Expression and Storage of Breastmilk Among Urban Mothers in Southern India: Knowledge, Attitude, and Practice (KAP) Cross-sectional Survey

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Abstract

Background: Breast milk is always the best milk for the baby. Despite the advantages, many mothers are not able to pursue breastfeeding for various reasons. Breast milk can be continued for the babies even in their mother's absence for a while by expressing and storing the breast milk.

Aims: To assess the knowledge, attitude, and practice regarding expression and storage of breast milk (EBM) among mothers.

Methods: A community-based descriptive cross-sectional study was conducted for 3 months in the urban field practice area, Chennai. A sample size of 400 was selected using the systematic random sampling technique. The information was gathered using a pre-tested, structured questionnaire, which was then analysed using SPSS Version 16.0 and presented using appropriate statistical methods.

Results: Out of 400, only 7% of them had adequate knowledge regarding the expression and storage of breast milk. A positive attitude towards the expression and storage of breast milk was seen among 3/4th (77%) of them. But only 2% had good practices related to expression and storage of breast milk.

Conclusions: Overall, knowledge and practice regarding EBM were very low, but more mothers had a positive attitude towards EBM. As there is a positive attitude towards it, the practices can be improved if the mothers are trained continuously during the antenatal period.

Introduction

Breast milk is the best milk produced by the mother for the baby. Besides being safe and clean, it provides complete nutrition and also protects the infant from various life-threatening infections. Breast milk provides all the energy and nutrient requirements that infants need for survival during the first 6 months of life and provides about half of the nutrient and energy needs during the second half of the year. It is an effective way to ensure a child's health and survival. Above all, it is possible to administer the breast milk to the baby even in the mother's absence by pumping and storing the breast milk and using it as and when required.

Globally, only about 40% of infants are exclusively breastfed. It is said that about 820,000 children would be saved each year if breastfeeding practices were scaled up. WHO gives three recommendations regarding breastfeeding, i.e., to initiate breastfeeding within one hour of life, to give exclusive breastfeeding up to 6 months of life, and to continue breastfeeding up to 2 years of age and beyond along with proper weaning foods.^[1]

In India, 25 million babies are born every year, of which 3.5 million are pre-term and 7.5 million are low birth weight babies. These pre-term and low-birth weight babies face problems with survival, mainly due to feeding problems. ^[2] Often, direct breastfeeding is not possible for these babies, and the next alternative would be expressed breast milk. Breast milk is expressed for various reasons. Some babies

may require extra milk as a top-up feed after breastfeeding, some babies may not suck well at the breast, mothers may return to work, and some women express milk on a regular basis to improve milk production.

It is a proven fact that providing adequate nutrition to these babies not only yields short-term dividends but also long-term benefits in the form of improved neurodevelopmental outcomes.

Despite the known and proven benefits, many mothers abandon breastfeeding either partially or completely due to lack of sufficient time, early return to work, or because they do not know the expression and storage techniques of breast milk.

Based on the foregoing, this study was conducted to determine the knowledge, attitude, and practice regarding expression and storage of breast milk (EBM) among mothers in the urban area of Kancheepuram District, Tamilnadu. This helps to ascertain the gaps existing in the study area and to plan appropriate corrective strategies.

Material And Methods

A community-based cross-sectional study was conducted in Anakaputhur, the urban field practice area attached to a medical college in Kanchipuram district, Tamilnadu. It has 18 wards with a population of 48,050 (males: 24,158; females: 23,892). This study was conducted for 3 months from November 2018 to January 2019 among mothers residing in the study area for 1 year or more. The sample size was calculated based on the study conducted by Prabu PM et al., in Maharashtra ^[3] which reported the knowledge of expression and storage of breast milk among mothers was 64%, the sample size was calculated at a 95% confidence interval and keeping the precision as 5. After accounting 10% for non-response, the final sample size was estimated to be 368 which is rounded off to 400. Systematic random sampling was used to identify the study participants. Sampling interval was calculated as follows: Total number of households in Anakaputhur (N) = 1851, Sample size (n) = 400, Sampling interval = $N/n = 1851/400 = 4.6$. Thus every 5th household was selected for identifying a subject. If there was no eligible respondent in the selected household, the next house with the eligible study subject was selected. From that house, the next 5th household was selected. This procedure was followed till the desired sample size was reached. Mothers having a child of 2 years of age and less than 2 years were included after obtaining the informed consent. Mothers with children more than 2 years of age, had child expired and who were not willing to participate in the study were excluded from the study.

