

A Systematic Review of Muslim Women's Knowledge, Perception and View Toward Breast Milk Donation and Milk Bank

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ABSTRACT

Background: Prematurely born, low birth weight, or sick infants are vulnerable and often do not receive enough breast milk from their mothers. In such cases, donated breast milk from other mothers can be safely stored in a milk bank. However, some Muslim countries have been hesitant to establish milk banks due to religious and ethical concerns. Despite this, a few Muslim nations have established Muslim-friendly milk banks to meet the increasing demand for donated breast milk. Nonetheless, it is unclear whether the Muslim community will fully embrace these efforts. This systematic review aims to gather and appraise evidence on Muslim knowledge, perceptions, and views towards breast milk donation and establishing Muslim-friendly milk banks.

Methods: A systematic search was conducted in Wiley Online Library, Scopus, Science Direct, ProQuest, and EBSCOhost databases using specific search terms and keywords. The search aimed to identify articles published between 2016 and November 2023 that discuss Muslim knowledge, perceptions, and views regarding breastmilk donation, as well as the establishment of Muslim-friendly milk banks. The identified articles were then screened and retrieved.

Results: A total of 2498 articles were initially retrieved out of which only twelve studies met the inclusion criteria and were finally considered for analysis. All the studies were conducted in Middle East countries among Muslim women. The analysis revealed that the majority of Muslim women were not aware of the availability of Muslim-friendly milk banks. They showed reluctance in donating their breast milk due to religious concerns. Moreover, a significant proportion of women expressed their doubts about the endorsement of milk banking due to religious beliefs and concerns regarding the potential transmission of diseases.

Conclusion: Recent studies have shown that there is a lack of awareness regarding Muslim-friendly milk banks, and there are also negative perceptions and views about donating breast milk and setting up milk banks. It is important to provide information that can increase women's confidence and encourage them to participate in breast milk donation and milk bank utilisation.

Keywords: Breast milk; Milk Bank; Muslim; Knowledge; Perception

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INTRODUCTION

Breast milk (BM) has been extensively studied and its benefits for infants are undeniable (1–6). BM reduces infant mortality and morbidity, strengthens their immune system, and is crucial for proper growth and development (1). Islam holds breastfeeding in high regard and considers it an important and virtuous act (7,8). The Quran mentions breastfeeding in several verses, emphasising its significance. For instance, in Surah Al-Baqarah (2:233), it states:

“The mothers shall give such to their offspring for two whole years if the father desires to complete the term. But he shall bear the cost of their food and clothing on equitable terms. No soul shall have a burden laid on it greater than it can bear. No mother shall be treated unfairly on account of her child, nor father on account of his child. An heir shall be chargeable in the same way. If both desire to wean after mutual consent and consultation, there is no blame on them. If you decide on a foster mother for your offspring, there is no blame on you, provided you pay what you offered on equitable terms. Fear Allah and know that Allah sees well what you do.”

There is empirical evidence that in order to optimise the potential health benefits of breast milk, infants must be breastfed exclusively with breast milk for at least the first six months of life (8,9). The World Health Organisation has acknowledged breast milk as the gold standard for infant nutrition, due to its unique composition that meets the specific nutritional needs of infants. As a result, an intensive breastfeeding campaign has been developed globally to promote the practice of exclusive breastfeeding. Unfortunately, not all infants have the opportunity to be breastfed by their biological mothers due to certain circumstances, such as mothers being unable to produce enough milk, delayed milk production, and abandonment (10,11).

According to evidence, breast milk is essential not only for healthy infants but also for vulnerable ones such as premature infants and critically ill newborns who cannot access their mother's milk (MM). This is especially true for infants being treated in newborn intensive care units (NICU) (10). Therefore, one of the interventions to help these vulnerable infants during their hospitalisation is to use pasteurised donated breast milk if the mother is unable to provide her own breast milk.

Donated breast milk (DBM) is the second-best option for providing essential nutrients to vulnerable infants (12).

The World Health Organisation recommends the use of DBM when breastfeeding by the biological mother is not possible. Therefore, establishing a milk bank is a great way to offer donated breast milk as an alternative (13). Milk banks collect, screen, store, process, and dispense DBM to recipient infants under the prescription of licensed healthcare professionals (14). The number of milk banks has increased in recent years, making it easier for infants to receive the nutrition they need (15).

However, this practice is primarily observed in Western countries, such as the United Kingdom, the United States of America, France, Uganda, South Africa, Ethiopia, Brazil, and others (15). Principally, these Western milk banks have two practices. The first practice is anonymous donation, which means that the parents of the recipient infant and the donor do not know each other. This anonymity ensures that there is no emotional attachment or obligation between the two parties. Donors are also guaranteed confidentiality, which encourages more women to donate their breast milk. The second practice is pooling and mixing milk, which ensures that each feed of banked milk contains the milk of several unknown women in unknown proportions (15). This practice is essential because it balances the nutrients in the milk, which is critical for the growth and development of preterm newborns and infants with a very low birth weight (16).

