Research Article

Feeding practices during first 6 months of infancy - Observations from a community-based cross-sectional survey in Central Kerala, India

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ABSTRACT

Background: Even though Kerala shows good breastfeeding indicators, several unhealthy feeding practices are prevalent. **Objective:** The onjective of this study is to assess the feeding practices during 1st 6 months of infancy and influencing factors. **Materials and Methods:** A community-based cross-sectional survey was conducted among 308 mothers of 6–12-month-old infants in Central Kerala. Descriptive analysis was done and logistic regression models were used to estimate odds ratios (OR) and 95% confidence intervals (CI). **Results:** Only 43.5% of participants reported that they initiated breastfeeding within 1 h of delivery and it was significantly related to place (government/private hospital) and type (cesarean/normal) of delivery. Prelacteal feeding was given to 22.4% of infants, and it was significantly higher among mothers who belong to Muslim religion (OR = 5.43; 95% CI: 2.91–10.16) as compared to mothers from other religious groups (Hindu/Christian). The majority of mothers (83%) were aware of the recommended duration of exclusive breastfeeding, but only 17.2% of mothers practiced it for 1st 6 months. Nearly 68% of mothers introduced cereals to their babies at the average age of 3.5 months. Advice from family members was the major reason reported for not following exclusive breastfeeding. **Conclusions:** There is a wide gap between awareness about the recommended duration of exclusive breastfeeding and actual breastfeeding practice. Breastfeeding initiation after delivery and prelacteal feeding practices should be monitored in all hospitals. Mothers and family members should be encouraged and motivated to provide exclusive breastfeeding to infants for 1st 6 months.

KEY WORDS: Awareness; Exclusive Breastfeeding; Feeding Practices; Infancy, Cross-sectional Survey, Kerala

INTRODUCTION

Infancy is characterized by rapid physical growth and development.[1] Breastfeeding is the primary way of providing ideal food for healthy growth and survival of infants.[2] Exclusive breastfeeding is defined as "no other food or drink, not even water, except breast milk (including milk expressed or from a wet nurse) for 6 months of life, but allows the infant to receive ORS, drops, and syrups (vitamins, minerals, and medicines)."[2] The World Health Organization (WHO) recommends initiation of breastfeeding within 1 h of birth, exclusive breastfeeding for 1st 6 months of life, and appropriate complementary food with continued breastfeeding up to 2 years of age or beyond.[3] It was observed that children who were breastfed for long duration had less infectious morbidity, fewer dental malocclusions, and higher intelligence and has protection against overweight and diabetes in later life.[4,5]

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Poor infant and young child feeding practices have been identified as major reasons for the huge burden of

childhood morbidity and mortality in many developing countries.[6] The WHO factsheet-2016 on infant and young child feeding shows that over 800,000 under-five children lives could be saved every year if globally all children are optimally breastfed.[7] As per the World Breastfeeding Trend Initiative report (2012) on breastfeeding in India, the prevalence of exclusive breastfeeding and timely initiation of breastfeeding was 46.5% and 40.5%, respectively.[8] The factors influencing infant feeding practices include maternal factors, health system factors, family and community factors, and socioeconomic factors.[9,10]

In 2002, Kerala was declared as the first baby-friendly state in the world based on the good achievements in breastfeeding indicators, but studies have shown that several unhealthy infant feeding practices such as late initiation of breastfeeding, prelacteal feeding, non-exclusive breastfeeding up to 1st 6 months, and bottle feeding are prevailing in this state.[11,12] The National Family Health Survey report 2015-16 (NFHS-4) also provides valid information on unhealthy feeding practices in the state.[13] Although the information on feeding practices is available based on nationally representative data such as NFHS, it will be useful to understand how breastfeeding recommendations are practiced and what are the factors influencing different feeding practices in specific locations. Therefore, we conducted a study among mothers of 6–12-–month-old children in a Taluk in Central Kerala.

The objectives of this paper are to describe the awareness of mothers regarding the recommended breastfeeding practices and to describe various feeding practices such as late initiation of breastfeeding, pre- and post-lacteal feeding, and non-exclusive breastfeeding during 1st 6 months of infancy, and the factors influencing these practices.

