Indian women's knowledge and attitudes towards human milk banks and human donor milk.

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ABSTRACT

Background: When breast milk is unavailable or insufficient, pasteurized human donor milk (HDM) from human milk banks (HMBs) is recommended. South Asian women's knowledge and attitudes towards HDM and HMBs are unknown. To establish HMBs and consequently increase exclusive use of breast milk, an understanding of this is required.

Objectives: To assess maternal knowledge of HMBs, acceptability of HDM, willingness to donate and/or use HDM, and determinants of milk donation and/or use of HDM.

Methods: A cross sectional study was conducted in four tertiary institutions in India using purposive convenience sampling and a structured questionnaire.

Results: 419 women were enrolled. 83.77% were exclusively breastfeeding; with higher rates observed in public institutions (P<0.001). 14.79% had heard of HMBs. 10.3% were aware of HMBs in India. 74.22% were willing to donate milk. 61.57% were willing to use HDM. Altruism was the primary motivator for willingness to donate (72.55%). Fear of milk insufficiency (39.13%) was the primary barrier. Women preferred to donate to family (73.31%) and infants in need (68.17%) rather than HMBs (45.02%). Women preferred to receive milk from family (82.95%) rather than HMBs (54.26%). Main barriers to acceptance of HDM were aversion (37.37%) and convenience of formula (37.37%). Women at private institutions preferred formula to HDM (P<0.001). Women who believed HDM had health benefits (46.54%) were more willing (P<0.001) to donate milk and receive HDM.

Conclusion: Awareness and acceptability of HMBs is poor but the majority had positive attitudes towards HDM. Targeted educational campaigns to promote HMBs are required.

INTRODUCTION

Breast milk is the gold standard for infant feeding. The World Health Organization and pediatric organizations advocate six months of exclusive breastfeeding.[1, 2] Breast milk provides optimal nutrition

and is an effective intervention for reducing neonatal mortality and morbidity. In the event of unavailability or insufficiency of breast milk, pasteurized human donor milk (HDM) from a human milk bank (HMB) is recommended as the next best alternative. Although not the equivalent of breast milk, HDM has been shown to be superior to formula; particularly in terms of reduced incidence of infections, and for the preterm population. HMBs, first established in Vienna in 1909, have since been established globally. HMBs collect, screen, process, store and distribute expressed human milk. [2] India has the highest global burden of preterm births and high neonatal mortality [3, 4] Hence there is an urgent need to increase the availability of HMBs. Furthermore, HDM would also be beneficial to mothers who have delayed onset of breast milk and can hence reduce rates of formula fed infants.

In order to establish a sustainable national network of HMBs, women need to be willing to donate and accept HDM. Although HMBs have long been established in India, maternal awareness and acceptance of HMBs and HDM are unknown.

This study sought to understand maternal perceptions of HMBs and HDM, identify underlying motivations for milk donation, and barriers to acceptance of HDM in women of healthy term infants. This is a crucial first step for successful implementation of public health campaigns to promote HMBs.

MATERIALS AND METHODS

Study design and setting

A cross-sectional study was conducted by purposive and convenience sampling in the postnatal wards of two private and two public tertiary health centers in Hyderabad, India. A pre-validated, structured questionnaire was used. The study was conducted in accordance with the Declaration of Helsinki guidelines. The Hospital Institutional Review Board approved the protocol and all participants gave written informed consent prior to enrolment.

Sample

Women, aged 18-49 years, who had given birth within the past week, and had no history of milk donation or wet nursing, were eligible for inclusion. Exclusion criteria included women who had delivered preterm (<37 weeks of gestation) and cases of neonatal death. A sample size of 420 women was chosen, assuming 50% knowledge of HMBs and accounting for a 10% non-response rate.

Data collection instrument

Based on previous literature, a 21-item, paper based, multiple choice, closed-ended questionnaire was developed. The questionnaire was designed to evaluate

feeding practices, knowledge and attitudes towards HMBs and HDM. Content validation was completed by an expert panel comprised of a pediatrician, neonatologist, obstetrician, statistician, lactation specialist and nutritionist (n=6). The questionnaire was then pilot tested in 60 postpartum women and was found to have good internal reliability (Cronbach's alpha= 0.7). Information on maternal age, education, employment status, parity, religion, type of family unit and number of antenatal visits was collected.