In regard to medical purposes, these banks had significantly improved vulnerable infants' health outcomes, especially for preterm newborns and infants with a very low birth weight (<1,500gm) (10,17). Studies have shown that the quality of donated breast milk is better than infant formula in reducing the incidence of hospital morbidities such as necrotising enterocolitis (NEC) by both preventing and mitigating its severity (10,18–21), sepsis (19), bronchopulmonary dysplasia, and severe retinopathy of prematurity (20–22).

The Muslim community may have concerns and issues with milk banks, especially due to cultural and religious perspectives. Some of

these concerns include donor anonymity, which conflicts with Islamic beliefs regarding lineage and familial connections. In Islamic law, marriage is prohibited between two individuals when certain forms of matrimony are established through milk kinship. Therefore, transparency in identifying donors is preferred among Islamic believers to respect the concept of milk kinship and prevent potential complications arising from the use of DBM, as well as its impact on familial relationships (7,12,23–25).

In addition to the points mentioned earlier, the cultural attitudes of Muslim families also play a significant role in their perspective towards milk banks (23–25). Muslim parents may seek assurance regarding the identity of breast milk donors to ensure that they can trace the origins of the milk and maintain a sense of trust and accountability (15).

Due to these concerns, some Muslim nations such as Kuwait and Malaysia have implemented a 'conditional identified milk banking system' that restricts the number of donors to three for each recipient infant and requires the identity of all recipients and donors to be recorded (7).

However, there is limited knowledge and understanding of Muslim women's views, knowledge, and perceptions regarding milk donation and milk banks. As a result, this systematic review aims to gather and evaluate evidence on Muslim women's attitudes towards breast milk donation and milk banks.

METHODS

On December 15, 2023, a thorough search was conducted using a variety of databases, including Wiley online library, Scopus, Science Direct, ProQuest and EBSCOhost. The focus of the search was to identify articles published between June 1, 2016, to November 30, 2023, that explored the knowledge, perceptions, and views of Muslim women regarding breast milk donation and milk banks. The search utilised a combination of keywords such as ("breast milk" OR "milk, breast" OR "human milk") OR ("milk bank" OR "banks, milk") AND ((knowledge) OR (perception OR "social, perceptions" OR "perceptions, social" OR "perception, social")) AND (Muslim OR Islam) were used **Table 1**. This review was designed according to the PICOS (Participants,

Intervention, Comparison, Outcomes, and Study Design) criteria in **Table 2** and The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (26) as in **Figure 1**.

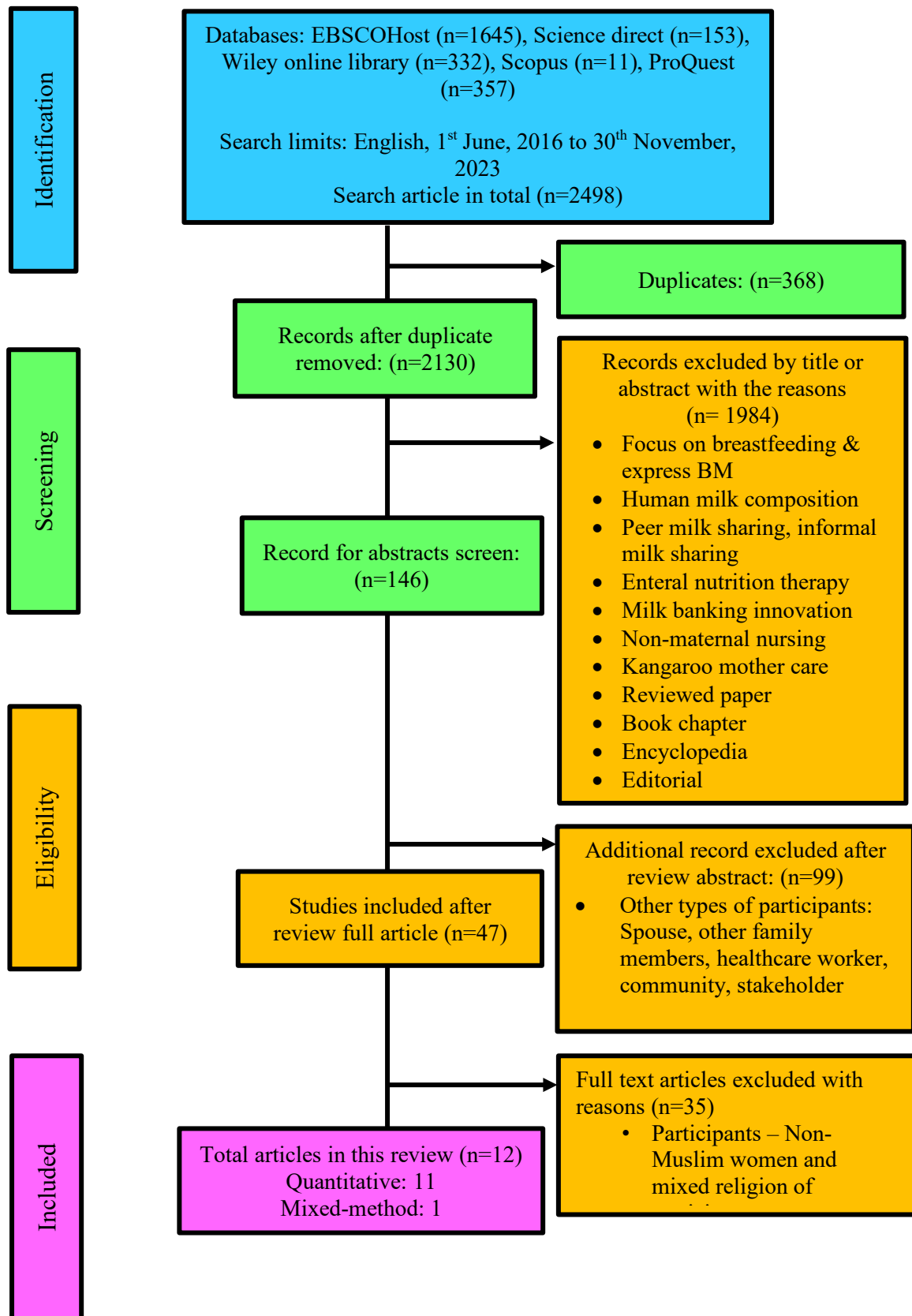
Table 1: Wiley Online Library, Scopus, ScienceDirect, ProQuest and EBSCOHost databases were used search for studies published from 1st June 2016 until 30th November 2023

