

Original Research Article

Effect of exclusive breastfeeding on growth and morbidity of infants up to 6 months of age: a longitudinal study

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ABSTRACT

Background: Breast feeding is the best infant food for optimal growth and development. Early initiation and exclusive breastfeeding for first 6 months of life are widely recommended. However, very few infants receive timely initiation and exclusive breastfeeding. The present research is conducted to know the practice of exclusive breastfeeding in the community and to study its impact on growth and morbidity during first 6 months of life.

Methods: Infants born in tertiary care hospital in Mumbai with defined inclusion criteria were included in the study. The study completed in two phases-1) Baseline Data collection: on socio-demographic and anthropometric details 2) Follow up: morbidity details and anthropometric measurements recorded during 3 follow up visits first at the end of neonatal period, second at completed 3 months and third at the completed 6 months.

Results: 402 infants were studied for this research. 256 (63.7%), 202 (50.2%) and 112 (27.9%) infants were reported to be exclusively breastfed at first, second and third follow up visits respectively. Infants with exclusive breastfeeding for a period of 6 months have better outcome in terms of weight than non-exclusively breastfed infants. Also Episodes of respiratory tract infection and diarrhoea were significantly lower ($p < 0.01$) in exclusively breastfed infants for 6 months compared to non-exclusively breastfed infants.

Conclusions: Infants with exclusive breastfeeding for a period of 6 months have better outcome in terms of weight than non-exclusively breastfed infants. Exclusive breastfeeding prevents respiratory infection and diarrhoeal diseases.

Keywords: Exclusive breast feeding, Growth, Infant morbidity

INTRODUCTION

Breastfeeding is the best food for the infant with wide range of impact on child survival, health, growth and development. Breastfeeding is regarded as first vaccination of the child. Breastfeeding prevents child from childhood illness like respiratory infections and diarrhoea.¹ Health status of infant is mainly dependant on breastfeeding and weaning practices. It has been observed that the beneficial effect of breastfeeding is maximum when it is exclusive. Also, there are reports of higher

incidence of infections and allergies when weaning food is introduced from 4 to 5 months.²⁻⁴

Experts recommends early initiation and exclusive breastfeeding for first 6 months of life.⁵ However it is not widely practiced. Only 23.6% of infants receive breastfeeding within 30 minutes of birth and Only 46% of the infants receive exclusive breastfeeding for first 6 month of age.⁶ These inappropriate feeding practices results in infant deaths due to diarrhoea, pneumonia and other related diseases.

The present research is conducted to know the practice of exclusive breastfeeding in the community and to study its impact on growth and morbidity during first 6 months of life. The present study design had promotion of exclusive breastfeeding as an integral component.

METHODS

The present study is a longitudinal study that involved enrolment visit at birth and periodic follow up of infants up to 6 months of age. Approval from institutional ethics committee was taken prior to the study.

Total 402 babies born in LTMMC & GH, Sion, Mumbai, a tertiary care hospital in Mumbai during the year February 2011-January 2013 with following inclusion criteria were included in the study- 1) Age of mother between 20-35 years 2) Parity of the mother 3 or less 3) Full term babies born by normal vaginal delivery 4) Babies with birth weight 2.5 kg or more. The study completed in two phases-1) Baseline Data collection: Enrolment and baseline data collection on socio-demographic and anthropometric details was done using predesigned interview questionnaire-the baseline proforma 2) Follow up: socio-demographics, anthropometry and morbidity were recorded during 3 follow up visits first at the end of neonatal period, second at completed 3 months of age and third at the completed 6 months of age. Tally sheets were provided to mothers to record morbidity events like respiratory tract infection, diarrhoea, skin diseases and other diseases that child suffered between previous and the current visit. Length of the infants measured using infantometer to the nearest 1 mm. Weight of the infants measured using digital weighing machine to the nearest 10 grams. The baseline data was collected at tertiary care hospital and follow up visits were done with home visits. The data collection was completed with the help of Medical Social Workers from Department of Community Medicine after orientation and training on this research work.