MATERIALS AND METHODS

A community-based cross-sectional survey was carried out among mothers of 6–12–month-old children from Chittur Taluk in Palakkad, a Central Kerala district using multistage cluster sampling method. Required sample size was estimated using the following formula: $3.84\times p(1-p)/d^2$ where $P = 56.2\%$ (prevalence of exclusive breastfeeding in 0–5-month-old infants in Kerala according to the NFHS-3[12]) and $d = 7\%$ (absolute precision). The sample size was adjusted for a design effect of 1.5, non-response rate of 10%, and finite population correction using a population size of 3300 mothers. The population of mothers having 6–12-month-old infants in Chittur Taluk was estimated to be 3300 based on the crude birth rate of Kerala (14.7)[14] and population size of Chittur Taluk in 2001 ($n = 425575$).[15] The final sample size was rounded to 308 mothers.

Mothers were recruited from seven randomly selected panchayats in Chittur Taluk. Each panchayat consists of a minimum of four subcenters. Eleven mothers were randomly selected from each subcenter area using the maternal and child health registers available in each subcenter. Four subcenters were randomly selected if there were more than four subcenters in a panchayat. A structured interview schedule with close- and open-ended questions was used for data collection. A written informed consent was obtained from all participants before the interview. The Institutional Ethics Committee approved the study protocol.

Statistical Analysis

Data entry and analysis were done using IBM SPSS Statistics for Windows (Version 21.0). The outcome variables for the analysis were defined as follows:

Initiation of breastfeeding within 1 h of delivery: Categorized as "Yes" or "No".

Pre-lacteal feeding: Categorized as "Yes" if the newborn received any liquid or food before initiation of breastfeeding and "No" otherwise

Post lacteal feeding: Categorized as "Yes" if the infant received any liquid or food other than breast milk within 1st 7 days of birth after initiated breastfeeding and "No" otherwise.

Duration of exclusive breastfeeding: How long the mother exclusively breastfed the child (months). For further analysis, the variable was categorized as ≤4 months and ≥5 months.

Early complementary feeding: Categorized as "Yes" if the infant received any kind of solid or liquid food before 6 months, and "No" otherwise.

Feeding practices were described using frequency and percentages. Chi-squared test was used to test associations. Odds ratios (OR) and 95% confidence intervals (CI) were estimated using logistic regression models. The variables that showed a significant relationship with outcome variables were selected for logistic regression analysis.

RESULTS

Details of Participated Mothers and the Indexed Children

Of 308 mothers, 15.3% were above 30 years of age and the remaining was in the age group of 18–30 years. Almost 55% of mothers attained an educational level of higher secondary or above and 77.6% of mothers were housewives. A 10% of women resigned job after delivery, and only 12.3% of women were currently employed in public or private sector. Majority of women were Hindus (74.7%), followed by Muslim (22.1%) and Christians (3.2%). The proportion of cesarean section was 41% and almost 59% of participants delivered

in private hospitals. Any health problem during delivery was reported to be 10%. Regarding children, more than 80% had normal birth weight, 53.7% were male, 41.6% were the first child of the mother, and 13.2% had any kind of health problem during birth.

Awareness Regarding Breastfeeding

Nearly half of the participants received any kind of information related to breastfeeding during antenatal period, whereas more than 90% of participants received any kind of information regarding breastfeeding after delivery. During antenatal period, ASHA or Anganwadi workers were the main providers of the information, whereas staffs at hospital or health center were the major source of information after delivery. There was a vast difference in the proportion of women who were aware of initiation of breastfeeding after a cesarean section (28%) and a normal delivery (65%). Majority of participants (83%) knew that the recommended duration of exclusive breastfeeding is up to 6 months.

Infant Feeding Practices

Table 1 shows feeding practices of the participated mothers during 1st 6 months of their infants. The mostly used prelacteal feedings such as Zam-Zam water and honey were given as part of religious practices, whereas glucose water was given due to the delay in shifting of mother to the room after delivery. Formula milk was the most used post-lacteal feeding (29.7%), which was given to the child mainly due to insufficient breast milk in 1st 2 days.