Keyword	MeSH Terms
Breast milk	Milk, breast; Human milk
Milk bank	Banks, milk
Knowledge	Knowledge
Perception	Social perceptions; perceptions, social; perception, social
Muslim	Islam

Table 2: PICOS criteria employed to design the systematic review

Criteria	Description
Participants	Muslim women
Intervention/ exposure	Breast milk donation and milk bank
Comparison	None
Outcomes	Knowledge, perception and view toward breast milk donation and milk bank
Study design	1. Quantitative – observational study, Randomized controlled trial (RCT), non-RCT, cohort 2. Qualitative study 3. Mixed-method

Figure 1: PRISMA flow diagram



Study Selection and Data Extraction

The aim of the search strategy was to find studies that reported on Muslim women's knowledge, perceptions, and views towards breast milk donation and milk banks. The inclusion criteria for this search were primary studies with randomised controlled trial (RCT), non-RCT, observational cohort, case-control, cross-sectional and qualitative study designs that reported on Muslim women's knowledge, perceptions, and views towards breast milk donation and milk banks. Meanwhile, the exclusion criteria were review articles, conference papers, and dissertations, non-English articles, and studies that are published as only abstracts without full texts.

The database search identified titles and abstracts which were independently screened and reviewed by two authors. Results were then compared, and disagreements were resolved by discussing and consulting with a third author when necessary. The following information was extracted from selected papers: Author(s), year of publication, study setting, study design, study population, sample size, study tools, how the outcomes were assessed, and the result of outcomes (knowledge, perceptions, and views towards breast milk donation and milk banks). Whenever further clarification of the study results or other details were required, the original authors of the paper were contacted.

Assessment of Risk of Bias

The mixed-method appraisal tool (MMAT) was used to evaluate the risk of bias in the selected study (27). The MMAT is a rigorous and comprehensive tool that allows for the appraisal of the methodological quality of five categories of studies: qualitative studies, which focus on subjective experiences and perceptions; randomised controlled trials, which are considered the gold standard for assessing the efficacy of interventions; non-randomised studies, which may include observational studies, case-control studies, or cohort studies; quantitative descriptive studies, which aim to describe a phenomenon or population without intervention; and mixed-methods studies, which use both qualitative and quantitative methods to address research questions.

The MMAT evaluates each study according to criteria specific to its study design. For

example, a randomised controlled trial would be evaluated on the quality of its randomisation method, blinding, and follow-up procedures, while a qualitative study would be evaluated on the credibility of its findings, the transparency of its methods, and the transferability of its results. Each criterion is scored independently by two reviewers, and any discrepancies are resolved through discussion or consultation with a third reviewer. The final score is then used to determine the overall risk of bias in the study, with a lower score indicating a higher risk of bias.

Data Synthesis and Analysis

In the study, the primary measures of the outcomes were calculated using mean, median, and percentage. Additionally, qualitative data was also taken into consideration during the analysis. To provide a clear and concise summary of the findings, the final selected papers were tabulated and then elaborated upon in a narrative that included a detailed synopsis of the main points. This approach helped to ensure that all relevant findings were accurately captured and presented in a manner that was easy for the reader to understand.

