

KNOWLEDGE ATTITUDE AND PERCEPTION OF HUMAN DONOR MILK IN POST-NATAL MOTHERS AT A TERTIARY CARE CENTRE IN AN INDIAN SUBURB: A CROSS SECTIONAL STUDY

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Abstract

Aim: The aim of this study was to assess the knowledge, attitudes, and perceptions of human donor milk among the Indian suburban population.

Material and Methods: This cross-sectional survey involved participants from suburban areas of India. Data were collected through structured interviews and questionnaires, assessing participants' knowledge, attitudes, and perceptions regarding human donor milk. Participants included postnatal mothers, health workers, and other members of the suburban community.

Results: Out of the participants surveyed, varying levels of awareness and acceptance of donor human milk were observed. While some respondents demonstrated positive attitudes towards breast milk donation, others were less familiar with the concept. Health workers expressed favorable views towards utilizing donor human milk as a cost-effective alternative to infant formula. The study also highlighted the potential benefits of donor human milk in reducing morbidity associated with delayed breastfeeding and allergies to formula.

Conclusion: The study findings indicate a willingness among the Indian suburban population to adopt donor human milk, acknowledging its potential to reduce morbidity linked to delayed breastfeeding and formula allergies. Efforts to increase awareness and acceptance of breast milk donation, particularly among health workers and the broader community, are essential for promoting the use of donor human milk as a viable alternative in infant feeding practices.

Keyword: Breastfeeding, donated human milk, donating, human milk banking, neonate

INTRODUCTION

A human milk bank, also known as a breast milk bank or lactarium, methodically gathers, pasteurizes, preserves, and distributes breast milk donated by individuals. In instances where a mother cannot provide enough or any of her own milk, donated breast milk serves as a substitute ¹. They play a pivotal role in the collection, processing, and distribution of donor human milk and act as intermediaries between donors and recipients, with the main goal of ensuring the quality and safety of this biological product and it provides an alternative for mothers unable to provide their own breast milk to their infants ¹. There may be concerns about disease transmission from the mother, a baby's hospitalization at birth with very low birth weight (posing risks like necrotizing enterocolitis), preterm babies or logistical challenges such as living far from the hospital during an extended stay ².

India has one of the highest neonatal morbidities and mortalities in the world ³. The World Health Organization (WHO) advises exclusively breastfeeding infants for the initial 6 months, followed by ongoing breastfeeding alongside the introduction of suitable complementary foods for a duration of up to 2 years or beyond ⁴. In situations where a mother cannot provide her own milk, either directly or through expression, pasteurized donor human milk serves as the next best alternative ⁵.

In an earlier study focused on formula feeding, researchers observed that infants who were never breastfed required extra office visits, additional days in the hospital, and more prescriptions during the first year ⁶.

In spite of notable economic advancement and augmented public health investments in food security and nutritional support, the burden of low birth weight (LBW) in India has not experienced substantial fluctuations in recent years and has stayed consistent

⁷. The National Health Mission, Government of India, aims to reduce the neonatal mortality rate as a key goal ⁸. Utilizing donor mother's milk through a human milk bank can significantly contribute to the reduction of the neonatal mortality rate ⁹.

In 1989, the inaugural human milk bank in India was founded at Lokmanya Tilak Municipal Medical College and General Hospital in Mumbai. Despite a slow start which can be attributed to a lack of awareness among community members and insufficient promotion within the industry ¹⁰ 22 human milk banks were set up between 2005 and 2015 but As of 2021, the number has surged to over 90 human milk banks in India ¹¹.

The International Milk Banking Initiative (IMBI) was established at the International Human Milk Banking Association of Northern America Congress (HMBANA) in 2005, and it identifies 33 countries with milk bank programs ¹². In a human milk bank, milk from multiple donors is commonly pooled in milk banks, although some banks only pool milk from individual donors (single-donor banks). Typically, milk provided by milk banks undergoes pasteurization and extensive laboratory testing to reduce the microbial load ¹³. After pasteurization, the milk is placed in small containers (100-150 mL) and stored frozen for up to 1 year, depending on local guidelines.

