ORIGINAL ARTICLE

Maternal Knowledge, Attitudes, and Cultural-Religious Perceptions Regarding Human Milk Donation and Human Milk Banking: A Cross-Sectional Study among Postpartum Mothers at a Tertiary Care Hospital

Saira Zubair[1], Khurram Fayyaz[2], Anfal Hanan[3], Minahil Fatima[4], Sadia Rehman[5], Sadia Karim[6]

ABSTRACT

Objective: To assess maternal knowledge, attitudes, and cultural-religious perceptions regarding human milk donation and acceptance of donor human milk among postpartum mothers at a tertiary care hospital in Karachi, Pakistan.

Study Design: It was a descriptive cross-sectional study.

Place and Duration of Study: Over the course of six months, October 1, 2025, to March 30, 2026, this study was carried out at Pakistan Naval Ship (PNS) Shifa Hospital in Karachi.

Material and Methods: A total of 375 postpartum mothers with infants younger than six months were enrolled using non-probability consecutive sampling. Data were collected using a standardized interviewer-administered questionnaire covering sociodemographic characteristics, obstetric history, knowledge, attitudes, and cultural-religious perceptions regarding human milk donation and milk banking. Descriptive statistics and Chi-square test were used for data analysis, with $p \leq 0.05$ considered statistically significant.

Results: A total of 375 postpartum mothers participated in the study, with a mean age of 28.73 ± 4.43 years. Awareness of human milk banks was reported by 169 (45.1%) mothers, while 209 (55.7%) believed donor human milk was more nutritious than formula milk. Most participants (321; 85.6%) expressed concerns regarding infection transmission through donor milk, and 342 (91.3%) were aware of the concept of milk kinship (Rada'a). Only 82 (21.9%) mothers were willing to donate breast milk, and 49 (13.1%) were willing to receive donor human milk for their infants, indicating low acceptance despite moderate awareness.

Conclusion: Despite moderate awareness of human milk banking, willingness to donate or receive donor human milk remained low among postpartum mothers. Fears of infection and cultural-religious concerns were the principal barriers to acceptance.

Key Words: *Breast Feeding; Human Milk Banks; Knowledge; Attitude; Mothers; Pakistan.*

Introduction

Breastfeeding is widely recognized as the optimal method of infant feeding, providing complete nutrition and immunological protection essential for healthy growth and development. Human milk contains an ideal balance of macronutrients, micronutrients, bioactive compounds, enzymes, and immunoglobulins that reduce the risk of neonatal infections, improve neurodevelopment, and confer long-term health benefits for both infants and mothers. The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life, followed by continued breastfeeding alongside complementary feeding up to two years of age or beyond.[1] However, breastfeeding may not always be possible because of maternal illness, inadequate milk production, maternal medication use, neonatal separation, or maternal death. In such circumstances, ensuring optimal nutrition for vulnerable infants becomes a significant public health challenge.[2,3] Pasteurized donor human milk is considered the preferred alternative when a mother's own milk is unavailable, particularly for preterm, low-birth-weight, and critically ill neonates. Human milk banks provide a safe mechanism for collecting, screening, pasteurizing, storing, and distributing donated breast milk according to standardized protocols. The use of donor human

[1,2,6]*Department of Pediatrics*
PNS Shifa Hospital, Karachi
[5]*Department of Biochemistry/Medical Students*[3,4]
Bahira University of Health Sciences, Karachi
Correspondence:
Dr. Saira Zubair
Resident Pediatrics Department
PNS Shifa Hospital, Karachi
E-mail: sairazubair94@gmail.com
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milk has been associated with a reduced incidence of necrotizing enterocolitis, late-onset sepsis, feeding intolerance, and other complications commonly encountered in premature infants when compared with formula feeding.[2,3] Consequently, several international organizations recommend donor human milk as the first alternative to maternal milk whenever breastfeeding is not feasible. Despite these established clinical benefits, the successful implementation of human milk banking depends largely on public awareness, parental acceptance, and confidence in the safety of donor milk.[3-5]

Studies conducted in different populations have demonstrated that acceptance of donor human milk is influenced by multiple factors, including educational status, knowledge of human milk banking, perceived risk of infection, cultural beliefs, and trust in healthcare systems.[4,5] Fear of disease transmission, concerns regarding donor screening, and misconceptions regarding the safety of donor human milk continue to limit its acceptance in many communities.[6] Healthcare professionals therefore play a critical role in providing evidence-based counselling to address misconceptions and improve community acceptance of donor milk.

