Research Article

Assessment of weight gain pattern of exclusively breastfed and nonexclusively breastfed infants in Bhavnagar city, Gujarat

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Received May 15, 2015. Accepted July 10, 2015

Abstract

Background: Exclusive breastfeeding is the optimal feeding practice to achieve infants' growth and development. Although appropriate feeding practice is the most cost-effective intervention to reduce child morbidity and mortality, only 38% of children less than 6 months of age are exclusively breastfed in the developing countries.

Objective: To assess the weight gain pattern of exclusively breastfed (EBF) and nonexclusively breastfed (NEBF) infants in the first 6 months of the life.

Materials and Methods: A retrospective cohort study has been carried out in UHTC field practice area of Government Medical College, Bhavnagar. Totally, 120 lactating mothers were selected who possessed infants of 6 months age. They were interviewed by predesigned prestuctured questioner, and weight for age was taken from the growth chart beginning from birth up to 6 months for every month. History of any morbidity within the last 6 months was taken. Anthropometric measurement of weight for age was compared according with their breastfeeding practices.

Result: At birth, 96.67% infants were exclusively breastfed, and the rate was declined progressively up to 23.33% at 24 weeks of age. Mother's education and delivery at a government health facility were positively associated with higher rates of EBF ($p < 0.05$). Only 14 (46.67%) babies were immediately breastfed (≤1 h) after delivery. At 24 weeks of age, EBF infants achieved a better and more rapid weight gain when compared with those in the NEBF group. Morbidities such as diarrhea and respiratory tract infections were more among NEBF infants.

Conclusion: The study revealed that EBF babies revealed a positive effect on the physical growth and health status, but the rate of EBF was low at the end of 24 weeks.

KEY WORDS: Exclusive breastfeeding, growth chart, infants, weight for age, weight gain pattern

Introduction

Poor infant feeding practices are known to have adverse consequences on the health and nutritional status of children, which in turn have consequences on the development of the child both physically and mentally.[1] Infants should be completely breastfed for the initial 6 months of life to attain ideal growth, development, and health, according to the recommendation of global public health. Afterward, to fulfill their nutritional requirements, infants must be provided with safe and nutritionally sufficient complementary foods in addition to the breastfeed, which last for up to 2 years of age or more.[2] All the primary needs of a child—food, health, and care—are concurrently provided by the sole practice of breastfeeding. It provides valuable benefits to the infants, mothers, and a nation as a whole. Breast milk contains all the nutrients and antimicrobial factors, which an infant needs to thrive. In developing countries, suboptimal breastfeeding during the first months of life is an important risk factor for infant and childhood morbidity and mortality, especially resulting from diarrheal disease and acute respiratory infections.[3] India is home to more than one-third of the world's undernourished children. In 1999, the National Family Health Survey (NFHS)

Access this article online	
Website: http://www.ijmsph.com	Quick Response Code:
DOI: 10.5455/ijmsph.2016.1505201518	

II found that 47% of all the children aged younger than 3 years were underweight.[4] Data from NFHS III show only a very small decline, with undernutrition level remaining around 45% for children younger than 3 years.[5]

With this background, the study was conducted with the following objectives: to assess the weight gain pattern of exclusively breastfed (EBF) and nonexclusively breastfed (NEBF) infants in the first 6 months of the life and to assess the morbidity pattern among EBF and NEBF infants.

Materials and Methods

A retrospective cohort study was conducted in UHTC field practice area of Government Medical College, Bhavnagar, Gujarat, India, from November 2013 to December 2013. There were total 26 Anganwadi under UHTC field practice area. "Mamta Day" activities held on different days on the 26 Anganwadis. Total, 120 infants who had completed 6 months were selected for study, and their mothers were interviewed with predesigned prestructured questionnaire. The weight gain patterns of infants were obtained from the growth chart.

Mothers whose babies are of 6 to 12 months of age and weighed 2.5 kg or more at birth and those who were ready to participate in the study were included.

