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Awareness and acceptability of donor human milk banking among women in Dar es Salaam Tanzania: A cross sectional study

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Background: Breast milk is the optimal food for all infants in the first months of life. Breastfeeding promotion is crucial in reducing neonatal mortality. World Health Organization recommends donor breast milk as the best alternative when mothers' milk is unavailable. Establishing human milk banks in Africa poses a big challenge due to a lack of awareness about donor milk and existence cultural and religious beliefs. This study assessed awareness and acceptability of donor human milk banking.
Methods: A cross-sectional study was conducted at Muhimbili National Hospital between July 2019 and October 2021. Five hundred-and sixty-two-women receiving care at Muhimbili National Hospital - Upanga, and its branch in Mlongazila were recruited. A pretested data collection form was used to collect information from women and was analyzed using SPSS window version 20.
Results: Four hundred and eighty-six women (86.48%) agreed to donate and 469 (83.45%) agreed to use donor breast milk. Three hundred and fourteen (66.95%) accepted donor human milk banking due to the health benefits of breast milk and 155 (33.05%) due to safety of breast milk. Most participants 495(88%) had never heard of milk donation for banking.
Conclusion: Although community awareness of donor human milk bank is low, acceptance of donor breast milk for use and for banking was high indicating community readiness to utilize Human Milk Banking services.

Keywords: Breastfeeding, Donor Breast Milk, Human Milk Bank, Dar es Salaam, Tanzania.

Résumé: *Contexte:* Le lait maternel est l'aliment optimal pour tous les nourrissons au cours des premiers mois de leur vie. La promotion de l'allaitement maternel est essentielle pour réduire la mortalité néonatale. L'Organisation mondiale de la santé recommande le lait maternel de donneuses comme meilleure alternative lorsque le lait maternel n'est pas disponible. La création de banques de lait humain en Afrique constitue un défi de taille en raison de la méconnaissance du lait de donneuses et de l'existence de croyances culturelles et religieuses. Cette étude a évalué la sensibilisation et l'acceptabilité des banques de lait humain de donneuses.
Méthodes: Une étude transversale a été menée à l'hôpital national de Muhimbili entre juillet 2019 et octobre 2021. Cinq cent soixante-deux femmes recevant des soins à l'hôpital national Muhimbili d'Upanga et à son annexe de Mlongazila ont été recrutées. Un formulaire de collecte de données pré-testé a été utilisé pour recueillir des informations auprès des femmes et a été analysé à l'aide de SPSS version 20.
Résultats: Quatre cent quatre-vingt-six femmes (86,48%) ont accepté de faire un don et 469 (83,45%) ont accepté d'utiliser du lait maternel de donneuses. Trois cent quatorze (66,95 %) ont accepté la banque de lait humain en raison des avantages du lait maternel pour la santé et 155 (33,05 %) en raison de la sécurité du lait maternel. La plupart des participantes, 495 (88%), n'avaient jamais entendu parler du don de lait pour la mise en banque.

Conclusion: Bien que la communauté soit peu sensibilisée aux banques de lait humain, l'acceptation du lait maternel de donneuses pour l'utilisation et la mise en banque est élevée, ce qui indique que la communauté est prête à utiliser les services de banques de lait humain.

Mots-clés: Allaitement, lait maternel de donneuse, banque de lait humain, Dar es Salaam, Tanzanie

Introduction

Despite progress made to reduce childhood mortality worldwide, neonatal mortality is still alarmingly high, making the neonatal period the most vulnerable time for children. In Tanzania, approximately 43,000 newborn deaths are recorded annually (neonatal mortality rate of 24 per 1000 live births), despite many interventions undertaken by the Ministry of Health during the past 2 decades.[1,2] Prematurity and low birth weight contribute to 27% of neonatal deaths and most occur within 24 hours of life.[3] Further efforts are required to reduce neonatal mortality to 12 per 1000 live births by 2030 as required by the Sustainable Development Plan.[4] Breastfeeding promotion is crucial in reducing neonatal mortality due to the benefits of breast milk in infection prevention, growth, and neuro-development especially in premature babies [5–7].