Human milk is acknowledged for its numerous advantages, such as inducing tolerance to allergens, offering passive immunization, enhancing lipid profiles, and regulating blood pressure hence supplying breast milk (BM) is regarded as a cornerstone of child survival and a cost-effective method to prevent the 2.8 million annual infant deaths globally. ¹⁴⁻¹⁵

Acknowledging the advantages of donor human milk (DHM) compared to formula milk in situations where the use of mother's own milk (MOM) is not feasible, the World Health Organization (WHO) has advocated for the global expansion of human milk banks (HMBs) (World Health Organization, 2016).

Unfortunately, in India, the establishment of modern human milk banks is still in its early stages which can be attributed to factors such as a lack of awareness, deficiencies in leadership, high infrastructural and maintenance expenses, and a scarcity of neonatal facilities ¹³. In this research we aim to explore the knowledge, attitude, and perceptions regarding human donor milk within the Indian suburban population. Understanding the community's awareness and perspectives on donor milk is crucial for improving healthcare practices, ensuring informed decision-making, and promoting the effective utilization of human milk banks. The findings may contribute to enhancing neonatal care strategies, addressing misconceptions, and fostering a supportive environment for donor milk programs in the Indian suburban context.

METHODOLOGY

In this cross-sectional study conducted at Dr.D.Y Patil Medical College, Hospital & Research Centre, Pimpri, Pune/Dr. D.Y Patil Vidyapeeth, Pimpri, Pune (deemed to be university). The present study investigated the knowledge, attitudes and perceptions surrounding human donor milk from Yashoda Human milk bank situated next to our post-natal ward among a diverse cohort of 150 participants who were admitted in the post-natal wards for a duration of 3 months from October 2023-January 2024. This study utilized a pre-validated structured questionnaire ¹⁶.

Simultaneously, a few in-depth interviews were conducted to qualitatively explore participants' perspectives, unveiling nuanced insights into their beliefs and experiences. Ethical considerations were paramount (ethical clearance ref no:

I.E.S.C./33/2023) with written informed consent obtained from all participants to ensure voluntary participation. Anonymity and confidentiality safeguards were instituted to protect participant privacy.

The comprehensive data collected from this cross-sectional study were subjected to rigorous analysis. Quantitative data underwent statistical assessment, enabling the synthesis of key findings related to participants' knowledge, attitudes and perceptions concerning human donor milk. On the qualitative front, five participants were subjected to in-depth interviews to see in depth about the perception of participants. This research contributes to the scientific discourse by offering a multifaceted understanding of human donor milk within the post-natal mothers in a tertiary care centre, providing valuable implications for healthcare practices and stimulating avenues for future research in maternal and child health.

RESULTS

In the current study a total of 150 participants were analyzed for the study. The majority of participants fall within the normal weight range, with 59.3% having a BMI between 18.5 and 24.9. A smaller percentage falls below the normal range (8.6% with a BMI < 18.5), while 30.6% fall within the overweight category (BMI 25-29.9). A minimal proportion (1.3%) has a BMI greater than 30, indicating obesity (Table 1) ¹⁷.

Table 1: BMI distribution of participants

BMI	FREQUENCY (n)	PERCENTAGE (%)
< 18.5	13	8.6%
18.5- 24.9	89	59.3%
25-29.9	46	30.6%
>30	2	1.3%
Total	150	100

The findings indicate a substantial presence in the Lower Middle class (47.3%), with a balanced representation in the Upper Middle class (34%). Notably, the Upper and Lower SES categories exhibit lower frequencies (1.3% and 3.3%, respectively) (Table 2) ¹⁸

Table 2: Socioeconomic status of participants

SOCIOECONOMIC STATUS	FREQUENCY (n)	PERCENTAGE (%)
LOWER	5	3.3%
LOWER MIDDLE	71	47.3%
UPPER	2	1.3%
UPPER LOWER	21	14%
UPPER MIDDLE	51	34%
Total	150	100

Notable findings include a majority with secondary education (51.3%), a balanced representation in graduation (30%), and a minor presence in primary education (16%) and post-graduation (2.6%) (Table 3).

