



## Original Article

# Impact of Infant and Young Child Feeding Practices on the Nutritional Status of Children in Northern Bangladesh

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### Abstract

**Background:** Proper feeding practices are essential for attaining and maintaining optimum nutrition, health, and development of infants and children. Exclusive breastfeeding during the first six months of life and continued breastfeeding for two years, together with age-appropriate, nutritionally adequate complementary feeding initiated after six months of age, are optimum Infant and Young Child Feeding (IYCF) practices. However, often many aspects of infant and young child feeding practices are not optimum, with serious consequences for the child.

**Objective:** To determine the impact of Infant and Young Child Feeding (IYCF) practices on the nutritional status of children.

**Materials and Method:** This Cross-sectional descriptive type of study was conducted among 314 children from 6 months to 24 months of age at the Pediatric Outpatient Department and EPI center of Rajshahi Medical College Hospital during the period of January 2017 to December 2018. Collected data were analyzed by using 'SPSS version 16.

**Result:** Among 314 children exclusive breastfeeding (EBF) rate was 68.2% for the first six months, and timely started complementary feeding was 58.5% of cases. In 214 exclusive breastfed infants, only 4.7% and 1.4% of children were moderate to severely wasted and stunted, respectively. On the other hand, among 97 infants who were not exclusively breastfed, the percentage of moderate to severe wasting and stunting was 11.4% and 13.4%, respectively. Among the 175 timely started complementary feeding children, only 12% and 6% were moderate to severely underweight and wasted, respectively, no one was stunted, but among the inappropriately started complementary children, 20.2%, 12.5%, and 12.8% were moderately to severely underweight, wasted and stunted respectively.

**Conclusion:** Most of the children who were given exclusive breastfeeding in the first six months and started complementary food at an appropriate time after six months had normal nutritional status. Both moderate to severe stunting and wasting were common in those children who were non-exclusively breastfed and started complementary feeding either early or late.

**Keywords:** Infant and Young Child Feeding (IYCF), Exclusive breastfeeding, Complementary feeding.

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### Introduction

Proper feeding is crucial for improving nutritional status, development of the child, and decreasing mortality.<sup>1</sup> World Health Organization (WHO)

recommends initiation of breastfeeding within 1 hour of birth, exclusive breastfeeding for the first six months of life, and continued breastfeeding for two years together with age-appropriate, nutritionally adequate complementary feeding

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initiated after six months of age as Optimum Infant and Young Child Feeding (IYCF) practices and formulated key indicators for assessment.<sup>2,3</sup>

However, many aspects of infant and young child feeding are far from optimal.<sup>4</sup> Now, 51% of the newborn are breastfed within 1 hour of birth, the rate of exclusive breastfeeding is 55%, and continued breast feeding is 87%. Overall, only 23 percent of children aged 6-23 months are appropriately fed based on recommended IYCF practices.<sup>5</sup>

Exclusive breastfeeding ensures that the infant receives the full nutritional and other advantages of breast milk, including developmental benefits and protection against infection and some chronic diseases.<sup>6</sup>

Complementary feeding is the process started when breast milk alone is no longer sufficient to meet the nutritional requirements of an infant and when other foods and liquids along with breast milk are needed.<sup>7</sup> Almost one-half (48%) of children under five years are underweight, and 42% are stunted. The prevalence of underweight rises nearly three-fold from 22% at six months to 60% at 12 months. This sharp increase between 6 and 12 months coincides with the introduction of complementary feeding.<sup>4</sup>

Recent research done by Saha K.K. et al. has shown that under-five mortality can be reduced by 13% with optimal breastfeeding and a further 6% with optimal complementary feeding.<sup>8</sup>

S Rao et al. showed 44.4% of babies were given complementary feeding before six months of age, and timely complementary feeding was given in 60% of infants.<sup>7</sup> In Bangladesh, there is no recent complete study on IYCF status and its impact on childhood nutrition. So this study was done to assess the impact of Infant and Young Child Feeding (IYCF) practice on the nutritional status of infants and children.

### Materials and Methods

A Cross-sectional descriptive type of study. The study was conducted at the Pediatric OPD and EPI

center of Rajshahi Medical College Hospital, Rajshahi, during the period of January 2017 to December 2018. Children from 6 months to 24 months of age whose parents gave consent were included. Children who were very sick, having known organic problems like congenital heart diseases, and whose parents were unwilling to participate were excluded. All clinical information was received in a predesigned data collection form. A total of 314 children meeting the eligibility criteria attending at Pediatric outpatient department were studied. Then feeding history of infants from birth to till date was collected from mothers. The length and weight were measured by using an infantometer and digital weighing (Misaka, Japan) scale. The nutritional status was calculated and plotted on National Center for Health Statistics (NCHC) chart. Data analysis was done by using 'Statistical Package for Social Science' version 16. The  $\chi^2$  test was applied to determine the level of significance. A p-value of  $<0.05$  was considered significant.