Breast milk is considered the best natural form of food in the first month of life.[8–10] It is recommended as the first choice, but when not available due to maternal illness, death, or inadequate breast milk; donated breast milk is the second-best option .[11] Donated milk must be safe and processed in a human milk bank (HMB). Human milk banking is the process by which donated human milk undergoes screening, pasteurization, and then stored for use by other babies.[12]

Donor breast milk provides the best alternative nutrition and provides protection to premature and sick hospitalized babies.[13] It is evident that donor human milk as opposed to formula milk decreases the risk, incidence, and severity of Necrotizing enterocolitis.[14–17]. Despite the process of pasteurization in human milk banking, most breast milk bioactive and immunological factors are preserved making it the best alternative to breastfeeding .[18]

Tanzania has not yet established a Human milk bank, but the Ministry of Health supports the use of donor milk as a strategy to emphasize the policy of exclusive breastfeeding. The practice of wet nursing, which was common in African countries including Tanzania, is currently discouraged due to the risk of disease transmission. Establishing Human milk banks in Africa poses a big challenge due to the lack of awareness and the existence of strong cultural and religious beliefs.[19–22] Studies on HMB have shown variable acceptability results in Africa thus local studies on acceptability are crucial. In a study done in Kenya on the perception of HMB, only a quarter of the participants ever heard of HMB.[23] In Nigeria, higher acceptability was found where 60% of mothers were willing to receive donor milk if the need arose.[22]
The acceptance of using donor milk is low due to a lack of information about the safety of donor milk[19] In South Africa; significant changes in mothers' knowledge and perception of donor milk safety were noted after education and training. [24] Other factors associated with the acceptability of HMB include religious and cultural concerns.[25]
For society to accept milk, banks there is a need to create awareness in order to alleviate safety fears that might exist due to previous campaigns against traditional milk sharing. This study assessed the awareness, and acceptability of HMB and factors associated with mother's willingness to donate or use donor breast milk in Dar es Salaam, Tanzania.

Methods and materials

Study design and area

July 2019 to October 2021, a descriptive cross-sectional study was conducted at Muhimbili National Hospital, in Dar es Salaam, Tanzania. Dar es Salaam is the biggest city in Tanzania with approximately 7million population according to the 2022 National Bureau of Statistics (NBS).[30] MNH is a national tertiary, and university teaching hospital with level III neonatal intensive care services. It receives patients including pregnant women and newborns from all regional referral hospitals in Dar es Salaam and from other neighboring regions in the country. MNH has two campuses: MNH Upanga and MNH Mloganzila. MNH Upanga has 1,500-bed capacity, attending an average number of 5000 deliveries per year. Mloganzila has a bed capacity of 571 and has an average of 1800 annual deliveries. MNH conducts high-risk deliveries and offer antenatal care services to pregnant women with complications who are referred from different parts of Dar es Salaam and its neighboring regions.

Study population

Women attending antenatal care clinic (ANC) and those receiving postnatal care (PNC) at the two hospitals during the time of the study were recruited consecutively.
Inclusion criteria: Breastfeeding mothers and pregnant women who were receiving care at MNH at the time of the study.
Exclusion criteria: Mothers who were sick and those who refused to consent.

Sample size and sampling

The sample size for the survey was estimated using the single population proportion formula using acceptability of 60% that was found in Nigeria.[22]

$N = \frac{Z^2P(1-P)}{E^2}$

Where:
Z=confidence interval used 95% CI of 1.96
P=Acceptability of donor human milk of 60% found in Nigeria.
E=Margin of error for this study is 0.05
N=Minimum sample size was 553.
Sample size was divided equally between the two hospitals for convenience. This study enrolled 562 women (281 from each hospital)

Data collection tool, procedures, and analysis

A structured pre-tested questionnaire was used for data collection, and trained research assistants administered it. The questionnaire contained sections on demographic characteristics, breastfeeding and breastfeeding challenges, acceptability and factors associated with acceptability. Women were enrolled consecutively until the desired number was achieved. Collected data was then checked for accuracy and completeness and then entered in Microsoft Excel. The SPSS window version 20 was used to analyze data. Categorical data were summarized as numbers and percentages, and continuous data as means and standard deviations (SD) or medians and interquartile ranges (IQR), as appropriate. A chi-square test was used to test for the association between the independent and the dependent variables. Bivariate and multivariate logistic regression was used to determine the associated factors and control for confounding.
A *p*-value of less than 0.05 was considered statistically significant.

