

Diarrhea in Breastfed versus Formulated Baby: A Hospital Based Study in 150 Children

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Summary:

Background: Breastfeeding reduces incidence of common childhood illnesses such as diarrhea and thus reduces infant mortality and morbidity.

Objective: To find out the incidence of diarrhea in breastfed versus formula fed baby.

Methodology: An observational cross sectional study was carried out in the Pediatric department of Northern private medical college hospital, Rangpur from March 2013 to June 2014. Total 150 children aged 1 to 24 months having diarrhea were enrolled in the study.

Result: Mean age of children was 11.6 with SD ± 5.29 months, ranges from 1 month to 23 months in which exclusively breast fed 51.3%, breast fed plus formula fed 39.3%, exclusively formula fed 9.4%; single attack of diarrhea occurred in 72.7%, 40.7%, and 28.6% children in exclusively breast fed, breast fed plus formula fed and exclusively formula fed children respectively. Frequent attack of diarrhea occurred in 27.3%, 59.3% and 71.4% children

in exclusively breast fed, breast fed plus formula fed and exclusively formula fed children respectively; among 59 patients who developed first attack of diarrhea by 6 months of age, 10.2%, 69.5 % and 20.3% were from exclusively breast fed, breast fed plus formula fed and exclusively formula fed children respectively. Patients who developed first attack of diarrhea by 7-12 months of age, 69.8% were from exclusively breast fed, 27.0% from breast fed plus formula fed and 3.2% from exclusively formula fed children. But 28 children whose first diarrhea occurred by 13-24 months of age, 96.4% and 3.6% were from exclusively breast fed, and breast fed plus formula fed group respectively.

Conclusion: Breast feeding reduces incidence of diarrhea, prevents frequent attack and early occurrence of diarrhea in under two children.

Key words: Exclusive breastfeeding, Formula feeding, Diarrhea.

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Introduction:

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants¹. Breast milk promotes sensory and cognitive development, and protects the infant against infectious and chronic diseases. Exclusive breastfeeding reduces infant mortality due to common childhood illnesses such as diarrhea, and helps for a quicker recovery during illness². Breast milk contains all nutrients as well as antibodies especially Immunoglobulin A (IgA) and protects baby from infections including diarrheal diseases. WHO has recommended, infants should be

exclusively breastfed for the first six months of life to achieve optimal growth, development and health. Breast milk substitutes (such as commercial infant formulas and cow's milk) are considered nutritionally acceptable for few infants, but there is greater risk of developing a number of infections including diarrhea. Breast milk substitutes and other baby foods as well as bottles, teats and utensil are attributable to contamination causing diarrheal diseases in infants who are not exclusively breastfed.

Objectives of the Study

To find out the incidence of diarrhea in breastfed versus formula fed baby.

Methodology:

This observational cross sectional study was carried out in the Pediatric department of Northern Private Medical College Hospital, Rangpur from March 2013 to June 2014. Total 150 children aged 1 to 24 months were included in the study. Children having diarrhea attending in and out patient department were enrolled in this study. Data were collected by face to face interview using a

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structured close ended questionnaire information regarding demographic data; containing detailed feeding history and information of diarrhea. All the parents and attendants were informed about the purpose of the study and verbal consent was obtained. Children aged less than 1 month or more than 24 months and the children whose mother were not agreed to include in the study were excluded. Data were processed by using SPSS-19 program. Frequency distributions and proportions were calculated for the values. Students unpaired *t test* were applied as statistical tools. P value of < 0.05 was considered as significance. There was no ethical problem, as because verbal consent of parents and attendants were taken before conducting interview for the study.

Results:

Age of the study population ranges from 1 month to 23 months. Mean age was 11.6 with $SD; \pm 5.29$ months. Demography of the study population is as follows:

Figure 1 shows, single attack of diarrhea occurred in 56 (72.7%), 24 (40.7%), and 4 (28.6%) children in exclusively breast fed, breast fed plus formula fed and exclusively

