

## Experience of human milk banking from tertiary care centre of South Rajasthan

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### Abstract

**Background and objective:** Human milk bank plays an essential role by providing human milk to infants who would otherwise not be able to receive human milk. This retrospective study was carried out to review the basic characteristics of donors and recipients, and the amounts and contamination of breast milk donated at the human milk bank from a tertiary care hospital in South Rajasthan.

**Materials and methods:** Milk banks collect, screen, store, process, and distribute human milk. Data regarding clinical characteristics of the donor mother and recipients, and collected human milk for a period of 9 months (April – December 2017) were obtained from medical records and analysed.

**Results:** The donor pool consisted of 3117 mothers with total sittings of milk donation being 6787. Maximum number (1763; 56.5%) of donor mothers were recruited from gynaecological indoor units. A total of 789.8 L milk was collected, and 767.4 L milk was processed. There were 1492 neonate beneficiaries. Preterm neonates were the most common beneficiaries.

**Conclusion:** Human milk banks serve a vital function by providing human milk for premature infants, sick or hospitalized infants and others who, for a variety of reasons, would otherwise not have access to mothers' milk. The use of donor milk is widely endorsed. Additionally, establishing a nationwide network of human milk banking and successfully integrating human milk banking services with newborn care will further contribute to the progress of milk banking and reducing preventable newborn deaths.

**Keywords:** Human milk, Milk bank, Preterm neonate.

### 1. Introduction

Breast milk has all the nutrients and protective immune components that a full term infants need for healthy development during the first month of life, and seems to decrease the risk of allergic and infectious diseases. Renewed interest in also providing low-birth-weight infants with human milk stems partly from nutritional considerations, but more importantly from evidence that it confers some protection against infections and allergy [1]. A human milk bank is a service established for collecting, processing, storing and distributing donated human milk. Human milk banks (HMB) play an essential role by providing human milk to infants who would

otherwise not be able to receive human milk. The largest groups of recipients are preterm neonates who derive very substantial benefits from it [2].

Human milk banking started informally almost a hundred years ago, however the first human milk bank was set up in the United States in mid 1980s. First human milk bank of Asia 'Sneha' was founded in 1989 in Mumbai, but there is still insufficient number of milk banks in India (around 22; most in private hospitals) [3]. Our tertiary care's milk bank was established in April 2013. At present more than 11 human banks are working in Rajasthan.

## 2. Materials and methods

In this study, we reviewed the basic characteristics of donors (regional distribution, age, occupations, education, motivation on donation, donation time after delivery) and recipients (regional distribution, age), the number of donors and recipients, amount of human milk for collection and processing, bacterial contamination rate of donor milk after pasteurization, indication for receiving donated milk. The study was carried out from April to December 2017.

Milk banks generally follow standardized procedures for the collection and handling of donated milk. Donor mothers are at first motivated and counselled about milk donation by trained nursing staffs in the indoors and outdoors (Gynaecology and pediatrics units). Donors are instructed by the milk bank staff about recommended breast cleaning and breast pumping procedures. Most commonly milk from multiple donors is pooled and then undergone pasteurization process. Pooling serves the purpose of distributing nutrients, such as protein and fat, as well as foreign substances evenly. Once pasteurized, milk is placed in small (30 ml) containers and is stored frozen for up to 6 months.

After processing, pasteurized milk undergoes bacteriological testing to ensure the absence of detectable bacterial growth. In the hospital approved microbiology laboratory, each milk sample was inoculated onto blood agar plate and incubated aerobically at 36°C for 48 hours. All contaminated milk was discarded.

## 3. Results

A total of 3117 donor mothers were registered during the study period. Characteristics of human milk donors are summarized in Table 1. The age distribution of new donor mothers ranged from 20 to 35 years, with those aged 20-25 years accounting for the majority at 67.5%. Maximum numbers of donors were of rural background (85.9%). Data regarding educational status of donor mother showed that majority were literate (primary standard to graduation) accounting for 72.9% of total. In terms of occupation, housewife mothers accounted for majority at 98.6%.

Figure 1 shows the registered new human milk donors in the milk bank. During the period of 9 months, number of new donors showed increasing trend. Maximum numbers of donor mothers were registered from gynaecology indoor units (1763; 56.5%) followed by pediatric (1217; 39.0%) indoor units, gynaecology outdoor (49; 1.6%), pediatric outdoor (43; 1.4%), community (37; 1.2%) and private hospitals (8; 0.3%). (Figure 2)

The donor pool consisted of 3117 mothers with total sittings of milk donation being 6787. Month wise distribution of sittings of donor mother is shown in Fig 3. Total amount of donated milk in the study period was

789.8L of which 767.4 L was processed. Month wise collection of milk is shown in Table 2. Highest amount of milk was collected in December month.