Following Operational Definitions were used in the study. *Full term babies*: Babies born after 37 completed weeks up to before completion of 42 weeks. *Normal birth weight*: Birth weight of 2.5 kg or more. *Exclusive breast feeding*: was defined as an infant's breast milk consumption with no supplementation of any type of food or drink (no water, no juice, no non-human milk and no solids), except for vitamins, minerals, and medications up to the age of six months. *Pre-lacteal feed*: denotes giving fluids (gripe water, water or juice), and honey to the infants before their first time being breastfed or during their first few days of life.

Statistical analysis was done using spss version 20.0. Mean weight, mean length, mean gain in weight and mean gain in length of the infants were compared in exclusive breastfed infants with non exclusive breastfed infants using independent 't' test. Incidence of morbidities in exclusive breastfeeding infants were compared with

non exclusive breastfed infants using chi square test. Statistical tests with p value of <0.05 was considered to be significant.

RESULTS

402 infants were studied for this research included 193 (48.01%) males and 209 (51.99%) females. Mean birth weight and mean birth length of the infants were 2938 grams (SD=342.88) and 49.80 cm (SD=1.32) respectively. 56% of infants belong to poor family, 15.9% were below poverty line and rest 28.1% belong above poverty line family as per modified BG Prasad classification. Mothers who had to go out of their house to work for earning were considered as working mothers. Out of 402 mothers 272 (67.7%) were home makers whereas 130 (32.3%) were working. Majority of them were working as maid, tailors and vendors.

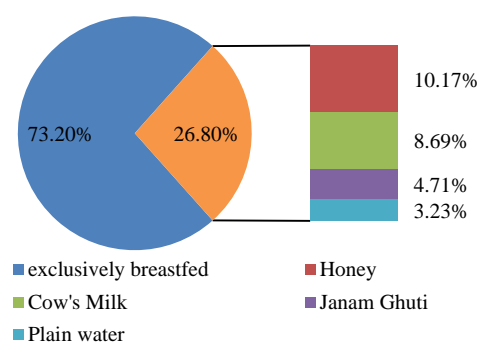


Figure 1: Pre-lacteal feeds received by the infants.

Practices related to breastfeeding initiation and pre lacteal administration were noted. 32.8% of infants were breastfed within 30 minutes of birth, 41.1% from 30 minutes to 1 hour, 21.9% from 1 hour to 24 hour and 4.2% were breastfed after 24 hours of birth. Though delivered at tertiary care centre, only 73.2% received breast milk as a first feed, 26.8% mothers reported they have given pre-lacteals in one form or the other (Figure 1).

Weight and length of infants at the end of each of three follow up visit as well as weight gain and length gain of infants with respect to previous visit were compared between exclusively breastfed and non exclusively breastfed infants. Also morbidity profile of exclusively breastfed infants with non-exclusively breastfed infants were compared. 256 (63.7%), 202 (50.2%) and 112 (27.9%) infants were reported to be exclusively breastfed at first, second and third follow up respectively. Following are the findings at the end of each follow up visit.

First follow up visit

Mean weight, mean length of infants of both the study group were not significantly different ($p > 0.05$) (Table 1).

Also mean weight gain and mean length gain of infants in both the groups compared to birth weight and birth length were not statistically different ($p>0.05$) (Table 1). No

significant difference was observed in any morbidity among exclusively and non-exclusively breastfed infants ($p>0.05$) (Table 2).

Table 1: Growth parameters of infants during first follow up visit.

Growth Parameters	Exclusively breastfed (n= 256) Mean (SD)	Non-exclusively breastfed (n= 146) Mean (SD)	P value (Independent t test)
Weight (grams)	3651.17(372.56)	3630.14(370.21)	P=0.58
Weight gain (grams)	707.42(171.79)	701.37(244.22)	P=0.79
Length (cm)	52.32(1.37)	52.19 (1.24)	P=0.35
Gain in length (cm)	2.51(0.43)	2.43 (0.69)	P=0.22

Table 2: Morbidity status of infants during first follow up visit.