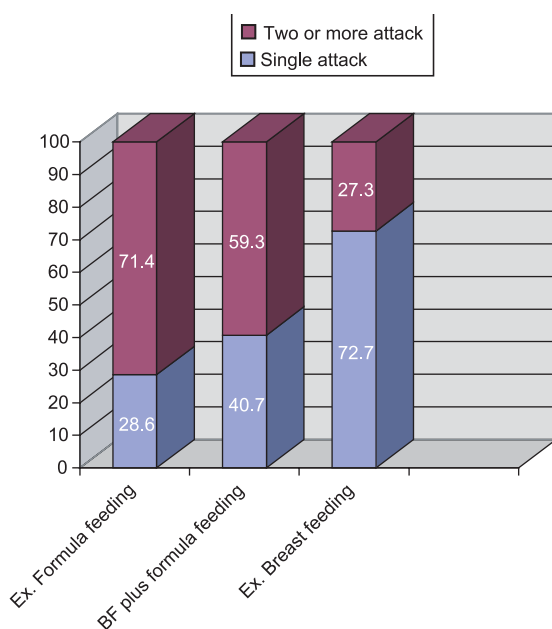


Fig-1: Relationship between feeding and number of diarrhea attack

formula fed group respectively. Frequent (≥ 2) attack of diarrhea occurred in 21 (27.3%), 35 (59.3%) and 10 (71.4%) children in exclusively breast fed, breast fed

plus formula fed and exclusively formula fed group respectively (p value .000).

Table-I

<i>Demography of study population</i>			
Parameters	No. (%)	Parameters	No. (%)
Age group		Sanitation	
1 to 6 month	30 (20.0)	Pacca	94 (62.7)
7 to 12 month	60 (40.0)	Water seal	15 (10.0)
13 to 18 month	47 (31.3)	Kacha	38 (25.3)
19 to 24 month	13 (8.7)	Open air	03 (02.0)
Sex		Residence	
Male	102 (68.0)	Urban	65 (43.3)
Female	48 (32.0)	Rural	79 (52.7)
		Urban slum	06 (04.0)
Fathers' education		Mothers' education	
Illiterate	22 (14.7)	Illiterate	22 (14.7)
Primary	33 (22.0)	Primary	54 (36.0)
Secondary	49 (32.7)	Secondary	54 (36.0)
Above secondary	46 (30.6)	Above secondary	20 (13.3)
Fathers' occupation		Mothers' occupation	
Service	73 (48.7)	Service	08 (05.3)
Business	26 (17.3)	Housewife	142 (94.7)
Farmer	37 (24.7)	Water supply	
Others	14 (09.3)	Tube well	131 (87.3)
		Tap water	19 (12.7)

Table III shows, patients who developed first attack of diarrhea by 6 months of age were 6 (10.2%) from exclusively breast fed, 41 (69.5%) from breast fed plus formula fed, and 12 (20.3%) from exclusively formula fed group. Patients who developed diarrhea by 7-12 months of age, 44 (69.8%), 17 (27.0%) and 2 (3.2%) respectively developed in exclusively breast fed, breast fed plus formula fed and exclusively formula fed group. Twenty eight patients developed diarrhea by 13-24 months of age; among them 27 (96.4%), and 1 (3.6%) were from exclusively breast fed, and breast fed plus formula fed group respectively (p value .000).

Table IV shows, children of illiterate mother had more frequent diarrheal attack (63.6%) than literate mother but educational level did not influenced consistently on occurrence and frequency of diarrheal attack on the study population (p value .02).

Table V shows, there is no significant influence of source of water on diarrheal attack and frequency in different group of patient (p value .407).

Table VI shows, residence of patients did not influenced on frequency of diarrheal attack (p value .084).

Table-II*Feeding information, number of diarrheal attack and age of first occurrence*

Parameters	No. (%)
Feeding	
Exclusively breast fed	77 (51.3)
Breast fed plus formula fed	59 (39.3)
Exclusively formula fed	14 (09.4)
Pre-lacteal fed	50 (33.3)
First occurrence of diarrhea	
1-6 month	59 (39.3)
7-12 month	63 (42.0)
13-24 month	28 (18.7)
Number of diarrheal attack	
1st attack	84 (56.0)
2nd attack	58 (38.7)
3rd attack	2 (1.3)
4th attack or more	6 (4.0)
Formula feeding utensils	
Bottle	55 (76.4)
Cup and spoon	17 (23.6)

Table-III*Type of feeding versus age of first occurrence of diarrhea*

Age of first diarrhea	Feeding			Total
	Exclusive breast feeding (%)	Breast feeding+Formula feeding (%)	Exclusively formula feeding (%)	
0-6 month	06 (10.2%)	41 (69.5%)	12 (20.3%)	59
7-12 month	44 (69.8%)	17 (27.0%)	02 (3.2%)	63
13-24 month	27 (96.4%)	01 (3.6%)	–	28
Total	77	59	14	150

