

Knowledge Attitudes and Practice of Breast Milk Expression and Storage Among Working Mothers With Infants Under 6 Months of Age in Public Well Baby Clinics

PRISCILLAH wanini EDEMBA (✉ wanini.edemba@gmail.com)

Kenyatta National Hospital <https://orcid.org/0000-0002-1084-6902>

Grace Irimu

University of Nairobi College of Health Sciences

RACHEL MUSOKE



University of Nairobi College of Health Sciences

Research

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Abstract

Background: Many studies show that working mothers are unable to exclusively breastfeed successfully. Expression and storage of breastmilk is a strategy that ensures continued breastmilk consumption in the event of temporary separation of an infant from the mother. The 2017 Kenyan Health Act mandates employers to provide lactation rooms with guidance for appropriate utilization.

Methodology: The study objective was to assess knowledge attitude and practice of breastmilk expression and storage among working women with infants below six months of age in Public Well Baby Clinics. This was a cross sectional study among 395 working women attending two large public hospitals in Nairobi Kenya. A structured questionnaire with open and closed ended questions was used to establish the knowledge and practice while a Likert scale was used to explore attitudes of the mothers towards expression and storage of breast milk.

Results: Only 161(41%) were expressing breast milk. Those with tertiary education and those working in the public sector had significantly higher odds of having satisfactory knowledge OR4.47(95%CI 2.01-11.07) and OR2.26(95%CI 1.33-3.85) respectively. Attaining tertiary education was significantly associated with a possibility of expressing and storing breastmilk OR3.6(95% CI 1.81-7.95). The workplace did not provide adequate equipment to facilitate breastmilk expression. Challenges experienced were breast pain and cumbersome nature of expressing milk.

Conclusion: The study revealed knowledge gaps in expression and storage of breastmilk that need to be addressed to enable the mothers fully utilize the lactation rooms when they become available at the workplace.

Background

The 2016 Lancet series on breastfeeding estimate that scaling up breastfeeding to near universal levels would prevent 823,000 deaths in children under five years annually (1). The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life. The fifth global target in the comprehensive implementation plan on maternal infant and young child nutrition is to increase the rate of exclusive breastfeeding from 38% in 2012 to >50% by 2025(2)(3).

In Kenya, the exclusive breastfeeding rate rose from 32% in 2008-09 to 61% in 2014 according to the Kenya Demographic Health Survey (KDHS). However, there seems to be a steady decline of exclusive breastfeeding rates from 3-5 months (63% at 3 months and 42% at 5 months)(4). This could be explained by a Kenyan study by Van et al which showed that 52% of women resumed work within 3 months of child birth(5). This means that work may have a negative effect in the overall ability of a woman to maintain lactation. With exerted efforts towards improving the quality of life of the girl child, more and more women are joining the work force. Currently, women make up 50% of the global labor work force, and 47% in Kenya(6).

The International Labor Organization(ILO) convention 2000 C183 proposed a period of paid maternity leave of not less than 14 weeks(7). The Kenyan labor laws provide for 12 weeks maternity leave in the Employment Act(8). The women working in the formal sector enjoy the benefits from such a provision yet three quarters of the Kenyan population work in the informal sector(5).

With time, lactating women faced with the prospect of returning to work developed strategies to continue breast-feeding while working e.g. expressing breast milk, cease breastfeeding or negotiate a reduced-hour or flexible schedule with their employer(9)(10). Expression of breast milk is becoming a normalized behavior among breastfeeding women and regular expression is associated with employment(11).

Kenya is making progress in supporting working breastfeeding women. In 2017, the Breastfeeding Mothers bill was passed that directs employers to provide lactation stations, breastmilk expression breaks and flexible working hours(12). This is now part of the Health Act 2017 sections 71 and 72 (13). The Ministry of Health-Kenya launched Guidelines for securing a Baby Friendly Environment at the work place in 2018(14). Lactation rooms can only be of benefit if the working mother is conversant with how to properly utilize them for the purposes of achieving exclusive breastfeeding. This study aims to examine the knowledge, attitudes and practices around breast milk expression and storage among working women in Kenya.