RESULTS

At the beginning of the study, 2498 studies were found in the search databases that were potentially relevant. However, after excluding articles that did not meet the inclusion criteria, 99 full texts were analysed. Out of these studies, only twelve met the inclusion criteria. Fifty-two were removed because they involved other types of participants such as spouses, other family members, healthcare workers, community members, and stakeholders. Additionally, 35 studies were removed because they did not focus specifically on Muslim women or reported mixed religious backgrounds. Finally, only twelve (12) studies were included in the analysis, which are listed in **Table 3**.

Study Characteristic

All twelve selected studies were conducted mainly in Turkey, with one each in Syria and Iran. Eleven of the studies used a quantitative design, while one used a mixed-method design. Out of the twelve studies, eight measured knowledge of milk banking, eight evaluated views on milk banks, and one

reported perceptions towards milk donation and milk banks. The quantitative studies (n=11) used questionnaires as data collection tools, administered through face-to-face interviews or self-administered questionnaires (28–38). All of the quantitative studies reported findings using descriptive statistics such as percentages, mean, and median. The mixed-method design incorporated questionnaires in both quantitative and

qualitative approaches, and face-to-face interviews were conducted to obtain subjective data (39). Furthermore, only one study reported the sect of their study subjects, which comprised Hanafi, Shafi, Maliki, and Hanbali (37). It is worth noting that the age of subjects in the twelve studies ranged from 18 to 45 years old. A detailed description of the eleven studies is presented in **Table 3**.

Table 3: Characteristics of the study includes in the final analysis (n=12)

Author	Study design	Study participant	Study outcomes	Study Tools	Analysis	Study Highlighted
Özcan & Oskay, (2017)	Quantitative Descriptive research	(n= 362) women living in Gumushane City	Perception of milk donation	Face-to-face interview using 32-question survey	Percentages, frequency, and mean scores	Negative perceptions focus on religious aspects and problematic issues in the future; fear of infectious diseases that can be transmitted
Ergin & Uzun, (2018)	Quantitative Descriptive research	(n=240) married women aged 15–49 years who had given birth within last 5 years	Knowledge of milk bank	Structured closed-ended Questionnaire	Percentages, frequency, and mean scores	62.5% had information on human milk banks
Kadioğlu et al., (2018)	Population-based and descriptive design.	Purposeful sampling method (n=1055) volunteer women who had at least one child	View on milk bank establishment	A 32-item closed-ended questionnaire Pilot study conducted Cronbach alpha (0.71)	Percentages, frequency, and mean scores	- Milk banking is seen as incompatible with Islamic beliefs - Participants believe the human milk banking project wouldn't get approval in Türkiye
Yılmaz et al., (2018)	Quantitative Descriptive research	Cluster and random sampling (n=614) of lactating mothers.	Knowledge of milk bank	Face-to-face interviews using 33 questions	percentage	- Mothers lack awareness of milk banks and have limited knowledge about their purposes and services - However, the majority of them still view milk banking as an appropriate practice
Can & Ünülü, (2019)	Descriptive cross-sectional study	(n=406) mothers who gave birth in the	Knowledge of milk bank	Face-to-face interview using 32-questionnaire	percentage	3/4 of mothers were unaware of milk banking

Author	Study design	Study participant	Study outcomes	Study Tools	Analysis	Study Highlighted
		maternity wards				As a result, they expressed distrust in breast milk banking and were unwilling to use its benefits
Gurel & Erenel Senturk, (2020)	Quantitative Descriptive research	102 women whose newborns were in the intensive care units	Knowledge of milk bank and view on the establishment	Face-to-face interview, using 32 questions	Frequency, Descriptive statistic	- Most mothers had no information about milk banking - However, many support the establishment of milk banks in Türkiye - The main reason for not supporting milk banks was religious belief
Sahin, (2020)	Quantitative Descriptive research	(n=250) multipara mothers with at least one child aged ≤5 years	View on milk bank establishment	A questionnaire that included 27 questions	Percentage, mean	- A limited number of women know about milk banks, leading to disapproval of their establishment - Lack of awareness mainly due to religious and ethical concerns
Bulut & Hilmiye, (2022)	Quantitative Descriptive research	220 mothers, random sampling method G power analysis used to determine the sample size	Knowledge of milk bank and view on the establishment	39 open-ended Questionnaire	Descriptive statistic	- Most mothers have never heard of milk banks - Lack of awareness leads to their unwillingness to donate or receive services from milk banks
Çelik et al., (2022)	Quantitative study	536 women, random sampling Power analysis used to determine sample size	View on milk bank establishment	Face-to-face interview using 27-Questionnaires	Mean, standard deviation, median (min-max), and percentage	Half of women opposed establishing milk banks due to religious reasons
Gunduz et al., (2023)	Quantitative Descriptive research	303 breastfeeding mothers	Knowledge of milk bank and view on the establishment	20 item questionnaires	Descriptive statistic	More than half of mothers were aware of milk banking and supported donating breast milk
Hosseinadeh et al., (2023)	Cross-sectional descriptive-analytic study	634 mothers of infants below 1 year of age	Knowledge of Iranian Muslim mothers regarding milk donation	A three-part questionnaire was completed through face-to-face interviews	Descriptive statistics Pearson correlation, independent <i>t</i> ,	In Iran, mothers are less aware of human milk banks compared to Western countries due to

