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# Perceptions and experiences related to use of breastmilk from another mother in central Nepal: a qualitative study

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## Abstract

**Background** When maternal breastmilk is unavailable in sufficient quantity for infant needs, the World Health Organization (WHO) recommends the use of donor breastmilk if safe, affordable, and available. However, in Nepal and most other low- and middle-income countries (LMICs), there are significant barriers to accessing safe and affordable donor breastmilk, including a paucity of milk banks. An in-depth understanding of perceptions and experiences in Nepal related to use of donor breastmilk could inform the development of interventions to address identified barriers.

**Methods** From December 2019 to January 2020, we conducted a qualitative study, including focus group discussions (FGDs) with parents and community health workers (CHW), and key informant interviews (KIIs) with public health stakeholders in Dhulikhel municipality, Kavrepalanchowk district in Nepal. In total, 44 individuals participated in five FGDs, including two with mothers, one with fathers, and two with CHW. Nine KIIs were conducted with stakeholders. Thematic analyses of translated transcripts were undertaken to explore perceptions and experiences of participants related to use of human donor breastmilk.

**Results** Participants in this study reported that informal breastmilk sharing between relatives and neighbors is common when a mothers' breastmilk is unavailable or insufficient and such sharing can occur via direct breastfeeding or milk expression. Numerous potential benefits with breastmilk sharing were described, including overcoming initial difficulties with milk supply in the postpartum period, convenience when mothers are unavailable, and reduced risk of infant infection and gastrointestinal distress. Hesitancies to breastmilk sharing included the risk of disease transmission from donor to infant and the possibility of decreased bonding between mother and infant. Some participants stated that animal milk is preferable to breastmilk sharing when mothers own milk is not available.

**Conclusion** Participants were aware of the potential benefits of donor breastmilk but identified numerous barriers to widespread adoption, including concerns about infectious diseases and mother-infant bonding, and preference for animal milks over another mother's milk. Addressing these concerns may help increase the acceptance and practice of donating and using donor breastmilk among mothers in Nepal.

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## Background

Exclusive breastfeeding and breastmilk feeds play vital roles in child survival, allowing children to achieve their optimal health and development [1]. If breastfeeding is not exclusive, malnutrition may occur during infancy. As a result, there is an increased risk of morbidity and mortality, leading to infectious diseases and causing growth impairment and delays in development that can have lifelong impacts [2, 3]. Breastmilk is well-established as the optimal source of nutrition for infants due to its bioactive components essential for developing immune and nervous systems [3]. The World Health Organization (WHO), the American Academy of Pediatrics (AAP), and worldwide medical organizations recommend that infants should be fed exclusively with breastmilk for the first six months of life [1, 4, 5]. However, several factors may prevent mothers from breastfeeding their infants, including inadequate breastmilk supply, mechanical difficulties with breastfeeding, and maternal illness and medical needs [6–8].

If maternal milk is not available, WHO, AAP and United Nations Children's Fund guidelines recommend the use of donor milk when safe, affordable and available [5]. Donor breastmilk has the potential to fill gaps when a mother's breastmilk is unavailable to support exclusive breastfeeding, and could promote exclusive breastfeeding for low birth weight infants who are admitted to the neonatal intensive care unit for extended time periods [3]. Given that a high proportion of mothers with low birth weight and preterm infants experience breastfeeding difficulties [9, 10] or breastfeeding discontinuation before 12 weeks postpartum [3], donated milk could support the initiation and continuation of breastfeeding in these cases, particularly for women with undersupply and with delayed milk production. Despite these potential benefits of donor breast milk, there is a paucity of milk banks or available donor breast milk in most low- and middle-income countries, which have high burdens of neonatal mortality [6].