Data collection

The principal investigators trained data collectors to conduct the surveys as private, individual interviews. Patients were recruited from May 2018 to September 2018 in the maternity wards of the four centers.

Data analysis

Continuous variables were reported as means, medians and standard deviations. Categorical variables were reported as counts or percentages. For a comparison between subjects at public and private centers, chi-square test of proportionality or fisher's exact test was used for categorical variables and Welch's two-sample t test was used for continuous variables. Test of association was conducted by Chi-square test of independence or Fisher's exact test. A *p*-value $\leq$ 0.05 was considered to be statistically significant. Analysis of data was conducted using R-Script (version 3.4.1, 2017, R Development Core Team, Vienna, Austria).

RESULTS

Of the 450 women who were approached, 440 agreed to participate. Women who delivered preterm (n=16) and those who did not complete the interview (n=5) were excluded. The final sample size was 419. Socio-demographic characteristics of the participants from public and private health centres are outlined in Table 1.

Breastfeeding practices

Majority of the women (83.77 %, n=351) were exclusively breastfeeding, 2.39 % (n=10) were using formula feeds, and 10.02 % (n=58) were giving a combination of human milk and formula. A significant difference was seen in feeding practices between public and private health centers (P<0.001). A larger percentage of women at the public centers (91.91%, n=193) were exclusively breastfeeding in comparison to those at the private centers (75.59%, n=158).

Knowledge of human milk banks

Knowledge of HMBs and the establishment of HMBs both nationally and locally was poor. Only 14.79 % (n=62) of women were aware of the concept of human milk banking. 10.26 %

(n=43) and 8.83 % (n=37) of all women were aware of the establishment of HMBs in India and Hyderabad respectively. Awareness was significantly higher (P<0.001) in women at the private hospitals (24.88%, n=52) in comparison to those at public hospitals (4.76%, n=10). Women in the private hospitals were significantly more aware of the presence of HMBs in India (P<0.001) and locally in the city of Hyderabad (P<0.001). Of the women who were aware of HMBs, they reported receiving information from health care providers (45.15%, n=28) or the media (50.0%, n=31). The majority reported receiving this information either in the prenatal (35.48%, n=22) or antenatal period (40.32%, n=25).

Attitudes towards milk donation

The willingness of women to donate milk, their preferred recipient of donated milk, the reasons cited for unwillingness to donate milk, and factors that would motivate them to donate are outlined in Table 2.

Attitudes towards the use of donor milk

Willingness to use HDM, feed preference, donor preference and reasons for unwillingness to use HDM are presented in Table 3. A larger percentage of women preferred to use HDM instead of formula in the event of a lack of breast milk. However, a significant difference was observed in milk preferences between women receiving care at public and private hospitals (P<0.001); with the latter expressing a strong preference for formula. In private hospitals 57.89% (n=121) of women preferred formula milk and 30.14% (n=63) preferred donor milk. In comparison, 16.66% (n=35) of women at public hospitals preferred formula milk and 59.05% (n=124) preferred donor milk.

Determinants of willingness to donate milk or accept donated human milk

Of the socio-demographic characteristics, only age played a significant role in willingness to donate milk (P = 0.005). Women aged 25-34 years were more willing to donate milk. No statistical significance was noted between willingness to donate and education, occupation, religion, type of family unit, parity, frequency of antenatal care or center of antenatal care. No statistical significance was noted between willingness to accept HDM and any of the above factors, including age. Women who believed HDM was better for the infant's health (46.54%, n=195) were significantly more willing to both donate their milk (P<0.001) as well as accept HDM (P<0.001). Prior knowledge of HMB played no role in attitudes towards donation or acceptance of HDM.

