



Awareness and Attitude on Storage and Feeding of Expressed Breast Milk among Postnatal Mothers Attending Tertiary Hospital, Pokhara

Samjhana Kshetri Basnet¹, Neeta Tamrakar², Rekha Thapaliya^{2*}

¹Pokhara Academy of Health Sciences, Pokhara, Nepal

²Department of Women's Health and Development, Pokhara Nursing Campus, Tribhuvan University, Institute of Medicine, Pokhara, Nepal

Email: *rekha363845@gmail.com

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Abstract

Breast milk is crucial for an infant's nutrition and immunity, especially in the first six months. When direct breastfeeding is not possible, expressing milk becomes essential, yet many mothers face challenges due to limited awareness. The study aimed to assess awareness and attitude on storage and feeding of expressed breast milk among postnatal mothers attending a tertiary hospital, Pokhara. A descriptive cross-sectional study was conducted among 335 postnatal mothers at Pokhara Academy of Health Sciences. Participants were selected using a non-probability purposive sampling technique. Data were collected through face-to-face interviews using a structured interview schedule. Descriptive and inferential statistics (chi-square test and Pearson correlation coefficient) were used for analysis. Almost all, (90.4%) mothers were aged 21 to 30 years, with a mean age of 26.99 ± 4.814 years. Most (90.7%) were Hindu, 42.3% were Brahmin/Chhetri, (74.0%) were homemakers, 70.7% had vaginal deliveries, and 43.0% were primiparous. In this study, 47.8% of mothers had adequate awareness and 51.9% had a positive attitude regarding expressed breast milk storage and feeding. Awareness was significantly associated with ethnicity ($p < 0.013$), while no significant association was found for attitude. A weak positive correlation ($r = 0.133$, $p < 0.015$) was observed between awareness and attitude. Over half of the mothers had inadequate awareness, although more than half showed a positive attitude. Hospital authorities should better organize health education and awareness programmes.

Subject Areas

Gastroenterology & Hepatology, Women's Health

Keywords

Awareness, Attitude, Expressed Breast Milk, Feeding, Storage, Postnatal Mother

1. Introduction

Breastfeeding is a natural process that benefits both the mother and the baby [1]. Breast milk provides all the necessary nutrition, immune support, and hydration for infants [2]. The World Health Organization recommends feeding infants exclusively with breast milk for the first six months of life. Inadequate breastfeeding is estimated to contribute to 16.0% of child deaths annually [3]. Even when mothers are separated from their babies, they can continue feeding them with expressed breast milk. However, many mothers do not utilize this approach for various reasons [4]. Breast milk expression involves extracting milk from a mother's breasts either manually or with a breast pump to store it for future use [5]. This process can help boost milk supply and avoid breast engorgement. It is also beneficial for babies who have feeding difficulties or require intensive care. For mothers who wish to continue breastfeeding while working, expressing milk is an effective solution [6]. Research in Kenya revealed a significant gap in knowledge regarding the techniques for expressing and storing breast milk. Despite this, working mothers generally hold a positive view towards achieving exclusive breastfeeding through milk expression [7]. A study conducted in Ethiopia found that 36% of working women were aware of expressed breast milk, and 44.0% supported its use [8]. Though 42.0% mothers have a generally positive attitude but they did not feed their babies because of a misunderstanding of their need for expressed breast milk [9]. Only 5.0% of mothers and 53.7% of health professionals had ever heard about donor milk banking [10]. The Nepal Demographic and Health Survey, [11] reports a decline in the rate of exclusive breastfeeding, falling from 70 percent in 2011 to 66 percent in 2016, and further to 56 percent in 2022. In Nepal, breastfeeding attitudes are generally positive, with nearly everyone breastfeeding and low use of infant formula; instead, cow or buffalo milk is commonly used as a supplement [12]. Studies in Nepal revealed that 46.2% of individuals had insufficient knowledge about expressed breast milk, and 54.1% had low awareness of it [13] [14]. Breast milk is essential for a child's survival and well-being, offering a safe, nutritious, and sustainable source of nourishment. Breastfeeding lowers the risk of gastrointestinal infections, pneumonia, ear infections, and urinary tract infections in infants [15]. Expressed breast milk ensures the infant feeding when mother and child are separated, addressing issues like latching difficulties, blocked ducts, breast engorgement, preterm or sick babies [16]. Expressed breast milk is an affordable and effective option for mothers, families and babies [17]. Despite 93.5% of mothers in Nepal being aware of the benefits, 71.5% breastfed but did not practice exclusive breastfeeding [18]. Another study found that approximately

half of working mothers had a good understanding and positive attitude toward expressed breastfeeding; however, the primary barrier to practicing it was perceived insufficient milk production [19]. EBM awareness and attitudes vary globally, with limited research in Nepal. So, this study aims to assess the awareness and attitude of postnatal mothers regarding the storage and feeding of expressed breast milk at a tertiary hospital in Pokhara.

