

Breastfeeding Practices among Urban Mothers of Central Kerala, India: A Cross-Sectional Study

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ABSTRACT

Background: The practice of breastfeeding is vital in child nutrition and morbidity. The authors aimed to determine breastfeeding practices and factors related to Exclusive Breastfeeding (EBF) among mothers with children aged six months to 2 years in an urban area of Thrissur district, Kerala, India.

Methods: This was a community-based and cross-sectional study conducted on 339 mothers using cluster sampling in 2016 for one year in the urban area of Thrissur district, Kerala. Details regarding sociodemographic factors, obstetric history, child-related data and breastfeeding practices were collected from mothers using a pretested and semi-structured questionnaire. Analyses were done using SPSS16 and Epi Info 7.

Results: The mean age of study population was 27.21 ± 4.27 . 223 mothers (65.78 %, 95% CI = 60.43-70.77) initiated breastfeeding within 1 hour, and prelacteal feeding was observed in 25 cases (7.37%, 95% CI = 4.92-10.83). 99.71% practiced feeding on demand, and 30.97% (95% CI = 26.15- 36.24) of children were exclusively breastfed up to 6 months with mean duration of 3.95 ± 1.79 months. The mean age at which complementary feeding started was 4.83 ± 1.32 months. Cultural beliefs, mothers' employment, and problems during breastfeeding were significant predictors of EBF for up to 6 months.

Conclusion: Despite high educational status and good antenatal care among the study population, breastfeeding practices were not carried out at the recommended level. Breastfeeding was initiated within 1 hour of delivery by $2/3^{\text{rd}}$ and $1/3^{\text{rd}}$ of the children were exclusively breastfed up to 6 months. Cultural beliefs and mothers' employment were factors associated with EBF.

Keywords: Breastfeeding Practices, Exclusive Breastfeeding, Breastfed, Prelacteal Feeding, Central Kerala.

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Introduction

Breast milk is the best source of nutrition for an infant and plays a vital role in child survival. Even though breastfeeding is a common practice in India, the appropriate breastfeeding practices are not satisfactory, resulting in malnutrition among children. In 2020, it was estimated that 38.9 million children were overweight or obese, 45 million were wasted, and 149 million children under the age of five were stunted (i.e., too short for their age) (1). Breastfeeding practices are practices followed while breastfeeding a baby, and include prelacteal feeding, breastfeeding initiation, exclusive breastfeeding (EBF) for 6 months (EBF), predominant breastfeeding, bottle feeding, and timely initiation of complementary feeding (2). The World Health Organization (WHO) recommends that infants be exclusively breastfed for the first six months, followed by complementary foods until the age of 2 or above (3). The beneficial effects of breastfeeding depend on its initiation as early as possible (avoiding delay beyond an hour), duration and the age at which breastfed children are weaned (4). Several other factors like the community's educational, social, cultural, and economic factors also significantly affect the different breastfeeding practices (4). UNICEF and WHO launched Baby-Friendly Hospital Initiative in 1992 to protect, promote, and support breastfeeding (5).

The practice of prelacteal feeding, whereby infants receive food or liquid before initiating breastfeeding for the first time (2), is widespread in many Indian societies (6,7). This practice could introduce infection, sensitize the gut to foreign proteins, or delay the onset of lactation (8), resulting in harmful effects on the newborn. According to the National Family Health Survey, 46.3% of children in India are exclusively breastfed for six months of age (9). The low prevalence and duration of exclusive breastfeeding increase the risk of infant and childhood morbidity in both developed and developing countries (10). Predominant breastfeeding practices, including giving other fluids like tea, water, and sugar water in limited quantities, along with breastmilk (11),

are also seen in many parts of India due to the lack of awareness. The practice of bottle feeding and feeding with infant formula is also widespread in many parts of India (12, 13). Data from various sources showed that a breastfed child has a greater chance of survival than an artificially fed child (3, 14). Continuing breastfeeding for 2 years along with EBF helps to prevent early malnutrition and is very important to achieve optimal growth and development (3).

