochi SL, Fleming DW, Hightower AW, et al. Primary invasive *Haemophilus influenzae* type b disease: A population-based assessment of risk factors. J Pediatr. 1986; 108(6):887–96.
19. Istre GR, Conner JS, Broome CV, Hightower A, Hopkins RS. Risk factors for primary invasive *Haemophilus influenzae* disease: Increased risk from day care attendance and school-aged household members. J Pediatr. 1985;106(2):190–5.
20. Takala AK, Eskola J, Palmgren J, et al. Risk factors of invasive *Haemophilus influenzae* type b disease among children in Finland. J Pediatr. 1989;115(5 Pt 1):694–701.
21. Dewey KG, Heinig MJ, Nommsen-Rivers LA. Differences in morbidity between breast-fed and formula-fed infants. J Pediatr. 1995;126(5 Pt 1):696–702.
22. Howie PW, Forsyth JS, Ogston SA, Clark A, Florey CD. Protective effect of breastfeeding against infection. BMJ. 1990;300(6716):11–6.
23. Popkin BM, Adair L, Akin JS, Black R, Briscoe J, Flieger W. Breast-feeding and diarrheal morbidity.Pediatrics. 1990;86(6):874–82.
24. López-Alarcón M, Villalpando S, Fajardo A. Breast-feeding lowers the frequency and duration of acute respiratory infection and diarrhea in infants under six months of age. J Nutr. 1997;127(3):436–43.
25. Bachrach VR, Schwarz E, Bachrach LR. Breastfeeding and the risk of hospitalization for respiratory disease in infancy: A meta-analysis. Arch Pediatr Adolesc Med. 2003;157(3):237–43.
26. Oddy WH, Sly PD, de Klerk NH, et al. Breast feeding and respiratory morbidity in infancy: A birth cohort study. Arch Dis Child. 2003;88(3):224–8.
27. Duncan B, Ey J, Holberg CJ, Wright AL, Martinez FD, Taussig LM. Exclusive breast-feeding for at least 4 months protects against otitis media. Pediatrics. 1993;91(5):867–72.
28. Aniansson G, Alm B, Andersson B, et al. A prospective cohort study on breast-feeding and otitis media in Swedish infants. Pediatr Infect Dis J. 1994; 13(3):183–8.
29. Mårild S, Hansson S, Jodal U, Odén A, Svedberg K. Protective effect of breastfeeding against urinary tract infection. Acta Paediatr. 2004; 93(2): 164–8.
30. Pisacane A, Graziano L, Mazzarella G, Scarpellino B, Zona G. Breast-feeding and urinary tract infection. J Pediatr. 1992;120(1):87–9.
31. Hylander MA, Strobino DM, Dhanireddy R. Human milk feedings and infection among very low birth weight infants. Pediatrics. 1998;102: E38.
32. el-Mohandes AE, Picard MB, Simmens SJ, Keiser JF. Use of human milk in the intensive care nursery decreases the incidence of nosocomial sepsis. J Perinatol. 1997;17:130–4.
33. Narayanan I, Prakash K, Bala S, Verma RK, Gujral VV. Partial supplementation with expressed breast-milk for prevention of infection in low-birth-weight infants. Lancet. 1980;2:561–3.
34. Lucas A, Cole TJ. Breast milk and neonatal necrotising enterocolitis. Lancet. 1990; 336:1519–23.
35. Yoshioka H, Iseki K, Fujita K. Development and differences of intestinal flora in the neonatal period in breast-fed and bottle-fed infants. Pediatrics. 1983;72:317–21.
36. Claud EC, Walker WA. Hypothesis: Inappropriate colonization of the premature intestine can cause neonatal necrotizing enterocolitis. Faseb J. 2001;15:1398–403.
37. Paricio Talayero JM, Lizán-García M, Otero Puime A, et al. Full breastfeeding and hospitalization as a result of

infections in the first year of life. Pediatrics. 2006;118(1):e92–9.
38. Venneman MM, Bajanowski T, Brinkmann B, et al. Does breastfeeding reduce the risk of sudden infant death syndrome? Pediatrics. 2009;123(3):e406–10.
39. Horwood LJ, Fergusson DM. Breastfeeding and later cognitive and academic outcomes. Pediatrics. 1998; 101(1):E9.
40. Anderson JW, Johnstone BM, Remley DT. Breast-feeding and cognitive development: A meta-analysis.Am J Clin Nutr. 1999;70(4):525–35.
41. Mortensen EL, Michaelsen KF, Sanders SA, Reinisch JM. The association between duration of breastfeeding and adult intelligence. JAMA. 2002;287 (18):2365–71.
42. Promotion of Breastfeeding Intervention Trial (PROBIT) Study Group. Kramer MS, Aboud F, et al. Breastfeeding and child cognitive development: New evidence from a large randomized trial. Arch Gen Psychiatry. 2008; 65(5):578–84.
43. Newcomb PA, Storer BE, Longnecker MP, et al. Lactation and a reduced risk of premenopausal breast cancer. N Engl J Med. 1994;330(2):81–7.
44. Collaborative Group on Hormonal Factors in Breast Cancer Breast cancer and breastfeeding: Collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50302 women with breast cancer and 96973 women without the disease. Lancet. 2002;360(9328):187–95.
45. Rosenblatt KA, Thomas DB. Lactation and the risk of epithelial ovarian cancer. The WHO Collaborative Study of Neoplasia and Steroid Contraceptives. Int J Epidemiol. 1993; 22 (2): 192–7.
46. Dewey KG, Heinig MJ, Nommsen LA. Maternal weight-loss patterns during prolonged lactation. Am J Clin Nutr. 1993; 58(2):162–6.
47. Ball TM, Wright AL. Health care costs of formula-feeding in the first year of life. Pediatrics. 1999;103(4 Pt 2):870–6.
48. Canadian Paediatric Society, Nutrition and Gastroenterology Committee (Principal author MC Boland). Exclusive breastfeeding should continue to six months. Paediatr Child Health. 2005; 10(3):148.
49. Health Canada. Nutrition for Healthy Term Infants – Statement of the Joint Working Group: Canadian Paediatric Society, Dieticians of Canada and Health Canada. Breastfeeding. [cited 2015 April 16]. Available from URL: www.hcsc.gc.ca/fnan/pubs/infantnourrisson/nut_infant_nourrisson_term_3-eng.php
50. UNICEF. Global strategy for infant and young child feeding. World Health Organization. Available from URL: www.unicef.org/nutrition/files/Global_Strategy_Infant_and_Young_Child_Feeding.pdf
51. UNICEF. Six million babies now saved every year through exclusive breastfeeding. [cited 2015 April 16]. Available from URL: www.unicef.org/nutrition/index_30006.html
52. Sharma R. We need to promote the culture of donating breast milk. [cited 2015 April 16]. Available from URL: http://www.downtoearth.org.in/content/we-need-promote-culture-donating-breast-milk

How to cite this article: Yadav S, Rawal G. Human breast milk bank. Int J Health Sci Res. 2015; 5(6):592-597.

****