Attitude and Views Concerning Human Milk Banking among the Mothers Residing in a Rural Region of Bangladesh

Abstract

Background: Human milk banks play an essential role by providing human milk to infants who would otherwise not be able to receive their own mother's milk.

Study aim: To determine the opinions and attitudes among the possible donor mothers regarding human milk banks in one rural region in Bangladesh.

Methods: A prospective, cross-sectional study following a probability type of stratified cluster sampling technique was used. *N*=121 mothers aged 20-49 years, with at least one child, currently lactating or had breastfed, residing in the rural community of Bangladesh were included in the study. Data were collected through a 21-item close-ended questionnaire and a face-to-face interview conducted by the researcher at participant homes.

Results: Among the participants, 98.3% (*n*=119) said that they hadn't heard about human milk banks before speaking with the researchers. Most participants (71.9%, *n*=87) would obtain human milk from milk banks if necessary. Twenty-eight percent of mothers (*n*=34) indicated that they would not receive milk from a milk bank, even if it was necessary for their children. Only 8.3% (*n*=10) said human milk banks were not appropriate according to Islam and 99.2% (*n*=120) did not know about the acceptance of human milk banking practices in Bangladesh.

Conclusions: For those with religious concerns, a framework for both the donors and recipients can be established. It can be recommended that health education through healthcare personnel (midwives, nurses, gynecologists, pediatricians, and other health professionals) and religious leaders may strengthen the belief and increase awareness among family members about milk banking practices.

Word count= 249

Background

Human milk banks (HMB) are an institution that has been formed as a source of donated human milk (DHM) for infants having inadequate mothers' milk (MM) as prescribed by licensed health care professionals (Abreu et al., 2017). The number of HMBs is increasing to improve health outcomes especially for preterm low birth weight (<1.5 kg) infants (Dritsakou et al., 2016). Researchers argue that MM is more effective than infant formula milk to decrease the development of hospital morbidities including necrotizing enterocolitis (NEC) (Herrmann & Carroll, 2014; Kim et al., 2019), sepsis (Miller et al., 2018), bronchopulmonary dysplasia, severe retinopathy of prematurity (Kim et al., 2019), and better neurodevelopmental outcomes (Belfort, 2017). International organizations (e.g., WHO, UNICEF) have emphasized MM due to the completeness of nutrient values and have highly recommended continuing breastfeeding during the first six months of an infant's life (UNICEF & WHO, 2017). As further suggested, expressed milk from a donor mother or HMB can also be an alternative in case of unavailability of MM (WHO, 2019).

The first human milk bank was established in 1909, in Vienna, Austria, and since then, more than 600 HBM around the world provide donor milk for ill and preterm infants (Green, 2018; Haiden & Ziegler, 2016). A nonprofit association named the Human Milk Banking Association of North America was formed in 1985 to evaluate and maintain the standards for donor milk (Yılmaz et al., 2018). Currently, HMBs are actively functioning across 37 countries as a result of increased awareness and the continuous demand for donor milk except in Muslim countries (Kimani-Murage et al., 2019). Although the Islamic tradition recognizes human milk as an ideal source of nutrition for children, Muslim nations maintain a strategic distance in establishing HMB due to religio-ethical reservations (Alnakshabandi & Fiester, 2016).

Different religions and cultural practices have described the acceptance and recognition of HBM in various ways. In Islam, the donation of human milk is considered a virtue, and breastfeeding is highly encouraged. Numerous verses in the Holy Quran state that mothers should continue to breastfeed their babies for two years from birth. For example, the Muslim Holy prophet Muhammad (*peace be upon him*) was breastfed by a woman named Halimatun Saadiah and stayed with her until the age of 4 years (Ozdemir et al., 2015). In Hinduism, the donation of human milk in the form of milk mothers is considered an integral part of their tradition. The mythological anecdotes tell the stories of Yashoda, the milk mother (human milk donor) of Lord Krishna (Nangia et al., 2018). Further, the sharing of MM is encouraged in Christianity and Buddhism (Hsu et al., 2012).

Nonetheless, Muslims agree that DHM establishes milk kinship. This refers to a relationship between the donor mother (including her offspring) and the recipient during milk sharing. Children of the donor mother and the infant receiving the donor milk are regarded as siblings. In other words, the recipient child would be considered the donor's child. The Holy Quran (An-Nisa 4:23) describes restrictions for marriage as: "Prohibited to you [for marriage] are your mothers, your daughters, your sisters, your father's sisters, your mother's sisters, your brother's daughters, your sister's daughters, your [milk] mothers who have suckled you, their daughters (your foster-sisters)."