2. Materials and Methods

A descriptive cross-sectional study design was used to assess the awareness and attitude toward the storage and feeding of expressed breast milk among postnatal mothers. The research study was conducted at the Pokhara Academy of Health Sciences, Western Regional Hospital in Pokhara for four weeks. The population consisted of postnatal mothers admitted to the postnatal ward. Postnatal mothers, regardless of parity, who had given birth either vaginally or through caesarean section and who were willing to participate were included, while those unwilling to participate and who were experiencing intra uterine fetal death and stillbirth were excluded from the study. In this study, awareness of storage and feeding of expressed breast milk refers to the correct responses expressed by postnatal mothers to a structured questionnaire on storage and feeding of expressed breast milk including meaning, way of expressing, storage, feeding, benefits of feeding expressed breast milk, etc. The level of awareness was measured as adequate or inadequate based on the mean score (26.892 ± 6.531). Attitude refers to the thoughts, feelings and emotions of the postnatal mother towards storage and feeding of expressed breast milk. Attitude was measured on a five-point Likert scale from strongly disagree to strongly agree. It was categorized into positive and negative attitudes based on the mean score (51.352 ± 4.612). Expressed breast milk refers to the practice of squeezing breast milk for further use by hand or breast pump *i.e.* manual and electric.

A non-probability purposive sampling technique was used where sample size was calculated using Cochran's formula, $n = (Z\alpha^2 pq) / d^2$ as referenced in [20]. The prevalence of awareness of expressed breast milk, which was 67.9%, was taken from the study by Lama (2019) and the sample taken was 335 postnatal mothers. A structured interview schedule was developed by the researcher based on an extensive literature review and consultation with subject experts. Face-to-face interviews were conducted using a structured interview schedule for data collection. Pretesting of the research instrument was conducted on 35 postnatal mothers admitted to the postnatal ward, who were not included in the final data analysis. Ethical approval was taken from the institutional review committee of Pokhara Academy of Health Science, Western Regional Hospital ref. no. (55/081) for the study, and from Tribhuvan University, Institute of Medicine ref.no. {Ref: 146(6-11) E2 081/082}. The data were analysed using descriptive statistics such as frequencies, percentages, mean, and standard deviation, which were computed for study variables. Inferential statistics, such as the Chi-square test, were used to

identify the association between the level of awareness and practice with selected variables at the 5% level of significance. Pearson's correlation coefficient was used to examine the relationship between awareness and attitude towards the storage and feeding of expressed breast milk.

3. Results

Most of the respondents (90.4%) were between the ages of 21 and 30 years. The mean age was 26.99 ± 4.814 years. Likewise, 60.0% resided in urban areas, 90.7% followed the Hindu religion, and 42.3% belonged to the Brahmin/Chhetri ethnicity. Regarding childbirth, 70.7% had vaginal deliveries, and 43.0% were primiparous. More than half of the respondents (51.7%) had learned expressed breast feeding from the health professionals. Most of the respondents (90.4%) were between the ages of 21 to 30 years. The mean age was 26.99 ± 4.814 years. Likewise, 60.0% resided in urban areas, 90.7% followed the Hindu religion, and 42.3% belonged to the Brahmin/Chhetri ethnicity. Regarding childbirth, 70.7% had vaginal deliveries, and 43.0% were primiparous. More than half of the respondents (51.7%) had learned expressed breast feeding from the health professionals.

Less than half of the respondents (47.5%) correctly replied to the meaning of expressed breast milk (EBM). Most of the respondents (86.9%) stated that freshly expressed milk is a type of expressed breast milk. Regarding methods, 77.0% answered that manual expression is a method of EBM. Similarly, 78.2% of them stated that it eases breast engorgement, and 49.3% responded that the best to initiate EBM is immediately after birth. Regarding considerations before EBM, 92.5% replied that hands should be washed thoroughly. Likewise, 30.7% of the respondents answered that the frequency of expression of EBM is 8 - 10 times in a 24-hour period.