Data were collected from the consented participants using a pre-tested, structured questionnaire by the investigator. The questionnaire consisted of details regarding the sociodemographic characteristics and the knowledge, attitude, and practice regarding breast milk expression and storage of breast milk. The three main outcome variables in this study were knowledge, attitude, and practice regarding the expression and storage of breast milk among the study participants. These variables are composite

scores and each outcome was measured using answers given by the study participants to several sets of questions.

The content of the question for each outcome and how these outcomes were scored are summarized below.

Knowledge of the study participants on expression and storage of breast milk (6 questions)

Each component was given a score of 1 for correct response and 0 for an incorrect response/answer not known. The scores were then added to generate a total score of 6 maximum. If the total score obtained by a study participant is ≥ 3 then the individual is categorized as having “adequate knowledge”, otherwise the individual is categorized as having “inadequate knowledge”.

Attitude of the study participant on expression and storage of breast milk (10 questions)

Each response consistent with a positive attitude towards expression and storage of breast milk was given a score of 1 and 0 for a response with a negative attitude. The total score (out of the maximum score of 10) was calculated by adding the scores to individual questions. If the total score exceeds 50% the participant is classified as having a positive attitude and if not the participant is classified as having a negative attitude.

Practices towards expression and storage of breast milk (4 questions)

Practices towards expression and storage of breast milk were assessed using the following components – whether the study participants have expressed breast milk and if so how did they express it manually or with the help of an instrument, whether they stored the breast milk before feeding it to the baby. Each response consistent with good practice was given a score of 1 and if otherwise a score of 0. The composite score of each individual was categorized using the cut off of 50% with scores above the cut off as “good practice” and if otherwise as “poor practice”

The data were entered in Microsoft (M.S.) Excel and analysed using SPSS software version 16.0. The results were obtained by applying appropriate descriptive and analytical statistics.

Ethical Approval: The study proposal was approved by the Institutional Ethical Committee of Sree Balaji Medical College and Hospital. Informed written consent in local language was obtained from all study participants before administering the study questionnaire.

Results

A total of 400 eligible mothers participated in the study. About 50% of the study participants belonged to the age group of 26 – 30 years. Majority of the study participants belonged to Hindu religion (82%) and were married & live with the spouse (97%). Half of them were graduates (51.3%) and employed (43.2%).

More than half (59%) of the mothers belonged to middle class and upper middle class as per Modified BG Prasad socioeconomic classification.^[4] (Table1).

Only 39% of the mothers had heard about the expression of breast milk. Overall, only 7% of the study subjects had adequate knowledge regarding expression and storage of breast milk. (Table 2)

Most of them felt that breast milk fed babies gain weight adequately (81%) and cow's milk should not be fed to the babies till 1 year of age (77%). About 62% of the mothers felt that breast milk should not be stopped when returning to work after maternity leave and switch over to formula feeds. Based on the overall attitude score, 77% of the study participants had positive attitude towards expression and storage of breast milk. (Table 3)

About 72% of study participants said that they had expressed breast milk and majority of them have done it manually (95%). Among them, only 2% had stored the breast milk before feeding it to the baby. Only 2% of the study participants had good practices related to expression and storage of breast milk. (Table 4)

The adequate knowledge on EBM was observed and found significantly associated among mothers who were unemployed (OR – 0.20, 95% CI: 0.07 – 0.61, $p = 0.02$) and belonged to below middle class (OR – 0.18, 95% CI: 0.07 – 0.45, $p = 0.005$). The positive attitude towards EBM was found among mothers who were aged > 30 years (OR – 0.36, 95% CI: 0.19 – 0.68, $p = 0.001$), educated at high school level and above (OR – 4.51, 95% CI: 2.65 – 7.66, $p = 0.001$), employed mothers (OR – 27.76, 95% CI: 9.94 – 77.45, p value – 0.001), and belonged to middle socio-economic class and above OR – 20.95, 95% CI: 10.63 – 41.29, $p = 0.001$) to be significantly associated.

The good practices towards EBM were found to be associated significantly among mothers who were aged > 30 years (OR – 0.56, 95% CI : 0.34 – 0.93, $p = 0.02$), educated at high school level and above (OR – 3.13, 95% CI: 1.88 – 5.22, $p = 0.001$), employed (OR – 4.10, 95% CI: 2.52 – 6.69, $p = 0.001$), belonged to middle socio economic class and above (OR – 7.86, 95% CI: 4.86 – 12.70, $p = 0.001$) and had positive attitude (OR – 14.78, 95% CI: 8.52 – 25.62, $p = 0.001$).

