

Characteristics of lactating mothers counselled for breast milk donation at a human milk bank in a tertiary care centre

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Citation this Article: Dr. Nimisha Sharma, Dr. Vinit Warthe, Dr. Amoolya Lois, “Characteristics of lactating mothers counselled for breast milk donation at a human milk bank in a tertiary care centre”, IJMSIR- July - 2022, Vol – 7, Issue - 4, P. No. 112 – 120.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: A Human Milk Bank is defined as a service that collects, screens, processes and dispenses human milk, by prescription, from donor lactating mothers who are not biologically related to the recipient baby. The concept of human milk banking was established in order to provide human milk to babies who do not have access to their biological mothers’ milk due to various reasons like mastitis, breast hypoplasia, hypoprolactinemia, etc. This study was embarked upon to describe the educational, socio-economic, psycho-social, maternal and infant-health related factors influencing donation of breast milk at a Human Milk Bank.

Methodology: A prospective observational study was conducted on 105 lactating mothers in a tertiary care hospital in the state of Maharashtra, India. A structured questionnaire was used for assessing the characteristics

of lactating mothers and their responses were recorded and analysed.

Results: Out of the 105 mothers included in this study, 30 were willing to donate breast milk. Maximum inclination towards donation was seen by mothers belonging to the age group of 18 to 25 years (19 donors), housewives (20 donors), primiparous mothers (14 donors) and those who had delivered via Lower Segment Caesarean Section (15 donors). Breast engorgement was a major determinant (18 donors) influencing a positive donation behavior according to this study. Mothers counselled by health-care workers trained in HMB activities (21 donors) were more likely to donate breast milk as compared to those counselled by non-HMB staff.

Conclusion: This study revealed that educational, socio-economic, psycho-social, as well as maternal and infant-health related factors play an important role in governing the attitude of nursing mothers towards breast milk

donation. Easy accessibility of milk banks, better health education and increased training and recruitment of staff in HMB would result in upscaling of human milk donation activities.

Keywords: Breastfeeding, Breast Milk Donation, Human Milk Bank, Infant Health, Lactation.

Introduction

The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) issued 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]

A global report compiled by WHO-UNICEF in 2016 suggests Exclusive Breastfeeding (EBF) of infants up to 6 months of age and complimentary feeding up to two years of age, as breastfed infants are 14 times less likely to suffer from mortality than those who are not breastfed at all.^[3]

However, EBF is not feasible in case of adoption, abandoned children or maternal demise. EBF is also difficult if a mother has breastfeeding problems like mastitis, engorgement, breast hypoplasia or hypo-prolactinemia. Infants of non-breastfed mothers have a greater risk of sepsis, necrotizing enterocolitis (NEC), pneumonia, intractable diarrhoea, etc.^[4,5] Every year, 27 million babies are born in India, of which 3.5 million are preterm and 7.5 million have low birth weight (LBW).^[6] These neonates constitute a highly vulnerable cohort and exhibit lower survival rates. LBW infants are at a 11–13 times increased risk of dying than those with normal birth weights^[7] and more than 80% of total neonatal deaths occur among LBW and preterm neonates.^[8] These deaths can be reduced by increasing breast feeding and human

milk banking practices.^[9] The likelihood of neurodevelopmental delay also known to be 50% higher in babies that are not breastfed at all as compared to those that are breastfed for at least 4 months.^[10] Although bovine and plant-based formulas are comparable to human milk with respect to their fat, protein and carbohydrate content, they are not able to replicate the complexity or functionality of other bioactive factors found in human breast milk.^[11] Banked human milk is an important factor in protecting vulnerable infants from succumbing to the sequelae mentioned above, promoting weight gain, as well as enhancing their neural development. Banked Human Milk is, therefore, said to be the “next best” after maternal breast milk.

Human Milk Banking (HMB) is a non-profit initiative, aiming to provide breast milk to neonates and infants who are unable to receive the same from their biological mothers due to various reasons like maternal mortality, inadequate breast milk production due to breast hypoplasia, hypo-prolactinemia, etc. Donors play a vital role in the success of this endeavour. Therefore, it is essential to study donor characteristics and the factors influencing donation behaviour in lactating mothers who have been counselled about HMB facilities.