Nepal is a lower middle-income country that has a high prevalence of infant undernutrition. Overall, 27% of infants are underweight in Nepal, with 36% and 10% experiencing stunting and wasting, respectively [11]. Only 62% of children under the age of six months are exclusively breastfed [12]. For the remainder, the use of infant formula and animal milk is common [13] which may introduce foreign proteins and pathogens into the infant gut, increasing the risk of illness [14, 15]. Although informal breastmilk sharing, defined as exchanging milk among relatives or friends to address a short- or long-term need [16], does exist in Nepal, it is highly dependent on individual circumstances and varies from community to community. Furthermore, there is only one certified donor milk bank in Nepal [17]. While Nepal has guidelines for comprehensive lactation management, establishing lactation management centers, and monitoring and quality assurance [12], strategies are needed for improving the prevalence of exclusive breastfeeding, especially among infants for whom maternal milk is limited or not available. There is little information regarding the perceptions, experiences, and motivations for sharing breastmilk in Nepal or regarding potential concerns about the practice of accepting milk from another lactating mother. Understanding local perceptions and experiences surrounding the use of another mother's milk could inform strategies for increasing access and utilization of screened donor breastmilk via human milk banks. The current study therefore explores local beliefs, perceptions, and experiences related to informal breastmilk sharing practices among parents, CHW, and public health stakeholders in Nepal.

## Methods

We conducted a qualitative study involving focus group discussions and key informant interviews with local stakeholders in Dhulikhel municipality, Kavrepalanchowk district in Nepal which is situated 30 km from the capital city, Kathmandu (Fig. 1). The ethnicities prevalent in Dhulikhel are Newars, Brahmin, Chhetti, Tamang and Dalit [18].

We used a purposive convenience sampling strategy to enroll parents and CHW in separate FGDs and public health stakeholders in KIIs to gather information on beliefs, perceptions, and experiences related to nutrition in early infancy. In total, five FGDs (two with only mothers, one with only fathers and two with only CHW) and nine KIIs were conducted. Parents were eligible for FGD if their child was born in the previous 12 months. CHW and public health stakeholders were eligible if their responsibilities included infant feeding or health. Individuals were excluded from participation if they were less than 18 years or did not speak Nepali or English.

Semi-structured FGD and KII guides were developed in an iterative process and were derived from guides previously used in Guinea-Bissau and Uganda [2] modified for use in Nepal (see Additional file 1 and 2). We conducted interviews in December 2019 and January 2020. The FGD and KII were led by female qualitative researchers with backgrounds in nursing and public health from the Center for Research on Environment, Health and Population Activities (CREHPA), a research organization based in Kathmandu, Nepal, and were attended by additional qualitative researchers from Dhulikhel hospital who took notes in Nepali of verbal and non-verbal responses. FGD and KII participants were queried about beliefs, perceptions, and experiences related to early infant feeding, including breastfeeding, milk expression, donor milk, and other practices, to gain insights into the

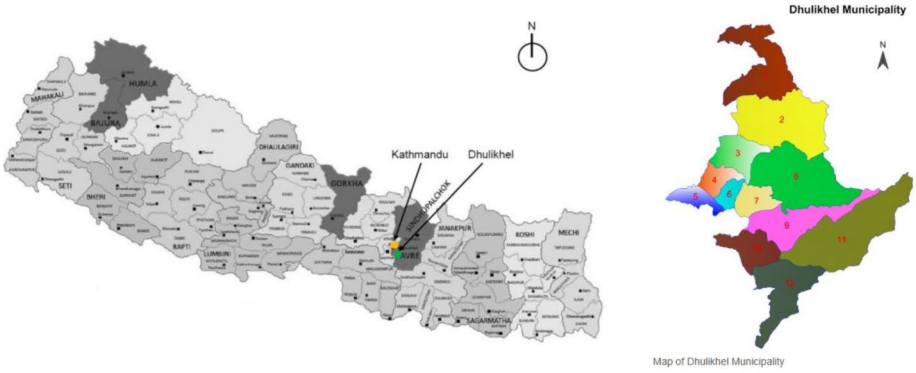


**Fig. 1** Map of Nepal and Dhulikhel municipality

**Table 1** Focus group discussion (FGD) participants

| Group name | Number of participants (mean age and SD in years) |
|---|---|
| Mothers, Group 1 | 8 (23.1 ± 2.4) |
| Mothers, Group 2 | 7 (24.6 ± 5.5) |
| Fathers | 9 (28.3 ± 4.3) |
| Community Health Workers, Group 1 | 10 (33.1 ± 10.6) |
| Community Health Workers, Group 2 | 10 (31.6 ± 5.1) |

barriers and drivers of breastfeeding, human donor milk use, and milk sharing in Nepal.