There were 1492 neonate recipients during study period. Routine beneficiaries include 7494 neonates (Table 3). 715.5 L of donated human milk was distributed to beneficiary neonates. These include neonates upto 28 days of age, who were premature and low birth weight; mother's diminished breast milk production during first few days and reasons related to mother's health. Laboratory investigations including HIV, VDRL and HbsAg were positive in 30 donors.

**Table 1: Characteristics of human milk donors (n= 3117)**

Parameters	No.	%
<b>Age (yrs)</b>		
20-25	2105	67.5
26-30	916	29.4
> 30	96	3.1
<b>Residence</b>		
Urban	439	14.1
Rural	2678	85.9
<b>Education</b>		
Literate	2271	72.9
Illiterate	846	27.1
<b>Occupation</b>		
Housewife	3074	98.6
Job	43	1.4

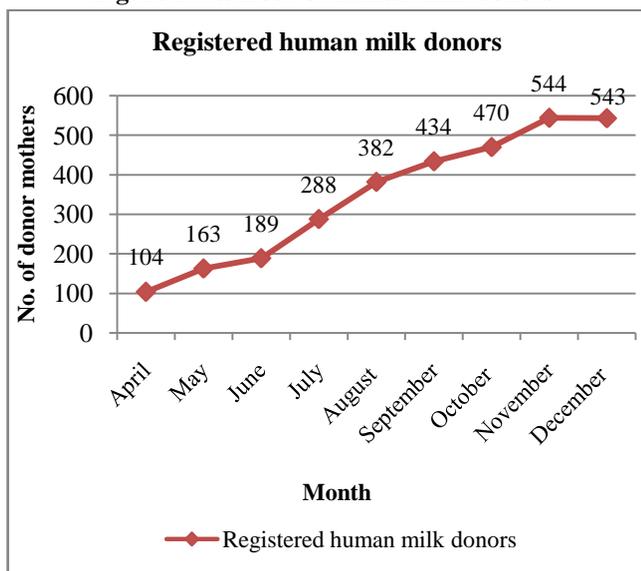
**Table 2: Characteristics of donor milk**

Month	Total collected amount (L)	Total processed amount (L)
April	16.0	15.1
May	30.3	29.4
June	58.0	55.0
July	78.1	77.5
August	112.2	109.7
September	114.3	110.0
October	126.9	112.8
November	114.3	122.1
December	139.7	135.8
Total	789.8	767.4

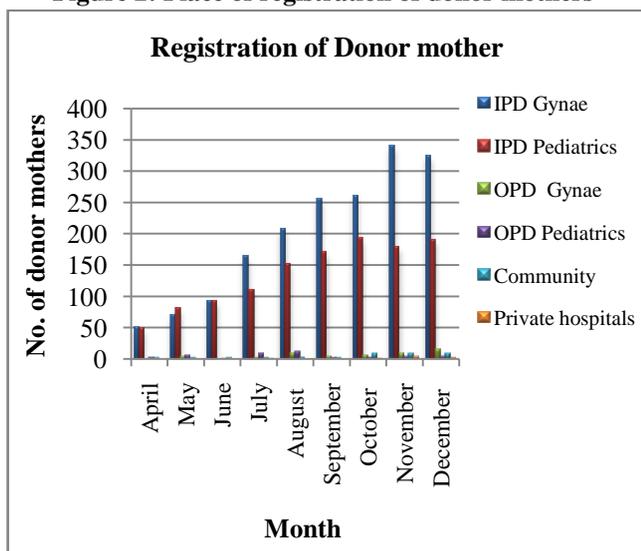
**Table 3: Characteristics of neonate beneficiaries**

Month	New	Routine
April	61	133
May	112	284
June	132	446
July	151	809
August	190	1393
September	188	816
October	217	1062
November	230	1137
December	211	1414
Total	1492	7494