There are a few studies conducted in Kerala regarding breastfeeding practices. Compared to other states in India, the literacy rate of Kerala is much higher, and the literacy rate in the urban areas is higher than rural area (15). Despite high literacy rate, breastfeeding practices are not improved substantially. The prevalence of EBF among infants under 6 is 55.5% (16), despite Kerala's high literacy rate of 94% (15). Moreover, most of the mothers in urban areas of Kerala are employed, and breastfeeding practices may be different. Hence, this study helps to promote appropriate breastfeeding activities in the community by assessing the different breastfeeding practices and factors associated with EBF up to six months among mothers with children of six months to 2 years in the urban area of Thrissur district, Central Kerala, India.

Methods

A community-based and cross-sectional study was conducted for one year during the year 2016, in the corporation area of Thrissur district, Kerala. Mothers with children aged 6 months to 2, residing in the area for a minimum period of 6 months, were included in the study. After obtaining written informed consent to participate in the study, an interview was conducted among mothers using the pretested semi-structured questionnaire. The authors interviewed the mothers individually, after explaining the purpose of the study and ensuring the subject's confidentiality. The study protocol was approved by the Institutional Research and Ethics Committees of Govt. Medical College, Thrissur. Consent for the

study was also taken from the Mayor of the Thrissur Corporation.

Thrissur district is situated in central Kerala. Thrissur Municipal Corporation is the civic body which governs Thrissur city in Kerala. It has a population of 325474, spread over 101.42 sq. km and divided into five divisions such as Ayyanthole, Vilvattom, Ollukkara, Ollur and Koorkanchery, which was again divided into 55 wards (17). Cluster sampling technique was used in, and each ward in this corporation was considered a cluster. There were 55 wards in the corporation area of Thrissur district. Therefore, 55 wards were considered 55 clusters. 20 clusters were selected by simple random method using the lottery method. In order to achieve a required sample size of 352, 18 subjects were included from each cluster. The first subject was chosen from the first household on a randomly chosen lane at the site of arrival in the cluster, usually the main bus stop. The survey, then, proceeded to consecutive houses on either side of the road until 18 mothers were chosen. If more than one mother was present in the same household, all of them were included in the study. Houses, where the subject was absent during the visit, were revisited two more times in the subsequent days to increase the response rate.

The study was conducted for a period of one year, and data collection was completed in four months. Data included sociodemographic profile, obstetric history, infant details, and breastfeeding practices. Details of antenatal checkups, childbirth and postnatal checkups were cross-checked with their MCP card or hospital records wherever possible. The socioeconomic status of the concerned family was assessed using the modified Kuppaswamy's scale (18) for the urban population

and classified accordingly.

The sample size was calculated as 352 by considering a prevalence rate of 38%, for the youngest surviving child exclusively breastfed for the first six months (19), α error of 5%, design effect as 2, and a 10% non-response rate. Data collected from each individual was entered into a Microsoft Excel sheet after coding and rechecking of variables. General characteristics of the sample population were described in terms of proportions. The pattern of different breastfeeding practices among the study population was measured using proportions and a confidence interval of 95%. Quantitative variables were summarized using mean duration and standard deviation. According to the nature of the covariates, factors associated with different breastfeeding practices were assessed by bivariate analyses through chi-square test or t-test. The odds ratios and their 95% confidence intervals were computed to measure the strength of the association. Regression analysis was carried out to discover determinant factors of various breastfeeding practices. The significance level was estimated with a 95% confidence interval, and analyses were done with the help of SPSS and Epi Info 7.