A study was conducted among the religious officers in Turkey, where the majority were in favor of the establishment of an HMB within the confinement of a religious verdict (Ozdemir et al., 2015). Additionally, the study revealed that the Turkish religious officers would only approve if the milk pool contained DHM restricted to a maximum of three donors, where the upper limit of the recipients is not more than three infants (Ozdemir et al., 2015).

The International Islamic Fiqh Academy allied with the Organization of Islam Conference has issued a fatwa that "Founding a human milk bank and feeding babies with those donated milk is forbidden in Muslim countries" in 1985 (Yılmaz et al., 2018). The European Council for Fatwa and Research, later on in 2004, has issued a fatwa that "Donated human milk can be used when needed but milk relatives cannot get married" (Caeiro, 2013). The Fatwa indicates religious leaders may take milk kinship into their considerations rather than forbidding milk sharing. In order to use HMB effectively to eliminate problems regarding milk kinship, an accepted religious and cultural approach should be considered in addressing this issue in Muslim countries.

Bangladesh, a Muslim country, is lagging behind the remaining world for setting up and advocating HMB even though the country has high rates of child malnutrition (Corraya, 2020). Religious beliefs, lack of confidence in serological tests, inability to know donors, lack of information about milk donation and staff shortages are some of the associated factors hindering the establishment of HMB in Bangladesh (Gelano et al., 2018). However, the importance of HMB and access to MM or donated MM has been described in recent news reports to avoid stunted growth in newly born children (Engelen & Deutz, 2018). Further, HMB can be promoted by developing a practical framework that is endorsed by general society, especially from Islamic country perspectives.

As the HMB is well accepted in Western societies, this issue should be discussed in Muslim societies, and a practical framework that is endorsed by general society and especially from Islamic country perspectives developed. Given that, our study aimed to determine the opinions and attitudes among the possible donor mothers regarding human milk banks in one rural region in Bangladesh.

Methods

Design

A prospective, cross-sectional, descriptive study was carried out to determine the views and attitudes among potential donor mothers regarding HMB (Karadag et al., 2015). The cross-sectional design was appropriate for this study because it can determine the prevailing characteristics in a population (i.e., demographic characteristics or community attitude) at a certain point in time. Additionally, this type of study usually involves 'one contact' with the study population and is inexpensive (Setia, 2016; Olsen et al., 2010). A probability type of a stratified cluster sampling procedure was employed to select the households for data collection. The stratified cluster sampling procedure is more feasible, requires fewer resources (administrative and travel expenses), and also can determine information about the clusters (Sedgwick, 2013; Wu & Thompson, 2020). This study was approved by Bangladesh Medical Research Council (BMRC), Registration # 06031072018.

Setting

In Bangladesh, the prevalence of exclusive breastfeeding (EBF) has remained largely unchanged for nearly two decades. It was around 45% in 1993–94 and 1999–2000 (Mitra et al., 2015; Mitra et al., 2001), then declined to 42% in 2004 (NIPORT & Macro, 2005) and was 43% in 2007 (NIPORT et al., 2009). However, in 2011, a prevalence of 64% was reported, an increase of 21 percentage points (NIPORT et al., 2011). Moreover, Rana et. al (2020) found very poor knowledge (34.5%) and practices (27.9%) of EBF among rural participants in Bangladesh. Therefore, this study was conducted in a rural community of Bangladesh, located in the Mirzapur sub-district of Tangail district, 60 km north of Dhaka, the capital city where the prevalence of EBF (36%) was lower than the national figure (64%) (Joshi et al., 2014). The majority of the population by religion was Hindu (91.81 %) and Muslim (7.84%). The literacy rate (age 7 and over) was 69.7% (male 71%, female 68.6%) (Bari et al., 2006). The main source of income of the population was agriculture.

Sample

A total of *N*=121 participants were selected. The enrolled mothers mostly stayed at home and were available to participate. The inclusion criteria for this study were limited to mothers of childbearing age between 20-49 years (Islam et al., 2017); having had at least one child; who was currently lactating or had breastfed her child; residing in the selected rural community of Bangladesh and could talk and share their views openly and willing. Exclusion criteria were mothers with mental instability, who did not belong to study age limits, residing outside of the study areas, who were not breastfeeding their child or currently not lactating or not willing to participate.