Predesigned and prestuctured questionnaire was used to obtain information on sociodemographic characteristics and birth-related characteristics, weight, and infant feeding pattern at 6, 10, 14, 20, and 24 weeks. History of fever, diarrhea, cold, and cough in the last 6 months was asked to mothers. Infants were classified as EBF and NEBF based on their feeding pattern every month. EBF was defined as the consumption of breast milk by a newborn with no inclusion of any other liquids or solids, excluding drops or syrups comprising vitamins and mineral supplements or medication (nothing else), while NEBF involved the consumption of other liquids and/or solids in addition to the breast milk.[6]

Weight of infant was recorded at the time of interview by using infant weighing scale. After checking for zero adjustment before each measurement, the weight was measured. Three consecutive measurements were noted every time, and the mean was noted to the nearest 0.05 kg of weight.

For the purpose of this study, the disease conditions were defined as follows[6]: Diarrhea is defined as the recurrent passage of loose or watery stool than that is normal for the baby or more than three times per day; and fever refers to the increase in the child's body temperature ≥ 37.5°C and above axillary (38°C rectal), or the condition of baby feeling hot, or a history of fever.

The objective of the study was explained to the participants, and their written consent obtained before the questionnaires were administered, and the weight was recorded.

Statistical Analysis

Data entry and analysis was carried out in Epi Info 7 statistical software. Data summarized in the form of tables and graphs. Student's t test was used to compare the weight achieved at different time period by the two breastfeeding groups. A $p < 0.05$ was considered statistically significant.

Results

Totally, 120 infants were included in the study. Table 1 shows sociodemographic characteristic of mothers according

Table 1: Breastfeeding pattern according to mother's demographic characteristics

Parameters	Breastfeeding pattern		χ^2 value	*p*
	EBF (*n* = 28)	NEBF (*n* = 92)		
Mother's age				
≤20	8 (28.57)	32 (34.78)	0.3727 *df* = 3	0.9458
21–24	8 (28.57)	24 (26.08)		
25–28	8 (28.57)	24 (26.08)		
29–32	4 (14.28)	12 (13.04)		
Mother's education				
Illiterate	4 (14.28)	40 (43.47)	30.247, *df* = 3	<0.001
Primary	3 (10.71)	20 (21.73)		
Secondary	9 (32.14)	28 (30.43)		
College and above	12 (42.85)	4 (4.34)		
Occupation				
Housewife	21 (75)	42 (45.65)	6.284, *df* = 1	0.0122
Working women	7 (25)	50 (46)		
Parity				
1	8 (28.57)	8 (28.57)	17.24, *df* = 2	0.0002
2	4 (14.28)	32 (34.78)		
≥3	16 (57.14)	52 (56.52)		

Table 2: Birth-related characteristics of the infants according to their breastfeeding group

PARAMETERS	BREASTFEEDING PATTERN		Chi-square value	*p* value
	EBF (*n* = 116)	NEBF (*n* = 4)		
Gender of the baby			0.01483	0.9031
Male	90 (77.58)	3 (75)	*df* = 1	
Female	26 (22.41)	1 (25)		
Mode of delivery			5.804	0.0160
Normal delivery	98 (84.48)	3 (75)	*df* = 1	
Caesarean section	18 (15.52)	1 (25)		
Place of delivery			14.136	0.0002
Govt.health facility	108 (93.10)	1 (25)	*df* = 1	
Private health facility	8 (6.90)	3 (75)		

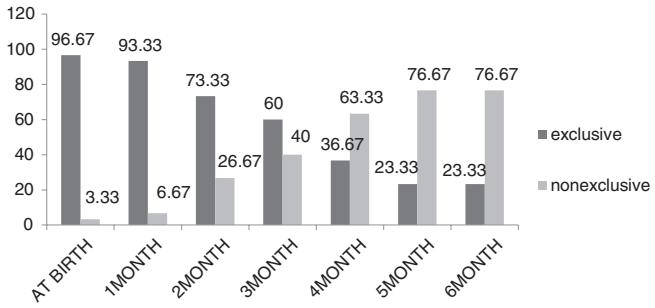

Figure 1: Infant feeding pattern among EBF and NEBF infants.