This prospective observational study done at human milk bank in a tertiary care centre in India aims to describe the educational, socio-economic, psycho-social, maternal and infant-health related factors influencing donation behavior among mothers. The data gathered in this study is compared with that of similar studies conducted in other countries all over the world and parallels are drawn where applicable, whereas, disparities are suitably highlighted as well. Such efforts will help in upscaling of HMB facilities by identifying population groups exhibiting increased donation behaviour, whereas, public

awareness campaigns can be increased in the groups showing reluctance.

Materials and methods

Aim

To describe the socio - economic, educational, occupational, psycho - social, maternal and infant-health related factors influencing donation of breast milk at a Human Milk Bank in a tertiary care centre.

Objectives

1. To describe the characteristics of mothers counselled for breast milk donation at a Human Milk Bank in a tertiary care centre.
2. To identify the factors leading to motivation or disinclination towards breast milk donation.

Methodology

Prospective observational study conducted over a period of two months at a human milk bank in a tertiary care centre in Maharashtra, India. Lactating mothers in Post Neonatal Care (PNC) ward and those whose babies were admitted in the Neonatal Intensive Care Unit (NICU) were adequately counselled about Human Milk Banking and the process involved in breast milk donation. Their queries were appropriately answered. Consent of subjects was taken and they were interviewed. A structured questionnaire was used and their answers were recorded. The data was compiled and analysed. The observations and results are described below.

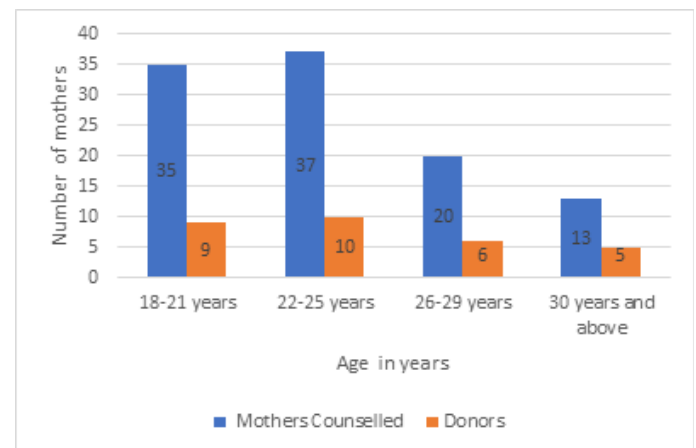
Sample size: 105 subjects were included in this study.

Results and discussion

Out of the 105 mothers that participated in this study, 28.6% or 30 mothers agreed to donate their breast milk but a majority of subjects, 75 in number, refused to donate at HMB. The characteristics of mothers counselled, including those that agreed to donate at HMB is described below.

33.3% (35 out of 105) of all mothers involved in this study were in the age group of 18-21 years, 35.2% (37 out of 105) were in the age group of 22-25 years and 19% (20 out of 105) were aged 26-29 years. Women above 30 years of age constituted the smallest group of 12.4% (13 out of 105). 30% (9 out of 30) of donors belonged to the age group of 18-21 years and 33.3% (10 out of 30) were in the age group of 22-25 years. 20% (6 out of 30) donors were aged 26-29 years, whereas, only 16.7% (5 out of 30) donors were of the age of 30 years and above. This is depicted in Figure 1 given below.

Figure 1: Age-wise distribution of subjects



This can be summarized as maximum donation behaviour (63.3% or 19 out of 30 donors) being observed in the maternal age group of 18 to 25 years in India. The tendency to donate breast milk declined thereafter. It is to be noted that 49.5% donors were aged between 19 to 28 years as per a study conducted in Londrina, Brazil by Talita dos Santos D et al. [11] in 2009. This is comparable to the data that has been collected in this study and supports the inference that a positive donation attitude is seen in younger mothers.