Results

Socio-demographic characteristics

Out of the 562 mothers involved, 280 (49.8%), 196 (38.1%), and 86 (15.3%) were of age group 26-35 years, 15-25 years and > 35 years respectively. 487 (86.6%) surveyed participants were married and 551 (98.0%) were had formal education.

Participants Clinical Characteristics

Majority of women; 559 (99.5%) had attended Antenatal Care (ANC) and about 513(91.28%) gave birth at a health facility. Only 384 (68.3%) of mothers attending ANC and 410 (73.0%) attending postnatal visits received breastfeeding counselling. 190(33.8%) of mothers reported having breastfeeding difficulties, and the most common reason for breastfeeding challenges was inadequate milk production(74.9%). (Table 1)

Table 1: Clinical characteristics of participants at Muhimbili National Hospital Upanga and its branch Mloganzila

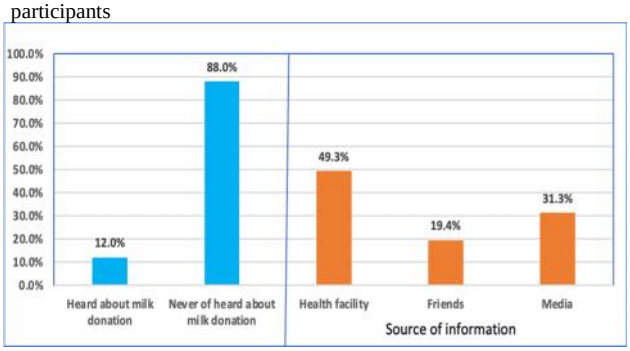
Variables	Label	Frequency	Percentage (%)
Antenatal Clinic visits	Yes	559	99.47
	No	3	0.53
Place of delivery	Home	5	0.89
	Health center	513	91.28
	Still pregnant	44	7.83
Counseled on breastfeeding at Antenatal	Yes	384	68.33
Clinic visits	No	178	31.67
Counseled on breastfeeding at Postnatal	Yes	410	72.95
Clinic visits	No	152	27.05
Ever experienced breastfeeding difficulties	Yes	190	33.81
	No	372	66.19
Breastfeeding difficulties	Reported	179	94.21
	Not reported	11	5.79
Reason for BF difficulties	Sick mother	19	10.61
	Breast problem	26	14.53
	Inadequate milk production	134	74.86
Alternative feeding plans used in case of	Warm water	11	1.96
breastfeeding difficulties	Cow milk	28	4.98
	Formula milk	326	58.01
	Soft food	51	9.07
	Others	146	25.98
Currently breastfeeding	Yes	405	72.06
	No	157	27.94

BF, breastfeeding

Awareness of human milk banking

In this study, 67(12%) reported having ever heard of HMB while 495(88%) had never heard of milk donation for banking. The most reported source of information about milk donation for banking was health facility 33 (49.25%) followed by media 21 (31.34%) and from friends 13 (19.40%). (Figure 1)

Fig 1: Awareness of human milk banking among study participants



Acceptability of donor breast milk

Four hundred and eighty six (86.48%) women agreed they could donate and 469 (83.45%) agreed to use donor breast milk. The acceptance of donor HMB was due to the health benefits of breast milk 314 (66.95%) followed by the safety of breast milk 155 (33.05%). (Table 2)

Table 2: Acceptance of donor human milk banking among women attending Muhimbili National Hospital and its branch