Discussion

The status of knowledge, attitude, and practice related to the expression and storage of breast milk was studied among 400 mothers who had children aged less than 2 years. In our study, 61.5% of the study participants were aware of EBM. This was similar to a study done by Monika Lama et.al in Nepal (67.9%).^[5] In our study, 61.5% of the mothers did not know that breast milk can be expressed and stored. However, the finding from Suvarna et al. in Telangana was controversial, where, it had shown that 68% of the study participants knew that breast milk can be expressed and stored.^[6] The overall knowledge regarding EBM was very low in our study. This was similar to other studies conducted by Ester Mary et al. in Tamilnadu where 91.7% of the mothers had inadequate knowledge,^[7] by Ektha Shinde et al. from Maharashtra

showed that 68.3% of the mothers had poor knowledge regarding EBM. ^[8] Similarly in a study conducted by Attahiru et.al in Nigeria found that most of the respondents (87%) had poor knowledge regarding EBM. ^[9]

In our study, 76% of the study participants had positive attitude towards expression and storage of breast milk. Similar findings were found in a study conducted by Shabbir F et al. in Malaysia (73%).^[10] Few studies such as Priya Mohan et al. in Maharashtra (57%)^[3], Shrijana Pandey et al. in Nepal (48%)^[11] reported to have less positive attitude towards EBM.

With regard to practices, in our study only 2 % of the study participants have practiced the technique. The main reason for the respondents not practicing the technique is due to the lack of knowledge and awareness about the importance of breast milk. However there is a high prevalence of feeding expressed breast milk to the babies in developed countries which could be attributed mainly to the organizations which are promoting breast feeding practices in these countries.

Shrijana Pandey et al. found that employed mothers had increased odds of having good knowledge of EBM which was not similar to the present study. ^[11] In a study conducted by Shabbir F et al. in Malaysia reported that mothers who are well educated are at increased odds of having a positive attitude towards expression and storage of breast milk, however others factors were not significantly associated. ^[10]

The factors which were found to be associated with good practices towards expression and storage of breast milk were age less than 30 years, education, being employed, belonging to middle class and above and the knowledge level of the study participants. However in a study conducted by Attahiru et al. in Nigeria found that there was no association between practice of expressed breast milk and the socio demographic variables. ^[9]

Strength and limitation:

The exclusive knowledge, attitude and practice towards expressed breastmilk was obtained from the mothers. The recall bias was minimized by including the mothers who had children less than 2 years. Since the study was carried out in a single point of time, the temporal relationship could not be established.

Conclusion

The overall knowledge and practice regarding EBM was very low, but most of them had positive attitude towards EBM. A positive attitude needs to be transformed into practice regarding the expression and storage of breastmilk. Continued health education for target mother's i.e. antenatal mothers, mothers, working mothers, is required to raise the awareness about EBM. The enhanced knowledge level and positive attitude are essential for the development of favourable practice.

Declarations

Ethics approval and consent to participate:

This study was approved by the Institutional Ethics Committee of Sree Balaji Medical College and Hospital. Written informed consent was obtained from the participants prior to participation. Participants were given rights to withdraw at any time of participation.

Consent for publication:

All the authors gave consent for publication.

Availability of data and materials:

Data available on request

Competing interests:

None

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Authors' contributions - Provide individual author's contribution:

Dr K.R. conceptualized and planned the study and its methodology, collected data and analysed for this article. Dr R U guided throughout the research work with the expert inputs. Dr M S helped in data analysis and manuscript revision. All the authors read and approved the final manuscript for submission to the journal. This research work is not published or presented elsewhere.

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Tables

Table 1: Socio-demographic characteristics of the participants (N = 400)

S.No	Characteristic	Number	Percentage %
1. Age			
	18 – 25 years	88	22
	26 – 30 years	199	49.8
	31 – 35 years	105	26.2
	36 -40 years	8	2
2. Religion			
	Hindu	328	82
	Christian	50	12.5
	Others	22	5.5
3. Marital status			
	Married	388	97
	Divorced	4	2
	Widowed	8	1
4. Education			
	Illiterate	2	0.5
	Primary and middle school	76	19
	High school and higher secondary	117	29.3
	Graduate and above	205	51.3
5. Occupation			
	Employed	173	43.3
	Unemployed	227	56.8
6. Socio economic status			
	Lower	52	13
	Lower middle	112	28
	Middle	130	32.5
	Upper middle	106	26.5

Table 2: Knowledge of the study participants on expression and storage of breast milk (N = 400)