This study was approved by the Institutional Review Committee of Nepal Health Research Council (Ref. No.1339), the Kathmandu University Institutional Review Committee (KUIRC-256/19), and the University of California, San Francisco Institutional Review Board (18-26956). Informed consent was obtained from each participant prior to participation. FGD and KII sessions were audio-recorded, transcribed verbatim, and placed in a file bearing the interview date, the place, and research questions, with subsequent translation into English for analysis.

Each participant was assigned an alphanumeric code in order to maintain anonymity. All transcripts were de-identified. An experienced research officer first transcribed the audio recordings into Nepali, and these were then translated into English and supplemented with written notes. Accuracy was verified by cross-checking the transcripts against the audio files. We then used an inductive thematic analysis approach to analyze translated transcripts. Familiarization with the narratives was accomplished through repeatedly reviewing the transcripts multiple times. Two coders then created themes from the condensed categories independently. Additional themes emerging during the process through combining multiple codes which were then grouped into categories [19]. An experienced qualitative researcher verified that the themes selected by the coders were true representations of the data collected [3, 20].

**Table 2** Key informant interview (KII) participants

| Key informant | Place of work | Role (if applicable) | Length of interview |
|---|---|---|---|
| Pediatrician 1 | Dhulikhel Hospital | Senior Pediatrician | 60 min |
| Pediatrician 2 | Dhulikhel Hospital | Junior Pediatrician | 53 min |
| Pediatrician 3 | Dhulikhel Hospital | Senior Pediatrician | 42 min |
| Physician | Dhulikhel Primary Health Care Center | Medical Officer | 35 min |
| Municipality Health Officer | Dhulikhel Municipality | Health Coordinator | 38 min |
| Public Health Nurse | District Health Office | - | 39 min |
| Staff Nurse | Family Planning Association Nepal | Senior Nurse | 40 min |
| Non-Governmental Organization | Save the Children | Senior Technical Specialist | 40 min |
| Non-Governmental Organization | We WOMEN | Senior Staff | 40 min |

## Results

In total, 44 individuals participated in five FGD including two with mothers, one with fathers, and two with CHW. In addition, nine key informant interviews were conducted. The summary characteristics of FGD and KII are shown in Tables 1 and 2. The primary themes identified were awareness and knowledge of breastmilk sharing (Theme 1); rationales for engaging in breastmilk sharing (Theme 2); and hesitancies about breastmilk sharing (Theme 3).

### Theme 1: awareness of informal human breastmilk sharing

Participants were generally familiar with informal breastmilk sharing. Both personal and community experiences with the use of another mother's breastmilk were

acknowledged by many participants, while only pediatricians, physicians and nurses were familiar with screened human donor milk in the hospital setting.

#### *Personal experience*

Several participants described their own personal experiences with breastmilk sharing, often alluding to desperation or necessity. One mother noted her worry for her child when disclosing her experience:

> *I was not worried about anything before my childbirth, but after my baby was born, I was worried. My milk was not squeezing out. My baby cries for a whole night out of hunger and so do I. One of the women also had childbirth [and] she fed her breastmilk to my baby. Then tomorrow morning, I fed my baby with [infant formula]. After my breastmilk was not adequate for my baby, I was worried.*

A father described the feeling of having no choice in the matter:

> *My wife does not have sufficient production of milk, so sister told us to give other's milk. We did not have any other choice. So, till now, we are feeding like this.*

A CHW shared a story of when they were asked to be an informal donor, highlighting multiple different personal experiences:

> *It happened to me as well. When my baby was sick and is admitted in hospital, one of the women came to me, asking if she can get some milk to her baby as her baby is sick and is crying excessively. I gave her my milk and she is thankful to me till this date.*