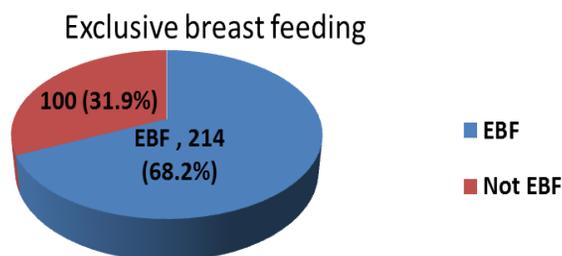
### Sampling method

Patients were selected by non-random purposive sampling. The study protocol was approved by the ethical review committee of Bangabandhu Sheikh Mujib Medical University, Dhaka. The risk and benefits of the study were explained to all subjects and informed written consent was obtained. After a thorough clinical examination of each subject, the information was recorded in a data schedule. Standard tube method tests for the determination of ABO blood groups of all subjects were used. Data thus obtained was analyzed statistically to determine any association between MI and different ABO blood groups.

Data were expressed as a percentage and an absolute number of frequency. All categorical variables were analyzed- by either the Chi-square test or Fisher's exact test. Statistics and probability were determined by SPSS version-22 Computer based software at a 95% confidence limit. A p-value less than 0.05 is considered a significant level. The data was presented table and graph.

## Results

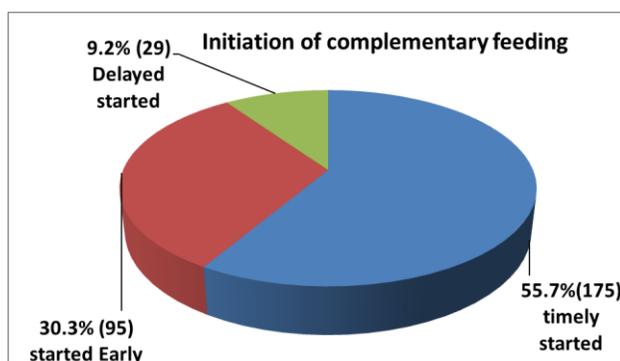
A total of 314 children aged six months to 24 months were included in this study. Feeding history, weight, height, and nutritional status were calculated and analyzed.



**Figure.1: Distribution of infants according to feeding status in first six months (Exclusive Breastfeeding EBF) n=314**

**Table 1: Distribution of child according to time of initiation of first breastfeeding. (n=314)**

Time of starting frequency		%
Within 1 hour	222	70.7
After 1 hour	92	29.3
Total	314	100



**Figure 2: Distribution of children according to time of starting complementary feeding. N=314**

**Table-2: Distribution of children according to types of foods was given**

Name of food	Number of children	Percentage
Rice	227	75.9
Suzi	73	25
Khichuri	152	50
Formula milk	75	25
Cow's milk	68	22
Dal	131	43.8
Egg	138	46
Meat	172	57
Fish	129	43

**Table 3: Nutritional status of children by WHO - Z score(n=314)**

<b>Weight for Length (WLZ)</b>	<b>frequency</b>	<b>Percentage</b>
+2 to -1Z (normal)	204	65 %
>-1 to -2Z (mild wasting)	89	28.3%
>-2 to -3Z (moderate wasting)	19	6.1%
<-3Z (severe wasting)	2	0.6%
<b>Total wasting</b>	<b>110</b>	<b>35%</b>
<b>Length for Age (LAZ)</b>	<b>Frequency</b>	<b>Percentage</b>
+2 to -1Z (normal)	209	66.5%
>-1 to -2Z (mild stunting)	89	28.3%
>-2 to -3Z (moderate stunting)	12	3.8%
<-3Z (severe stunting)	4	1.3 %
<b>Total stunting</b>	<b>105</b>	<b>33.4%</b>
<b>Weight for Age( WAZ)</b>	<b>Frequency</b>	<b>Percentage</b>
+2 to -1Z (normal )	163	51.9%
>-1 to -2Z (mild underweight)	103	32.8%
<-2 to -3Z (moderate underweight )	36	11.4%
<-3Z (severe underweight)	12	3.8%
<b>Total underweight</b>	<b>151</b>	<b>48%</b>