Methods

This was a cross-sectional study done in December 2018 and February 2019. It was conducted at the Well Baby Clinics of Kenyatta National Hospital (KNH) and Mbagathi District Hospital (MDH) both situated in Nairobi County. Working mothers were recruited both in formal and informal sector with infants under 6 months of age. Those excluded from the study were mothers below 18 years, those allowed to carry their infants to work and those with contraindications to breastfeeding according to the WHO criteria.

Sample size was calculated using the Fishers Formula. Calculated Sample Size = 384 Subjects. Stratified sampling procedure was used to give a total of 299 mothers in KNH and 85 mothers in MDH. Consecutive sampling procedure was used to further select the mothers to be interviewed from each Well Baby Clinic.

Face to face interviews with a structured questionnaire was used to collect data. Contextualized Yes/ No questions and open-ended questions were used to assess knowledge and practice. A five-point Likert Scale was used to assess attitude. A soft copy interface of the questionnaire was developed using Epi Info software. The collected responses were stored in an excel format for analysis in R Studio Version 3.5.1 Software.

A scoring system was used to analyze responses to closed ended questions on Knowledge:1= correct response,0= Incorrect response (consistent with Academy of Breastfeeding Medicine guidelines)(15). Any mother who did not know the answer was considered to have an incorrect response.

During the analysis of factors associated with poor knowledge of expression and storage of breastmilk, a scoring system was used to analyze responses to closed ended questions on Knowledge. A median score was used to distinguish between satisfactory and poor knowledge. The level of knowledge was then cross tabulated against the variable of interest.

The variables were further analyzed using a multivariate analysis test to determine the factors independently associated with satisfactory knowledge. Associations between satisfactory knowledge and each independent variable were examined by Odds ratio (OR) and 95% confidence interval.

Prior to regression, the collected data were explored through univariate data analysis of the independent variables to describe and find patterns within it. Univariate analysis of the continuous variables was done through calculation of measures of central tendencies. Univariate analysis of categorical variables was done through the calculation of proportions.

Responses for attitude were based on a five-point Likert scale. The responses were later collapsed into 3 cells representing agree, neutral and disagree for ease of interpretation.

Bivariate data analysis was done through regression of the binary outcome (expressing breast milk/ not expressing breast milk) against each independent variable. All independent variables that showed a statistically significant relation to the

response variable in the bivariate regression analysis were used to develop a multiple regression model. All the analyses were done at an alpha value (critical p-value) of 0.05.

Results

Sociodemographic characteristics

A total of 395 working mothers were interviewed. The median age of the mothers was 29 years (IQR) of 25-34 years. The median age of the infants when mother resumed work was 3 months (IQR=3-6). More than half (52%) of the mothers had received tertiary level of education. In terms of workplace, the majority (76%) were in the private sector. At the time of data collection, only 41% of mothers were expressing breast milk either regularly or irregularly. (Table1).

Table 1: Sociodemographic characteristics of the participants

Indicator	Levels	n(%)
N	395	100
Age of mother (median years)	29(IQR=25-34)	
Child age (median months)	4(IQR=3-6)	
Age of child when mother resumed work (median months)	3(IQR=2-4)	
Gestational Age Of Child At Birth	<=36 weeks	77(19.49%)
	>36 months	313(79.24%)
	Not documented	5(1.27%)
Highest level of education attained	No formal education	6(1.52%)
	Primary	44(11.14%)
	Secondary	136(34.43%)
	Tertiary	204(51.65%)
	Not documented	5(1.27%)
Parity	Multiparous	252(63.8%)
	Primiparous	138(34.94%)
	Not documented	5(1.27%)
Place of Work	Private Sector	302(76.46%)
	Public Sector	86(21.77%)
	Not documented	7(1.77%)
Nature of mothers' employment	Salaried	175(44.3%)
	Self Employed	215(54.43%)
	Not documented	5(1.27%)
Expressing Milk	No	234(59.24%)
	Yes	161(40.76%)
	Not documented	0(0%)

Knowledge of breastmilk expression and storage.