In Muslim-majority countries such as Pakistan, religious and cultural considerations represent additional barriers to the establishment of human milk banks. This concern has generated considerable hesitation regarding donor human milk despite its proven medical benefits.[7] A previous attempt to establish a human milk bank in Pakistan encountered significant religious opposition, highlighting the importance of integrating Islamic principles into milk banking policies.[8] Nevertheless, experiences from countries such as Malaysia and Iran have demonstrated that culturally acceptable human milk banking systems can be successfully implemented by maintaining comprehensive donor-recipient records and involving religious authorities during policy development.[9,10]

Although donor human milk has become an integral component of neonatal care in many countries, evidence regarding maternal knowledge, attitudes, and cultural-religious perceptions toward human milk donation in Pakistan remains limited. Understanding these perceptions is essential for developing culturally appropriate educational interventions, strengthening community awareness, and guiding policies for the safe implementation of human milk banking. Therefore, the present study aimed to assess the knowledge, attitudes, and cultural-religious perceptions regarding human milk donation and human milk banking among postpartum mothers attending a tertiary care hospital in Karachi, Pakistan

Materials and Methods

This cross-sectional study was conducted at the Department of Pediatrics, Pakistan Naval Ship (PNS) Shifa Hospital, Karachi, Pakistan, over a period of six months from 1st October 2025 to 30th March 2026. The study was approved by the Institutional Ethical Review Committee of PNS Shifa Hospital (ERC/2026/PED/94) before the commencement of data collection. Written informed consent was obtained from all participants, and the confidentiality and anonymity of their information were strictly maintained throughout the study.

The study population comprised postpartum mothers attending the postnatal wards and pediatric outpatient department of PNS Shifa Hospital with infants younger than six months of age. Mothers who were willing to participate and provided written informed consent were included in the study. Mothers who declined participation, were unable to communicate effectively, or had incomplete questionnaire responses were excluded from the analysis.

The sample size was calculated using the single population proportion formula, $n = Z^2P(1-P) / d^2$, where $Z = 1.96$ for a 95% confidence level, $P = 73.4\%$ (0.734) based on the awareness of donor human milk banking reported by Tu et al., and $d = 5\%$ (0.05) margin of error.[11] The minimum required sample size was 341 participants. After adding a 10% allowance for non-response, the final sample size was 375 participants. Data were collected using a structured, interviewer-administered questionnaire developed after an extensive review of the published literature. To establish content validity, the questionnaire was reviewed independently by three faculty members with expertise in pediatrics, neonatology, and medical education. Their suggestions regarding wording, clarity, and relevance of the items were incorporated before data collection. A pilot test was conducted among 20 postpartum mothers to ensure

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comprehensibility and feasibility of administration. The pilot participants were excluded from the final study analysis.The questionnaire was administered in a private setting by trained investigators to ensure uniform data collection.

The primary outcome was the willingness of mothers to donate and receive donor human milk. Secondary outcomes included the level of knowledge regarding human milk banking, awareness of milk kinship (Rada'a), perceived safety of donor milk, and factors influencing attitudes toward human milk donation. Responses were initially recorded as Yes, No, or Maybe. For statistical analysis, "No" and "Maybe" responses were combined into a single category because both represented the absence of a definite willingness to donate or receive donor human milk.

Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation, whereas categorical variables were presented as frequencies and percentages. Associations between willingness to donate breast milk and selected sociodemographic, obstetric, and knowledge-related variables were assessed using the Chi-square test. A p-value ≤ 0.05 was considered statistically significant.

Results

A total of 375 postpartum mothers participated in the study, with a mean age of 28.73 ± 4.43 years. The sociodemographic characteristics of the participants, including age, educational status, occupation, monthly family income, and place of residence, are presented in Table I. Obstetric and neonatal characteristics, including parity, mode of delivery, gestational age, and neonatal intensive care unit (NICU) admission, are summarized in Table II.

Knowledge and awareness regarding donor human milk and human milk banking are presented in Table III. Each participant identified a single primary source of information regarding human milk banking, with media being the most frequently reported source among those who were aware of human milk banking. Overall, 45.1% of participants had heard about human milk banks, while 55.7% believed that donor human milk was more nutritious than formula milk. The majority (85.6%) expressed concerns regarding the transmission of infections through donor milk. Awareness regarding breast milk storage was reported by 80.5% of mothers, whereas 91.3% were familiar with the concept of milk kinship (Rada'a). Nearly half (47.5%) had no prior source of information regarding human milk banking.

Table I: Sociodemographic Characteristics of the Participants (n = 375)

Variable	Category	n (%)
Age (years)	20–29	208 (55.5)
	30–39	165 (44.0)
	≥40	2 (0.5)
Educational Status	Primary	71 (18.9)
	Secondary	113 (30.1)
	Higher Secondary	88 (23.5)
	Graduate and above	104 (27.7)
Occupation	Housewife	265 (70.7)
	Employed	110 (29.3)
Socioeconomic Status	Low	67 (17.9)
	Middle	212 (56.5)
	High	96 (25.6)
Place of Residence	Urban	297 (79.2)
	Rural	78 (20.8)

Table II: Obstetric and Neonatal Characteristics of the Participants (n = 375)

Variable	Category	n (%)
Parity	Primiparous	78 (20.8)
	Multiparous	297 (79.2)
Mode of Delivery	Vaginal delivery	156 (41.6)
	Cesarean section	188 (50.1)
	Instrumental delivery	31 (8.3)
Gestational Age	Term (≥37 weeks)	228 (60.8)
	Preterm (<37 weeks)	147 (39.2)
NICU Admission	Yes	165 (44.0)
	No	210 (56.0)

Discussion

The present study assessed the knowledge, awareness, and attitudes of postpartum mothers regarding human milk donation and human milk banking at a tertiary care hospital in Karachi. Although breastfeeding is widely accepted as the optimal source of infant nutrition, awareness and acceptance of donor human milk remained limited among the participants. These findings highlight the need for structured educational initiatives and culturally sensitive policies before the successful implementation of human milk banking in Pakistan.

Table III: Knowledge and Awareness Regarding Human Milk Banking (n = 375)

Variable	Response	n (%)
Aware of human milk bank	Yes	169 (45.1)
	No	206 (54.9)
Donor human milk is considered more nutritious than formula	Yes	209 (55.7)
	No	166 (44.3)
Fear of infection transmission through donor milk	Yes	321 (85.6)
	No	54 (14.4)
Aware of breast milk storage devices	Yes	302 (80.5)
	No	73 (19.5)
Source of information	Media	92 (24.5)
	Healthcare provider	65 (17.3)
	Peers	40 (10.7)
	Not aware	178 (47.5)

In the present study, less than half of the participants (45.1%) were aware of human milk banks. This finding suggests inadequate public awareness regarding donor human milk despite increasing global recognition of its benefits. Similar findings have been reported from Malaysia, where only 55.9% of respondents had prior knowledge of human milk banking, indicating that awareness remains suboptimal even in countries where the concept is more established.[11] Likewise, studies from India have shown that limited knowledge remains one of the principal barriers to the successful establishment and utilization of human milk banks.[12] These observations emphasize the importance of educating mothers during antenatal and postnatal care through healthcare professionals and public health campaigns.

