

Determinants and Effects of Exclusive Breastfeeding Among Infants at a Tertiary Care Center, Kerala

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Abstract

BACKGROUND: Exclusive breastfeeding (EBF) is the first fundamental right of the child. Globally less than half of the infants of the world are optimally breastfed. Suboptimal breastfeeding can lead to increased respiratory and gastrointestinal infections. This study was undertaken to assess the determinants and effects of EBF among infants at a tertiary care hospital in south India.

METHODS: This cross-sectional study was done among infants at the pediatric unit of Believer's Church Medical College Hospital, from October 2019 to April 2020, using a structured pretested questionnaire.

RESULTS: 257 infants were included in the final analysis. 70.4% of babies were exclusively breastfed for the first 6 months, while 80.9% were breastfed within the first hour after birth. Among determinants of exclusive breastfeeding, unemployed mothers and mother's without a professional qualification were more likely to continue exclusive breastfeeding for 6 months (OR 2.8 95% CI (1.6 – 4.9). and 2.7 95% CI (1.5 – 4.9). respectively). Antenatal counselling appeared to have some beneficial effect but the result was not statistically significant. We did not find significant increase in the number of infections or hospitalizations for respiratory or gastrointestinal infections among the formula fed babies. However, significantly lower number of breastfed babies had constipation (OR 0.4, 95% CI 0.2 – 0.9) when compared to formula fed babies.

CONCLUSION: Significantly higher percentage of infants presenting to our hospital have been exclusively breastfed as compared to the state average. The major determinant of EBF was maternal education and employment and the main effect of EBF was a protection against constipation.

Background

Breastfeeding is the first fundamental right of the child. Exclusive breastfeeding is defined as 'no other food or drink, except breast milk for the first 6 months of life, with the exception of oral rehydration solution, or drops/syrups of vitamins, minerals or medicines (1). WHO recommends initiation of breast milk within the first hour of life, continuing exclusive breastfeeding till 6 months, and appropriate complementary food with continued breastfeeding up to the age of 2 years. According to the WHO, over 800,000 under 5 children's lives could be saved if optimal breastfeeding practices were followed, however only 44% of infants under 6 months of age are exclusively breastfed globally (2).

According to India's National Family Health Survey 5 (NFHS) (2019-2020), 66.7% of children in Kerala received breastfeeding within an hour of birth, while only 55.5% were exclusively breastfed for 6 months(3). Though these figures are marginally better than the previous survey in 2015-2016 (64% and 53% respectively), the fact remains that only about 50% of infants receive optimal breastfeeding.

Infant and young child feeding practices significantly affect child mortality and morbidity. The World Health Organization has identified 17 indicators of Infant and Young Child Feeding (IYCF) practices. Of these, 6 are breastfeeding indicators which are:

- a. Ever breastfed
- b. Early initiation of breastfeeding
- c. Exclusively breastfed for the first 2 days after birth
- d. Exclusively breastfed under 6 months
- e. Mixed milk feeding under 6 months
- f. Continued feeding 12-23 months(4)

This study was undertaken with the aim to understand breastfeeding trends and analyze breastfeeding indicators among infants admitted to a tertiary care hospital in Kerala, South India.

Methods

STUDY DESIGN AND SETTING:

Cross-sectional study among infants visiting the pediatric facility (OPD, immunization clinic, emergency room, in-patients wards) at Believer's Church Medical College hospital between October 2019 and April 2020. Study participants were infants from 6 months to 1 year of age, and their mothers. Following discharge, telephonic interviews were conducted and a pretested structured questionnaire was administered to each mother. Each interview lasted for about 20 minutes. The questionnaire was based on previous similar studies, and a pilot study was initially conducted among 100 babies born in this hospital, and the questionnaire was modified accordingly.

TIME FRAME: October 2019 to April 2020

SAMPLE SIZE CALCULATION:

Based on the NFHS-5 data, using a prevalence of 55.5% breastfeeding in Kerala, relative precision of 10% and alpha error of 5% the minimum required sample size was calculated to be 309.

STUDY MEASURES:

We defined exclusive breastfeeding (EBF) as being fed only breast milk without other formula supplementation as per WHO. To assess socio-demographic characteristics of the mother questions asked were age at delivery, education, employment, gravidity, and type of family. Child characteristic assessed were birth weight of infant, gestation at birth and mode of delivery and gender. Reasons for discontinuing EBF were asked in detail. To assess the effects of type of feeding on the infants' health, questions were asked about respiratory, gastrointestinal and ear infections, and infections requiring antibiotics or hospitalization as well as constipation.