Almost all women (97%) had correct knowledge that expression of milk could be done using hand or breast pump but > 90% thought that there was a difference in contamination levels and volume of milk expressed between the various methods of breast milk expression. Only 62% satisfactorily knew that the Kenyan Government had directed employers to set up lactation stations at their workplaces. (Table 2).

Table 2: Knowledge on breastmilk expression.

Indicator	Level	Score	Frequency n(%)
What can be used to express breast milk	Not Known	0	8(2.03%)
	Hand or Pump	1	387(97.97%)
Any difference in volume when expressing by hand or by pump	Yes	0	353(89.37%)
	No	1	42(10.63%)
Any difference in contamination of milk when expressing by hand or pump	Yes	0	366(92.66%)
	No	1	29(7.34%)
Is it correct to discard the first few drops of milk before expressing milk	Yes	0	160(40.51%)
	No	1	235(59.49%)
Whether expressed milk is nutritious for baby	No	0	67(16.96%)
	Yes	1	328(83.04%)
Handwashing is important before expressing breastmilk.	No	0	5(1.27%)
	Yes	1	390(98.73%)
Cleaning the breast important before expressing breastmilk.	Yes	0	365(92.41%)
	No	1	30(7.59%)
The government of Kenya has directed employers to have lactation rooms.	No	0	149(37.72%)
	Yes	1	246(62.28%)

Majority of mothers (>70%) correctly stated that expressed breast milk can be stored at room temperature or refrigerated. However, there was a huge knowledge gap in terms of safe storage duration of breast milk in a refrigerator (61%) or freezer (78%). (Table 3).

Table 3: Knowledge on breast milk storage

Indicator	Level	Score	Frequency n(%)
Breast milk can be stored at room temperature	No	0	103(26.08%)
	Yes	1	292(73.92%)
Breastmilk can be stored in refrigerator	No	0	75(18.99%)
	Yes	1	320(81.01%)
Breast milk can be stored in a freezer.	No	0	162(48.49%)
	Yes	1	228(58.46%)
How long can breast milk be stored in room air.	>9 hours	0	123(31.14%)
	8 hours	1	272(68.86%)
How long Breastmilk can be stored in a refrigerator in hours	8 hours or 9 months	0	242(61.27%)
	Up to 72 hours	1	153(38.73%)
How long can Breastmilk be frozen	1 month or 24 hours	0	309(78.23%)
	9 months	1	86(21.77%)
Expressed breast milk is nutritious if stored at room temperature	No	0	84(21.27%)
	Yes	1	311(78.73%)
Expressed breast milk is nutritious if stored in a refrigerator.	No	0	115(29.12%)
	Yes	1	280(70.89%)
Expressed breast milk is nutritious if frozen for 9 months	No	0	173(43.8%)
	Yes	1	222(56.2%)
Refrigerated milk has a different smell from fresh breast milk	No	0	186(47.09%)
	Yes	1	209(52.91%)
Can baby refuse to take stored milk because of smell	Yes	0	153(38.47%)
	No	1	242(61.27%)

A scoring system was used to analyze responses to closed ended questions on Knowledge:

1= correct response, 0= Incorrect response (consistent with Academy of Breastfeeding Medicine)(16). Any mothers who did not know the answer was considered to have an incorrect response. A median score was used to distinguish between satisfactory and poor knowledge. (Figure 1).

Satisfactory knowledge on breast milk expression was attained by 43% (170) of mothers while 47% (186) had satisfactory knowledge on storage. When combined, only 34% (135) of mothers had satisfactory knowledge on breastmilk expression and storage (Figure 2).

Working in the public sector and attaining tertiary level of education was significantly associated with satisfactory knowledge on expression and storage of breastmilk (Table 4).