Some also reported that lactating women may breastfeed another infant directly without expressing milk:

> *We have found that after delivery they breastfeed their baby here as much as they can and later [when] they are not able to produce breastmilk then they are breastfeeding their baby from another woman in the neighborhood who is lactating.*
> *In some cases, if some women are not lactating, in the first 2–3 days, some women are not able to produce breastmilk so in such a situation we have found that if there is another mother with a small baby in the neighborhood, they ask to breastfeed their child as well.*

#### *Use in community*

In addition to first-hand experience, participants referenced hearing about breastmilk sharing in the community. It was clear that the majority of participants had at least heard of the practice.

One mother explained:

> *I have seen in this hospital that one woman was lactating more than enough for her baby, so she expressed her milk and fed another's baby as well.*

Another mother in discussion about the topic explained her distant awareness:

> *I heard long ago that one mother was not lactating, so the baby was fed another woman's breastmilk.*

Other CHW together confirmed their awareness of the practice and then described the communal nature of breastmilk sharing:

*There are some who do so when they are not able to produce breastmilk.*

*There is the practice of returning favor in the village. [Everybody laughing]*

*They feed from those mothers who are their relatives.*

Fathers agreed that breastmilk was usually shared between neighbors or mothers in the same village:

> *For baby, in village there is practice of giving milk of another mother who have baby. If not, then we give [infant formula] from bottle.*

Some of the fathers shared information about their perception of the extent of community breastmilk sharing:

*Such practice of feeding [shared] milk will be 5% out of 100.*

> *There will be even less as most of the mother does not want other mother milk to feed their child.*

*If there are own relatives, then they feed.*

#### *Lack of knowledge*

Although knowledge of use of another mother's breastmilk was common, it was not universal. For example, a public health nurse shared:

> *I have not heard about donor milk. The mother would rather give cow or buffalo milk because if a mother had to breastfeed other's baby, then she is also a mother with a baby and she would prefer to feed her own baby instead of others as the milk might not be sufficient for her own baby. So, there is no such practice in this area. Also, in some cases,*

*even if a mother dies during delivery, then the baby is given cow or buffalo milk.*

Interestingly, the pediatricians who participated in KIIs generally did not acknowledge informal milk sharing in the community, and instead focused their comments on more formal processes of human donor milk sharing through the hospital or breastmilk banks. One pediatrician commented:

*This actually in our hospital as well, we have been talking about providing donor milk. Many mothers' breast milk has been kept as substitutes. But this kind of practice is not done much outside [the hospital]. Feeding another mother's breastmilk to the baby is done only with the parent's consent. If a mother is not able to produce breastmilk, we do counselling with the parents, but if the mother is really depressed, then she won't be able to. So, we do screen the milk of the donor mother [and] then only we start it.*

Another pediatrician expressed confusion about the idea, but referenced the formal idea of breastmilk banks:

*I have not heard it by saying donor milk, but I have heard about breastmilk bank.*

#### Theme 2: rationale for using another mother's breastmilk

A major theme that emerged was a need for participants to provide a rationale for breastmilk sharing when discussing its use. Rationales usually included references to the barriers to breastfeeding which needed to be overcome or to using breastmilk as a tool for nourishment.

##### *Overcoming breastfeeding barriers*

Many different barriers experienced by women trying to breastfeed were touched on in these interviews. Common breastfeeding barriers included inadequate breastmilk supply, mechanical difficulties with breastfeeding, and the necessary time commitment of breastfeeding. These were frequently referenced when discussing breastmilk sharing.