STATISTICAL ANALYSIS:

Descriptive statistics includes counts and proportions for categorical data and Mean and Standard Deviation for continuous data. Univariate analysis to obtain the determinants and effects of EBF included Test of proportions, Student t test and Odds Ratio with 95% Confidence Interval

Results

There were 2426 children who visited the pediatric facility from October 2019 to April 2020. Of these 603 were infants between the ages of 6 months to 1 year. Attempts were made to contact all eligible parents. However, after excluding mothers who did not give consent for the study and mothers who did not respond to the phone call, 257 mother-infant dyads were included in the final analysis.

181 (70.4%) mothers gave exclusive breast feeding to their babies for the first 6 months. 208 babies (80.9%) were breastfed in the 1 hour after birth. There was no significant gender based difference in the rates of exclusive breastfeeding. Nor was there a significant difference in the rates of exclusive breast feeding by gestational age at delivery or birth weight.

Demographic characteristics and its association with exclusive breastfeeding are given in Table1.

The youngest mother was 19 years old at the time of delivery and the oldest was 42 years old. The average age of mothers in our study was 29.1 years. Age of the mother at delivery did not influence her choice to exclusively breastfeed her baby.

A majority (61.1%) of the mothers had either a professional qualification or a post graduate degree. However, the less educated were more likely to breastfeed exclusively (OR 2.7, 95% CI 1.5-4.9, p=0.001).

About a third (32.2%) of the mothers were employed at the time of pregnancy. Mothers who were unemployed were significantly more likely to practice exclusive breast feeding (OR 2.8, 95% CI 1.6-4.9, p=0.001). Of the mothers who were employed, there were 19 (25%) mothers who had shorter maternity leaves and needed to return to work before 6 months post-partum.

Almost equal number of mothers lived in joint families (49%) as in nuclear families (51%). The type of family did not have an association to the feeding practices.

Analyzing the characteristics of the child, the sex ratio was a little over 1 with girls being more than boys. There were more firstborns (56%), less pre-term babies (12.1%) and less low birthweight babies (13.6%). None of these characteristics were associated with feeding practices.

A majority, which is 232 (90.7%), of the mothers were given counselling antenatally about the need for exclusive breastfeeding and how to practice exclusive breastfeeding for 6 months. Mothers who were counselled antenatally appeared to be more likely to continue exclusive breastfeeding. However, this association was not significant (OR 1.5, 95% CI 0.6-3.6, p=0.9). Similarly most mothers, (80.9%) breastfed within one hour. However, this practice too, was not statistically significant for continued breastfeeding till 6 months (OR 1.3, 95% CI 0.7-2.6, p=0.9).

The predominant reasons for supplemental feeding were failure of lactation (39.3%), mother resuming work or studies (26.3%), post infection (13.2%) and poor weight gain (9.2%) (Fig. 1). Mothers reported resorting to formula feeding specially during an episode of illness, either in the mother or in the child, following which either mixed feeding was practiced or mother resorted to formula feeding only.

We also examined the effect of EBF on the health of the infant. Breastfed babies were less likely to have constipation when compared to breastfed babies (OR 0.4, 95% CI 0.2 – 0.9). The two groups did not differ in either the need for hospitalization or the number of respiratory or gastrointestinal infections.

Table 1
Determinants of Exclusive Breastfeeding

Determinants	Total	Exclusively Breastfed (N=181)	Not Exclusively Breastfed (N=76)	P value	OR (95% CI)
	n (%)	n(%)	n(%)		
Mother's Characteristics					
Age at delivery ≤25 years	53 (20.6)	39 (21.5)	14 (18.4)	0.6	1.2 (0.6 - 2.4)
Mother's education: non professional	100 (38.9)	82 (45.3)	18 (23.7)	0.001	2.7 (1.5 - 4.9)
Mother unemployed	174 (67.7)	135 (74.6)	39 (51.3)	0.001	2.8 (1.6 - 4.9)
Nuclear family	131 (51.0)	93 (51.4)	38 (50.0)	0.8	1.1 (0.6 - 1.8)
Child's Characteristics					
Male Child	127 (49.4)	92(50.8)	35 (46.1)	0.7	1.2 (0.7 - 2.1)
Term Birth	226 (87.9)	160 (88.4)	66 (86.8)	0.8	1.2 (0.5 - 2.6)
Birth weight ≥ 2.5 kg	222 (86.3)	158 (87.3)	64 (84.2)	0.5	1.3 (0.6 - 2.7)
Birth order: > 1	113 (44.0)	83 (45.9)	30 (39.5)	1	1.3 (0.8 - 2.2)
Breastfeeding Indicators					
Breastfed within 1 hour of birth	208 (80.9)	149 (82.3)	59 (77.6)	0.3	1.3 (0.7 - 2.6)
Antenatal Counselling Received	233 (90.7)	166 (91.7)	67 (88.2)	0.9	1.5 (0.6 - 1.3)