Results

Out of the 352 subjects eligible for the study, 339 mothers participated in the study. The overall response rate was 96.3%, and the mean age of the subjects was 27.21 ± 4.27 . Among them, 78.48% of the mothers had an education above senior high school education level, and only 19.17% of the mothers were employed. The sociodemographic characteristics of the study participants are given in Table. 1

Table 1. Sociodemographic characteristics of the participants

Variable	Category	Frequency	Percentage
Age group (years)	11- 20	8	2.36
	21- 30	262	77.29
	31- 40	67	19.76
	41- 50	2	0.59
Religion	Hindu	184	54.28
	Christian	122	35.99
	Muslim	33	9.73
Education	Primary	1	0.29
	Secondary	1	0.29
	Senior secondary education(Grades 10-12)	71	20.94
	Graduated and above	266	78.48
Occupation	Housewife	274	80.83
	Professional	11	3.25
	Semiprofessionals	21	6.19
	Others	33	9.73
Socio-economic status	Lower	0	0
	Upper lower	24	7.08
	Middle/lower middle	183	53.98
	Upper middle	115	33.93
	Upper	17	5.01
Type of family	Nuclear	62	18.29
	Joint	277	81.71

Breastfeeding practices of the participants

The distribution of different breastfeeding practices is described in Table 2. 25 (7.37%) mothers gave prelacteal feeds to newborns. The common prelacteal feeds were giving Zam-zam water to (holy water from Mecca), 13 (52%) babies, 6 (24%) babies, Infant formula–lactogen, and 3 (12%) babies were fed with honey. The proportion of EBF was 30.97% (95%CI= 26.15-36.24). The mean duration of EBF was 3.95 ± 1.79 months, ranging from post-neonatal day 1 to 7 months, and the median duration was 4 months.

The mean age at which complementary feeding started was 4.83 ± 1.32 months, with a minimum of 1 month to a maximum of 6.5 months. Most mothers used banana powder (42.48%) followed by ragi (36.28%). About one-fourth of the mothers had one of the following problems during breastfeeding; the majority suffered from cracked nipples (63.16%), some insufficient milk (27.63%), and some other suffered from breast engorgement (3.95%). Reasons for early introduction (< 6 months) of feeds other than breast milk are presented in Figure 1.

Table 2. Summary of various breastfeeding practices (n = 339)

Variable	Frequency	Percentage	95% CI
Pre-lacteal feeding	25	7.37	4.92 - 10.83
Early initiation of breastfeeding (< 1 hour)	223	65.78	60.43 - 70.77
Colostrum feeding	339	100	100 - 100
EBF up to 6 months	105	30.97	26.15 - 36.24
Predominant breastfeeding before 6 months	115	33.92	28.95 - 39.27
Complementary feeding at 6 months	163	48.08	42.67 - 53.54
Bottle feeding	164	48.38	42.96 - 53.83

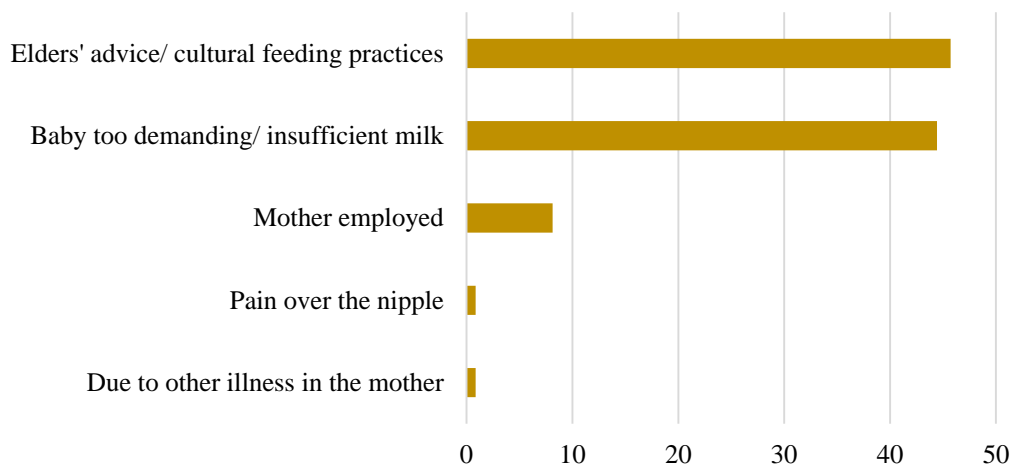


Figure 1. Reasons for early cessation of EBF (n = 234)