Table 4: Factors associated with knowledge of breast milk expression and storage. (multivariate analysis).

Term	AOR	95%CI	p-value	
Age	Mother's age	1.09	1.03-1.14	0.001
	<36 weeks	ref		
Gestation Period	>36 weeks	0.89	0.49-1.63	0.701
	Primary	ref		
Level of education	Secondary	1.81	0.78-4.61	0.188
	Tertiary	4.47	2.01-11.07	0.001
Multiparous	ref			
Parity	Primiparous	1.1	0.63-1.91	0.742
	Private sector	ref		
Place of Work	Public sector	2.26	1.33-3.85	0.003

Attitude towards breast milk expression and storage.

The majority working women (94%) agreed that breastmilk expression could be done using hand technique. Pain during breast milk expression was experienced by 50% of mothers and 66% thought it was cumbersome.

Majority (87%) of the mothers agreed that proper storage of breast milk would help them succeed in exclusive breastfeeding however, 76% of them thought it was an expensive venture. Majority (75%) felt that they had inadequate facilities at work to support breast milk expression. (Table 5).

Table 5: Attitudes towards breast milk expression and storage

Breast milk expression/ storage	Agree	I don't know	Disagree
Other feeds should be introduced to the baby after 6 months	386(97.72%)	0(0%)	4(1.01%)
Breast milk expression can allow mothers to achieve exclusive breastfeeding for 6 months	333(84.3%)	12(3.04%)	44(11.14%)
Breast milk expression is painful	198(50.13%)	33(8.35%)	159(40.25%)
Breast milk expression is cumbersome/ fussy	260(65.82%)	15(3.8%)	115(29.11%)
Breast milk expression can be done at the workplace	229(57.97%)	9(2.28%)	152(38.48%)
Your workplace has facilities that support breast milk expression	91(23.04%)	3(0.76%)	296(74.94%)
Breast milk expression can be done by hand	373(94.43%)	4(1.01%)	13(3.29%)
Proper storage of breast milk can help achieve six months of exclusive breastfeeding	344(87.09%)	13(3.29%)	33(8.35%)
Stored breast milk is safe for infants to drink	301(76.2%)	19(4.81%)	70(17.72%)
Storing breast milk is expensive	301(76.2%)	19(4.81%)	70(17.72%)
Stored breast milk has less nutritional value compared to milk that baby feeds directly from the breast	177(44.81%)	31(7.85%)	182(46.08%)
It is safe to store expressed breast milk for up to 8 hours at room temperature	247(62.53%)	58(14.68%)	85(21.52%)
It is safe to freeze expressed breast milk for up to 9 months	101(25.57%)	86(21.77%)	203(51.39%)
I would like to know how to properly express and store breast milk	367(92.91%)	0(0%)	23(5.82%)

Practice of breast milk expression and storage

The mothers who expressed breast milk were 41%, majority of whom were taught by health care professionals (63%). Hand expression was done by 50% of the mothers. Storage of breastmilk at room temperature was preferred by majority of the mothers at 49% compared to storing in a refrigerator at 34% and freezing at 16%. Baby bottles were used as storage containers by 55% of mothers. Mothers with refrigerators at home were 76% and at work were 35% but 77% preferred expressing breastmilk from home. (Table 6).

Table 6: Practice of breastmilk expression and storage.