##### *Inadequate breastmilk supply/mechanical difficulties*

Mothers talked about their personal experiences with being unable to provide their breastmilk to their child. One mother described both having insufficient milk and an inverted nipple which prevented her from breastfeeding normally. She turned to a family member to provide milk for her infant:

*My milk is not sufficient for my baby. When I have my first daughter, I have inverted nipple, so I have pulled it out with the help of a syringe for a month. So, I was unable to feed the baby properly. So, my sister-in-law, who was also childbearing woman, fed my first daughter. Her baby was 3 months old. I tried to breastfeed my baby, but my milk was not sufficient, so she fed my baby. I also fed [infant formula] to my child in the first month. My nipple got sore after I used the syringe to pull out my nipple. My nipple got so sore that I can't even touch it. That's why my sister-in-law fed her milk and [infant formula] to my baby. My baby only gets to feed little amount of my milk."*

Other mothers similarly shared that problems with sore nipples and milk insufficiency frequently led them to milk sharing:

*I had sore nipple, so my older sister fed my baby at hospital.*

CHW also touched on their experiences working with women in the community who faced such difficulties. One CHW described that women frequently turn to their family members for help:

*Because here we have been counseling mothers. While coming for follow-up next time, some say milk is fully sufficient for the baby and some mothers say that the baby is constantly crying because milk was not sufficient, so she fed the baby aunt's breastmilk.*

Another CHW shed light that some mothers of twins utilize breastmilk sharing if they are worried about milk sufficiency:

*It is the event of just some days ago, one of my relatives gave birth to twins. Then after that while visiting her mother's place, she fed them her relative's breastmilk. Because her milk was not sufficient for both, she fed them her relative's breastmilk.*

##### *Time commitment of breastfeeding*

Breastfeeding can be hugely time-consuming, and when mothers must be away from their children for a period of time due to work or other responsibilities, this also led people to engage in breastmilk sharing.

One of the CHW FGDs had a long discussion about mothers' use of breastmilk sharing as a means to allow flexibility when busy:

*It also occurs because some women don't have free time. One goes to work, and if the baby cries, another feed her own breastmilk….*
*Even while visiting here for immunization, mother doesn't come along with the infant, so if a baby cries, they feed it another mother's breastmilk.*

*That is because the mother was not available at that time. And the other thing is they feed another mother's breastmilk when its own mother's milk is not sufficient.*
*They feed another mother's breastmilk when the mother's breastmilk is not sufficient, the mother is out for work, baby is crying.*
*Usually, they do so when mother is away for work. When there are two small babies in a household, one goes away for work and there is a small baby, then another feeds her breastmilk to the baby.*

Mothers confirmed that breastmilk sharing is a way to overcome the time constraints of breastfeeding. One mother described:

*When I have to go outside, my older sister fed my baby. She feeds my baby whenever my baby cries.*

#### *Breastmilk as nourishment*

Another subtheme of participants' rationales for breastmilk sharing was the ability for breastmilk to feed and nourish an infant. Participants reported that breastmilk sharing was a way to keep infants from starving and commented on its superiority to other alternatives.

One mother stressed the desperation of the act:

*I had fed my eldest daughter in such a way. I was not lactating, so my daughter was starving and crying a lot. So, in order to prevent her from starving, I let my daughter to suckle on my neighbor's. Not much, just for 2 to 4 times.*

Another mother described filling the baby's stomach as a priority:

*It makes baby's stomach full at the time when they might be starving, so I don't think there will be any challenges as such.*

A CHW also commented on this idea of nourishment as a reason for breastmilk sharing:

*Benefits might be that the hungry baby might get to fill his empty stomach and sleep well.*

*The infant doesn't need to stay hungry.*

A staff nurse elaborated on the nutritious value of breastmilk and sharing breastmilk with others:

*I have recently seen such activity on television, where a lady goes to a child organization in the morning and breastfeeds the babies the whole day and comes back home at night. I liked that a lot as that organization has taken babies found on the road as well. And what else might be more nutritious than a mother's breastmilk to those babies. The mother's breastmilk contains the antibodies to fight against the diseases.*

### Theme 3: hesitancies about use of another mother's breastmilk

While participants expressed many reasons for choosing to use breastmilk from another mother, hesitancies about the practice were also elicited. Participants expressed concerns about potential infectious disease transmission, decreased bonding between mother and infant, religious issues and stigma, and the quality of the donor breastmilk provided and its potential incompatibility with mother's breastmilk.