Table 1: Feeding practices reported by mothers (*n*=308)

Feeding practices	*n* (%)
Breastfeeding initiated within 1 h of delivery	134 (43.5)
Prelacteal feeding given to the infant	69 (22.4)
Type of prelacteal feeding given (*n*=69)	
Zam-Zam water	36 (52.2)
Glucose water	14 (20.3)
Honey	27 (39.1)
Plain water	4 (5.8)
Formula milk	7 (10.1)
Others*	4 (5.8)
Post-lacteal feeding given to the infant	64 (20.8)
Type of post-lacteal feeding given (n=64)	
Glucose water	8 (12.5)
Honey	18 (28.1)
Plain water	11 (17.2)
Cow's milk	3 (4.7)
Formula milk	19 (29.7)
Others**	16 (25.0)

*Other prelacteal feeding includes dates, sugar, and gold rubbed water. **Other post-lacteal feed includes tea, dry grape juice, sugar solution, gold rubbed water, and palm sugar solution

Around 72% of participants gave exclusive breastfeeding at least for 1st 3 months and 24% of the mothers exclusively breastfed their children for more than or equal to 5 months. The sudden decline in the proportion of infants who received exclusive breastfeeding between the age of 3 and 4 months is clearly shown in Figure 1. The major reasons for not following exclusive breastfeeding for the recommended period were advice from family members (60.8%) and insufficiency of breast milk (29%). Among participants who introduced any kind of food to the child before the age of 6 months (*n* = 228), 92% gave cereals at an average age of 3.5 months. Fruits (10%), cow's milk (10.5%), formula milk (14%), and mashed vegetables (1.8%) were the other solid or liquid foods introduced to the infants before 6 months.

Factors Related to Infant Feeding Practices

Factors related to the initiation of breastfeeding and prelacteal feeding are described in Tables 2 and 3. Birthplace and type of delivery were identified as the most important factors related to the initiation of breastfeeding within the recommended time. Mothers who delivered in government hospitals were 3 times more likely to initiate breastfeeding within 1 h of delivery as compared to mothers who delivered in private hospitals. Similarly, those who had a normal delivery were 3 times more likely to start breastfeeding within the recommended duration as compared to mothers who had a cesarean section [Table 2]. Being a female child, mother belongs to Muslim religion and delivered in private hospital showed significantly higher odds for initiating prelacteal feeding as compared to their counterparts, among which mothers who belong to Muslim religion showed the highest OR [Table 3].

Health problem to the child during birth was the only significant factor associated with post-lacteal feeding. The proportion of post-lacteal feeding was 40.6% among those who had health problems versus 22.6% among those who had no health problems during birth (OR = 3.05; 95% CI: 1.50–6.19). Occupational status of mother and information related to breastfeeding received during the antenatal period were the significant factors associated with exclusive breastfeeding (for ≥5 months). Mothers who received information on breastfeeding during the antenatal period were nearly 2 times more likely to practice exclusive breastfeeding compared to those who did not receive information (OR = 1.83; 95%CI: 1.07–3.24). Exclusive breastfeeding was significantly higher among mothers who are currently employed in public or private sector than homemakers (OR = 2.15; 95%CI: 1.04–4.45).

DISCUSSION

Major observations from our study is that only one of four mothers actually practiced exclusive breastfeeding for more than or equal to 5 months and a considerable proportion of

Table 2: Factors influencing initiation of breastfeeding within 1 h of delivery

Variables	Total	Women initiated breast-feeding within 1 h	OR and 95% CI	
		n (%)	Un adjusted	Adjusted
Birthplace				
Private hospital	181	59 (32.6)	1	1
Government hospital	127	75 (59.1)	2.98 (1.86–4.77)	3.23 (1.95–5.33)
Type of delivery				
Cesarean section	127	35 (27.6)	1	1
Normal delivery	181	99 (54.7)	3.17 (1.95–5.16)	3.35 (1.99–5.61)
Health problems to the child during delivery				
Present	41	11 (26.8)	1	1
Absent	270	123 (45.6)	2.23 (1.07–4.66)	2.01 (0.89–4.54)
Health problems to mother during delivery				
Present	31	10 (32.3)	1	1
Absent	277	124 (44.8)	1.7 (0.77–3.74)	1.44 (0.59–3.51)