The rural area of Mirzapur was stratified into four regions. The villages (*N=8*) were selected randomly from each region with the probability of selection proportional to the size of the village, and subsequently, *N*=20 households from each village. The calculated sample size for the main outcome variable, namely attitudes and views deemed sufficient for the questionnaire.

Measurement

A structured questionnaire consisting of 21 closed-ended questions was developed considering previous relevant literature that focused on the participant's cultural practices and beliefs (Supplementary Table 1). The questionnaire was used in order to collect data on the sociodemographic characteristics, attitudes, and views of mothers on milk banking. The sociodemographic (5) questionnaire included age, education, religion, number of children, and feeding status of children, and 16 questions related to mother's opinions (10) and their views (6) about milk banking. The questionnaire was translated into the local language and the quantitative validation included pre-tests incorporating reliability and validity tests as described below.

Forward translation and back-translation process

The questionnaire was first translated from English to Bangla by a bilingual team consisting of a nursing academic and a linguist. The translators came up against a few difficulties in expressing the concept of mother's opinions and views about milk banking in the Bangla context. A committee of experts composed of translators, authors, and the heterogeneous expert group (one nursing academic and one gynecologist) discussed the problematic points of the translation in order to reach a consensus. A synthesis of the two translations was established to obtain a single preliminary version in Bangla and specified that all contents related to attitudes and views were accessible.

Face validity

Second, a pre-test of the questionnaire was performed among 12 mothers with similar characteristics whose responses were not included in the study to check the content validity. Before conducting the interview, the researchers gave them a brief education on HMB and questionnaire contents (6 were related to views and 10 were related to attitudes) to maintain the transparency or relevance of the study. The researchers discussed thoroughly experiences gained from the pre-test evaluation and relevant feedback was incorporated in the final version of the questionnaire. Statistical analysis was not performed.

Data collection

This study was conducted between October and December 2019. The research team explained the study purpose, procedures, confidentiality agreement, and consent to all participants and were informed about the anonymity of the study. Their participation was completely voluntary and written informed consent was obtained from all participants. As most of the study participants had not heard about HMB, appropriate education regarding HMB was needed before initiating the survey. Subsequently, the research team provided a brief description of HMB, the benefits of donating or receiving human milk, and its acceptance in Bangladesh before conducting the survey. The survey took approximately 30

minutes. The data were collected using face-to-face interviewing techniques along with a survey form by the researchers at the participants' homes.

Quality control was an important part of our study; therefore, we prepared an autonomous quality control team. The team generated a variety of summary reports regarding data completeness, outstanding questionable values, and monitoring the quality of field activity. This facilitated the timely identification and resolution of problems in data collection and processing. In this regard, among 5% of all study participants, the quality control team independently checked data collected on the same day at the field center. Detected errors were corrected immediately at the field site. The findings of the quality control team were considered for necessary corrections if any major discrepancies were found.

Confidentiality and privacy of data were ensured following various steps including all hard copies of the filled questionnaires (raw data) were kept in a locked cabinet in the study site office; a soft copy was stored in a specific folder in the computer. Only the research team had access to the documents. Moreover, participants' identity was anonymized through a manual de-coding of their identification number soon after the data collection was completed.

Data analysis

The data were analyzed using the IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp (IBMCorp, 2017). Descriptive statistics and categorical variables were done to see the percentages and frequency.

Results

Demographic characteristics

The mean age of the participants was 26.4 (5.0) years (range: 20-37 years). Most of the participants completed their secondary school certificate (SSC) education, were Muslim by religion, and had one child (Table 1). During the perinatal period, about half of the participants fed only their own milk while the other half fed both their own milk and formula

to their children (Table 1). In terms of education, fewer participants who had completed tertiary level education (graduate and master's completion) fed their own milk (13.2%, *n*=16) than those with intermediate level education (SSC and HSC completion) (35.5%, *n*=43).

Mothers' views on milk banking

Almost all participants had never heard about HMB prior to the introduction given by the researcher (Table 2). After receiving a brief education about HMB, most of the participants agreed to donate their milk for a baby in intensive care even when they are breastfeeding their own child (Table 2). On the other hand, more than one-fourth of participants said they will never receive milk from the milk bank even if their child needs it (Table 2). Almost all participants stated that HMB practice is insupportable in Bangladesh (Table 2). Milk bank becoming widespread was not suitable, because the practice is risky in terms of disease transmission and social context mentioned by more than half of the participants (66.1%, *n*=80). Whereas very few participants mentioned HMB is not appropriate according to Islam or think that if they donate milk their child would be deprived of nutrition. None of the participants had knowledge regarding the processing and storage conditions of donated milk in the milk bank (Table 2).

