Factors Associated with Nutritional Status and Morbidity in Bangladeshi Breastfed Children

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Abstract

This study assessed the exclusive breastfeeding practice and also examined the influence of socioeconomic and demographic characteristics influence on child nutrition and morbidity in Bangladesh. Data from a National Survey entitled "Surveillance on Breastfeeding and Weaning Situation and Child and Maternal Health in Bangladesh " conducted by the Institute of Child and Mother Health were used. Information was collected on 2781 children between 0-2 years of age from their mothers. The results of the study showed that only 16% of women exclusively breastfeed their babies for 6 months. Among the children 38.1 % were stunted and 38% were underweight for their age, while 46% were affected by some diseases. In bivariate analysis of factors associated with exclusive breastfeeding, a significant association was found with maternal education ($p<.001$) and family income ($p<.01$). Exclusively breastfed children were less stunted than non-exclusive breastfed children ($p<.001$). Logistic regression analysis showed that children of illiterate women were more stunted than children of higher educated women (OR=1.69, 95% CI=1.33-2.15). Male children were more likely to be stunted than female children (OR=1.12, 95% CI=1.02-1.43). Non-exclusive breastfed children had 1.6 times higher risk of morbidity and 3.57 times higher risk of occurrence of diarrhoea ($p<.001$). In conclusion, exclusive breastfeeding improved linear growth and reduced morbidity of below 2 years children. Despite all efforts of different government agencies and NGOs, this study showed that exclusive breastfeeding rate was still low in Bangladesh. More steps therefore, are needed to encourage exclusive breastfeeding for 6 months of age in order to improve the physical growth of children in Bangladesh.

Key Words: Exclusive Breastfeeding, Child Nutrition, Bangladesh

Introduction

Nutrition is an important factor because of its role of preventing disease. Breast milk is an appropriate source of nutrition for infants and provides them with immunological protection. It is generally free of contamination. Infant feeding practices have serious implications for infant survival and

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growth[1,2]. Increased morbidity among children living in poverty is strongly linked to malnutrition and an inadequate diet[3]. Chronic protein energy malnutrition leads to stunted growth and increased morbidity and mortality among children in the developing world, and childhood malnutrition also decreases the survival chances of adults later in life[4]. Thus, reductions in morbidity and improvements in nutritional status are major policy issues for health planners in less developed countries[5].

The purpose of the present study is to assess exclusive breastfeeding practice in Bangladesh and examine the factors associated with nutritional status and morbidity of 0-2 years children.

Materials and Methods

Data from a National Survey entitled "Surveillance on Breastfeeding and Weaning Situation and Child and Maternal Health in Bangladesh " conducted by the Institute of Child and Mother Health (ICMH) were used for this study. A cross sectional type of observational study was carried out from April to July 1998 of six divisions in Bangladesh. A sample of 2781 children between 0 and 2 years was selected by multistage cluster sampling. From the mothers of the sampled children, information was collected by a structured questionnaire in a personal interview. A pre-test of the questionnaire was made by Community Health Workers (CHW) under the supervision of the investigators. Detail information about breastfeeding practice, socioeconomic and demographic characteristics was recorded. The respondent mothers provided information about duration of exclusive breastfeeding, time of weaning and present feeding status.

Anthropometric measurements were taken by a single observer following a standard procedure. Recumbent length was measured to the nearest millimetre using a portable anthropometer and flatboard. Naked weights of children were measured to the nearest kilogram directly with a salter scale. Data for length, weight, age and sex were used to compare all individual children to the National Center for Health Statistics (NCHS) standard, which is recommended by WHO, 1989. The growth performance of any child at the time of measurement was expressed in terms of weight-for-age Z-score and height-for-age Z-score using computer software EPI Info[6]. Statistical Package for Social Science (SPSS[7]) was used to analyse the data.

Bivariate relationships between exclusive breastfeeding and each of independent (Socioeconomic, demographic and anthropometric) variables were examined using cross tabulation with Chi-square test of association. The effects of feeding practice on child health were estimated by logistic

regression model[8]. The model examines the effects of breastfeeding on the likelihood of child being stunted; controls for child, maternal and socioeconomic characteristics also being included. Since the dependent variable is dichotomous the model is estimated using logistic regression. The equations express the log odds of being stunted versus not stunted in the analysis. The coefficient in the analysis represent increase or decrease in the log odds of being stunted (versus not stunted) associated with a unit or category change in an independent variable. In the analysis breastfeeding is measured as infant or child exclusively breastfed (infant consumes only breast milk and no other liquids, milks or solid foods) and almost exclusively breastfed (Infant consumes breast milk and non-milk liquids infrequently), which was defined by Interagency Group for Action in Breastfeeding[9].