Table 3: Comparison of mean weight of infants according to their breastfeeding group at birth and at 24 weeks

	EBF	NEBF	*t* test	*p*
At birth				
No. of infants	116	4	0.5792	0.564
Mean weight	3.028 ± 0.40	3.166 ± 0.25		
At 24 weeks				
No. of infants	28	92	3.183	0.0036
Mean weight	6.27 ± 0.47	5.62 ± 0.47		

to their breastfeeding pattern. It shows that mother's education and parity revealed significant effect on their EBF pattern ($p < 0.05$).

Table 2 shows that babies' gender possessed no significant effect on breastfeeding pattern over 6 months. Place of delivery revealed significant difference between the two groups. EBF was observed in 93% babies delivered in government health facility compared with 6.90% delivered at private health facility. Only 15.52% of babies delivered by cesarean section were EBF.

As shown in Figure 1, 96.67% of babies were EBF at the time of birth and the EBF rate declined progressively. By the age of 24 weeks, only 23.33% were breastfed exclusively. Supplementary foods used by the mothers included nonhuman milk and other formulas being shown in the advertisements.

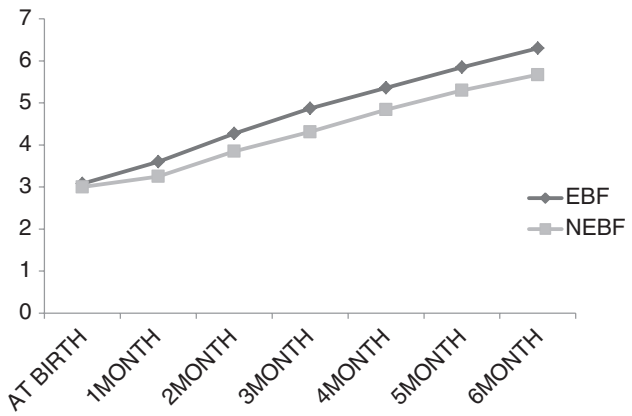

Figure 2: Mean weight gain pattern of EBF and NEBF infants.

Table 3 shows the comparison of mean weight of infants according to their breastfeeding group at birth and at 24 weeks of age. No significant difference was found in the mean weight of infants at birth. At 24 weeks, mean weight of EBF infants was 6.27 ± 0.47 kg and of NEBF infants was 5.62 ± 0.47 ($p = 0.003$).

Figure 2 describes that the weight gain pattern of EBF infants is better when compared with NEBF infants over the period of 6 months. The health status of the infants with respect to their breastfeeding group is presented in Figure 3. The NEBF infants were more likely to suffer from fever, diarrhea, and cough and cold than the EBF infants. In the NEBF infants, episodes of fever diarrhea, cough, and cold were seen in 15.6%, 57.6%, and 38.4%, respectively, when compared with 13.2%, 9.6%, and 9.6% of the EBF infants, respectively ($p < 0.000$).

Discussion

According to NFHS III, only 69% of infants under the age of 2 months were EBF. Exclusive breastfeeding declines to 51% at 2–3 months of age and 28% at 4–5 months of age.

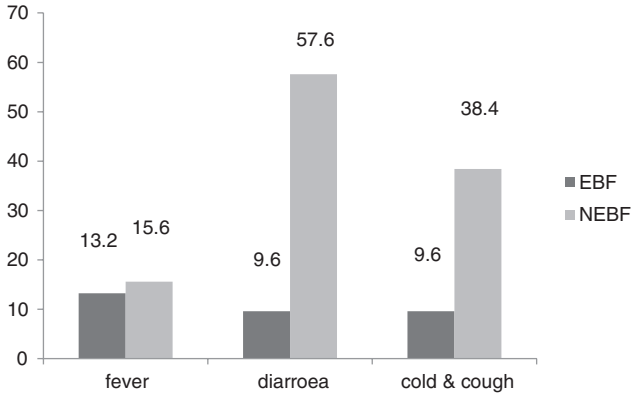

Figure 3: Morbidity pattern among EBF and NEBF infants.