Author	Study design	Study participant	Study outcomes	Study Tools	Analysis	Study Highlighted
			and milk banks		and one-way ANOVA	the limited establishment of human milk banks in Islamic countries
Gul & Zengin, (2023)	Mixed method: Convergent parallel mixed-methods design In the quantitative phase: Descriptive and cross-sectional The qualitative phase: Face-to-face interviewing techniques.	415 lactating mothers Quantitative: Convenience sampling using Naing's formula using $\alpha = 0.05$. 19 samples Qualitative: purposive sampling	Knowledge of milk bank and view on the establishment	Quantitative data: 35 item questionnaires Qualitative data: 5 open-ended questions for the interview	Quantitative analysis: Descriptive statistic Qualitative analysis: Framework analysis	- Half of the women were unaware of milk banking, leading to reluctance to donate milk and feeding infants with banked breast milk - Husband's approval influenced women's opinions on milk banking - Religious concerns, commercial gain, hygiene, and perceived decreased nutritional value were significant factors influencing opinions towards milk banking

Quality Appraisal

Twelve studies were assessed using the MMAT rating checklist. It is important to note that only two studies did not receive a "YES" response on the checklist. Gunduz et al.'s study did not specify their sampling strategy, although they provided a rationale for their sample frame (37). On the other hand, Özcan & Oskay's study did not mention whether the questionnaires underwent validation and reliability testing (28). A comprehensive summary of the quality appraisal is shown in **Table 4**.

Knowledge of Milk Banking

Out of the twelve publications that were retrieved, eight studies focused on evaluating the knowledge of Muslim women regarding breast milk donation and milk banks. These studies aimed to understand the level of awareness that Muslim women have about the benefits of breast milk donation and the availability of milk banks.

The researchers conducted surveys and interviews to gather data on the participants' knowledge, attitudes, and beliefs towards these topics. The findings of these studies could potentially help to improve the uptake of breast milk donation and increase the utilisation of milk banks among Muslim women (29,30,32,33,35,36,38,39). The studies that were chosen for analysis were conducted in Turkey, Syria, and Iran. Out of the eight studies, seven were quantitative, and one followed a mixed-method design. Six studies reported that a majority of Muslim women were not aware of milk banking, with the percentage ranging from 67.7% to 95.1% (32, 33, 35, 36, 38). Gunduz et al. revealed that 73.6% of Muslim women did not know whether there were milk banks established in Türkiye (38). Meanwhile, research conducted in Iran indicated that only 12.8% of women knew of milk banks (30). In contrast, a study conducted in Türkiye found that 62.5% of Muslim women were aware of milk banks (29). The discrepancies are probably due to different study settings whereby

Table 4: Summary of quality assessment of the included studies using the mixed-method analysis tools (MMAT)

QUANTITATIVE DESCRIPTIVE STUDY							
Author/Year	Do the collected data allow to address the research questions?	Are there clear research questions ?	Is the sampling strategy relevant to address the research questions?	Is the sample representative of the target population?	Are the measurements appropriate?	Is the risk of non-response bias low?	Is the statistical analysis appropriate to answer the research questions?
1. Gurel & Erenel Senturk, (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Ergin & Uzun, (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3. Sahin, (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4. Kadioğlu et al., (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5. Can & Ünülu, (2019)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6. Yilmaz et al., (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7. Özcan & Oskay, (2017).	Yes	Yes	Yes	Yes	No	Yes	Yes
8. Bulut & Hilmiye, (2022)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9. Çelik et al., (2022).	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10. Gunduz et al., (2023).	Yes	Yes	No	Yes	Yes	Yes	Yes
11. Hosseinzadeh et al., (2023)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MIXED-METHOD STUDY							
Author/ Year	Are there clear research questions ?	Do the collected data allow to address the research questions?	Is there an adequate rationale for using a mixed methods design to address the research questions?	Are the different components of the study effectively integrated to answer the research questions ?	Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?
12. Gul & Zengin, (2023)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Ergin and Uzun conducted the study in Honaz district, Denizli, Türkiye, while Gunduz et al. conducted their study in Ankara (29,38), which is a major urban centre and the second-largest city in Türkiye after Istanbul. Both of the areas are urban, but they differ in terms of their level of urbanisation and size. In a study conducted by Yılmaz et al., it was found that 97.2% of Muslim women lacked knowledge about the purpose and services provided by a milk bank (32).