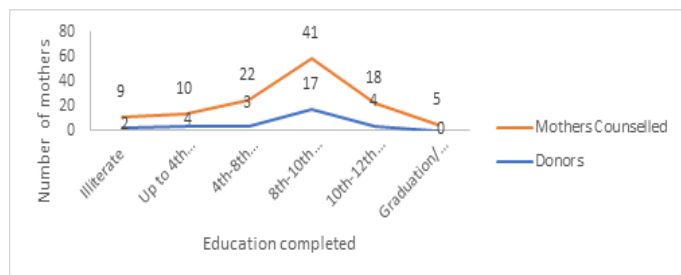
Recent data collected from China by Zhonghu a Er Ke Za Zhi et al. [12] shows that among the 3121 eligible donors in 2017, 2553 (81.8%) were between 25 to 35 years of age. According to a study conducted in 2007 in Austin by

Osaldiston R et al. [14], a maximum of 48% donors were aged between 30 to 34 years of age. The mean age of donors was 31.3 years, according to the data collected in 2013 from Taiwan by Fang-Yuan Chang et al. [14]. Research activities in Korea by Jang HL et al. [15] in 2016 showed maximum donation (69.8%) from mothers aged between 30 to 39 years of age. This disparity seen in the age group of donors with maximum donation at HMBs in other countries as compared to that seen in India can be attributed to a relatively late age of marriage and child bearing seen in women in developed countries. Of all mothers counselled for breast milk donation, 8.6% (9 out of 105) were illiterate, 9.5% (10 out of 105) had studied up to 4th standard, 21% (22 out of 105) had studied up to 8th standard and 39% (41 out of 105) had been educated up to 10th standard. 17.1% (18 out of 105) subjects had completed education up to 12th standard, whereas, only 4.8% (5 out of 105) mothers counselled had finished their graduation/diploma degree.

6.7% (2 out of 30) of donors were illiterate, 13.3% (4 out of 30) had studied up to 4th standard, 10% (3 out of 30) had been educated up to 8th standard and 56.7% (17 out of 30) donors had finished education up to 10th standard. 13.3% (4 out of 30) donors had been educated up to 12th standard, whereas, none had finished their graduation/ diploma degree.

Data regarding the educational status of subjects involved in this study is demonstrated in Figure 2 given below.

Figure 2: Distribution of subjects as per education completed



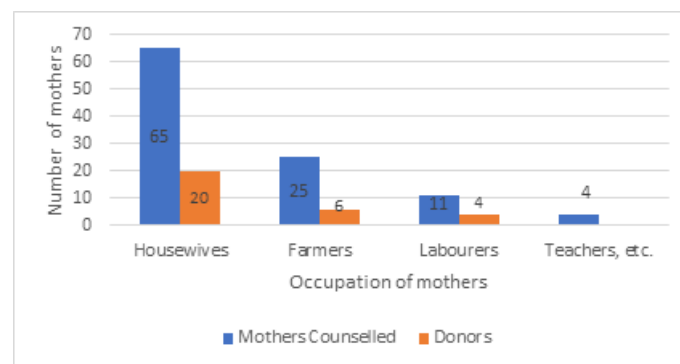
A positive donation attitude was expected to rise with an increase in education and such a trend is observable in this study as well. However, the peak of 56.7% donors at completion of education up to 9th-10th standard, followed by a dip with only 13.3% donors being educated up to 11th-12th standard and none being graduates or diploma holders, is most likely due to a lower number of women seeking higher education in our country, especially in rural areas. This is evident in the decreased number of mothers counselled who had pursued education beyond 10th standard.

A similar pattern was observed in Londrina, Brazil by Talita dos Santos D et al. [11] in 2009 where 8.8% of donors were illiterate, 19.8% had completed basic education, 41.8% donors had completed intermediate education and only 29.7% of donors had completed superior education.

61.9% (65 out of 105) of all mothers counselled for donation were housewives, 23.8% (25 out of 105) were farmers, 10.5% (11 out of 105) were labourers, while only 3.9% (4 out of 105) were tuition teachers, Anganwadi workers, factory workers, etc.