Table 1: Socio-demographic characteristics (*N*=419)

Characteristic	Public hospitals *n* (%)	Private hospitals *n* (%)
Maternal age		
18-24 years	136 (64.76)	35 (16.75)
25-34 years	65 (30.95)	170 (81.34)
>=35 years	9 (4.29)	4 (1.91)
Education level		
High school or less	185 (88.10)	33 (15.79)
Graduate	20 (9.52)	113 (54.07)
Postgraduate	5 (2.38)	63 (30.14)
Occupation		
Homemaker	187 (89.05)	122 (58.37)
Maternity leave	23 (10.95)	87 (41.63)
Parity		
Primiparous	89 (42.38)	100 (47.85)
Multiparous	121 (57.62)	109 (52.15)
Religion		
Hindu	106 (50.48)	119 (56.94)
Muslim	103 (49.04)	90 (43.06)
Christian	1 (0.48)	0 (0)
Family unit		
Nuclear	155 (73.81)	133 (63.64)
Extended	55 (26.19)	76 (36.36)
Number of antenatal visits		
< 4	6 (2.86)	3 (1.44)
4-8	68 (32.38)	26 (12.44)

Table 2: Women's attitudes towards human milk donation (*N*=419)

Variables	n(%)
Willingness to donate mother's own milk (*N*=419)	
Yes	311 (74.22)
No	46 (10.98)
Undecided	62 (14.79)
Preference for recipient of donated milk (*n*=311)	
Milk bank	140 (45.02)
Family	228 (73.31)
Friends and acquaintances	140 (45.02)
An infant in need	212 (68.17)
Reasons for unwillingness to donate mother's own milk (*n*=46)	
Fear of milk insufficiency for own infant	18 (39.13)
Family will not agree	11 (23.91)
Religious beliefs	7 (15.22)
Cost of equipment and time constraints	5 (10.87)
Travel to donate milk	3 (6.52)
Reasons that would motivate them to donate mother's own milk (*N*=419)	
Knowing an infant will benefit	304 (72.55)
Desire to not waste milk	257 (61.33)
Explanation of benefits of human milk	213 (50.84)
Family support	206 (49.17)
Explanation of process of milk banking	166 (39.62)
Financial compensation	107 (25.54)
Pick up of pumped milk from residence	102 (24.34)
Provision of equipment	100 (23.87)
Establishment of regulations for human milk donation	84 (20.05)

Table 3: Women's attitudes towards the use of donor milk (*N*=419)

Variables	n(%)
Willingness to use donor milk (*N*=419)	
Yes	258 (61.57)
No	99 (23.63)
Undecided	62 (14.79)
Milk preference in absence of mother's own milk	
Donor milk	187 (44.63)
Formula milk	156 (37.23)
Undecided	76 (18.14)
Preference for type of milk donor (*n*=258)	
Milk bank	140 (54.26)
Family	214 (82.95)
Friends and acquaintances	121 (46.89)
Reasons for unwillingness to use donor milk (*n*=99)	
Dislike using another's milk	37 (37.37)
Convenience of formula	37 (37.37)
Risk of infections	29 (29.29)
Family will not agree	17 (17.17)
Donor milk is less nutritious	9 (9.09)
Religious beliefs	8 (8.08)
Fear infant will reject mother's breast later	8 (8.08)

DISCUSSION

In this study, breastfeeding practices, knowledge and views of HMB and HDM were assessed in Indian mothers. High rates of exclusive breastfeeding (EBF) (83.77%) were noted in the sample surveyed; but rates of EBF were suboptimal in the women who received care in private health centers. This is in line with national trends wherein an inverse relationship has been observed between the standard of living index and rates of EBF; perhaps a consequence of easy access to formula.[5, 6] This is in contrast to European countries wherein women living in poverty are less likely to breastfeed.[7] Considering the role of EBF in improved health outcomes, the decline in EBF rates needs to be halted.