Mother's attitudes about milk donation

Among the participants, few believed that MM is only beneficial for their own child (Table 3) and they preferred formula rather than donor milk even if their child needed it (Table 3). However, most of the participants thought that the donor and recipient child's age should be the same (Table 3). More than one-fourth of participants (Table 3) believed that the individual characteristics of the donor mother are important to them. However, nearly one-third of participants mentioned they would not feed milk to their babies from a stranger whereas one-fourth of participants said they would donate their milk to a baby whom they did not know. A considerable number of participants said that donor mothers

should get remuneration (Table 3). Almost all of the participants agreed that breastfeeding mothers should be informed about milk banks and supported to donate their milk (Table 3). For human milk banks to be suitable in the Islamic belief, the majority of the participants mentioned that they themselves would donate and use milk once regulations were in place, if there were available information regarding donors and recipients. Nonetheless, nearly two-thirds of participants mentioned that their spouses would never allow them to donate their milk (Table 3).

Discussion

In our study, the majority of participants had never heard about milk banking. Our results correspond to other studies where most of the study population had never heard of milk banking and were unaware of the operational processing of milk banks (Ekşioğlu et al., 2015; Gürol et al., 2014). This situation might be connected to a lack of understanding about milk sharing as well as to the significance of human milk within the mother's social and economic conditions.

The participants' education level has a significant influence on attitudes towards milk banking. Kaur et al. found that the respondents with middle-level education mostly have a neutral attitude towards milk banking (2019). Similarly, breastfeeding is more common among better-educated women from high-income countries than those with low education and who live in low-income countries (Rollins et al., 2016). One of the reasons might be associated with the assumption that the higher the education level for women, the more chances of getting involved in the labor market. As a result, it is possible for working mothers to have less time to feed their own milk to their children regularly.

In Bangladesh, a considerable number of women (approximately 3.6 million) are employed in the readymade garments industry. They usually work for long hours to earn extra money to support their family (Jahan & Rahman, 2018). These garments factories rarely

have day-care facilities to provide care for the employees' children. It is, thus, often difficult for the mothers to go home and feed their child(ren) or be able to express milk at work. As a result, family members are bound to take care of the child, eventually dependent on infant formula. However, the donated milk or HMB has already been found as an effective choice for working mothers who are unable to breastfeed their infants (Gelano et al., 2018).

In line with that, HMB might also be essential for a country where a considerable number of children face difficulties with breastfeeding due to reasons including prematurity and low birthweight. For instance, an estimated 0.6 million out of three million children yearly in Bangladesh are born prematurely with the death of 20,000 infants (Hasan, 2019). Despite the facilities of breastfeeding in all the maternal and childcare hospitals in Bangladesh, HMB is not operational. Moreover, healthcare providers are reluctant to provide adequate counseling, encouragement, and guidance on milk donation (Sultana et al., 2015). Some reasons might include ethical issues (e.g., the donor and the recipient do not know each other), traditional and religious beliefs, and attitudes towards HMB. Several studies conducted in Muslim countries including Bangladesh have similar findings (Ozdemir et al., 2015; Kaur et al., 2019).

The very first attempt to establish HMB in Bangladesh was initiated by the Institute of Child and Mother Health (ICMH) (which did not take place officially) on 1st December 2019 but was banned immediately in the same month with the intervention of a Muslim priest (Sonali, 2019). According to the priest, DHM for babies is a way to dishonor Islamic law (Star, 2019). Haiden & Ziegler, (2016) showed that some of the participants did not support the milk bank emphatically because of the chance of milk sibling weddings. And, from the religious point of view, Islamic scholars said that sharing human milk builds a brotherly relationship that prohibits future marriage between them (Alnakshabandi & Fiester, 2016; Corraya, 2020).

In addition, a predominant belief among mothers is that the personality characteristics of a donor mother can be transferred to a child through donated milk (Lubbe et al., 2019). Therefore, it is important to find an appropriate donor mother who came from similar moral and societal norms of the recipient child. Less than one-third of our study participants agreed that the character qualities of the donor mothers may influence the child. Mothers were more concerned about the safety of donor milk rather than Islamic beliefs and showed interest in milk donation if essential preparation for milk banks is taken following the Islamic laws. A number of participants mentioned they will not offer milk to their child from the women who they did not know, rather they will prefer formula milk if the mother cannot breastfeed. It has been reported that MM stabilizes premature babies and reduces complications rather than formula feeding (Can et al., 2014; Thorley, 2014). In all studies, NEC and feeding intolerance were found to be significantly higher among children with fed formula. Thus, studies support feeding MM to these newborns and recommend donor milk only to the newborns in intensive care units who are premature, or low birth weight and are unable to receive milk from their own mothers (Quigley et al., 2019).