66.7% (20 out of 30) of donors were housewives, 20% (6 out of 30) were farmers and 13.3% (4 out of 30) were labourers. This variation in occupational history is depicted in Figure 3 given below.

Figure 3: Distribution of subjects based on occupation



It is evident that housewives showed a higher inclination towards donation, possibly due to better care, diet and rest opportunities being available at home, which leads to a decreased incidence of anemia, weakness and other illnesses and promotes breast milk expression and

donation behaviour. This was also demonstrated by Pimenteira C et al. ^[16] in Brazil in 2008 as their study showed that 69.9% of donors were not formally employed.

46.7% (49 out of 105) of all mothers counselled for donation were primiparous, 18.1% (19 out of 105) were pregnant for the second time, 21% (22 out of 105) for the third time and 10.5% (11 out of 105) were pregnancies of the fourth order. Only 3.9% (4 out of 105) were pregnancies of the order 5 and above.

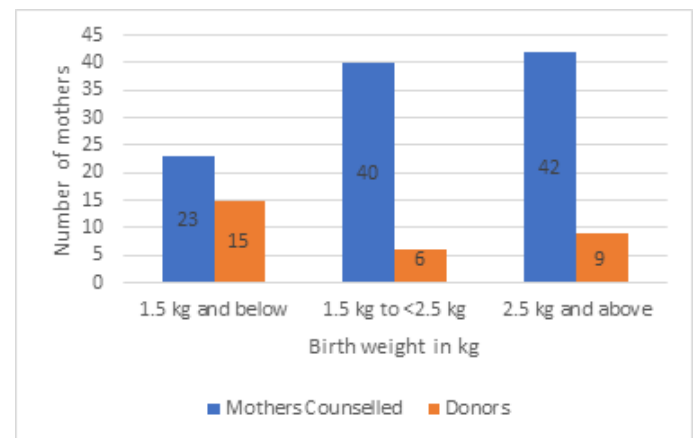
Donation was seen maximally with primiparous mothers (46.7% or 14 out of 30 donors). Mothers showed a decreased tendency to donate breast milk with an increase in the number of their off-springs. 16 out of 30 donors had one living child, 9 had two living children, while 5 out of 30 donors had three living children.

46.6% of donors were primiparous, 35.9% had two children, 13.6% had three children and 3.9% had four children as per a study conducted in France by Azema M et al. ^[17] in 2003. 56.6% donors were primiparous donors, as shown by Talita dos Santos D et al. ^[11] and 87.8% had 1 to 3 pregnancies as per research done by Pimenteira C et al. ^[16] This may be due to pregnancies of higher orders having a greater risk of complications, leading to an overall decrease in the maternal health which, in turn, adversely affects maternal breast milk production and her inclination to donate it.

49.5% (52 out of 105) of all mothers counselled for donation were mothers of full-term babies and 50.5% (53 out of 105) had given birth to preterm babies. Of them, 23 had delivered babies with a birth weight of less than or equal to 1.5 kilograms, 40 had babies of birth weight of less than 2.5 kilograms and more than 1.5 kilograms, whereas, 42 mothers had babies weighing more than or equal to 2.5 kilograms at birth.

It was observed that 70% (21 out of 30) donors were mothers of full-term babies and only 30% (9 out of 30) had preterm babies. Of them, 15 donors had delivered babies with a birth weight of less than or equal to 1.5 kilograms, 6 donors had babies of birth weight of less than 2.5 kilograms and more than 1.5 kilograms, whereas, 9 donors had babies weighing more than or equal to 2.5 kilograms at birth. The impact of birth weight of the baby on donation behaviour is represented in Figure 4 given below.

Figure 4: Distribution of subjects as per birth weight of their baby.