#### Potential for infectious disease transmission

A common fear expressed by both parents and public health workers was that informal breastmilk sharing could lead to disease transmission. A medical officer at a public health care center commented on the risks vs. benefits:

*As the baby gets nutrition, it has both advantages and disadvantages. We have heard about a case while studying. Its advantage is nutrition and disadvantage are that the mother who was breastfeeding other's baby, she might have known or not, but she had diagnosed or undiagnosed HIV, and later it got transmitted to the baby. There are really low chances, but maybe she didn't even take antiretroviral therapy at that time.*

Many others expressed the same sentiment that they feared this possibility. A CHW stated:

*The negative aspect is that if the baby of that another mother is sick, then the baby who is breastfed by that mother might get sick as well.*

Another mother confirmed:

*If any woman is sick, then the disease might get transferred to the baby.*

One father shared how the anxiety around the potential for disease transmission made it much more likely that he would feed his infant animal milks rather than breastmilk sharing:

*They think positive about giving cow's and buffalo's milk. But they may be afraid about spreading other mother's disease to their baby when they allow baby*

*to suck neighbor's milk. For instance, when my wife does not have sufficient breastmilk, at that time if we need to feed other mother milk, then we feel afraid. We become afraid if that mother has any disease, then it may transfer to our baby. So, nothing is said if cow's and buffalo's milk is given.*

A staff nurse also commented about disease transmission from breastmilk sharing:

*In community we might not know what kind of diseases are prevalent in people unless tested. There might also be diseases that might get transferred to babies.*

#### Decreased bonding between mother and infant

Another large hesitation expressed by participants was the potential for lack of bonding between mother and infant. Mothers, fathers, and CHW all shared similar sentiments in their FGD.

One mother noted:

*There might be less attachment between mother and the baby.*

A father further explained how that possibility made him feel:

*I do not like feeding other mother's milk. It is just given to save the life of baby. Mother will have different emotional attachment. When other mother feed, the baby may have less emotional attachment with own mother.*

Another CHW similarly felt a strong fear of decreased connection:

*The bond between the other mother and the baby will be stronger than the bond between the actual mother and the infant. The love between the actual mother and the child might become weak.*

A pediatrician also agreed that the attachment between the mother and child would be decreased:

*The disadvantage is there will be a lack of attachment with one's own mother because the baby is breastfed by another mother, so there is lack of bonding with the actual mother. Like it would have been easier to give [Kangaroo Mother Care (KMC)] if breastfeeding is done by the actual mother. If the other mother is breastfeeding the baby like her own, then KMC can be given to that mother. There are no other particular disadvantages.*

#### Stigmas and religious issues associated with sharing breastmilk

Most of the respondents including health professionals believed that there might be stigmas and health issues associated with shared milk.

*Women were scolded by saying "there might be challenges occurs while feeding other women's breastmilk. There might be less attachment between mother and the baby and the kuldeuta (favorite god of the house) gets angry [for breastmilk sharing] and will stop to give blessings with upcoming generations and family will become less auspicious."*

*Women were scolded by saying there is difference in the milk of older baby's mother's milk and newborn baby's mother milk. It is difficult for the baby to digest that milk.*

*There might be health issues [associated with shared breastmilk], because in a community we might not know what kind of diseases are prevalent in people [lactating mother] unless tested. There might also be diseases that might transfer to babies. If some mothers have any kind of disease, then it might get transmitted to the baby as well.*

#### Incompatibility between donor and mother's breastmilk

Another subtheme that emerged was hesitancy around the quality or incompatibility between donor and mother's breastmilk. Comments were made about the age of the donor mother's child compared to the age of the receiving mother's child or the misalignment of the two mothers' diets.