Indicator	Levels	n=161(%)
Learnt how to express breastmilk through	Friend	14(8.7%)
	Healthcare Provider	101(62.73%)
	Mass Media	10(6.21%)
	Others	7(4.35%)
	Relative	28(17.39%)
	Not documented	1(0.62%)
Methods used to express breastmilk	Both Hand & Pump	20(12.42%)
	Electric Pump	12(7.45%)
	Hand	81(50.31%)
	Manual Pump	48(29.81%)
	Not documented	0(0%)
Breastmilk is stored in	Freeze	25(15.53%)
	Refrigerator	55(34.16%)
	Room Temperature	78(48.45%)
	Not documented	3(1.86%)
Where express breast milk	Both	31(19.25%)
	Home	124(77.02%)
	Work	4(2.48%)
	Not documented	2(1.24%)
Has a refrigerator at home	No	39(24.22%)
	Yes	122(75.78%)
	Not documented	0(0%)
Has a refrigerator at work	No	104(64.6%)
	Yes	57(35.4%)
	Not documented	0(0%)
Container for storing breastmilk	Baby Bottle	88(54.66%)
	Others	23(14.29%)
	Polythene Bag	3(1.86%)
	Special Breast milk Bags	36(22.36%)
	Not documented	11(6.83%)

Chi-square statistical analysis showed a statistically significant relationship between expression of breast milk and ownership of a refrigerator: p-value<0.001.

When subjected to a multivariate analysis, mothers with tertiary education (AOR 3.9 CI 1.96-8.41) were significantly associated with expression and storage of breast milk (Table 7).

Table 7: Factors associated with expression and storage of breast milk.

Indicator	Term	Univariable model			Multivariable model		
		OR	95%CI	p.value	AOR	95%CI	p.value
Age	Mother's age	1	0.96-1.03	0.905	-	-	-
Level of education	Primary	ref			ref		
	Secondary	1.64	0.79-3.64	0.203	1.6	0.76-3.55	0.229
	Tertiary	3.91	1.96-8.41	0	3.66	1.81-7.95	0.001
Place of Work	Private sector	ref					
	Public sector	1.68	1.04-2.73	0.035	1.32	0.8-2.18	0.283
Gestation period	<36 weeks	ref			ref		
	>36 weeks	0.76	0.46-1.25	0.277	-	-	-
Exclusive breastfeed	No	ref					
	Yes	0.77	0.48-1.22	0.263	-	-	-

Reasons given by working mothers for expressing breastmilk

The main reason why mothers chose to express breastmilk was being able to delegate feeding to someone else when they were at work (24.7%). Expression of breastmilk was also beneficial to those who had been unsuccessful at breast feeding (14%). (Figure 3).

Discussion

Majority (79%) of infants in this study were born term and healthy. The median age when the mother resumed work was 3 months which correlates with a Kenyan Study that showed most working mothers resumed work when their child was 3 months old (5). A 2016 Kenyan study showed that 67% of working mothers got the mandatory 3 months maternity leave(16) which seems to be lower than Nigeria at 91% (17).

The 2018 BFHI guidelines recommend that at least 80% of mothers with preterm and term infants should correctly describe or demonstrate how to express milk(18). In our study, only 41% of mothers expressed and stored breastmilk. In addition, 50% of our mothers felt that expression of breastmilk was painful and 66% thought it was cumbersome. This reveals inadequate preparation of the mothers by healthcare professionals. We did not explore knowledge of the actual manual technique of expression. In our study, 98% of the participants knew that expression of breast milk could be done by either hand or breast pump comparable to India at 93.7% by Prabhu *et al*(19) .

Our rate of breastmilk expression (41%) was close to 37% reported by Attahiru *et al*/in Nigeria in 2018(17) but higher than a 2016 study done in Kenya by Chege *et al* at 18.9% (16). Of note, each of these studies used different questions from ours and we focused on infants aged 6 months and below.

Majority knew about facilities used to store breastmilk as 74% responded correctly that expressed milk could be stored at room temperature and 81% in a refrigerator. There was poor knowledge on safe breastmilk storage duration when using a refrigerator yet 75% participants in our study had a refrigerator at home. Prabhu *et al* gave a 35.7% rate on satisfactory knowledge on storage like Rai *et al* at 36%, but our study revealed a higher figure of 47.3%.