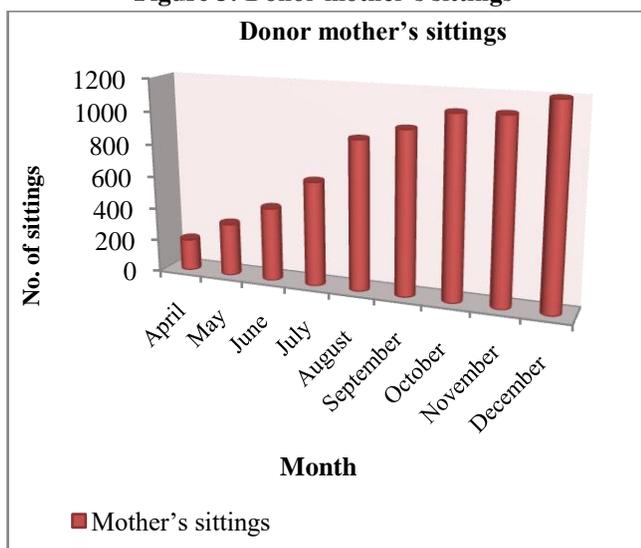
**Figure 1: Number of human milk donors**



**Figure 2: Place of registration of donor mothers**



**Figure 3: Donor mother's sittings**



#### 4. Discussion

Breast milk has all the nutrients and protective immune components that infants need for healthy development, and seems to decrease the risk of allergic and infectious diseases, such as otitis media, and gastrointestinal tract and respiratory disease in infancy [4-7]. In addition, breastfeeding promotes emotional and motor development in babies [8]. It is universally accepted that breast milk is the optimum exclusive source of nutrition for the first six months of life and may remain part of the healthy infant diet for the first two years of life and beyond [9]. Human milk is species specific and is, thus, markedly superior to all alternatives for newborn feeding [10]. Unfortunately, there are circumstances where mothers are not able to breastfeed their babies for a number of reasons despite the various benefits. Commercial infant formula is a common replacement for breast milk in these instances. However, donor breast milk can be an excellent alternative to formula feed [11].

Greatest beneficiaries to human milk banking will be preterm babies who are at risk of necrotizing enterocolitis and neonatal sepsis - diseases well known to be associated with high mortality and morbidity. It also helps them to reach full enteral feeds earlier than without human milk by strong trophic effects on gut [12- 15]. A meta-analysis of trials comparing formula feeds versus donor milk has shown significant protective effect of donor milk compared to formula in preventing necrotizing enterocolitis [16-18]. In a cohort study by Hylander *et al* [19], consumption of mother's milk had a large effect on infectious morbidity. They found a 47% combined infection incidence in the formula group compared to 29% in the human milk group. In addition, in a randomized trial by Narayanan *et al* [20], human milk consumption (both milk from the mother and pasteurized donor milk) reduced the incidence of infection.

During nine months of study period a total of 3117 donor mothers are enrolled with 6787 sittings of milk donation. Month wise distribution showed increasing number of donor mothers. This is due to increase in counselling of mothers at gynaecology and paediatric indoors and also outdoors by staff posted at human milk bank. Maximum numbers (67.5%) of donor mothers were in the age group 20-25 years. In a Korean study by Jang *et al* [11], majority of donor mothers were in the age group 30-39 years. This can be explained by earlier age at marriage, early conception and child birth in Indian subcontinent compared to western countries. Most of donor mothers were from rural background (85.9%). This high figure from rural area contributes to the fact that being tertiary care hospital, referrals from periphery is more, so as the deliveries conducted.

A total of 789.8 L of donated milk was collected and 715.5 L of milk was distributed in 7494 neonatal beneficiaries, with an average of 95ml per neonate. Another study [11] included infants and adults in the beneficiary list. A total of 8,174.7 L of donor milk was supplied during the 8-year period. A total of 1,544 distributions were made, for an average of 5.3 L per person. The most common reason for receiving donated breast milk was a premature baby, which appears to be growing in proportion in recent years. Although the majority of the recipients were preterm infants, donor milk was also being ordered for babies and children for a variety of other reasons, including adoption, baby's refusal of formula, milk allergy, decreased amount of mother's breast milk, and mother receiving chemotherapy for cancer or underlying diseases [11].

## 5. Conclusion

Human milk banks serve a vital function by providing human milk for premature infants, sick or hospitalized infants and others who, for a variety of reasons, would otherwise not have access to mothers' milk. The use of donor milk is widely endorsed. Additionally, establishing a nationwide network of human milk banking and successfully integrating human milk banking services with newborn care will further contribute to the progress of milk banking and reducing preventable newborn deaths.

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