Table 1 reveals the storage and handling practices of expressed breast milk (EBM). Most of the respondents (89.3%) replied that the appropriate container for EBM is disposable plastic bags. Majority of them (66.6%) responded that the method of storing EBM is at room temperature. Most of them (89.3%) answered that the duration of the EBM storage in the refrigerator is 4 days. Regarding the correct way to thaw refrigerated breast milk before feeding, most of them (83.3%) stated that the milk container is dipped in warm or lukewarm water. Most of them (80.6%) responded that boiling for 5 minutes cleans the equipment or utensils used for storage. Regarding handling of thawed breast milk, 46.0% replied to never refreeze it.

Table 2 reveals that 74.0% of the respondents answered that the best method to feed a baby is spoon feeding. While feeding EBM, 75.8% stated that the refusal should be observed in the baby. Regarding sign of spoiled expressed breast milk, most of them (85.4%) stated that the clumpy texture or curdling is a sign.

Table 3 illustrates the respondents' attitudes toward the storage and feeding of expressed breast milk (EBM). The majority of the respondents (74.0%) disagreed with the statement that expressed breast milk (EBM) is preferred for the child.

Likewise, majority of them (66.3%) disagreed with the statement that stored expressed breast milk is safe and healthy for babies. Similarly, the majority of them (65.4%) disagreed with the statement that EBM maintains the bond between the mother and child when they are apart. Most of the respondents (84.5%) agreed with the negative statement that stored expressed breast milk has less nutrition than fresh milk. Likewise, 71.0% of the respondents agreed with the statement that EBM is best for working mother to keep breast feeding. Most of the respondents (86.6%) agreed with the negative statement that breast milk expression can be uncomfortable or painful for mothers. More than half of the respondent agree with the negative statements that EBM can be cumbersome for mothers and that expressing, freezing, and thawing breast milk may affect the work concentration with 66.6% and 60.6% agreeing respectively. Regarding milk expression, 77.9% agreed that breast milk can be expressed by hand, and 93.1% agreed that hygiene must be maintained while expressing and storing breast milk.

Table 4 demonstrates the level of awareness of expressed breast milk among the respondents. More than half of the respondents (55.8%) had an inadequate level of awareness of the expression of breast milk. Similarly, 58.8% of the respondents had an inadequate level of awareness related to the storage of expressed breast milk and 53.4% had an adequate level of awareness of the feeding of EBM. The findings reveal that more than half of the respondents (52.2%) had an overall inadequate level of awareness, with a mean score of 26.89 ± 6.53 , and scores ranging from 14 to 50, indicating variability among participants.

Table 5 depicts that 51.9% had a positive attitude toward expressed breast milk feeding and storage.

Table 1. Awareness on storage of expressed breast milk among the respondents (n = 335).

Correct Responses	Number	Percent
Appropriate containers for storage*		
Disposable plastic bags	299	89.3
Glass container	199	59.4
BPA free plastic container	161	48.1
Silicon bag	22	6.6
Method of Storing*		
Room temperature	223	66.6
Refrigerator	147	43.9
Deep freezer	29	8.7
Insulated cooler bag with ice packs	25	7.5
EBM can be stored in refrigerator for up to 4 days	299	89.3
EBM can be stored at room temperature (26°C or below) for 6 - 8 hours	17	5.1

Continued

EBM can be stored in the deep freezer for 12 months	7	2.1
Correct way to thaw refrigerated breast milk before feeding*		
Dip it in the warm or lukewarm water	279	83.3
Keep the container with expressed breast milk under running lukewarm water	55	16.4
In refrigerator overnight	34	10.1
Clean equipment or utensils used for storage*		
Boil for 5 minutes	270	80.6
Wash in a clean basin with soap and water	152	45.4
Steam according to instructions	135	40.3
Air-dry on a clean towel	118	35.2
Store in a clean, protected area	105	31.3
Rinse thoroughly under running water	102	30.4
Sanitize in a dishwasher	65	19.4
Handle thawed breast milk*		
Never refreeze	154	46.0
Use within 2 hours of warming or bringing to room temperature	146	43.6
Use within 24 hours of thawing in the refrigerator	53	15.8
Leftover milk can be used within 2 hours	33	9.9

*Multiple Response.

Table 2. Awareness on feeding of expressed breast milk among the respondents (n = 335).

Correct Responses	Number	Percent
Best method to feed a baby*		
Spoon feeding	248	74.0
Bottle feeding	155	46.3
Cup feeding	12	3.6
Palladia feeding	9	2.7
Observe in a baby while feeding*		
Refusal	254	75.8
Vomiting	223	66.6
Diarrhoea	191	57.0
Upset stomach	186	55.5
Signs of spoiled expressed breast milk*		
Clumpy texture/curdling	286	85.4
Sour smell	248	74.0
Unusual colour	193	57.6
Soapy smell	121	36.1

*Multiple response.