Overall rate on satisfactory knowledge on both expression and storage of breastmilk was 34%. Satisfactory knowledge was more among those who expressed milk (47%) compared to those that did not at 25%. However, acquiring tertiary education OR4.5(95%CI 2.01-11.07) and working in the public sector OR2.26(95% CI1.33-3.85) was significantly associated with a possibility of having satisfactory knowledge. This could have been due to their ability to access information on different fronts, access to better health care or financial strength to buy breast pumps and storage devices supported by Qutah *et al* who reported that most mothers acquired information from the internet(20).

Working mothers who were expressing milk preferred to express their milk at home (77%) compared to expressing at work at 3% yet 36% had access to a fridge at work. Most likely these were communal refrigerators and not exclusive for the purposes of breastmilk storage. The home environment therefore seemed a more comfortable place to express milk compared to the workplace.

Majority of working mothers (75%) felt that there were inadequate facilities at work to support lactating mothers. A study done in Ghana revealed that 69% of mothers received no additional support at work from their employers beyond maternity leave(21). Good effort has been made by the 2017 Kenyan Breastfeeding Mothers Act in defining lactation rooms. They should have a comfortable seat, a small table, electrical outlets, refrigeration facilities and they should not be located in the rest rooms(12).

The results on attitudes towards expression and storage were encouraging. Most participants (83%) knew that expressed breast milk retained its nutritional value, would enable them to achieve 6 months of exclusive breastfeeding and 76% agreed that it was safe for infants to drink. This shows that working mothers are seeing an opportunity to achieve exclusive breastfeeding through expression and storage of breastmilk.

Conclusion

Special emphasis needs to be put in place in all health facilities to educate all mothers on expression and storage of breastmilk. This would also help them overcome the challenges of pain and cumbersome attitude while expressing breast milk.

Education of the girl child needs more serious consideration as those who had attained tertiary education had a significantly high odds of expressing and storing breast milk.

There needs to be provision of fully equipped lactation rooms as laid down in the 2018 Kenyan Policy Guidelines for Securing a Baby Friendly Environment at the Workplace. Breast milk expression breaks will also help in encouraging more working mothers to express milk at their workplaces.

Abbreviations

BFHI Baby Friendly Hospital Initiative.

ILO International Labor Convention.

KDHS Kenya Demographic Health Survey.

KNH Kenyatta National Hospital.

MDH Mbagathi District Hospital

WHO World Health Organization.

UNICEF United nations International Children's Emergency Fund.

Declarations

Ethical approval: Not applicable

Consent for publication: Not applicable.

Availability of data: The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

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Authors Contributions: This work was carried out in collaboration of all authors. Author PWE designed the study, performed all data collection, and wrote the first draft, sought ethical approval, and assisted in data collection and data entry. Author GI and RM supported and supervised the work from the proposal stage to final draft. All authors read approved the final manuscript

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Figures

Knowledge Scores in Breastmilk Expression & Storage:
dotted line represent median score