OR were adjusted for each other variables. OR: Odds ratio, CI: Confidence interval

Table 3: Factors influencing prelacteal feeding

Factors	Total	Infants received prelacteal feeding	OR and 95% CI	
		n (%)	Unadjusted	Adjusted
Educational status of mother				
Up to high school	139	22 (15.8)	1	1
Higher secondary and above	169	47 (27.8)	2.04 (1.16–3.60)	1.70 (0.88–3.30)
Religion				
Hindu/Christian	240	36 (15)	1	1
Muslim	68	33 (48.5)	5.34 (2.95–9.67)	5.43 (2.91–10.16)
Sex of the child				
Male	167	30 (18.1)	1	1
Female	144	39 (27.5)	1.71 (1.00–2.94)	2.45 (1.32–4.53)
Birthplace				
Government hospital	127	16 (12.6)	1	1
Private hospital	181	53 (29.3)	2.87 (1.15–5.30)	2.22 (1.11–4.44)

OR were adjusted for each other variables. OR: Odds ratio, CI: Confidence interval

mothers started complementary feeding when the child was 3½ months old even though majority of participants had awareness regarding recommended duration of exclusive breastfeeding (82%). The initiation of breastfeeding within the recommended time was related to birthplace and type of delivery, whereas prelacteal feeding was related to religion, sex of the child, and birthplace and post-lacteal feeding was mostly related to health problems to the child. Breastfeeding information received during the antenatal period has a significant influence on practicing exclusive breastfeeding for more than or equal to 5 months of infancy.

Similar to our study, the initiation of breastfeeding within 1 h of delivery was documented as 40% in DLHS-3 report for India and 45% in one study conducted among mothers attending a pediatric clinic in a rural hospital in Kerala.[16,17] A much higher prevalence was reported in a study done in UP where the early initiation of breastfeeding was 75%.[18] The NFHS-4 report shows that the initiation of breastfeeding within 1 h of delivery ranges from 28.7% in Kollam district to 81.4% in Kottayam district in Kerala, and the proportion was 63.4% in Palakkad district.[13] The observed difference in the proportion of mothers who initiated breastfeeding within 1 h of delivery between those who delivered in government and private hospitals (59% vs. 33%) in the current study seeks more attention. One study conducted in a rural village in Kancheepuram District in Tamil Nadu reported that breastfeeding initiation within the recommended duration is high among mothers who had normal delivery and hence suggests that type of delivery can affect initiation of breastfeeding within recommended time.[19] However, our data suggest that late initiation of breastfeeding among those who delivered in private hospitals may not be due to a large number of cesarean deliveries done in private hospitals because the proportion of cesarean deliveries done in government and private hospitals was similar (40.2% vs.

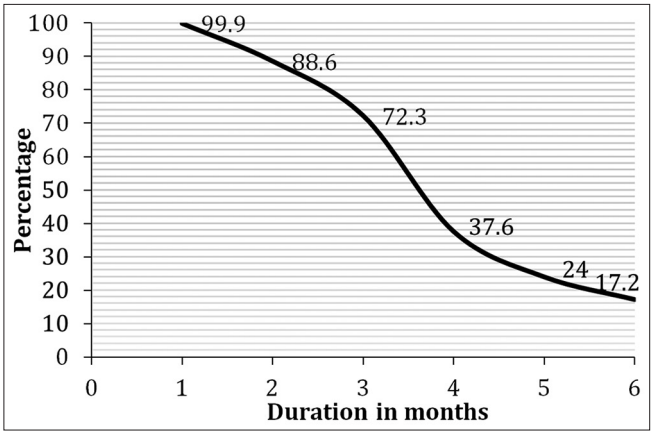

Figure 1: Duration of exclusive breastfeeding

42.0%) in the current study. Some mothers who delivered in private hospitals reported that late initiation of breastfeeding was occurred due to delay in shifting mothers from the delivery room after late night delivery.