Table 3. Attitude toward expressed breast milk feeding and storage (n = 335).

Statements	Responses					Mean ± SD
	SD No. (%)	D No. (%)	N No. (%)	A No (%)	SA No. (%)	
Expressed breast milk is preferred for the child	5 (1.5)	248 (74.0)	19 (5.7)	63 (18.8)	-	2.42 ± 0.807
Stored expressed breast milk is safe and healthy for babies	1 (0.3)	222 (66.3)	27 (8.1)	84 (25.1)	1 (0.3)	2.59 ± 0.877
Expressed breast milk maintains the bond between the mother and child when they are apart	7 (2.1)	219 (65.4)	27 (8.1)	82 (24.5)	-	2.55 ± 0.884
Stored expressed breast milk has less nutrition than fresh milk	1 (0.3)	32 (9.6)	15 (4.5)	283 (84.5)	4 (1.2)	3.77 ± 0.642
EBM is best for working mother to keep breastfeeding	1 (0.3)	70 (20.9)	24 (7.2)	238 (71.0)	2 (0.6)	3.51 ± 0.837
Expression of breast milk can be done at workplace	-	112 (33.4)	41 (12.2)	182 (54.2)	-	3.21 ± 0.915
Storing breast milk is expensive	1 (0.3)	133 (39.7)	63 (18.8)	138 (41.2)	-	3.01 ± 0.907
Breast milk expression can be uncomfortable or painful for mothers	-	27 (8.1)	14 (4.2)	290 (86.6)	4 (1.2)	3.81 ± 0.584
Expressing breast milk can be cumbersome for mothers	-	95 (28.4)	17 (5.1)	223 (66.6)	-	3.38 ± 0.898
Expressing, freezing, and thawing breast milk may affect the work concentration	-	90 (26.9)	41 (12.2)	203 (60.6)	1 (0.3)	3.34 ± 0.878
Expressing breast milk does not reduce milk supply	-	111 (33.1)	35 (10.4)	189 (56.4)	-	3.23 ± 0.919
Expressing breast milk supports exclusive breastfeeding for six months	1 (0.3)	119 (35.5)	36 (10.7)	178 (53.1)	1 (0.3)	3.18 ± 0.982
Expressed breast milk can be stored in plastic containers	3 (0.9)	181 (54.0)	40 (11.9)	110 (32.8)	1 (0.3)	2.78 ± 0.932
Breast milk expression can be done by hand	2 (0.6)	40 (11.9)	31 (9.3)	261 (77.9)	1 (0.3)	3.65 ± 0.713
Hygiene must be maintained while expressing and storing breast milk	-	7 (2.1)	3 (0.9)	312 (93.1)	13 (3.9)	3.99 ± 0.363
Express breast milk only when experiencing breast engorgement	2 (0.6)	165 (49.3)	18 (5.4)	150 (44.8)	-	2.94 ± 0.982

SD (Strongly Disagree), D (Disagree), N (Neutral), A (Agree), SA (Strongly Agree).

Table 4. Level of awareness on expression, storage and feeding of expressed breast milk among the respondents (n = 335).

Awareness on EBM	Level of Awareness		Mean ± SD
	Adequate No. (%)	Inadequate No. (%)	
Expression	148 (44.2)	187 (55.8)	12.232 ± 3.620
Storage	138 (41.2)	197 (58.8)	8.7015 ± 2.806
Feeding	179 (53.4)	156 (46.6)	5.958 ± 2.258
Overall awareness on EBM	160 (47.8)	175 (52.2)	26.892 ± 6.531

Table 5. Attitude toward storage and feeding of expressed breast milk among the respondents (n = 335).

Attitude	Number	Percent
Positive	175	51.9
Negative	160	48.1

Mean \pm SD: (51.352 \pm 4.612)
Minimum- Maximum score (36-64)

There was a statistically significant association between the level of awareness on expressed breast milk feeding and storage and ethnicity ($p = 0.013$), especially higher level of awareness among Brahmin Chhetri than Janajati, Dalit and Muslim.

While demographic and socioeconomic variables (e.g., age, ethnicity, religion, education, occupation, parity, type of family) were tested for an association with attitude to provide a more complete analysis and there was no statistically significant association .

Table 6. Correlation between awareness and attitude of expressed breast milk feeding and storage (n = 335).