Variables	Label	Frequency	Percentage
Accept to donate milk in HMB	Yes	486	86.48
	No	76	13.52
Accept to use of donor's milk	Yes	439	83.45
	No	93	16.55
Reported reasons for accepting the use of donated human milk	Breast milk is safe	155	33.05
	Health benefits	314	66.95
Reported reasons for NOT accepting using donated human milk	Cultural issues	13	13.98
	Needs more education	29	31.18
	Safety concern	51	54.84
Ever breastfed another baby	Yes	11	1.96
	No	551	98.04
Accept to donate human milk in the HMB once given education	Yes	523	93.06
	No	39	6.94
Needs consent from spouse to use or donate human milk in the HMB	Yes	314	55.87
	No	228	40.57
	Not sure	20	3.56
Expect anything in return after donating human milk in the HMB	Yes	26	4.63
	No	536	95.37

HMB, human milk bank

Factors associated with mother's willingness to donate or use donor breast milk

Educated women were more willing to donate milk in HMB compared to those with no formal education (p <0.02). Other factors that were associated with mothers' willingness to donate milk in HMB included women who received breastfeeding counselling during antenatal clinics (p= 0.01) and postnatal clinics (p= 0.01, 1%) and place of delivery in a health facility (p=0.01). Women who were currently breastfeeding were more willing to accept the use of donor milk from HMB (p= 0.01). Marital status, religion, experience of breastfeeding difficulties and history of breastfeeding another baby did not influence readiness to donate or use donor breast milk.

After adjusting for confounders, those who are pregnant [adjusted odds ratio [AOR 12.6 (95% confidence interval (CI): 1.2-130.9)] were more likely to accept donating milk in the HMB. Also, women who were breastfeeding [AOR 2.2 (95%CI: 1.3-3.9)] and those who were ready to donate milk in HMB [AOR 12.2 (95%CI: 6.9-21.6)] were more likely to accept using donated milk in HMB. (Table 3).

Table 3: Multivariate logistic regression for associated factors of donor milk among women attending Muhimbili Hospital and its branch Mloganzila

Variables	Outcome variable: Willingness to donate milk in the HMB		Outcome variable: Acceptance of using donated milk	
	Crude Odds Ratio, COR (95%CI)	Adjusted Odds Ratio, AOR (95%CI)	Crude Odds Ratio, COR (95%CI)	Adjusted Odds Ratio, AOR (95%CI)
Currently Breastfeeding				
Yes	-	-	2.0 (1.3-3.2)	2.2 (1.3-3.9)
No			1	1
Would be ready to donate milk in HMB for other babies to use?				
Yes	-		10.5 (6.2-18.0)	12.2 (6.9-21.6)
No		-	1	1
Place of delivery				
Home	1	1		
Health center	9.5 (1.6-57.8)	4.1 (0.6-27.7)		
Still pregnant	20.5(2.4-174.1)	12.6 (1.2-130.9)	-	-
Received breastfeeding counseling during ANC				
Yes	2.1 (1.3-3.3)	1.7 (0.9-3.0)	-	-
No	1	1		
Received breastfeeding counseling during Postnatal clinic				
Yes	2.0 (1.2-3.4)	1.5 (0.8-2.8)	-	-
No	1	1		

Discussion

This study intended to assess the awareness towards donor human milk banking, acceptability of donor breast milk, and factors associated with mother's willingness to donate or use donor breast milk in Dar es Salaam, Tanzania. We have found high acceptability rates for willingness to donate milk and use of milk from HMB despite very low awareness rates of HMB. Women who had formal education and those who received breastfeeding counselling were more willing to donate their breast milk to HMB.

This study enrolled 562 women who were attending a tertiary referral facility where the first milk bank in Tanzania is likely to be established. The design of the study did not allow for a deeper understanding of both religious and cultural issues around milk sharing, however, our results suggest that establishing a milk bank will be beneficial as breastfeeding difficulties were common in this study. As this was an urban setting, women in other areas in Tanzania might have different views regarding donor human breast milk and therefore generalizability of our findings is limited.