One FGD of mothers elicited a nuanced conversation about the topic:

*I think the women who have older babies, their milk also gets older and when we feed those women's milk, our baby cannot fully digest the milk and might get stomachache.*

*Some of the women eat spicy foods, so it might affect the baby's stomach.*

*After feeding other women's milk, our baby might refuse to take our milk.*

*If other women's baby is also small, it might not cause problem, but if the other women's baby is older, they might have taken spicy foods which might cause stomach upset in babies. We had some food restrictions.*

A CHW also commented on the difference between breastmilk:

*Women were scolded by saying there is difference in the milk of older baby's mother's milk and newborn baby's mother milk. It is difficult for the baby to digest that milk.*

The sharing of milk by someone who had a miscarriage was also frowned upon in the community. Another CHW described:

*One of the women who had miscarriage and she was staying at home, and another woman who has small baby went to work, so her baby was crying excessively. So, she fed her milk to the crying baby but the other people in the neighborhood heard about it and start a fight. The mother-in-law scolded the mother, saying why you are giving the milk of a woman who recently had a miscarriage. That is why community people are afraid to give other women milk.*

Furthermore, there was worry that if a mother donated some of her breastmilk to another's child, there would be inadequate breastmilk left for her own child. A public health nurse commented:

*It is a good deed if we see it from a help point of view, but if a mother shares the breastmilk, then it won't be sufficient for two babies because at least one baby would get [in] sufficient breastmilk, so I don't like such feeding practice.*

A CHW also worried about the same scarcity:

*And also, while breastfeeding another mother's baby, the breastmilk might not be sufficient for her own baby.*

Another CHW added the advice:

*If the mother is doing exclusive breastfeeding and also breastfeeding another mother's baby as well then, her own baby is being discouraged from exclusive breastfeeding.*

## Discussion

To our knowledge, this is the first study about the perceptions and experiences among parents, CHW, and public health stakeholders related to use of breastmilk from another mother and informal milk sharing in central Nepal. We found that informal breastmilk sharing between relatives and neighbors is common in the study areas when a mother's milk is unavailable or insufficient, while use of banked human donor milk was uncommon. Major themes identified include awareness and knowledge of breastmilk sharing, rationales for engaging in breastmilk sharing, and hesitancies concerning breastmilk sharing. Reported concerns about breastmilk sharing included fear of potential for infectious disease transmission and other potential risks, concern regarding the possibility of decreased bonding between mother and infant, and incompatibility between the donor's and the mother's breastmilk. However, breastmilk sharing was also perceived as having great potential for benefit, providing a path to exclusive breastfeeding for infants whose mother's milk was unavailable or insufficient.

Our findings regarding familiarity with human breastmilk sharing contrast with the strong stigmas against human breastmilk sharing noted in other settings such as Nigeria [21], Uganda [2, 22], and the United States [23], and highlight the importance of considering the local context [6, 8, 21, 23, 24]. Since informal breastmilk sharing is already a familiar practice in some of the settings of our study, educational interventions regarding infant feeding in Nepal should including supporting mothers and families to make informed choices by discussing the risks and benefits of informal breastmilk sharing and the possibility of using banked donor milk. As recommended by the American Academy of Pediatrics and other worldwide medical organizations, healthcare providers and CHWs can advise on medical screening of donors for illnesses and safe milk handling practices to maximize the safety of community-based breastmilk sharing practices [1, 16, 25].

While addressing barriers to human donor breastmilk acceptability, also important is the need to address barriers to breastmilk donation. One barrier to breastmilk sharing identified in our study is the societal stigma in Nepal against the use of another mother's breastmilk following her miscarriage or stillbirth. An educational campaign supporting donor breastmilk use that addresses both donation and receipt would have the potential to motivate parents and communities so that women who have abundant breastmilk supply donate their breastmilk and women who have less can receive breastmilk, if needed and chosen. An established theory, such as the health belief model, which addresses an individual's perception of the threat posed by a problem and the factors that influence their decisions, such as for breastmilk sharing, could guide future development of context-specific educational interventions to help parents make choices about infant feeding [26]. In addition, to allay some of the stigma and fear of breastmilk sharing, human breastmilk banks could be certified and regulated by an existing governmental authority that would help instill confidence in the milk-screening process. This process has been practiced in Ghana and could be replicated in Nepal [3].