Morbidity status		Exclusively Breastfed (n=256) Mean (SD) (%)	Non-exclusively breastfed (n=146) Mean (SD) (%)	P value (Chi square test)
Respiratory Tract Infection	Present	13 (5.08)	08 (5.48)	P=0.86
	Absent	243 (94.9)	138 (94.5)	
Diarrhoea	Present	09 (3.5)	11 (7.53)	P=0.07
	Absent	247 (96.5)	135 (92.47)	
Skin diseases	Present	6 (2.3)	3 (2.1)	P=0.85
	Absent	250 (97.7)	143 (97.9)	
Others	Present	6 (2.3)	3 (2.1)	P=0.85
	Absent	250 (97.7)	143 (97.9)	

Table 3: Growth parameters of infants during Second follow up visit.

Growth Parameters	Exclusively Breastfed (n= 202) Mean (SD) (%)	Non-exclusively breastfed (n= 200) Mean (SD) (%)	P value (Independent t test)
Weight (grams)	5190.27 (456.74)	5167.66 (402.07)	P=0.14
Weight gain (grams)	1533.15 (304.16)	1537.85 (386.4)	P=0.89
Length (cm)	57.52 (1.71)	57.20 (1.58)	P=0.07
Gain in length (cm)	5.11 (0.93)	5.06 (1.21)	P=0.57

Table 4: Morbidity status of infants during second follow up visit.

Morbidity status		Exclusively Breastfed (n=202) (%)	Non-exclusively breastfed (n=200) (%)	P value (Chi square test)
Respiratory Tract Infection	Present	13 (6.4)	169 (8)	P=0.54
	Absent	189 (93.6)	184 (92)	
Diarrhoea	Present	20 (9.9)	32 (16)	P=0.06
	Absent	182 (90.1)	168 (84)	
Skin diseases	Present	6 (3)	5 (2.45)	P=0.77
	Absent	196 (97)	195 (97.5)	
Others	Present	5 (2.5)	10 (5)	P=0.18
	Absent	197 (97.5)	190 (95)	

Second follow up visit

Mean weight, mean length of infants of both the study group were not significantly different ($p>0.05$) (Table 3). Also mean weight gain and mean length gain of infants in both the groups compared to birth weight and birth length were not statistically different ($p>0.05$) (Table 3). Also,

there was no difference in morbidity among exclusively and non exclusively breastfed infants ($p>0.05$) (Table 4).

Third follow up visit

Mean weight and mean gain in weight was significantly higher in exclusively breastfed infants compared to nonexclusively breastfed infants ($p<0.01$) (Table 5).

Mean length of infants of both the study group were not significantly different ($p=0.54$) in spite of significantly higher gain in length in exclusively breastfed infants than non exclusively breastfed infants ($p<0.01$) (Table 5). Episodes of respiratory tract infection and diarrhoea were

significantly lower ($p<0.01$) in exclusively breastfed infants compared to non- exclusively breastfed infants (Table 6). However episodes of skin diseases were not significantly different in exclusive and non exclusively breastfed infants.

Table 5: Growth parameters of infants during third follow up visit.

Growth Parameters	Exclusively Breastfed (n=112) Mean (SD)	Non-exclusively breastfed (n= 290) Mean (SD)	P value (Independent t test)
Weight (grams)	6867.66 (494.82)	6687 (430.67)	$P<0.01$
Weight gain (grams)	1743.60 (250.94)	1487.14 (302.99)	$P<0.01$
Length (cm)	64.99 (1.88)	64.86 (1.59)	$P=0.541$
Gain in length (cm)	7.65 (0.54)	7.48 (0.48)	$P<0.01$

Table 6: Morbidity status of infants during third follow up visit.