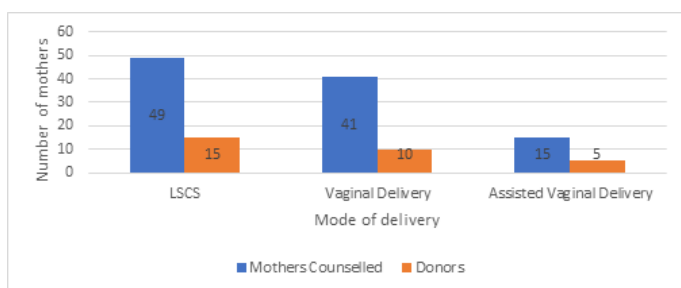
Among the 3121 eligible donors in China ^[12] in 2017, a total of 2828 (90.6%) had full-term deliveries. It is evident that mothers of full-term babies who had very low birth weights were more likely to donate milk at HMB. The rationale behind this can be attributed to a longer duration of admission at NICUs in case of low-birth-weight babies compared to those with an adequate birth weight, leading to a higher incidence of breast engorgement in their mothers if breastfeeding is not possible or indicated. This may be the motivating factor towards donation in such mothers.

46.7% (49 out of 105) of all mothers counselled for donation had delivered via Lower Segment Cesarean Section (LSCS), 39% (41 out of 105) had delivered via

vaginal deliveries, whereas, 14.3% (15 out of 105) mothers had undergone forceps or vacuum assisted deliveries.

50% (15 out of 30) of donors had delivered via Lower Segment Cesarean Section (LSCS), 33.33% (10 out of 30) had delivered via vaginal deliveries, whereas, 16.67% (5 out of 30) donors had undergone forceps or vacuum assisted deliveries, as shown in Figure 5 given below.

Figure 5: Distribution of subjects based on mode of recent delivery.



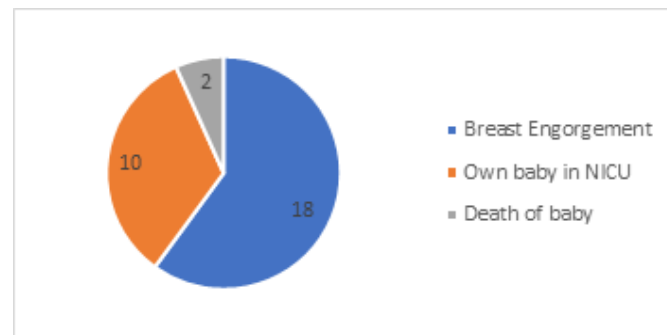
Thus, it is evident that deliveries occurring via LSCS were associated with increased donation due to these deliveries usually being performed on high-risk pregnancies, leading to a longer duration of hospitalization for the mother-baby duo.

60% (18 out of 30) of donors had breast engorgement and wanted excess milk to be extracted, in order to be relieved of the associated pain.

33.3% (10 out of 30) donors agreed for donation at HMB as their babies were sick and kept nil per oral in the NICU. They would rather donate their milk so that it could be beneficial to “another unfortunate baby” than throw away the excess.

7% (2 out of 30) donors had agreed for breast milk donation as their baby had died in the NICU and their milk was no longer needed. However, such mothers were prescribed drugs to suppress lactation. The data on reasons for agreement for milk donation is depicted in Figure 6 given below.

Figure 6: Reasons for agreement for donation at HMB



Professional recommendation, which is mostly seen in cases of breast engorgement or excess milk production, was a major factor promoting donation behavior, with a maximum contribution of 61.3%, as recorded by Pimenteira C et al. [16] The most frequently reported reasons for donating breast milk were altruism and excess milk production as per a study conducted in Federal District, Central-West Brazil by Alen car LC et al. [14] in 2005. As per studies carried out in France [17] and Fortaleza [12] in 2003 and 2006 respectively, breast engorgement/excess production was the prime (60-70%) motivation for donation, while desire to help (30-40%) was the second most important factor. Research conducted in Austin [13] in 2007 and Londrina [11] in 2006 also supports this finding, with problems related to lactation and breastfeeding being the key factors influencing a positive attitude towards donation.