This study takes place in Kayseri Province, Turkey, an area that combines both urban and rural regions and is often identified as predominantly rural, although it does not strictly fall under the suburban category. The participants in the study had gained knowledge about milk banks from various sources. According to Gul and Zengin, 42.4% of participants knew about milk banks, and they primarily learned about them from the Internet (54.6%) and television (20.4%). Healthcare providers were found to be the source of knowledge for only 13.1% of the participants (39). Bulut and Hilmiye conducted research in the urban setting of Denizli Province's capital (36). However, only a small percentage of participants (10%) were aware of milk banking, despite the urban context. The research found that 87.5% of participants relied on the Internet, while 12.5% obtained information from television as their sources of knowledge about milk banks (36). In contrast to the research undertaken in Iran, most women obtained information from healthcare providers (71.4%), with the Internet and media being the next common sources (20.6%). Interestingly, they also received information from family members (8%), a finding that was not reported in any of the reviewed studies (30). A detailed summary of Muslim women's knowledge of milk banks and milk donation is illustrated in **Table 5**.

Perceptions of Breast Milk Donation

Out of twelve studies reviewed, only one had sought perceptions of milk banking among the Muslim population. The study revealed that 28.7% of the participants supported the idea of milk banking for infant health, while 20.9% supported it for emergency cases. On the other hand, 51.8% of Muslim women were unwilling to donate their breast milk, citing religious concerns as the primary reason for refusal. The potential issues arising from the marriage of individuals who have been breastfed by the

same person were also cited as a significant factor. Additionally, Muslim women believed that the breast milk donation process posed a significant danger of transmitting infectious diseases to recipients (28).

View on the Establishment of Human Milk Bank

Seven out of the twelve publications examined contained information on the opinions of Muslim women regarding milk banks. These studies discovered that anywhere from 25.7% to 76.7% of Muslim women in Turkey did not approve of a milk banking project (31,34,37,38). The primary reason for this disapproval is due to religious beliefs, specifically concerns about the possibility of marriage between individuals who have consumed milk from the same donor (31,34,36-38).

A study conducted by GÜNDÜZ et al. among 303 Muslim women found that 47.1% of them supported the establishment of a milk bank, 25.7% were against it, and 27.3% stated that they did not have complete knowledge of the issue (38). The main reason for objection highlighted the possibility of problems regarding marriage in the future. According to another study, 76.7% of the participants who did not want a milk bank to be established stated that they did not want it because of the risk of disease transmission (37). The same study identified several significant factors that act as barriers to milk bank establishment, including lack of support from husbands, religious concerns, commercial gain, hygiene, and decreased nutritional value (39).

Out of seven studies, only one study showed that a significant number of Muslim women (77.5%) support the establishment of milk banks in Turkey (35). According to ÇELİK et al., 41.5% of women who agreed with the establishment of a milk bank also indicated that they would be willing to use the service of milk banking (37). Another study reported that factors that facilitate the establishment of milk banks include nutrient-rich content, cost-effectiveness, avoiding wastage, satisfaction with helping, and the need for a milk bank (39). They also found that the opinions of the participants were shaped by their husband's approval (39). A detailed summary of the view on milk bank establishment is illustrated in **Table 6**.

Table 5: Studies on Knowledge Regarding Milk Bank (n=8)

Author	Finding Knowledge of Milk Bank
Gurel & Erenel Senturk, (2020)	95.1% of women had no prior knowledge of breast milk banks
Ergin & Uzun, (2018)	62.5% had information on human milk banks
Can & Ünülu, (2019)	73.20% of mothers (n=297) were unaware of Breastmilk Banking 50.70% (n=206) were unwilling to donate their milk due to distrust in milk banking and religious reasons
Yılmaz et al., (2018)	93.6% of mothers had no information about human milk banks 97.2% of mothers did not know the purpose of human milk banks - The majority of mothers were unaware of the milk bank's purpose and services
Bulut & Hilmiye, (2022)	47.4% of mothers are unsure if there is a need for a breastmilk bank 86.1% of mothers had not previously heard of human milk banking 90% of participants were unaware of human milk banking 58.3% of mothers seek information about human milk banking - Source of knowledge: Internet and television
Gul & Zengin, (2023)	- More than half of the participants in the study lacked knowledge about HMB 42.4% had no knowledge about milk banks 57.6% were unaware of milk banks - Information sources for HMB: - Internet: 54.6% - Television: 20.4% - Friends: 13.1%
Gunduz et al., (2023)	67.7% of participants had heard of human milk banks 73.6% stated they were unsure if there were human milk banks in Türkiye
Hosseinzadeh et al., (2023)	12.8% of participants had heard about the milk bank - Information source for HMB - Health center staff: 71.4% - Internet and media: 20.6% - Family members: 8%

Table 6: Studies on View on Establishment of Milk Bank (n=7)