Table 3: Educational status of participants

EDUCATION LEVEL	FREQUENCY (n)	PERCENTAGE (%)
Primary	24	16%
Secondary	77	51.3%
Graduation	45	30%
Post-graduation	4	2.6%
Total	150	100

The significant prevalence of Hindu participants, constituting 90% (i.e. n=135) of the study population, out of 150 were noted in the study. In contrast, the Muslim community represents a smaller proportion, accounting for 10% (i.e. n=15).



Figure 1: Religion of participants

Notably, 28.5% (n = 10) cited cost considerations (CHEAPER), emphasizing the economic aspect of their decision. A significant proportion (34.2%, n = 12) expressed the ease of availability (EASILY AVAILABLE) as a determining factor, highlighting convenience. Additionally, 25.71% (n = 9) expressed concerns about potential infections associated with donor milk (DONOR MILK CAN BE INFECTED), indicating safety considerations. A smaller subset (11.42%, n = 4) preferred formula due to the availability of milk banks (MILK BANK), suggesting a specific preference for regulated sources. Statistical analysis revealed a significant difference in reasons provided (p = 0.002*), underscoring the diverse factors influencing maternal decisions in favor of formula over donor breast milk (Table 4).

TABLE 4: Reasons for preferring formula milk instead of donor milk for their infants

REASONS	FREQUENCY (n)	PERCENTAGE (%)
CHEAPER	10	28.5%
EASILY AVAILABLE	12	34.2%

DONOR MILK CAN BE INFECTED	9	25.71%
MILK BANK	4	11.42%
p = 0.002*		

*p< 0.05 – significant difference

A majority of participants (73.3%, n = 110) expressed a preference for utilizing milk banks as the source of donor breast milk. In contrast, a minimal proportion indicated a preference for a FRIEND (0.5%, n = 8), and a notably higher percentage chose a RELATIVE (21.3%, n = 32) as the preferred donor. Statistical analysis revealed a highly significant difference in preferences among the three categories (p < 0.001**), emphasizing a distinct inclination towards milk banks as the favored source of donor breast milk among the study participants (Table 5).

Table 5: Selection of alternate donors for breastmilk by participants

DONORS	FREQUENCY (n)	PERCENTAGE (%)
FRIEND	8	0.5%
RELATIVE	32	21.3%
MILK BANK	110	73.3%
p < 0.001 **		

**p< 0.001 – highly significant difference

The total of 54.6% of participants were aware of DBM availability, with no significant difference between those who were aware and those who were not (p = 0.732). A majority (76.6%) believed that DBM is a better option than formula when facing insufficient breast milk (p < 0.001). Additionally, 85.3% would continue pumping their own milk even if DBM was available (p < 0.001). Most participants (87.3%) recognized DBM's nutritional superiority over formula (p < 0.001) and 84.6% considered breast milk donation banks in India safe and trustworthy (p < 0.001).

Concerns were raised about the potential transmission of infections (32.6%, p = 0.004), but a significant proportion acknowledged immunological benefits (68%, p = 0.002). The study indicated that 82.6% perceived DBM to have more benefits than disadvantages (p < 0.001), and 80% expressed a willingness to change their attitude with more information about DBM (p < 0.001) (Table 6).

Table 6: Knowledge regarding donor breast milk.