Results

Of the respondent mothers who completed the interview, 50.2% were below 25 years old (Table 1). Among mothers 18.2% were from urban areas and the rest of them from rural areas.

Table 1. Percentage distribution of mothers according to socioeconomic and demographic characteristics

Characteristics	%
Residence	
Urban	18.2
Rural	81.8
Child sex	
Male	54.3
Female	45.7
Mothers age	
<=25	50.2
>25	49.8
Mothers education	
No Schooling	52.1
Primary	23.8
Secondary +	24.1
Family income	
<=3000 BDT	67.6
>3000 BDT	32.4
Parity	
<=2	52.7
>2	47.1
Almost exclusively breastfeeding	
<=6 months	69.9
> 6 months	30.1
Morbidity within one week	
Yes	46.1
No	53.9

Only 24.1% women had secondary levels of education whereas 52.1% had no formal education. The present study found that 67.6% mother's family income was below 3000 BDT. 69.9 % mothers almost exclusively breastfeed their infant's upto 6 months.

About 16% women were found to practice exclusive breastfeeding during the survey. Urban mothers (16.2%) exclusively breastfed their children more than rural mothers (15.7%). Fewer male (14.5%) than female (17.1%) children were exclusively breastfed by their mothers Table 2.

Table 2. Percentage of exclusive breastfeeding by socioeconomic characteristics among 0-2years children

Background characteristics	Exclusive breastfeeding	Not exclusive breastfeeding	Total	
	%	%	n	%
Residence				
Urban	16.2	83.8	507	100
Rural	15.7	84.3	2274	100
χ^2=0.06 d.f. (1)				
Child sex				
Male	14.8	85.2	1509	100
Female	17.1	82.9	1272	100
χ^2=2.7 d.f. (1)				
Mothers' age				
<=25 year	16.0	84.0	1396	100
> 25 year	15.6	84.4	1385	100
χ^2=0.11 d.f. (1)				
Mother's education				
No education	14.8	85.2	1450	100
Primary	13.5	86.5	661	100
Secondary +	20.4	79.6	670	100
*χ^2=14.8*** d.f. (2)*				
Family income				
<=3000 BDT	14.5	85.5	1317	100
>3000 BDT	18.6	81.4	1464	100
*χ^2=7.44** d.f. (1)*				
Total	**15.8**	**84.2**	**2781**	**100**

*p<.05 **p<.01 ***p<.001

Maternal characteristics were also associated with exclusive breastfeeding. Mothers' level of education had a significant impact on exclusive breastfeeding. Women with primary level of education (13.5%) were less likely to breastfeed than secondary level of educated women (20.4%). Family income also had significant association with exclusive breastfeeding (χ^2=7.44, *P< .01).* 14.5% of mothers were practice exclusive breastfeeding whose family income had less than or equal 3000 BDT (Bangladesh Taka), whereas 18.6% of mothers were practice exclusive breastfeeding whose family income was more than 3000 BDT (Table 2).

Among all the children, it was found that 38.1% were stunted and 38.0% were underweight for their age. More than 46% were suffering from some disease during the survey. Chronic malnutrition appeared higher (40.2%) among the non-exclusively breastfed children than exclusively breastfed ones (26.8%). Only 19.5% of children were underweight for their age of the exclusive breastfed children whereas 41.4% children were underweight for their age of non-exclusive breastfed. Almost 37% children were suffering from some disease among exclusively breastfed children while 47.8% children were infected some of disease among the non-exclusively breastfeeding in the last one week. Over 11% of non-exclusively breastfed children were affected by diarrhoea which was more than three times higher as compared to exclusively breastfed children.

Table 3. Distribution of nutritional status by exclusive breastfeeding

Background characteristics	Exclusive breastfeeding	Not exclusive breastfeeding	Total	
	%	%	n	%
Height-for-age				
Stunting	26.8	40.2	1060	38.1
Normal	73.2	59.8	1721	61.9
*χ^2=28.3*** d. f. (1)*				
Weight-for-age				
Underweight	19.5	41.4	1056	38.0
Normal	80.5	58.6	1725	62.0
*χ^2=75.4*** d. f. (1)*				
Diarrhoea				
Yes	3.4	11.4	281	10.1
No	96.6	88.6	2500	89.9
*χ^2=25.8*** d. f. (1)*				
Morbidity				
Yes	37.0	47.8	1282	46.1
No	63.0	52.2	1499	53.9
*χ^2=17.24*** d .f. (2)*				
Total	**100**	**100**	**2781**	**100**