Author	Finding
Gurel & Erenel Senturk, (2020)	77.5% approved the establishment of breastmilk banks in Türkiye - Reasons for not approving the establishment of breastmilk banks were primarily religious beliefs
Sahin, (2020)	40.8% of mothers were against the establishment of HMBs in Türkiye due to religious restrictions 24.4% of mothers approved of obtaining milk from HMBs
Kadıoğlu et al., (2018)	78.6% stated they would not receive support from a human milk bank 46.8% of participants believe it is inappropriate according to Islamic beliefs, as babies are believed to become milk siblings 57.2% of participants think that a human milk banking project would not be approved in Türkiye

Author	Finding
Bulut & Hilmiye, (2022)	• 33.9% of respondents indicated that a milk bank would cause religious problems
Çelik et al., (2022)	• 76.7% (n=133) of participants opposing the establishment of a milk bank cited concerns about the risk of disease transmission • 49.4% (n=86) of participants opposing the establishment of a milk bank cited religious objections • 41.5% of participants who supported establishing a milk bank believed it would have a positive impact • 81.3% of those who agreed with establishing a milk drop center expressed willingness to use it if unable to breastfeed • Regarding the establishment of a milk drop center, 109 (20.3%) participants were undecided
Gul & Zengin, (2023)	• The husband's approval significantly influenced participants' opinions • Barriers toward milk bank establishment included: - Lack of husband support - Religious concerns - Concerns about commercial gain - Hygiene issues - Perceived decreased nutritional value • Facilitators toward establishment included: - Nutrient-rich content of breastmilk - Cost-effectiveness - Preventing waste - Satisfaction derived from helping others - Recognized need for milk banks
Gunduz et al., (2023)	• 47.1% found them not objectionable • 25.7% found them objectionable • 27.3% stated that they did not have complete knowledge of the issue • Objections highlighted concerns about potential future problems regarding marriage

DISCUSSION

This review analysed twelve studies that investigated Muslim women's knowledge, perceptions, and views regarding breast milk donation and milk banks. However, the findings were mixed and inconclusive due to limited research and evidence. The studies were conducted only in Middle Eastern countries, and no research was conducted in Asian countries. Most of the previous research used quantitative methods, and only one study used a mixed-method approach, which reduced the depth of information extracted from Muslim women's views. This study discovered that most Muslim women were not aware of milk banking, indicating a widespread lack of knowledge about this practice. This finding is consistent with previous research, which has found low awareness levels among participants, ranging from 10% to 28.4% (40–43). A similar study conducted in South Africa showed that women in hospitals were more aware of the presence and

benefits of milk banks for infants who couldn't receive breast milk from their biological mothers (44). This suggests that there may be geographical or cultural differences in awareness and perceptions of milk banking.

Furthermore, the review identified a lack of understanding among Muslim women regarding the objectives and services provided by milk banks. This is in line with earlier research by Ellsworth et al., which highlighted participants' limited knowledge about key operational aspects such as the safety of donated breast milk sources and the pasteurisation process (42). This lack of awareness may be due to the relative novelty of milk banks in Muslim nations, leading to a general unfamiliarity with the concept. It was found that people who were aware of milk banks had obtained information from various sources. The primary source of information was the Internet, including social media platforms, followed by

television and healthcare providers. In a study conducted by Tian et al. in China, 40.1% of the participants were familiar with milk banks or donor milk. Survey links were sent to participants through WeChat, which is a social media platform similar to Facebook (43). Various channels, including the Internet, friends, relatives, television, and lactation consultations, helped participants gain awareness of milk banks (42,45,46). In contrast, Iloh et al. found that healthcare providers were the most common source of information about donated breast milk (47). The Internet's ability to rapidly spread information is a key factor in the quick dissemination of important details about milk banks. Moreover, the Internet enables people from different parts of the world to access comprehensive information about milk banks with ease, thus enhancing global accessibility.

According to this review, half of the women were not willing to donate their breast milk. In South Africa and the United States, the participants' limited awareness about milk banks led to misinformation, which reduced their willingness to donate or even contemplate donating milk (42,48). However, a study conducted among pregnant and breastfeeding women in Ethiopia revealed that the participants were not aware of the existence of a milk bank. Despite this, the women were willing to donate and use donated breast milk, driven by the belief that BM has disease-preventing properties (49). This discovery suggests that Muslim women have limited exposure to the functioning of milk banks, with the primary obstacle being a misunderstanding that hinders their willingness to donate.

In a study, it was found that the main reason for refusal of donor milk was due to religious concerns. This was specifically related to the belief that if the same woman nurses an infant, she becomes like the child's mother. As a result, the infant would be considered the child of the milk donor, which could lead to the prohibition of marriage between the donor's offspring and the recipients' children. This was discussed in a scholarly article about establishing a donor milk banking system in a Muslim nation. However, a study conducted in South Africa found that most participants believed that religion and culture would support milk donation (48). This could be due to the insufficient understanding among Muslim women about how Muslim-friendly milk banks operate.