Overall, EBF was practiced in only marginally less than half of the children aged younger than 6 months were EBF.[5] This study also find the progressive decline in the exclusive breastfeeding rate, which became only 23.33% at the 6 months of age. Similar findings were observed in study conducted in Nigeria where the rate of EBF infants declined from 64.9% at birth to 37.3% at the 6 months of age.[7] Study conducted in Bangladesh by Islam et al.[8] also showed that only 45% women practiced exclusive breastfeeding up to 6 months of age.[8]

This study showed that maternal education revealed a significant effect on influencing decision on exclusive breastfeeding. Jessri et al.[9] showed in their study that only 17.4% mothers with less than secondary education breastfed their infants up to 6 months of age whereas 41.3% of women with postgraduate degree EBF their infants up to 6 months.[9]

In this study, an association was found between the parity of mother and breastfeeding practices of mother. Those who possessed two or more children, they practiced EBF of their infants. A study conducted in Saudi Arabia revealed that 80.6% multiparous mothers breastfed exclusively compared with 45.7% nulliparous mothers.[10] It may be because, over the period of time, mothers acquire experience and confidence in proper child care practices such as breastfeeding. This is supported by a report that older women probably know more about the benefits of breastfeeding and have more realistic outcome expectations.[11]

This study showed positive association between place of delivery and breastfeeding practices. Those babies who were delivered at private health facility were less likely to receive exclusive breastfeeding than those who were born in government hospitals. The study conducted in Nigeria showed similar results that rate of exclusive breastfeeding was higher among deliveries of government health facility.[7] This shows the importance of correct information provided by medical and paramedical staffs to the women regarding breastfeeding.

In this study, the mean weight gain at the 6 month of age was more in EBF infants when compared with NEBF infants. Similar study conducted by Mugo in Narok District, Kenya,[12] found an association between underweight and poor infant feeding practices among infants aged 0–6 months.[12] The study conducted in Nigeria also showed that significant increase in the mean weight among EBF infants when compared with the NEBF infants at the age of 24 weeks.[7] This clearly indicates the adequacy of breast milk alone for infant growth during the first 24 weeks of life.

In this study, prevalence of diarrhea, fever, cough, and cold were found more among NEBF infants. Similar findings were observed in the study conducted by Dr. Andrew Ukegbu. In his study, the morbidity rates were higher in the NEBF infants. This was significantly so for diarrhea and fever (p = 0.000).[7] The findings of this study are similar with those of other studies, namely that EBF infants experienced fewer hospital visits for diseases such as diarrhea and acute respiratory tract infections.[13] This may be because breast milk contains antimicrobial factors and a number of other substances that play an important role in the protection of the infant against infections.

In this study, only term infants with minimum weight of 2.5 kg were selected and studied in order to avoid the possible influence of postnatal catch-up growth that may occur in low birth weight infants. EBF infants doubled in their body weight at 24 weeks, which indicated that breast milk alone was satisfactory for the growth of the EBF infants at this stage. Similar findings were shown in the study conducted in Nigeria that EBF infants revealed better advantage on the growth curve compared with their NEBF counterparts.[6]

The limitations of this study are as follows: (1) the history of diarrhea and fever in the last 6 months was asked to the mothers; so, there may be subjective error of identifying the symptoms by mothers; and (2) those infant with whose birth weight <2.5 kg were not included in the study; so, the results of this study may not apply to low birth weight babies.

Conclusion

This study showed that exclusive breastfeeding supported weight gain of the study infants during the first 6 months of life. Maternal education, multiparty, and place of delivery were significantly associated with higher rates of exclusive breastfeeding. EBF infants achieved rapid and more weight when compared with NEBF infants. Morbidity rate were higher among NEBF infants.

Recommendations

Activities to promote exclusive breastfeeding should be targeted in areas where it is poor, and it can be done through behavior change communication and practical demonstration for breastfeeding.

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How to cite this article: Chauhan MG, Mehta DP, Koria B, Patel H, Singh M. Assessment of weight gain pattern of exclusively breastfed and nonexclusively breastfed infants in Bhavnagar city, Gujarat. Int J Med Sci Public Health 2016;5:64-68

Source of Support: Nil, **Conflict of Interest:** None declared.