Benefits of EBF for 6 months

The benefits of exclusive breastfeeding in this study were assessed based on the occurrence of illness among the children during EBF period and the duration of lactational amenorrhoea (Tables 3 and 4). The odds of developing illness among those who were not exclusively breastfed until 6

months was 3.2 times higher as compared to those who were exclusively breastfed up to 6 months (OR = 3.20, 95% CI = 1.31- 7.82). The delayed return of menstrual period was observed in those mothers who practiced EBF, even though it was not significant.

Table 3. Association between illness in the child and EBF until 6 months of age

EBF up to 6months	Illness present (%)	Illness absent (%)	OR (95% CI)	χ^2	P-value
Not practiced (n = 234)	38 (16.24%)	196 (83.76%)			
Practiced (n = 105)	6 (5.71%)	99 (94.29%)	3.20 (1.31- 7.82)	7.108	0.007
Total (339)	44 (12.98%)	295 (87.02%)			

Table 4. Exclusive breastfeeding duration versus lactational amenorrhoea duration

EBF duration	Lactational Amenorrhoea	T value	P-value
< 6 months (n = 234)	4.25 ± 2.93months		
≥ 6 months (n = 105)	4.83 ± 2.92 months	1.687	0.09

Obstetric and child details of the study participants

240 (70.80%) mothers received breastfeeding advice at antenatal checkups, and health workers conducted home visits regarding 291 (85.84%) mothers. All the deliveries were institutional, 56 of which (16.52%) occurred in government hospitals.

Among the 339 mothers, 210 (61.95%) were had vaginal delivery, and the rest, 129 mothers (38.05%) underwent Caesarian sections. The mean age of children in the study was 14 ± 5.6 months and ranged from 6 months to 24 months. The majority of the children, 173 (51%), belonged to the age group 6- 12 months, 109 (32.2%) were

between 12 months to 18 months, and 57 (16.8%) children were between 19 months to 24 months. Most of the children, 183 (53.98%), were females. The mean birth weight was 2.99 ± 0.48 Kg, with a minimum birth weight of 950 gm to a maximum of 4.5 kg.

Factors associated with EBF until 6 months

Cultural beliefs, mothers' employment, and problems during breastfeeding (such as insufficient

milk and cracked/retracted nipple) were significant predictors of EBF until 6 months of age (Tables 5 and 6). Being above 30, religion, joint family system, educational level of senior high school and below and breastfeeding advice given by public health staff during house visits also affected EBF in the study area, even though it was not significant.

Table 5. Sociodemographic factors associated with EBF

Variable	Category	EBF up to 6 months		Odds ratio (95% confidence interval)	
		No (%)	Yes (%)	COR* (95% CI)	AOR**(95% CI)
Age	Age \leq 30yrs	188 (69.6)	82 (30.4)	1.146	1.07
	Age > 30 yrs	46 (66.7)	23 (33.3)	(0.65-2.01)	(0.58-1.99)
	Hindu	134 (72.8)	50 (27.2)	1.74	1.19
Religion	Christian	80 (65.6)	42 (34.4)	(0.79-3.75)	(0.52-2.78)
	Muslim	20 (60.6)	13 (39.4)	1.23	1.23
Type of Family	Joint	196 (70.8)	81 (29.2)	(0.55-2.73)	(0.54-2.86)
	Nuclear	38 (61.3)	24 (38.7)	1	1
	Senior secondary education and below	122 (71.3)	49 (28.7)	1.53	1.26
Mothers' education	Graduated and above	112 (66.7)	56 (33.3)	(0.86-2.71)	(0.68-2.34)
	Employed	50 (76.9)	15 (23.1)	1.245	1.29
Mothers' occupation	Unemployed	184 (67.2)	90 (32.8)	(0.78-1.97)	(0.79-2.12)
				1.63	2.01
				(0.87-3.06)	(1.02-3.94)