	Yes N (%)	No N (%)	P value (using Chi square) Significance
Have you heard about the availability of donor breast milk	82 (54.6%)	68 (45.3%)	p = 0.732 (NS)
If you do not have enough breast milk, donor breast milk is a better option for your baby than formula.	115 (76.6%)	35 (23.3%)	p< 0.001**
If Donor Breast Milk was available for your baby, do you think you would stop pumping your own milk	22 (14.6%)	128 (85.3%)	p< 0.001**
Donor breast milk contains more nutrients than formula milk	131 (87.3%)	19 (12.6%)	p< 0.001**
Breast milk donation bank in the India is safe and trustworthy	127 (84.6%)	23 (15.3%)	p< 0.001**
Donor breast milk may transmit infection(s)/disease(s) from the donor to your baby	49 (32.6%)	101 (67.3%)	p =0.004*
Donor breast milk provides some immunological benefits (immunity/resistance to infections) that can reduce the rate of infections	102 (68%)	48 (32%)	p =0.002*
Donor breast milk may increase the risk of infants having allergy	63 (42%)	87 (58%)	p =0.701
Donor breast milk has more benefits than disadvantages	124 (82.6%)	26 (17.4%)	p< 0.001**

Would your attitude toward Donor breast milk be changed, if you learn more about Donor breast milk	120 (80%)	30 (20%)	p< 0.001**
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p> 0.005 – no statistical significant difference

*p< 0.05 – significant

**p< 0.001 – highly significant

DISCUSSION

The primary objective of this research was to assess the knowledge and attitudes regarding human breast milk banking among 150 post-natal mothers. This study aimed to discern the attitudes within our population regarding the use of donor breast milk. Our study demonstrated that most women (82.6%) demonstrated positive attitudes towards donor breast milk and that the use of DHM would be beneficial to their neonates even though the concept was unfamiliar to most respondents whereas a study in Kenya, Nairobi showed that many mothers were open to contributing their breast milk for the nourishment of at-risk children, some hesitated to allow their own infants to be fed with DHM from other women due to concerns about the potential transmission of diseases, issues related to hygiene, cultural and social considerations, and a general personal aversion to the concept¹⁹.

In our study women who were well educated and of a higher socioeconomic status had a view of accepting HDM as an option for their neonates when their own milk was unavailable whereas few mothers who were subjected to in-depth interviews who were uneducated or who had a primary level education and women of lower socioeconomic strata expressed apprehension towards the use of HDM contemplating that it might be sourced from another mother, leading to worries about disease transmission or the potential for allergies in their infants. Various studies have shown that the age of participants, their educational history, the newborn's weight, and pre-existing awareness of human milk banks were identified as variables that could serve as positive predictors for their knowledge, attitudes, and practices related to human milk banks and the act of donating milk²⁰. A study conducted by Veena Melawani et al. in Bhopal, involving 246 postnatal mothers, reported that only 10% had knowledge about the existence of breast milk banks, while 85.4% were willing to accept milk. In our study, 9% of mothers demonstrated high knowledge, 42% had medium knowledge, and 49% had low knowledge regarding feeding banked human milk to neonates²¹ whereas another study by Parvinder Kaur et al. found that knowledge levels were not associated with age, education, occupation, religion, income, or type of feed²².

Most mothers were aware of the benefits of breastfeeding but remained hesitant to accept donor milk for their neonates due to their lack of knowledge regarding HDM. In a study conducted by Zhang et al showed that most postpartum women express support for human milk banks, displaying a greater inclination towards donating breast milk rather than receiving donor milk²³. The primary obstacles preventing postpartum women from participating in milk donation or accepting donor milk are a lack of awareness about human milk banks and safety apprehensions. These results underscore the importance of increasing public awareness regarding human milk banks, emphasizing their role as potential resources for life-saving therapy, particularly for preterm infants²³. They concluded that pregnant women's health education should also encompass the significance of human milk, along with information about the viability and safety of donor milk from milk banks. This emphasis is crucial, particularly in promoting the well-being of preterm infants and those who are unable to receive their mothers' breast milk as an alternative.