Table 2
a: Effects of Exclusive Breastfeeding

Effects	Total	Exclusively Breastfed (N=181)	Not Exclusively Breastfed (N=76)	P value	OR (95% CI)
	n (%)	n(%)	n(%)		
Infection					
Respiratory	53 (20.6)	37 (20.4)	16 (21.1)	0.6	1.0 (0.5 - 1.9)
Gastrointestinal	5 (1.9)	3 (1.7)	2 (2.6)	0.1	0.6 (0.1 - 3.8)
Hospitalization					
Respiratory	40 (15.6)	28 (15.5)	12 (15.8)	0.9	1.0 (0.5 - 2.0)
Gastrointestinal	15 (5.8)	13 (7.2)	2 (2.6)	0.3	2.9 (0.6 - 13.0)
Antibiotic Used	24 (9.3)	14 (7.7)	10 (13.2)	0.1	0.6 (0.2 - 1.3)
Constipation	42 (16.3)	23 (12.7)	19 (25.0)	0.02	0.4 (0.2 - 0.9)

Discussion

Breastfeeding is a vital part of providing every child with the healthiest start in life(5). Gareth Jones et al. reviewed child survival interventions in low income countries and found that breastfeeding could have prevented 13% of under 5 deaths in low income countries. In fact, breast feeding and oral rehydration were the only two interventions which could prevent more than 10% of under-5 deaths individually (6).

The prevalence of exclusive breastfeeding is showing a declining trend over the years, despite extensive efforts by organizations and governments to promote exclusive breastfeeding, among other IYCF practices. As per WHO fact sheets, only 44% of infants are exclusively breastfed till 6 months globally (2). In the recently concluded National Family Health Survey 5 from India, 12 states and union territories showed a decline in early initiation of breastfeeding, while 7 states showed a drop in the exclusive breastfeeding rates(3). As per the NFHS 5, 66.7% of babies were breastfed within 1 hour of birth in Kerala, while 55.5% received exclusive breastfeeding till 6 months of age. In our study we found 80.9% mothers to have breastfed within 1 hour after birth and exclusive breastfeeding for 6 months was practiced by 70.4% of mothers. We found similar results in our pilot study with 76% of mothers exclusively breastfeeding till 6 months of age. In a previous study from Kerala conducted during 2012-2013, Raveendran et al, found the prevalence of exclusive breastfeeding to be much lower (21.9%)(7). Higher rates of breastfeeding among our study population may be due to better knowledge among mothers as

majority of them had received counselling antenatally (90.3%), and most of them were well educated (89.8% with a college degree).

In low income countries, there are numerous factors which affect breastfeeding practices such as maternal age, maternal education, maternal employment, cultural and religious practices, living arrangements, antenatal counselling regarding breastfeeding and professional support at the time of delivery(7–9). A systematic review from Sub-Saharan Africa demonstrated that knowledge of the benefits of exclusive breast feeding was the most common facilitator towards exclusive breastfeeding(10) In a randomized control trial from Pakistan, mothers who were counselled antenatally were significantly more likely to initiate breastfeeding early and continue exclusive breastfeeding for 6 months(11). In our study, however we did not find antenatal counselling to be a significant facilitator. This is probably because almost everyone (90.7%) received antenatal counselling, irrespective of the choice to breastfeed or not. Therefore other factors such as postnatal lactation support may play a role. For example, Lin-Lin Su and associates found antenatal counselling and postnatal lactation support to independently improve EBF among mothers in Singapore(12). In our study, the most common reason given for not continuing to EBF was poor lactation (39.4%). Therefore additional postnatal support for lactation which includes nutritional counselling is essential. Many of the other reasons given could have been resolved with postnatal counselling.

Maternal employment plays a role in determining the duration of breastfeeding. Mothers who were employed were almost three times more likely to resort to formula than mothers who were not employed. The systematic review from Sub-Saharan Africa mentioned earlier also identified maternal employment as the major barrier to exclusive breastfeeding (10). One of the reasons could be inadequate maternity leave. Various other studies from around the globe have demonstrated a positive correlation between longer maternity leave and exclusive breastfeeding rates (13–16). According to the new Maternity Benefit (Amendment) Act 2017 in India, women are entitled to 26 weeks of maternity leave with full pay, on completion of at least 80 days in an establishment in the 12 months prior to her expected date of delivery (17). However, these laws are not uniformly followed. In our study 19 (25%) mothers who stopped breastfeeding early did so to resume work. On an average they had only 3.6 months of maternity leave.

The other factor that affected EBF was maternal education. Since education and employment status are highly correlated, a multivariate analysis may include only one of the two in the final model. We could not pursue this for lack of adequate sample size.