Table-IV*Relation between Mothers' education and number of diarrheal attack*

Mothers' education	Single attack (%)	Two or more attack (%)	Total
Illiterate	08 (36.4%)	14 (63.6%)	22
Primary	31 (57.4%)	23 (42.6%)	54
Secondary	33 (61.1%)	21 (38.9%)	54
Above secondary	12 (60.0%)	08 (40.0%)	20
Total	84 (56.0%)	66 (44.0%)	150

Table-V

Relation between water supply and number of diarrheal attack			
Water supply	single attack (%)	Two or more attack (%)	Total
Tube well	73 (55.7%)	58 (44.3%)	131
Tap water	11 (57.9%)	08 (42.1%)	19
Total	84 (56.0%)	66 (44.0%)	150

Table-VI

Relation between residence and number of diarrheal attack			
Residence	Single attack (%)	Two or more attack (%)	Total
Urban	39(60.0%)	26(40.0%)	65
Urban slum	03(50.0%)	03(50.0%)	06
Rural	42(53.2%)	37(46.8%)	79
Total	84(56.0%)	66(44.0%)	150

Discussion:

Breast milk is the ideal food for an infant's first six months of life. Colostrum and breast milk contains an abundant amount of IgA₂ and other antibodies that can help the baby to resist infections³. Breastfeeding has many health benefits for both the mothers and infants. In addition to providing ideal nourishment, breastfeeding provides infants with protection from many infections, including diarrheal diseases. Breastfeeding can also reduce the severity, duration, and negative nutritional consequences of diarrhea⁴. On the other hand, use of formulas including infant formula is associated with increased health risks such as acute gastroenteritis, otitis media, severe lower respiratory tract infections, atopic dermatitis, asthma and obesity⁵. The infant's intestine is not properly ready to digest non-human milk and this may often result in diarrhea, intestinal bleeding and malnutrition⁶. In our study, we found more than half (51.3%) of the study population were exclusively breastfed and single attack of diarrhea occurred in all children (as per inclusion criteria). But frequent (two or more) attack of diarrhea occurred in non-exclusive breast fed children; in breast fed plus formula fed children 35 (59.3%), exclusively formula fed 10 (71.4%) and exclusively breast fed 21 (27.3%). Abdulbari Bener et al.⁷ study on exclusive breast feeding and prevention of diarrheal diseases showed more than half of the infants (59.3%) were exclusively

breastfed; the risk for presenting diarrhea was higher in formula fed (48.7%) and partially breastfed children (37.3%) when compared to exclusively breast fed (32.5%). Black RE et al.⁸ study on Maternal and child under nutrition showed, the relative risk for prevalence of diarrhea was more in predominant and partial breastfeeding (1.26 and 3.04 respectively) as compared to exclusive breastfeeding.

World Health Organization (WHO) recommends exclusive breast feeding for first six months of life and continuation of breast feeding for two years or beyond^{9,10}. We found 59 patients developed first attack of diarrhea by 6 months of age, of whom most children were from non-exclusively breast fed group; there were breast fed plus formula fed children 41 (69.5%), exclusively formula fed 12 (20.3%) and exclusively breast fed only 6 (10.2%). This finding reflects exclusive breastfeeding has influence on prevention of early occurrence of diarrhea. On the other hand, patients who developed first attack of diarrhea by 7-12 months and 13-24 months of age mostly were from exclusively breast fed group (69.8%, and 96.4%) respectively indicating later occurrence of diarrhea in exclusively breast fed children than non- exclusively breast fed one. Our finding correctly supports current WHO recommendation on breast feeding. Laura M Lamberti et al.¹¹ study on breastfeeding and the risk for diarrhea morbidity and mortality showed excess risk of diarrhea

in non-exclusively breast fed 0-5 months aged infants; relative risk of diarrheal incidence was 1.26, 1.68, and 2.65 in predominant, partial, and non-breastfed group children respectively. Similarly, the estimated relative risk of incident diarrhea was elevated when comparing non-breastfed to breastfed 6-11 months aged infants.

We have observed the relationship of diarrheal incidence with other demographic parameters also. But residence, water supply, sanitation and parent's educational level had no significant influence on incidence and frequency of diarrhea.

Conclusion:

Breast feeding reduces incidence of diarrhea, prevents frequent attack and early occurrence of diarrhea in under two children. Residence, water supply, sanitation and parent's educational status may not have significant influence on incidence of diarrhea.

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