Morbidity status		Exclusively Breastfed (n=112) (%)	Non-exclusively breastfed (n=290) (%)	P value (Chi square test)
Respiratory Tract Infection	Present	14 (12.5)	73 (25.2)	$P<0.01$
	Absent	98 (87.5)	217 (74.8)	
Diarrhoea	Present	18 (16.1)	100 (34.5)	$P<0.01$
	Absent	94 (83.9)	190 (65.5)	
Skin diseases	Present	8 (7.1)	20 (6.9)	$P=0.93$
	Absent	104 (92.9)	270 (93.1)	
Others	Present	4 (3.6)	9 (3.1)	$P=0.81$
	Absent	108 (96.4)	281 (96.9)	

Infants with exclusive breastfeeding for a period of 6 months have better outcome in terms of weight than non-exclusively breastfed infants. The gain in length was observed to be more at 6 month of age in exclusively breastfed infant, however difference in means of length at the age of 6 months was not significant. So, to conclusively comment on effect of breastfeeding on length of infants studies with longer duration of follow up are needed. Also, exclusively breastfed infants have better morbidity profile in terms of reduced episodes of respiratory tract infection and diarrhoea. Follow up of mother and child dyads in the community for promoting exclusive breastfeeding through existing infrastructure is need of hour.

DISCUSSION

In our study breastfeeding initiation within 30 minutes, within 1 hour, within 24 hours of birth and thereafter was observed in 32.8%, 41.4% and 21.9% respectively which is better than the national average of 23.6%, 24.5% and 55.3% respectively. In present study 26.8 % infants received pre-lacteals like honey, cow's milk, plain water or any other fluid and rest 73.2% were exclusively breastfed. This finding is consistent with the national family household survey-3 where around quarter of infants being fed with pre-lacteals was noted.⁶

In a study by Castillo et al on breastfeeding and nutritional status in Chilean children age less than 18 months prevalence of exclusive breastfeeding was found

to be higher with prevalence of 86.5%, 66.7% and 25.3% than our findings with prevalence of 63.6%, 50.25% and 27.86% at age of 1 month, 3 month and 6 month respectively.⁷ Study by Chudasma et al and Patil et al also reported higher prevalence of exclusive breastfeeding with 54% and 61.5% infants at 6month of age being exclusively breastfed.⁸

In our study better growth outcomes were found in exclusively breastfed infants than non-exclusively breastfed which is consistent with Castilo et al study in which the risk of having less weight for age was 1.2 to 5 times greater among children who were fed with milk substitutes than among those who received breastmilk.⁷ Also in a study by Onayade et al it was found that infants who were exclusively breastfed for six months had median weights above the 50th percentiles of the WHO/NCHS reference.⁹

In Present study follow up was for only 6 months, so it is difficult to conclusively comment on effect of breastfeeding on length of infants studies. In a study conducted in Menaufia in Egypt on 200 newborn infants for 6 months showed that exclusively breastfed infants lost 14 percentiles of weight for age and 6 percentile of length for age from birth to 6 months as compared to 18 percentile loss in weight for age and 8 percentile loss in length for age in exclusively formula fed infants.¹⁰

In a study by Chantry et al on secondary data in united states significant increased risk of pneumonia (OR=4.27)

and otitis media (OR=1.95) was observed in those who were fully breastfed for 4 months to less than 6 months as compared to those infants breastfed 6 months or more.¹¹ In a study by Quigley MA in United Kingdom shows 53% of diarrhoea and 27% of respiratory tract infections admissions could have been prevented each month by exclusive breastfeeding than 31% of diarrhoea and 25% of Respiratory tract infection by partial breastfeeding.¹² A prospective observational study in slums area of Dhaka, Bangladesh shows compared to exclusive breastfeeding; partial or no breastfeeding was associated with 2.4 and 3.94 fold higher risk of deaths due to respiratory tract infection and diarrhoea respectively.¹³ All these studies are consistent with the present study with the finding of significantly decreased ($p<0.01$) episodes of respiratory tract infection and diarrhoea among exclusively breastfed infants.

In a meta-analysis of prospective study by Gdalevich et al in Israel, breastfeeding was protective against eczema when studied in children with a family history of atopy separately. Studies of children without a history of atopy in first-degree relatives showed no association between breast-feeding and the onset of atopic dermatitis.¹⁴ A study by Benn et al showed no overall effects of exclusive or partial breastfeeding on the risk of atopic dermatitis.¹⁵ These findings were similar to no significant difference in incidence of skin disease between exclusively breastfed infants and non-exclusively breastfed infants in present study. However family history of atopy was not considered in present study.

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