*Crude OR, **Adjusted OR

Table 6. Cultural and maternal factors associated with EBF

Variable	Category	EBF up to 6 months		Odds ratio (95% confidence interval)	
		No (%)	Yes (%)	COR* (95% CI)	AOR** (95% CI)
Cultural feeding practices	Yes	61 (85.9)	10 (14.1)	3.35	3.37
	No	173 (64.6)	95 (35.4)	(1.64- 6.84)	(1.53-7.43)
Breastfeeding advice by public health staff during house visit	Yes	37 (77.1)	11 (22.9)	1.605	1.01
	No	197 (67.7)	94 (32.3)	(0.79-3.29)	(0.539-1.73)
Problems during breastfeeding	Yes	65 (85.5)	11 (14.5)	3.29	3.38
	No	169 (65.43)	94 (35.7)	(1.65-6.53)	(1.67-6.83)

*Crude OR, **Adjusted OR

Discussion

Appropriate breastfeeding practices are necessary to achieve the fourth goal of MDG (Millennium Development Goals), which is reducing child mortality. Kerala is well known for

its health indicators comparable with developed countries and its high female literacy rate (15). Despite high educational status and good antenatal care among the study population, breastfeeding practices were not up to the desired level in the

study area. Every child should start being breastfed at the earliest. Breastfeeding was initiated within 1 hour of delivery by 2/3rd of the study population. In this study, 223 (65.78%) mothers began breastfeeding within one hour, which was comparable with other studies conducted in India (8, 9, 20, 21, 22) and was consistent with the NFHS-5 data of Kerala(16), which was 66.7%. This percentage was lower, compared to the District Level Household and Facility Survey, in which 78.8% of the mothers initiated breastfeeding within one hour (23). and a study conducted in Africa, in which 72.9% initiated breastfeeding within an hour (24). This was while Patel A et al. (13) in their observed a 23.5%. rate of timely initiation, which was very low. All the children were fed with colostrum in the study area.

The problem of prelacteal feeding was observed in the study population, in line with other studies (7, 12, 25, 26), with the highest proportion belonging to Muslims. This practice is harmful to the newborn as they could introduce infection, sensitizes the gut to foreign proteins, and may delay the onset of lactation (8). The present study showed the prevalence of prelacteal feeding at 7.37%. The prevalence of prelacteal feeding in the present study was very low as compared to other studies conducted in different parts of India, which was from 19% (27) to 91.25% (28). This lower prevalence of prelacteal feeding may be due to higher educational status of the mothers in the study population. The most common prelacteal fluid given in the present study was Zam-zam water (holy water from Mecca) among Muslims (52%), followed by lactogen (24%), Honey (12%), water (8%) and cow's milk (4%). Ghutti and honey were the most common prelacteal feeds in the study by Manish Chadurvedi et al. (7) in New Delhi. According to Vashney A M et al. (12), in Gujarat, animal milk and sugar water were the most common prelacteal fluids.

In the present study, all mothers (100%) have given breast milk to their babies, which was higher than the National Family Health Survey, in which 95.7% of the children in India were ever breastfed and 97.4% in Kerala (9). A study in Uttarakhand

by Vyas Shili et al. (29) found the proportion of children ever breastfed to be 93.6%. According to a study in Villages of Karnataka by Banapurmath C R et al., (30) 97% of the children were ever received breast milk.