S.No	Variables	Number	Percentage %
1. Have you ever heard of expression and storage of breast milk?			
	Yes	154	38.5
	No	246	61.5
2. Can the breast milk be pumped and stored and given to the babies?			
	Yes	28	7
	No	306	76.5
	Maybe	66	16.5
3. Are electric pumps more effective than manual expression?			
	Yes	27	6.75
	No	287	71.75
	Maybe	86	21.5
4. Can the breast milk be stored at room temperature for 4 to 8 hours?			
	Yes	21	5.25
	No	311	77.75
	Maybe	68	17
5. Can the breast milk be stored in refrigerator for 3 days?			
	Yes	21	5.25
	No	312	78
	Maybe	67	16.75
6. Can the breast milk be stored in freezer for 6 months?			
	Yes	21	5.25
	No	310	77.5
	Maybe	69	17.25

Table 3: Attitude of the study participants on expression and storage of breast milk (N = 400)

S.No	Attitude towards expression and storage of breast milk	Number	Percentage %
1. Does expressing breast milk help to return or maintain pre pregnancy weight?			
	Yes	40	10
	No	288	72
	Maybe	72	18
2. Does pumping increases and maintains mothers' milk production?			
	Yes	87	21.75
	No	262	65.5
	Maybe	51	12.75
3. Does breast milk fed babies gain weight adequately?			
	Yes	324	81
	No	24	6
	Maybe	52	13
4. Cow's milk should not be fed to babies till 1 year of age			
	Yes	306	76.5
	No	94	23.5
	Maybe	-	-
5. Is it best to stop breast milk when we go back to work after maternity leave and switch over to formula feeds?			
	Yes	152	38
	No	248	62
	Maybe	-	-
6. Does the taste of the breast milk change after expression and storage?			
	Yes	46	11.5
	No	284	71
	Maybe	70	17.5
7. Is it too cumbersome to express breast milk?			
	Yes	95	23.8
	No	305	76.2
	Maybe		

8. Does breast milk loses all its nutrition by expression, freezing and thawing?		
Yes	46	11.5
No	288	72
Maybe	66	16.5
9. The equipment required for expression of breast milk are too expensive when compared to formula feeding?		
Yes	43	10.8
No	357	89.2
10. Expressing breast milk is more stressful to the mother compared to formula feeding		
Yes	78	19.5
No	306	76.5
Maybe	16	4

Table 4: Practice of the study participants on expression and storage of breast milk (N = 400)

S.No	Practice towards expression and storage of breast milk	Number	Percentage %
1. Have you ever expressed breast milk?			
	Yes	286	71.5
	No	114	28.5
2. If yes, how did you express it manually or mechanically?			
	Manual expression	271	94.7
	Mechanical expression	15	5.3
3. Did you store the breast milk before feeding it to the baby?			
	Yes	7	2.5
	No	279	97.5
4. If yes, how did you store the milk?			
	In refrigerator	7	2.5

S.No	Variables	Adequate	Inadequate	Odds Ratio	p-value
1.	Knowledge	n	n	(95% Confidence Interval)	
a. Age (in years)					
	≤ 30	17	270	0.65	0.37
	> 30	10	103	(0.29 – 1.46)	
b. Education					
	High school & above	18	304	0.454	0.06
	Below high school	9	69	(0.19 – 1.05)	
c. Occupation					
	Employed	4	169	0.20	0.02
	Unemployed	23	204	(0.07 – 0.61)	
d. Socio economic status					
	Middle class & above	6	230	0.18	0.005
	Below middle class	21	143	(0.07 – 0.45)	
2.	Attitude	Positive	Negative	Odds Ratio	p-value e
		n	n	(95% Confidence Interval)	
a. Age (in years)					
	≤ 30	207	80	0.36	0.001
	> 30	99	14	(0.19 -0.68)	
b. Education					
	High school & above	266	56	4.51	0.001
	Below high school	40	38	(2.65 – 7.66)	
c. Occupation					
	Employed	169	4	27.76	0.001
	Unemployed	137	90	(9.94 – 77.45)	
d. Socio economic status					
	Middle class & above	225	11	20.95	0.001
	Below middle class	81	83	(10.63– 41.29)	
e. Practice level					

	Good	253	22	15.62	0.001
	Bad	53	72	(8.90 – 27.4)	
3.	Practices	Good n	Poor n	Odds Ratio (95% Confidence Interval)	p-value
a. Age (in years)					
	≤ 30	188	99	0.56	0.02
	> 30	87	26	(0.34 – 0.93)	
b. Education					
	High school and above	238	84	3.13	0.001
	Below high school	37	41	(1.88 – 5.22)	
c. Occupation					
	Employed	146	27	4.10	0.001
	Unemployed	129	98	(2.52 – 6.69)	
d. Socio economic status					
	Middle class and above	203	33	7.86	0.001
	Below middle class	72	92	(4.86 – 12.70)	
e. Attitude Level					
	Adequate	68	46	14.78	0.001
	Inadequate	26	260	(8.52-25.62)	