More than half of the mothers (55.7%) believed that donor human milk is more nutritious than infant formula, reflecting a reasonable understanding of the nutritional superiority of human milk. Nevertheless, this knowledge did not translate into a greater willingness to donate or receive donor milk. Similar discrepancies between knowledge and acceptance have been observed in Malaysian and Iranian populations, where participants acknowledged the health benefits of donor milk but remained hesitant because of safety concerns and cultural beliefs.[11,13] This finding indicates that improving knowledge alone may not be sufficient to enhance acceptance unless misconceptions and social concerns are simultaneously addressed.

A notable finding of the present study was that the majority of mothers (85.6%) expressed concern regarding the transmission of infections through donor milk. Similar concerns have consistently been reported in previous studies and represent one of the most frequently cited barriers to donor milk acceptance.[12,13] Mothers often perceive donated milk as a potential source of infectious diseases despite rigorous donor screening, pasteurization, and microbiological quality assurance practiced by accredited human milk banks. These findings highlight the need for healthcare professionals to educate families regarding established safety protocols and quality control measures used in human milk banking.[14,15]

Only 21.9% of participants expressed willingness to donate breast milk, while an even smaller proportion (13.1%) were willing to receive donor human milk for their own infants. These findings are also consistent with the observations of Bhutta et al.[16] in Pakistan, who highlighted that despite the recognized clinical benefits of donor human milk, implementation of human milk banking remains challenging because of limited public awareness, religious concerns, and the absence of an established regulatory framework. These contextual barriers may partly explain the low acceptance observed among mothers in the present study.[16] The lower acceptance observed in the present study may reflect the influence of sociocultural norms, religious considerations, and limited familiarity with human milk banking in Pakistan. Furthermore, approximately half of the participants selected "maybe" when asked about donation and acceptance, suggesting uncertainty rather than outright refusal. This finding indicates that targeted educational interventions could potentially improve acceptance among undecided mothers.

Religious and cultural beliefs remain an important consideration in Muslim-majority countries. Although awareness of the concept of milk kinship (Rada'a) was high among our participants,

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acceptance of donor human milk remained low. Similar findings have been reported from Iran and Malaysia, where concerns regarding milk kinship and Islamic jurisprudence significantly influenced parental attitudes toward donor milk.[13,14,16] Recent qualitative evidence suggests that these concerns can be addressed through transparent donor-recipient documentation, collaboration with religious scholars, and culturally appropriate counselling, thereby improving public confidence without compromising religious principles.[15,16]

The strengths of this study include a relatively large sample of postpartum mothers and the evaluation of both knowledge and attitudes within the local cultural context. However, the study has certain limitations. Being a single-center cross-sectional study, the findings may not be generalizable to all regions of Pakistan. In addition, the use of convenience sampling and self-reported responses may have introduced selection and response bias.

This study has several limitations. As a single-center descriptive cross-sectional study using non-probability consecutive sampling, the findings may not be generalizable to the wider population of postpartum mothers in Pakistan. The interviewer-administered questionnaire may have introduced interviewer and response bias, and although the questionnaire was developed following an extensive review of the literature, it did not undergo formal psychometric validation.

Chi-square test; multivariable logistic regression was not performed to identify independent predictors of willingness to donate or receive donor human milk. Future multicenter studies using validated instruments and multivariable analytical approaches are warranted to provide more robust evidence.

Conclusion

Postpartum mothers demonstrated moderate awareness of human milk banking; however, willingness to donate or receive donor human milk remained low despite recognition of its nutritional benefits. Fear of infection and cultural-religious concerns were the major barriers influencing maternal attitudes. Targeted educational initiatives, engagement of healthcare providers and religious scholars, and culturally sensitive policies are essential to improve knowledge, acceptance, and the safe implementation of human milk banking in Pakistan.

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Conflict of Interest The authors declare no conflict of interest.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.