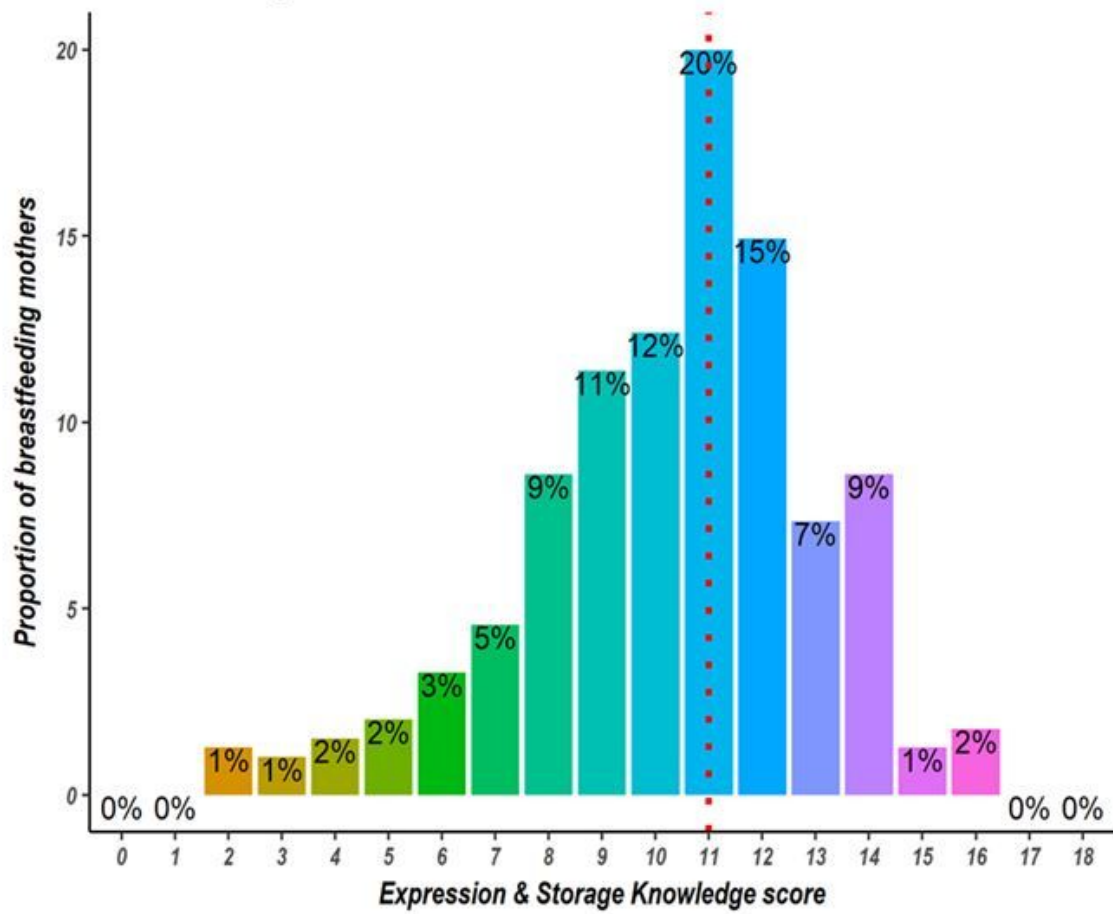


Figure 1

Distribution of knowledge scores on breastmilk expression and storage.