*p<.05 **p<.01 ***p<.001

Multivariate results are presented in Table 4. The co-efficient based on the logistic regression model explains that stunting increased with child age. Children between age 13-24 months were 2.8 (1/.36) times more likely to be stunted than the children aged 0-12 months (p<.001). Female children were 17% less likely to be stunted than male children (p<.05). Rural areas in Bangladesh experienced greater levels of poverty as compared to urban areas. Therefore, it is expected that children of the rural areas were more stunted than urban areas. The odds ratio shows that there is no significant impact of residence on nutritional status. Control for maternal characteristics also influence the physical growth of the child. The likelihood

of the child being stunted decreased with the increase in mothers' age and especially with mothers' education. In particular, children with uneducated (no formal schooling) mothers were 1.69 times more likely to be stunted as children with secondary and above educated mothers (p<.001). Family income had the significantly negatively affect on the child health. Children with the family income 3000 BDT were 26% less likely to be stunted than the children with family income less or equal 3000 BDT (p<.01).

Table 4. Logistic Regression Analysis on Nutritional Status (Stunting and underweight)

Covariate	Stunting		Underweight	
	OR	95% CI	OR	95% CI
Child age				
0-12 Months	.36 *** 1.00	.30-.42	.10 **	.08-.12
13-24 Months			1.00	
Child sex				
Male	1.21*	1.02-1.43	1.10	.91-1.33
Female	1.00		1.00	
Residence				
Urban	1.00		1.00	
Rural	1.08	.86-1.34	1.06	.83-1.35
Mothers age				
<=25 year	1.00		1.00	
> 25	.78 *	.64 - .96	1.11	.89-1.40
Mothers education				
No Schooling	1.69 ***	1.33-2.15	1.75 ***	1.34-2.29
Primary	1.47 ** 1.00	1.13-1.90	1.35 *	1.01-1.80
Secondary +			1.00	
Family income				
<=3000 BDT		1.00	1.00	
> 3000 BDT	.74 **	.61-.90	.74 **	.60 - .93
Parity				
<=2	1.00		1.00	
>2	1.12	.91-1.37	1.26*	1.01-1.58
Almost exclusive breastfeeding				
<=6 months	1.00		1.00	
> 6 months	1.21*	1.01-1.47	1.12	.90–1.37
Morbidity within one week				
Yes	1.12	.94 -1.32	.86	.71-1.04
No	1.00		1.00	
Constant	-.68		-1.64	
-2 Log likelihood	3141.34		2628.28	
χ^2 ***(d. f.)***	222.40 (10)		722.01 (10)	

*p<.05, ** p<.01, *** p<.001, OR= Odd Ratio, CI= Confidence Interval

Almost exclusively breastfed more than 6 months children were 1.21 times more likely to be stunted than children who almost exclusively breastfed less than 6 months (p<.05). Mothers' parity is positively associated with children nutritional status. Children with mothers' parity more than 2 were 1.12 times higher stunted than the children with mothers' parity less or equal 2.

Table 5. Logistic Regression Analysis on Morbidity and Diarrhoea

Covariate	Morbidity		Diarrhoea	
	OR	95% CI	OR	95% CI
Child Age				
0-12 Months	1.13	.95-1.32	.82	.63-1.07
13-24 Months	1.00		1.00	
Child Sex				
Male	1.15	.99-1.35	.97	.74 -1.25
Female	1.00		1.00	
Residence				
Urban	1.00		1.00	
Rural	.77 *	.63-1.47	83	.60-1.15
Mothers Age				
<=25 year	1.00		1.00	
> 25	.92	.76-1.11	.89	.65-1.21
Mothers Education				
No Schooling	1.05	.85-1.29	1.02	.98-1.61
Primary	1.11	.88-1.40	1.10	.74-1.62
Secondary +	1.00		1.00	
Family Income				
<=3000 BDT	1.00		1.00	
> 3000 BDT	.93	.78- 1.12	.82	.61-1.12
Parity				
<=2	1.00		1.00	
>2	1.01	.83 - 1.22	1.32	.96-1.80
Exclusive breastfeeding				
No	1.60***	1.28-1.99	3.57***	2.05-6.23
Yes	1.00		1.00	
Constant	-.48		-2.05	
-2 Log likelihood	3503.10		1639.9	
χ^2 ***(d. f.)***	31.09 (9)		43.11 (9)	

*p<.05, ** p<.01, *** p<.001, OR = Odd Ratio, CI = Confidence Interval

Child age had significant effect on underweight status (Table 4). The likelihood of the child being underweight for their age increased with their age (p<.01). Maternal education was highly influenced the child being underweight. Children with uneducated mother were about 2 times more likely to be underweight as compared to children with secondary and higher educated mothers (p<.001). Parity and family income had the significant impact on child being underweight. Family income was negatively associated on children underweight whereas parity were positively associated.