EBF is recommended because it contains all essential nutrients for the first six months of life. 1/3rd of mothers in the study area did EBF until baby was six months.. Although female literacy rate was higher in Kerala compared with other states, a lower prevalence of EBF was observed in the present study (30.97%), lower as compared to the National level, 46.4% (9), and other studies conducted in different parts of India (26, 29, 31, 32). This percentage was higher than Kerala, which was 22.3% (23). In a population where the mother's educational status is high, and most of them are currently unemployed, EBF can easily be practiced. In addition, this percentage is relevant considering that all the deliveries were institutional and received postnatal feeding advice. In the present study, common reasons for discontinuation of EBF were elders' advice with regard to cultural feeding practices (45.73%), followed by insufficient milk (44.44%) and maternal employment (8.12%). In a study by Nishimura H et al. (33) conducted at rural South India, it found that insufficient milk was the most common factor for early discontinuation of EBF, which was consistent with the findings of the present study. Other studies carried out in India demonstrated that Insufficient milk (42%) and (28.5%), mother's employment (20%), and weight gain of the baby (15%) were the reasons for early discontinuation (8, 34, 22, 29). Diseases like respiratory infections and diarrhoea were significantly higher among infants with EBF for less than six months, similar to other studies (35, 36, 37).

The present study revealed a critical barrier, i.e., elders' advice regarding prevalent cultural feeding practices. Similar findings were observed in a study conducted by Avneet Randhawa et al. (32) at Punjab where it was found that that nuclear families were more likely to exclusively breastfed their babies more than those staying in joint or extended nuclear families. This finding may be due

to the cultural practices followed by the elders in the family. Hence, to improve EBF in a state with good health indices and a high literacy rate, focus group discussions may be conducted by involving elders of the house, religious leaders, local leaders, healthcare providers and mothers to address prevailing practices which hamper EBF. EBF is a simple and cost-effective method to reduce common morbidities like acute diarrheal diseases and acute respiratory infections among under-five children. Due to short maternity leave time, the return to work may hamper employed mothers from breastfeeding their infants exclusively for the recommended six months duration. Therefore, adequate support for breastfeeding mothers in the workplace should be ensured.

Since the data collected was pertaining to the previous two years, recall bias may have occurred. As mothers with children of over 2 were included in the study, it is impossible to assess the continuation of breastfeeding for up to 2 years.

Conclusions:

Breastfeeding practices among the women in the study area are not up to the recommended level, even though there is a high level of academic education in the study group. The prevalence of EBF up to 6 months is 30.9%, which is extremely low, compared to the WHO recommendations (100%) and the national average (55.5%) according to NFHS-5 data. This study also highlights certain crucial areas of concern, such as the cultural barriers imposed by the elders in the family, mother's employment, and problems faced by mothers during breastfeeding (insufficient breast milk, cracked nipple, retracted nipple). These factors were statistically consistent with other studies conducted in different parts of India.

Therefore, it is imperative to carry out in-depth studies to identify the gaps in breastfeeding practices and offer tailored interventions such as counselling the mothers and elders in the family antenatally, providing postnatal lactation support and counselling, and considering adequate

maternity leave for mothers based on the needs of the study population. This in turn may positively influence breast feeding practices, thereby, improving child health and lowering healthcare costs.

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All the ethical principles have been observed in the present study. The study protocol was approved by the Institutional Research and Ethics Committees of Govt. Medical College, Thrissur

Conflict of interest

Authors declared no conflict of interest.

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Ethical considerations

All the ethical principles have been observed in the present study. The study protocol was approved by the Institutional Research and Ethics Committees of Govt. Medical College, Thrissur

Code of Ethics

Maintained during the entire study period.

Authors' contributions

All authors contributed to conception, design, and definition of the intellectual content of the study; Data were collected by F. O and J. KS; all authors participated in data analysis, interpretation, and manuscript drafting, and F. O, P. C, S. MV, and R. R provided critical revisions. The final draft of the manuscript was reviewed and approved by all authors.

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List of abbreviations

Abbreviation	Definition
EBF	Exclusive breastfeeding up to 6 months
MDG	Millennium Development Goals
WHO	World Health Organization
UNICEF	United Nations Children's Fund