Variables	Pearson correlation (r)		
	Awareness on EBM	Attitude on EBM	p value
Awareness on EBM	1	0.133**	0.015**
Attitude on EBM	0.133**	1	

**Pearson correlation coefficient significant at p value 0.01 level (2-tailed).

4. Discussion

In the current study, 47.8% of the respondents have had an adequate level of awareness, while 52.2% of postnatal mothers have had an inadequate level of awareness regarding expressed breast milk. These findings align with studies conducted in Nepal and Ethiopia, where less than half of the respondents were found to have adequate knowledge, at 46.2% and 36%, respectively [8] [21]. Similarly, studies in Nepal and Malaysia found that 39.6% of respondents had an inadequate level of awareness, while 50.6% and 57.0% demonstrated adequate knowledge, respectively [19] [22] [23]. These results indicate a consistent pattern across regions, highlighting significant gaps in knowledge about expressed breast milk that require targeted awareness programs and interventions. This study identifies a statistically significant association between awareness of expressed breast milk storage and feeding and ethnicity, with a p-value of 0.013. A similar association between the level of awareness and ethnicity ($p = 0.001$) was found in a study conducted in Nepal (14). These findings underline the importance of developing culturally sensitive awareness programs to address knowledge gaps across different ethnic groups. However, another study conducted in Nepal presents contradicting results, reporting no statistically significant association with selected variables

[22]. While another study conducted in Nepal shows a statistically significant association between the level of awareness and educational qualification and type of work, with p-values of 0.001 for both variables [13]. These varying findings emphasize the complexity of factors influencing awareness and suggest that different variables may play a role in different contexts.

The findings of the current study show that 51.9% of the respondents had a positive attitude, while 48.1% had a negative attitude toward expressed breast milk (EBM) storage and feeding. A similar study conducted in Kuala Lumpur, Malaysia, supported these findings, reporting that 73.0% of mothers had a positive attitude toward EBM [23]. Studies conducted in a tertiary hospital in India and Nepal showed that 68.75% and 60.4% of postnatal mothers, respectively, had an unfavourable attitude toward EBM feeding [4] [13]. These findings suggest that cultural beliefs, healthcare access, and breastfeeding education influence mothers' attitudes toward EBM. This study found no statistically significant association between attitudes toward the storage and feeding of expressed breast milk and the selected variables. Similar study conducted in India found no significant association between attitude towards expressed breast milk and demographic variables [4]. However, studies from Nepal have revealed significant associations between attitude levels and variables such as education ($p = 0.029$), ethnicity ($p = 0.017$), occupation ($p = 0.008$), and the child's sex ($p = 0.048$) [19]. Additionally, practice related to expressed breast milk were significantly associated with educational qualification ($p = 0.035$) and type of work ($p = 0.020$) [13]. In Malaysia, ethnicity was found to have a significant role in shaping positive attitudes toward expressed breast milk [23]. These variations suggest that factors influencing attitudes toward expressed breast milk can vary between different populations and cultures like working mothers. In context of Nepal, the practice of EBM is an emerging concept which have been a new practice. The cultural aspect related with feeding and storing EBM is not easily accepted in Nepal. The present study found a weak positive correlation between awareness and attitude toward expressed breast milk (EBM) storage and feeding ($r = 0.133$, $p < 0.015$) (Table 6). However, other studies report a moderate positive correlation ($r = 0.390$, $p < 0.001$) and a strong positive correlation ($r = 0.14$, $p < 0.012$) and ($r = 0.646$, $p < 0.001$) respectively [13] [22]. These differences highlight the varying strengths of the relationship between awareness and attitude in different contexts and populations.

5. Conclusion

More than half of the respondents had an inadequate level of awareness and positive attitude toward the storage and feeding of expressed breast milk. A significant association was found between the level of awareness and ethnicity. However, no significant association was observed between the level of attitude and the selected variables. There was a weak positive correlation between awareness and attitude of expressed breast milk feeding and storage. The discussion on the ways of expressing breast milk, the thawing methods, duration of storage of EBM at room

temperature, refrigerator and deep fridge could be discussed where the awareness was found low. Health education programs and awareness campaigns on expressed breast milk could be organized for individuals and families by the relevant hospital authorities.

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Author Contributions

Samjhana Kshetri Basnet: conceptualization, methodology, data collection, writing original draft, reviewing and editing.

Neeta Tamarakar: Formal analysis, Data Curation.

Rekha Thapaliya: supervision, visualization reviewing and editing.

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Data Availability Statement

The data is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

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Abbreviations

EBM Expressed Breast Milk