The analysis shows that non-exclusively breastfed children were 1.60 times more likely to had morbidity as compared to children who exclusively breastfed (Table 5). The morbidity was lowest among oldest age group. The children of 0-12 months of age were 1.13 times more likely to had had morbidity, compare to the children of age 13-24 months. The occurrence of morbidity decreased with increase of maternal education. The children with primary educated mothers were 1.11 times more likely to had morbidity than the children of secondary and higher educated mothers. Place of residence

were also significantly influenced on occurrence of morbidity. Rural children are 23% less likely to had morbidity than the urban children.

The recent episode of diarrhoea and its correlates are shown in Table 5. The result indicates that the episode of diarrhoea was lowest among the younger age. The contrast is that occurrence of morbidity was higher among the younger age group. Supplementation practice might be the cause of diarrhoea occurrence. Exclusive breastfeeding had the great impact on occurrence of diarrhoea. Infants who did not exclusively breastfed during the early month of life were 3.57 times more likely to had had a episode of diarrhoea as compared to who exclusively breastfed ($p<.001$).

Discussion

Bangladesh has a tradition of exclusively breastfeeding as experienced approximately 16% mothers exclusively breastfed their children and is comparable to the study by Ahmed[10]. This study reveals that socioeconomic characteristics were the risk factors of exclusively breastfeeding. The bivariate analysis found mothers education and family income significantly influence the exclusive breastfeeding. Secondary and higher educated mothers more exclusively breastfed than mothers those had no formal education[10]. Also the women of higher income family were more exclusively breastfed than women with lower income family.

Almost two-fifth of the children of age 0-24 months in Bangladesh was stunted or short for their age and approximately half of those children had experienced of morbidity. This study shows that the risk of stunting increased with age and that male children were more likely to be stunted than female. The gender difference in nutritional status is probably the result of biological rather than cultural factors. Higher male than female mortality is the biological norm found at all ages in both the developed and less developed world [11,12]. Child health is influenced in particular by socioeconomic or personal living standards[13,14]. Malnutrition is common among children in Bangladesh[15]. Findings from this study indicate that Bangladeshi children living in the poverty (Family income <=3000 BDT, 3000 BDT is the median family income) were more likely to stunted than children living in more affluent household.

The educational level of mother in the home is also a strong factor influencing child health. Children of mothers with little or no formal education were also more likely to be stunted compared to children of more educated mothers. The importance of maternal education to child health is evident even after controls for socioeconomic status are included. Thus, in addition to the economic benefits of higher education, increased maternal education influence child health outcomes in other ways. As women become more educated, they feel in greater control over their lives and become more responsible for their children survival. Educated mothers are more likely to identify with aspect of modernisation and, thus to seek modern health care[16]. Palloni [13] argued that, in addition to the individual limitations imposed by a lack of education, a community's ability to address the health needs of its members is also influenced by the education level of the population.

Therefore, children and families suffer because of a lack of information as well as communities are hampered in their efforts to provide health care. Policy efforts, therefore, should focus not only on increasing economic resources, but also educated women.

Parity of mothers is important not only the child health but also mothers. Multiple birth close together deplete a women's body nutrients and increase the risk of giving birth to a low birth weight baby[17]. Thus lengthening the birth interval to 2 years or more and reducing the number of higher parity birth should improve the health status of children.

Almost exclusive breastfeeding is associated with stunted growth in Bangladesh. It is evident that after six months infants need additional food for its growths. So this result is consistence. The benefits of breastfeeding are most pronounced among the children in rural poverty. After about 6 month of age the nutrients provided by breast milk become inadequate to sustain growth, and the addition of complementary foods becomes necessary[18].

In Bangladesh exclusive breastfeeding upto six months of age could reduce likelihood of both diarrhoea and stunted child. Introduction of weaning foods often considered as the reason for healthy growth for its quality and quantity. Despite all efforts of different government agencies and NGOs, this study showed that exclusive breastfeeding rate was still low in Bangladesh. More steps therefore, needed to encourage exclusive breastfeeding upto 6 months of age in order to improve the physical growth of children in Bangladesh.

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