Religion and culture also significantly influence the acceptability of DHM and human milk banking, emphasizing

the need for a comprehensive, multi-stakeholder approach involving health professionals, community leaders, and religious figures in communication and advocacy. The apprehension that children sharing mother's milk are considered milk siblings in Islam may contribute to the lower proportion of Muslim mothers accepting donor human milk compared to Christians. Similar concerns were observed in Turkey²⁴. A study by Khalil et al. in a Muslim setting revealed that religious leaders approved DHM only if it came from a single known donor or pooled from a maximum of three donors²⁵. Addressing community concerns, beliefs, and misconceptions through adequate information and awareness campaigns is crucial for fostering confidence and acceptance of breast milk donation.

Additionally, we observed that mothers who gave birth through a caesarean section were more open to considering donor milk as an alternative to breastfeeding. This willingness stemmed from the convenience it offered, especially during the postoperative period when they experienced pain and limited mobility compared to women who gave birth vaginally who were more comfortable to initiate breastfeeding and did not require human donor milk.

In a different study healthcare professionals expressed the view that employing DHM could present a more economical solution compared to the expensive infant formula currently used when the mother's own milk is unavailable. They also believed that DHM could decrease morbidity, particularly by mitigating the adverse effects linked to delayed breastfeeding and allergies to infant formula and could primarily be used as therapeutic nutrition for premature infants whose health required improvement. Numerous studies provide evidence that DHM lowers infection rates and feeding intolerances in vulnerable neonates, consequently reducing their hospitalization duration²⁶. Promoting education about the advantages of both mother's own milk and donor breast milk, along with the establishment of milk banks, stands as a crucial public health initiative essential for enhancing the acceptance of human milk as the optimal form of nutrition for infants hence healthcare workers play a vital role in motivating mothers to become donors and use DHM.

The Baby-Friendly Hospital Initiative (BFHI) was launched in 1991 by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) which aimed to promote, protect, and support breastfeeding. Our tertiary care center has adopted the Baby-Friendly Hospital Initiative (BFHI), which encompasses crucial measures such as establishing a written breastfeeding policy regularly shared with all healthcare staff and providing training for its implementation. Additionally, it entails organizing antenatal clinics to educate women about the advantages and techniques of breastfeeding, as well as assisting postnatal mothers in initiating breastfeeding within half an hour of giving birth²⁷. These practices could potentially foster positive attitudes among postnatal women toward accepting human donor milk when necessary for their infants.

The cost-effectiveness of introducing stored human milk in neonatal intensive care units has been observed in Western nations primarily due to its role in decreasing the incidence of necrotizing enterocolitis (NEC). This, in turn, results in fewer surgeries and a decrease in neonatal morbidity and mortality. In India, the expenses associated with operating a milk bank and the potential cost savings resulting from a decrease in necrotizing enterocolitis (NEC), sepsis, and hospital stay

duration have not been thoroughly evaluated¹⁰. Therefore, establishing numerous milk banks throughout the country could benefit our nation by potentially yielding significant cost saving and reducing the burden of neonatal mortality.

CONCLUSION

In conclusion, the study on knowledge, attitudes, and perceptions of human donor milk in the Indian suburban population revealed positive attitudes towards breast milk donation. Despite the concept being new to many respondents, health workers expressed that utilizing donor human milk (DHM) would offer an affordable solution compared to costly infant formula. The findings suggest a willingness to adopt DHM, recognizing its potential to reduce morbidity associated with delayed breastfeeding and allergies to formula. The study emphasizes the importance of awareness campaigns and multi-stakeholder involvement, including health professionals and religious leaders, in promoting acceptance and understanding of DHM in the community, the adoption of Baby friendly hospital initiatives and the need to establish more milk banks across the country as this intervention could lead to a significant reduction in the neonatal morbidity and mortality of our nation.

Limitations: The study's generalizability is limited to the selected post-natal mothers admitted in a tertiary care centre in a suburban Indian population, and findings may not be representative of urban or rural areas. The study's limitations include its focus solely on postnatal mothers within a private hospital, excluding government setups and a smaller sample size was used. Additionally, there was no long-term follow-up of postnatal mothers.

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