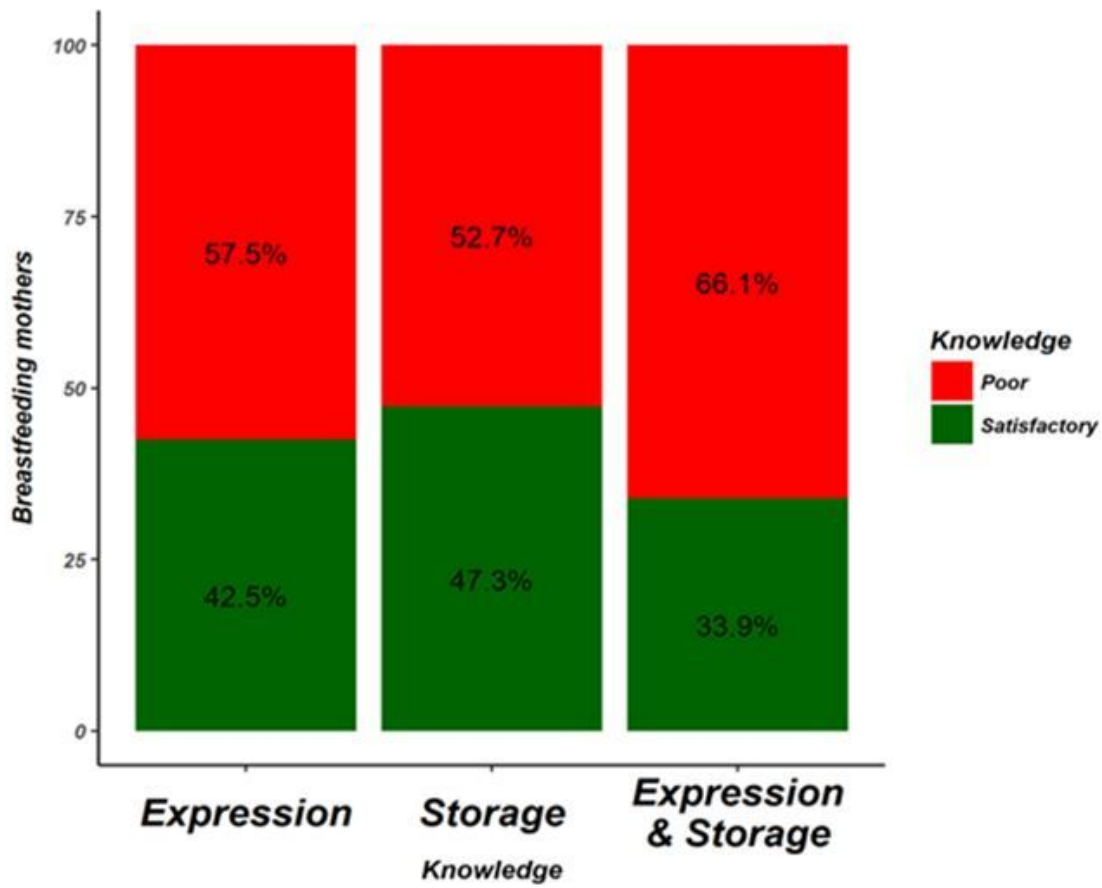
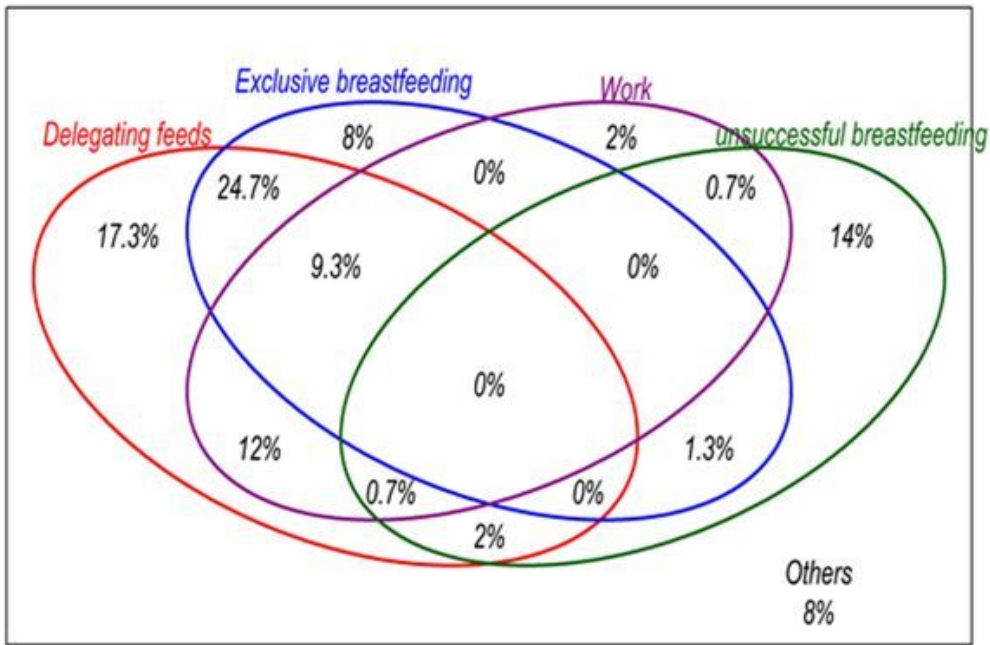


Figure 2

Proportions of mothers with satisfactory and poor knowledge of breast milk expression and storage.



*Others implies other reasons not among the four in the Venn diagram.

Figure 3

Reasons why mothers expressed and stored milk.