Our study has several limitations including its exploratory study design, convenience sampling strategy, and lack of generalizability. The study was conducted in a

single Asian country, Nepal, which limits the generalizability of our findings to other Asian countries or other LMIC settings. Our context-specific findings cannot even necessarily be generalized to the rest of Nepal. Furthermore, due to the qualitative nature of this study, we are not able to provide estimates of the prevalence of breastmilk sharing and we are unable to support a determination of a causal relationship between reported barriers to breastfeeding and breastmilk sharing. Finally, not all FGD participants were able to answer all open-ended questions, due to the nature of the group discussions. Nonetheless, our study findings open a discussion with the policymakers and health workers to leverage the development of safer alternatives for infant feeding by establishing human milk banks that could feed low birthweight neonates, preterm infants, and those with insufficient milk supply or delayed lactation experiences, potentially leading to reduced neonatal mortality [3] in Nepal.

Future research could evaluate effective health communication strategies that promote safer breastmilk sharing among Nepalese lactating women and explore stigmas related to miscarriage and stillbirth, as both demand and supply need to be increased for human milk banks to be successful. In addition, further exploration of the mechanism for providing adequate training and education to healthcare providers and CHWs for safe breastmilk sharing processes is needed, as these groups have major roles in shaping lactating mothers' and communities' beliefs, perceptions and attitudes toward human breastmilk sharing. Obtaining an in-depth understanding of the beliefs, socio-cultural factors and stigmas from the viewpoints of fathers, mothers-in-law, grandmothers, traditional healers, and community leaders would also be helpful, because these individuals might pose obstacles or be facilitators to potential breastmilk donation and human milk banking. Such assessments will help inform decisions by policymakers and stakeholders regarding existing gaps of human milk banking that need to be addressed in order to provide safer channels for milk donation.

## Conclusions

Although informal breastmilk sharing is common in Nepal, cultural, social and health concerns appear to limit both acceptance and availability. Engaging with a variety of community stakeholders to provide education and address concerns regarding the benefits of human milk sharing through a formal milk bank may increase the acceptability of the concept. There is the need to establish formal and safer channels of breastmilk sharing through human milk banking systems. Healthcare providers can help pregnant and lactating mothers and families make informed choices about infant nutrition and can also educate mothers about safe breast milk storage and the benefits of donating excess breastmilk though safer sharing practices. In this way, it might be possible to help increase the availability and acceptance of formal breastmilk sharing while perhaps also increasing donations to human milk banks in Nepal. Use of certified human milk banks will improve newborn outcomes and help save lives of Nepal's most vulnerable neonates and infants.

## Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13006-025-00706-8.

Supplementary Material 1

Supplementary Material 2

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### Author contributions

A.S. coordinated the field work, assisted in data collection, supervised research assistants, performed analysis under the supervision of VF, ASG, and SD and drafted the manuscript. N.G. performed the analysis and drafted the manuscript. ASG helped design the study and critically reviewed and revised the manuscript. VL and SG provided administrative and technical support, participated in data analysis and critically reviewed and revised the manuscript. VF conceptualized and designed the study, provided administrative and technical support, participated in data analysis and critically reviewed and revised the manuscript. MCP including his team collected the data, conducted focus group discussions, key informant interviews and critically reviewed the manuscript. SD coordinated the field work, assisted in data collection, supervised research assistants, performed analysis helped for drafting the manuscript. All listed authors contributed to the study design. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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### Data availability

The data analyzed for this study are not publicly available, however the data are available from the corresponding author upon reasonable request and signature of a mutual agreement.

## Declarations

### Ethics approval and consent to participate

This study was approved by the Institutional Review Committee of Nepal Health Research Council (15th December 2019, Ref. No.1339), Kathmandu University Institutional Review Committee (19th December 2019, KUIRC-256/19), and the University of California, San Francisco Institutional Review Board (18-26956). Informed consent was obtained from all participants before participation. Focus group discussions and key informant interview sessions were audio-recorded, transcribed verbatim, and placed in a file bearing the interview date, the place, and the research questions, with subsequent translation into English for analysis.

**Consent for publication**
Not applicable.

**Competing interests**
The authors declare no competing interests.

**Conflict of interest**
The authors declare no conflict of interests.

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