Muslim-friendly milk banks follow a different approach compared to traditional milk banks in the West. In the West, milk from multiple mothers is collected, combined, and pasteurised. However, Muslim-friendly milk banks adhere to Islamic principles regarding milk kinship. This includes ensuring that milk from different women is not mixed. Instead, each woman's milk is collected, stored, and distributed separately. Donors are carefully screened to ensure that the milk meets safety standards, and storage facilities are maintained according to Islamic guidelines. Distribution methods are implemented to prevent mixing, preserving the integrity of each donor's milk. By operating in this manner, Muslim-friendly milk banks uphold the principles of milk kinship while safeguarding the best interests of infants in need of donor milk (15,50).

According to a research study conducted by Kimani-Murage et al., Muslim women expressed concerns regarding the transmission of infectious diseases through the process of breast milk donation. This fear was identified as the main obstacle to women's willingness to donate their breast milk (51). Numerous studies have echoed these results, with participants expressing negative attitudes towards accepting DBM due to concerns about potential infection from the donor (41,44,46,50). This discovery aligns with the results of Gelano et al., who found that women exhibited low acceptance of milk banks primarily because of insufficient information and misunderstandings about the safety of BM (49). Consequently, it becomes crucial to communicate this significant point to participants and incorporate it into the information provided about milk banks, extending the dissemination to the entire community.

According to the analysis, a significant percentage of Muslim women (ranging from 25.7% to 76.7%) believed that a milk banking project would not be approved. The primary reason for this disapproval is due to their religious beliefs. Specifically, they are concerned about the possibility of marriage between individuals who have consumed milk from the same donor. On the other hand, Onat and Karakoç reported that 77.3% of lactating women supported and believed in the necessity of establishing milk banks (41). According to a study, 18.9% of people believed that setting up a milk bank in a Muslim country would be inconvenient for religious reasons. To remove any religious barriers that could potentially

impact the well-known benefits of breastfeeding, it is recommended that relevant government officials involve religious leaders in promoting the concept of donor breast milk. This collaborative effort aims to address any religious biases and improve overall acceptance of the idea (47). Many women who were against the creation of a milk bank cited concerns over the risk of disease transmission as their reason for opposition. This is in line with a previous study that found similar results, where women were hesitant to support milk banks due to perceived risks of disease transmission (52). In addition, there are a few key barriers to establishing a milk bank, such as concerns over commercial gain, hygiene, and the potential decrease in nutritional value. These findings are consistent with several other studies (52,53).

According to a review, only a small number of Muslim women showed support for the establishment of milk banks, considering it a valuable practice. This is consistent with the findings of a study by Kimani-Murage et al., which identified the primary motivation among participants for donating breast milk to milk banks as the desire to save the life of a child in need (51). In line with a study conducted in China, a total of 73.4% of women indicated that they were willing to donate to help other infants (45). There are various reasons why people support the establishment of milk banks. These include the fact that breast milk is rich in nutrients, making it beneficial for babies. Additionally, establishing a milk bank can be cost-effective, and it prevents wastage of breast milk. Many people also find satisfaction in helping others and believe that there is a need for a milk bank. This is consistent with findings from other studies, where people who had an oversupply of breast milk expressed a reluctance to see it go to waste. They also had a strong desire to assist others, reduce costs, and provide nutrient-rich milk to babies (41,52,54). Additionally, Kimani-Murage et al. reported that women's motivation to donate breast milk was primarily altruistic rather than driven by compensation (51).

It has been found that a husband's agreement plays a significant role in shaping the opinions of women who are considering donating or accepting donor breast milk (50). Studies have shown that in the context of Islam, a woman must obtain her husband's permission before deciding to feed breast milk to another person's infant. Additionally, it is essential to secure the consent of the child's father to designate the woman as the child's milk donor. Scholars have elaborated on the prerequisites for being a milk donor, emphasising that the donor must undertake this responsibility

with her husband's approval (55,56). In Islam, milk kinship is permissible, and the milk father needs to understand his responsibilities to avoid any future complications.

This review has many strengths. Firstly, the study was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards. Additionally, the research primarily focuses on Muslim women in the Middle Eastern population, resulting in a lack of studies conducted within specific populations like Malaysia, which has a multiracial ethnicity and religion. Their beliefs and culture may influence their perceptions and views towards breast milk donation and milk banks, which contrasts with the abundance of current studies predominantly from Western countries. Based on this systematic review, none of the examined papers originated from Asian countries, highlighting a significant gap that requires further research. However, a significant limitation of this review was that it only included articles written in English, due to the requirement for translation, which incurs additional expenses.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest concerning this article's research, authorship, and/or publication.

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AUTHOR CONTRIBUTIONS

NANA: drafted the manuscript and contributes to the concept development and design of the article through data collection, analysis and data interpretation for the article.

SMM, NAJ, MAMKB, SH: revised the manuscript critically with intellectual contents and approved the final version of the manuscript.

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