Milk-sharing practices represent the base of the initiation of donor human milk banking although its practice is no longer common due to concerns about milk safety especially during this error of HIV pandemic.[31] Few women reported to have ever breastfed another baby indicating that traditional milk sharing (wet nursing) is fading away, although some studies have indicated wet nursing is still being practiced in some parts .[32,33]

Majority of the participants 495(88%) were not aware of donor Human milk banking. Studies conducted in African countries of Ethiopia, Kenya, Uganda, had similar results where few participants reported ever heard of HMB by 10%, 25%, and 23% respectively.[19,23,34] The low awareness on donor human milk banking in our country and most African countries can be explained by the fact that most women are used to the culture of breastfeeding their own babies direct from the breast. Donor breast milk is a new alternative feeding method in Africa that needs community education before any attempt to establish HMB. On the contrary, in a developed country such as Turkey, more than half of the participants (62.5%) were aware of HMB.[35]

Furthermore, those who reported ever heard of HMB had received breastfeeding counseling in antenatal and postnatal clinics showing that donor Human milk banking education can be incorporated into the antenatal and postnatal breastfeeding counselling. This is also supported by the finding that most participants heard of HMB from health facilities showing that health centers are important sources of HMB education when incorporated in breastfeeding counselling.
Most of our participants supported the concept of donor breast milk for banking and its use as most women agreed to donate breast milk for banking and were willing to use donor breast milk for feeding their infants. This finding shows the community's readiness to use future HMB services in our country. Breastfeeding difficulties were not uncommon in this study, highlighting the strong support to establish Human milk banks. HMB could save the lives of babies by providing the health benefits found in breast milk. Similar high acceptability results have been reported in Kenya (79%), Uganda (78%), and Nigeria (60%) but very low acceptability reported in Ethiopia (11%).[19,22,23,36] Acceptability of HMB in Africa varies, but the high level of acceptability in our study may be attributed to participant's understanding of the health benefits of breast milk. Participants' willingness to donate without demanding anything in return demonstrate their recognition that human milk banking is a non-profit service.

Furthermore, there was increase in number of the participants who were willing to accept HMB donation 523 (93.06%) and use (92.35%) after getting more information showing the importance of community education before establishing HMB. In this study, mothers who had formal education were more likely to donate breast milk in HMB but there was no statistical significance. Education has also been mentioned in other countries as an important determinant of HMB acceptability.[22,24]
Other factors that increased the likelihood of milk donation or use were mothers who received antenatal and postnatal counseling, still being pregnant, and those who were still breastfeeding. This shows counselling received from health facilities on breastfeeding increases knowledge of the benefits of mothers breastmilk thus facilitating acceptance of donor breast milk.
Among those who did not accept donor human milk, 51 (54%), participants were concerned about the safety of donor breast milk. The human milk bank process usually adheres to safety measures including screening of donors, pasteurization, and safe storage of milk.[26,27] Assurance on safety is important during advocacy of HMB. Safety concerns regarding donor human milk were also common in most studies conducted in Africa.[20–23,34,36]

Religious and cultural norms are known to influence breastfeeding and breastfeeding practices.[37] Although our study did not find significant influence of religion and culture, other studies have identified these as barriers to acceptability of donor breast milk.[25] Additionally, over half of the women in our study indicated they would need their spouse's consent to utilize human milk bank services. This suggests that education on human milk banking should also be directed at men who are often considered as the primary decision-makers in African families.

Study conclusion

Generally, this study shows that, despite low community awareness of HMB; the acceptance of breast milk donation for banking and its use is high, as most participants understand the health benefits found in breast milk.

What is already known about this topic?

- Breast milk is the best newborn food for optimal growth and development.
- Donor breast milk is recommended as a second option when own mother's milk is not available.
- What this study will add
- Provide an understanding of the level of community understanding about human milk banking services.
- Shed light on the factors associated with willingness to donate or use donor breast milk

Study recommendations

Community education about donor human milk should be provided before initiation of milk banking services.HMB education can be incorporated in breastfeeding counselling during antenatal and postnatal clinics and through different media to reach the whole community.

Authors' contributions
Yohana Kimaryo and Lucy Lawrence Mpayo was involved in concept development and design data collection, analysis, interpretation and preparation of the final report. Mwanaidi Amir Msuya, Robert Moshiro, and Judith Cosmas Lamosai were involved in the proposal review, data collection, review and approval of the final report.
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