Exclusive breastfeeding for 6 months has many benefits for the mother and baby. Various bioactive factors in breast milk protect the baby against gastrointestinal and respiratory infections. The Generation R study, a Dutch population based cohort study found breastfeeding for 6 months or longer to be protective against lower respiratory tract infections till 4 years of age (18). The TEDDY group found breastfeeding for 3-6 months to be protective against respiratory infections, infective gastrointestinal infections and otitis media (19). In our study, the mean number of respiratory infections and infections requiring hospitalization was lower in the exclusively breastfed group. Similarly, the mean antibiotic use

was also lower in the breastfed group. However, both these results were not statistically significant. This may be because only a small number of children required hospitalization or antibiotics (Additional file1). We did however find a significant association with formula feeding and constipation. Similar results were demonstrated in a multicentric cross sectional trial among European infants, where formula fed infants were noted to have more constipation, among other functional gastrointestinal disorders, as compared to breastfed infants(20).

Global Breastfeeding Collective is a partnership of prominent international organizations including UNICEF and WHO, with the aim of improving breastfeeding trends across the globe. There are seven steps recommended, which, if implemented at all levels of the community and government, will ensure increase in the breastfeeding rates (5).

Exclusive breastfeeding for the first 6 months of life, requires the collective effort of the community in the form of antenatal counselling, postnatal lactation support, family support, employee benefits and paid maternity leave. Beneficial effects of exclusive breastfeeding extends beyond the mother infant dyad. It leads to healthier communities and improves the economy of the country.

The limitations of our study would include inability to achieve the desired sample size.

Conclusion

Significantly higher percentage of infants in our study group have been exclusively breastfed as compared to the state average. The major determinant of EBF was maternal education and employment and the main effect of EBF was a protection against constipation. Further emphasis on counselling mothers antenatally, providing postnatal lactation support and counselling, providing mothers with adequate maternity leave will play a major role in promoting exclusive breastfeeding in our community.

Declarations

ETHICS COMMITTEE APPROVAL : This study was approved by the Institutional Research Committee and Institutional Ethics Committee of Believer's Church Medical College Hospital, Thiruvalla, Kerala. (IEC/2019/06/106). Consent was taken from each of the participants before including them in the study.

CONSENT FOR PUBLICATION : Not applicable

DATA AVAILABILITY: The datasets during and/or analysed during the current study available from the corresponding author on reasonable request.

COMPETING INTERESTS: All authors declare no competing interests in the conduct/publication of this study.

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AUTHORS CONTRIBUTIONS:

- a. Study design : JJ, RJ and AD
- b. Data collection: LS, DD, MY
- c. Data analysis: AD, RJ, JJ
- d. Manuscript preparation: RJ, AD, JJ

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Figures

REASON FOR NOT BREASTFEEDING EXCLUSIVELY

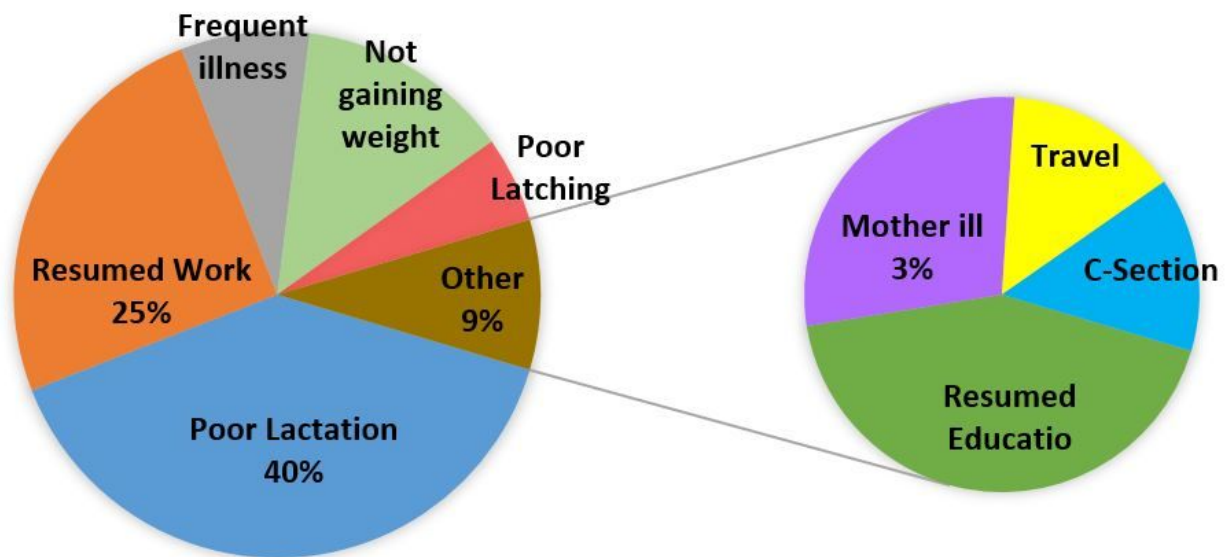


Figure 1

Reasons for not exclusively breastfeeding

Supplementary Files

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