We found a dichotomy in previous studies concerning whether milk donors should get paid. The participants in our study gave positive opinions that milk donors should be paid that correspond to some previous studies (Ekşioğlu et al., 2015; Gürol et al., 2014). Payment options may likewise be considered as an unethical and hazardous practice for mothers giving their milk to milk banks. Mothers may also be constrained to sell their milk instead to take care of their own child because of monetary challenges or household member's greediness (Kimani-Murage et al., 2019). Many donor mothers volunteering their milk. The payment system might be an option for the mother in the circumstance if her child dies (Nangia et al., 2018). However, it might be too early to involve a donor mother in the payment system as there will be potential risks of mishandling. Thus, HMB requires legal support from

governments, especially when considering a Muslim country like Bangladesh. The service should be free of cost rather than money-making in order to mitigate relevant economic challenges to the donor mother and the recipient children.

In order to mitigate these challenges, a Conditional Identified Milk Banking System (CIMBS) can be developed for both donors and recipients in a country like Bangladesh (Alnakshabandi & Fiester, 2016). The CIMBS is outlined to meet the concerns of milk banking raised by Islamic scholars where both the donor's and the recipient's identities are accessible to both families. Therefore, a two steps milk-banking process was proposed to conform to Islamic religious guidelines: first, a donor-recipient database was created so that the donor and the recipient can identify each other, and second, a limited number of donors pool their milk into each lot of milk pasteurized together, constraining the number of kinship connections created through the use of these milk banks (Picaud, 2015).

As the religious tenet of milk kinship is broadly known over the Muslim world, families who donate and receive milk will be aware of the marriage confinements. The ideal number of milk donors who may have their milk pooled together is three to five (Khalil et al., 2016). The peer-to-peer strategy employed in Kuwait, for example, limited the families involved to three. A recent survey of the opinions of Muslim religious scholars in Turkey showed that five donors were considered an acceptable number for milk pooling. Thus, the consequences for the offspring's marriage prospects can be easily overseen without creating a grave burden and over 70% of religious scholars would support milk banking if religious concerns were taken into consideration (Ozdemir et al., 2015).

Notably, results from our study showed that more than one-third of the participants would not get permission from their spouses to donate milk. This can be explained through the predominant patriarchal practices in Bangladesh where the males, generally, retain sole responsibility to make family decisions and enjoy the privilege to speak on behalf of their

wives. Though the explanations behind the milk donation were not addressed; men should step up in expanding their knowledge and affectability. However, in our study, we demonstrated three-fourth of the families give significance to donor milk. With regards to this, family awareness may help to open milk banks. It can be done by involving spouses, families, friends, and healthcare personnel together in the acceptance of milk banking (i.e., milk collection, distribution) (Smith & Iillamo, 2020).

Limitations

This study has several limitations. First, the study was conducted in a rural area of Bangladesh with participants who had at least one child which may not justify the generalizability of our study results. Second, a selection bias may have existed, as all of the participants volunteered to take part in the study. Third, participants did not have a chance to express their own opinion due to the nature of the closed-ended questions. Further studies can be conducted in which the participants would have a chance to express their views. Fourth, in this study, the researcher could not manage to conduct an interview or any other discussion with the religious leaders for their opinions as well as to check the validity which could be more supportive especially in Bangladesh's perspective. Further research may benefit from incorporating this specific group of people.

Conclusions

In conclusion, we found that the participants' greater lack of information on milk banking might be related to their level of knowledge or attitudes towards HMB. However, a majority of the participants showed their interest in donating milk if the regulations are adopted by following the Islamic rules. This indicates a positive environment for developing HMB in Bangladesh. Besides religious concerns, the study participants often raised concerns about disease transmission through the process. Thus, it is important to ensure hygiene when human milk banks are established. We recommend future studies should consider healthcare

personnel (midwives, nurses, gynecologists, pediatricians, and other health professionals) to educate rural mothers about HMB. Further, the incorporation of religious leaders in research may strengthen the belief as well as awareness of family members about milk banking practices.

Conflicting of Interest statement

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