Prelacteal feeding increases the risk of illnesses such as diarrhea, allergy, and other infections in children.[20] The NFHS-4 report shows that among ever breastfed last-born children to mothers, only 9% received a pre-lacteal feed in Kerala.[13] However, the prevalence of prelacteal feeding was quite high in studies using the definition of prelacteal feeding as in the current study. A cross-sectional study conducted in Maharashtra by Dawal *et al*. in 2014 showed a prevalence of 49%,[21] whereas another cross-sectional study from Uttarakhand showed a prevalence of 66.8%.[22] Although the prevalence is low in the current study (22.6%) compared to the above-mentioned studies, it needs attention because one of five infants received any prelacteal feed. Moreover, it may possible that prelacteal feeding was underreported in our study because women were interviewed several months after their delivery, and women sometimes may not be aware of whether the relatives had given any prelacteal feed to the infant.

It was noted that significant proportion of female children received prelacteal feeding as compared to male children in the current study. Results of multiple logistic regression analysis showed that the role of sex was significant even after adjusted for religion and educational status of mothers. Some people have the belief that prelacteal feeding will give beauty to the girl child. This could be a reason for the increased prevalence of prelacteal feeding among female children. In contrast, some other studies done in India did not show any marked sex difference in prelacteal feeding practice.[21,22] The NFHS-4 data show that the proportion of children who received prelacteal feed was slightly higher among male children (10.2%) than female children (7.7%) in Kerala.[13] In the current study, the practice of prelacteal feeding was significantly higher among mothers who belong to Muslim religion as compared to Hindu/Christian. Similar observation of the high prevalence of pre-lacteal feeding practice among Muslim religion was reported in a study conducted in Maharashtra.[21] However, in the NFHS-4 report, the prevalence of prelacteal feeding was lower among Muslim religion (6.9%) than Hindu (10.4%) or Christian (9.3%) religion in Kerala.[13]

Some Indian studies showed a low prevalence of exclusive breastfeeding for 6 months similar to our study. One study conducted in Bengaluru in 2015 reported that the prevalence of exclusive breastfeeding for 6 months was 27%,[23] and a nationwide survey in 2003 reported a prevalence of 26% for 4–6 months duration of exclusive breastfeeding.[24] As per the NFHS-4 report, 4–5-month-old children who received exclusive breastfeeding were 37.5%,[13] the proportion is quite close to what we observed in our study. However, much higher prevalence was also reported by studies in India. One study conducted in rural areas of Bengaluru in 2009 reported that 40% of the children received exclusive breastfeeding for 1st 6 months.[25] One study conducted in South India in 2012,[26] and another study in Jhansi (Uttar Pradesh) in 2015 [18] reported a prevalence of 60%. However, one recent study conducted in a rural village in Tamil Nadu reported a prevalence of 69%.[19] In the current study, the major reason reported for non-exclusive breastfeeding was advice from family members followed by insufficiency of breast milk. However, some other studies reported the major reason to be insufficiency of breast milk.[18,19]

In general, the current study helped to describe the different feeding practices followed for infants during 1st 6 months in a community in Central Kerala. One of the limitations of this study is long recall period since the participants need to recall things which were done 6 months before. Another limitation of this study is that mothers' awareness was asked after completion of their practice.

CONCLUSION

The study pointed out that a considerable number of mothers started complementary feeding before the child was 4 months old, even though the majority of women had awareness regarding the recommended duration of exclusive breastfeeding. The number of children who received prelacteal feed was also not negligible, and it suggests that breastfeeding initiation should be monitored in all hospitals compulsorily. The awareness programs should focus mothers as well as their family members, especially the primary caregivers during the postnatal period, and continuous support should be given to mothers for at least 1st 6 months of infant's life. Mothers should get advice on how to increase breast milk production. Supplementary and complementary feeding should be advised only in unavoidable situations.

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