HMBs have been established for decades in both India and the city of Hyderabad, but this survey revealed that only a few women were aware of the concept of human milk banking (14.79%) or the existence of HMBs in the country (10.26%). This level of awareness of HMBs is similar to that of women surveyed in Eastern Ethiopia (10%), but outstripped by that seen in Nigerian (25.8%) and Turkish populations (41.6-62.5%).[8-11] Imparting of information by HCPs needs improvement as less than half the women received information from their HCPs. Furthermore, encouragement by HCPs increases donation rates to HMBs.[12] Promotion of HMBs by media sources may be another effective tool in increasing awareness as observed by Ergit et al. who attributed the increased awareness of HMBs in Turkey to increased media focus on HMBs.[10]

Nearly three quarters of the population surveyed was willing to donate their excess milk. Apprehensions of milk insufficiency and resistance from the family were the main barriers to milk donation. Women mostly preferred to donate milk to family members but half the women were also willing to donate to any infant in need, with the majority citing altruism as the primary motivator for milk donation. This is similar to the views of mothers from diverse populations; including women who have donated to milk banks or participated in peer-peer milk sharing.[13-15] Unwillingness to waste milk, a strong belief in the benefits of human milk, and family support were other predominant reasons that women stated would increase their willingness to donate. Hence programs to recruit milk donors should focus on the themes of helping others and the value of breast milk while also involving family members.

Less than half the women (45%) were willing to donate to a HMB; which is higher than rates reported in certain Turkish (9.2%-19.1%), Ethiopian (11%) and Nigerian (39.9%) populations.[8, 10,11,16]

However, it falls short of rates observed in other regions of Turkey (58%-68.8%).[9,17] Unlike women surveyed in Muslim majority countries who did not support HMBs due to concerns of milk kinship; few Muslim women in this population raised religious concerns as a barrier to use HMBs or donate breast milk.[18,9] Respondents in this study were more reluctant to donate to HMBs than family and infants in need. A further evaluation of concerns related to donating to a HMB is required.

Approximately 60% of the population was willing to use donor milk, which was lower than the percentage of women willing to donate milk. Women overwhelmingly preferred to use milk donated by family members rather than HMBs; perhaps because they perceive it to be safer or due to fewer logistical barriers. However, informal milk sharing carries significant risks, as without donor screening and pasteurization, the safety of donor milk cannot be assured. Nearly 40% of the women cited the convenience of formula as an obstacle to the use of HDM; which is a legitimate concern considering the limited supply of and the prioritization of HDM for preterm and sick infants.[2] Another major barrier to the use of HDM was an aversion to the practice of human milk sharing. A further elucidation of the underlying psychology of this discomfort is required before it can be addressed. Unexpectedly, less than a third of the women feared transmission of infections via HDM whereas in prior studies most women expressed safety concerns as an obstacle to the use of HDM.[8,9,11,19]

The authors analyzed factors presumed to affect attitudes towards milk donation and acceptance but found that attitudes were independent of socio-demographic variables, parity and type of antenatal care. This contradicts findings by Katke and Saraoge who found that Indian women with lower parity, income and education were more likely to donate milk.[20] Unlike in previous studies, knowledge of the concept of HDM played no role in increasing willingness to use donor milk.[11, 19] A perception of superior benefits of HDM had a positive effect on the acceptance of HDM in this population. Hence, in the Indian context it is imperative that awareness programs of HMBs should include a thorough explanation of the process; with an emphasis on the benefits and safety of HDM.

The study has several strengths. A large and representative sample was chosen, including women from diverse socioeconomic and religious backgrounds. To the best of the authors' knowledge, this is the first study to assess the perceptions of South Asian mothers with healthy infants towards HMBs and HDM. Since this population is

best suited to donate excess milk, the insight into their views provided by this study is invaluable. The study did have its limitations. The findings may not be generalizable to all South Asian women. As this was not a qualitative study, the barriers and facilitators of milk donation and acceptance, as well as the reason for preference for formula could not be explored in sufficient detail. These areas require further study.

CONCLUSION

In conclusion, there is a dire need to improve awareness and acceptability of HMBs and HDM in the South Asian population. Targeted, community-based public health campaigns involving health care professionals, local government and media which focus on the health benefits and safety of HMBs and pasteurized HDM may improve rates of milk donation and acceptance of HMBs. This would in turn increase rates of human milk donation and facilitate the large-scale establishment of HMBs.

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