93.3% or 70 out of 75 subjects counselled for donation refused to donate breast milk at HMB as they felt that on doing so, less milk would be available for their own infant. This proportion indicates a lack of awareness of low milk output and breastfeeding adequacy parameters. Therefore, it is of utmost importance to counsel mothers about proper feeding practices and signs of adequate feeding. 4% or 3 out of 75 subjects refused to donate milk as their families would not allow them to do so. It is imperative to upscale health education in the form of

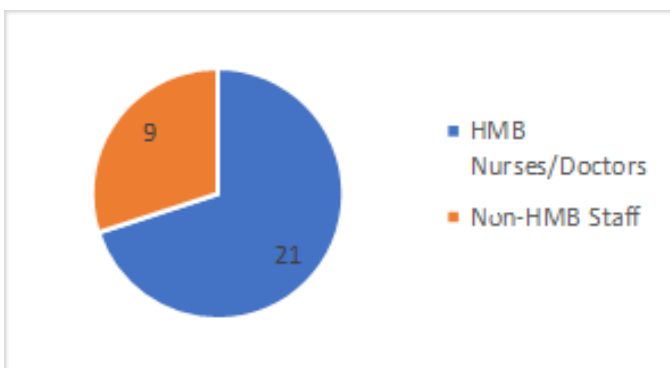
advertisements, plays, seminars, etc. and to make breast feeding and donation of breast milk a topic of discussion among the citizens of our country in order to remove the stigma surrounding the subject. 2.7% or 2 out of 75 subjects refused to donate milk at HMB because they were given discharge and they had to go home. Travel facilities in Indian villages are poor and the economic status of Indian rural families is also low, making travelling for donation a far-fetched idea.

9.5% or 10 out of the 105 lactating mothers counselled for breast milk donation gave a history of prior donation at the Human Milk Bank. All of them were of the opinion that the donation experience was good and they had not encountered any difficulty in the process. 10% donors had one prior donation experience, whereas, 30% had two and 20% had three prior donation experiences, respectively. 40% donors had donated milk 4 times or more.

This is an encouraging statistical figure as it indicates that a large number of donors are likely to donate at HMB again. Data gathered from Austin^[13] in 2007 also shows that 97% donors would donate again.

70% (21 out of 30) donors were counselled by doctors/nurses working at HMB, whereas, 30% (9 out of 30) donors were counselled by non-HMB staff like social workers and nurses from general wards. This is demonstrated in Figure 7 given below.

Figure 7: Distribution of donors as per counselling staff.



This indicates improved donation outcomes when health-care workers trained in human milk banking and breastfeeding activities are available to educate mothers about the importance of breast milk donation, explain the procedure of donation at HMB and quell any doubts that they may have regarding the process.

Branco et al.^[18] have also demonstrated that professionals trained in breastfeeding and HMB activities are more likely to encourage mothers to donate at HMB.

Conclusion

This prospective observational study done to describe the educational, socio-economic, psycho-social, maternal and infant-health related factors influencing donation of breast milk revealed that out of 105 mothers counselled for donation, 30 mothers were willing to donate breast milk at the Human Milk Bank.

21 out of 30 donors had been counselled by HMB staff and increased motivation for donation was observed in mothers belonging to the age group of 18 to 25 years (19 out of 30 donors) and stay-at-home-mothers (20 out of 30 donors).

Primiparous mothers (14 out of 30 donors) and those who had delivered via Lower Segment Caesarean Section (15 out of 30 donors) demonstrated a greater inclination to donate breast milk.

Breast engorgement (18 out of 30 donors) was an important factor governing a positive donation attitude, followed by “desire to help” (10 out of 30 donors).

10 out of 105 subjects had a history of prior donation at the milk bank and none of them had any complaints regarding the procedure of donation.

However, most mothers (70 out of 105 subjects) showed disinclination towards donation of breast milk at HMB as they believed that less milk would be available for their own infant on doing so.

It is, therefore, evident that health education regarding the subject of lactation and breast milk donation, along with increased recruitment and training of health-care professionals is the need of the hour for improving donation outcomes at pre-existing as well as newly emerging HMBs.

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