**Table 4: Relationship between initiation breastfeeding after birth and nutritional status of infant and children.**

Parameter	Breastfeeding started within one hour (n=222)	Breastfeeding started after one hour n=92	Statistics ( $X^2$ )
<b>Weight for age</b>			
Normal	<b>132 (59%)</b>	<b>56 (60%)</b>	P=0.18
Mild underweight	52 (23%)	21 (22%)	
Moderate underweight	31 (13%)	13 (14%)	
Severe underweight	7 (3%)	2(2%)	
<b>Weight for length</b>			
Normal	<b>140 (63%)</b>	<b>61 (66%)</b>	P=0.2
Mild wasting	64 (29%)	25 (27%)	
Moderate wasting	16(7.2%)	5( 5.4%)	
Severe wasting	2 (0.9%	1 (1%)	
<b>Length for age</b>			
Normal	<b>146(65%)</b>	<b>61 (66%)</b>	P=0.5
Mild stunting	61 (27%)	27(30%)	
Moderate stunting	11 (4.9%)	3(3.2%)	
Severe stunting	4 (1.8%)	1(1%)	

Table 4: No significant difference in nutritional status was found between the two groups

**Table 5: Relationship between feeding practice in the first six months of life and nutritional status:**

5. (A) According to weight for age Z score. n=314

Nutritional status	Feeding status						Statistics
	EBF(214)		Other feed (3)		Both (97)		
	N	%	N	%	N	%	
Normal	106	49.5	0	0	57	58.8	$X^2=9.3$
Mild underweight	74	34.6	1	33	28	28.9	Df=6
Moderate underweight	28	13.1	2	66	6	6.2	P=0.15
Severe underweight	6	2.8	0	0	6	6.2	

**Table 5(A)** Among 214 exclusively breastfed babies, 34.6% were mildly underweight, 13.1% were moderately underweight, and 2.8% were severely underweight. Among 97 non-exclusive breastfed infants, 28.9% were mildly underweight, 6.2% were moderately underweight, and a similar number was also severely underweight. ( $p=0.15$ )

**Table:5-(B): According to Weight for length Z score ( wasting) n=314**

Nutritional status	Feeding status						Statistics
	EBF(214)		Other feed (3)		Both (97)		
	N	%	N	%	N	%	
Normal	134	62.6	3	100	67	69.1	$X^2=12.9$
Mild wasting	70	32.7	0	0	19	19.6	Df=6
Moderate wasting	10	4.7	0	0	9	9.3	P=0.044
Severe wasting	0	0	0	0	2	2.1	

**Table 5 (B):** Among 214 exclusive breastfed babies, 32.7% were mildly wasted, and 4.7% were moderately wasted; no one was severely wasted. Among 97 non-exclusive breastfed children, 9.3% were moderately wasted ( $P$  value 0.04), 19.6% were mildly wasted, and 2.1% were severely wasted, So the percentage of malnutrition is high among non-exclusive breastfed babies.

**5(C): According to Length for age( stunting ) among exclusively breast fed and non-exclusive breast fed children**

Nutritional status	Feeding status						Statistics
	EBF(214)		Other feed (3)		Both (97)		
	N	%	N	%	N	%	
Normal	139	65	1	33	67	69.1	$X^2=26.7$
Mild stunting	72	33.6	0	0	17	17.5	Df=6
Moderate stunting	2	0.9	2	66	10	10.3	P=0.001
Severe stunting	1	0.5	0	0	3	3.1	

**Table 5 (C):** Among 214 exclusively breastfed children, 33.6% were mildly stunted, and 0.5% were severely wasted. Among non-exclusively breastfed children, 17.5% were mildly stunted, 10.3% were moderately stunted, and 3% were severely stunted ( $p= 0.001$ ). So, stunting is more prevalent among non-exclusive breastfed children.

**Table.6: Relationship between the age of initiation of complementary feeding and nutritional status.**

Parameter	Timely complementary (n=175)	started feed (n=124)	Early or late starting of complementary feed	Statistics
<b>Weight for age</b>				
Normal	<b>94 (53.7%)</b>		<b>60 (48%)</b>	
Mild underweight	60(34.3%)		39 (31%)	P=0.004
Moderate underweight	18(10.3%)		16 (13%)	
Severe underweight	3(1.7%)		9 (7.2%)	
<b>Weight for length</b>				
Normal	<b>118 (67.4%)</b>		<b>80 (64%)</b>	
Mild wasting	51 (29.1%)		29 (23.3%)	P=0.001
Moderate wasting	6 (3.4%)		13( 10.4%)	
Severe wasting	0		2 (2.1)	
<b>Length for age</b>				
Normal	<b>130 (74.3%)</b>		<b>70 (56%)</b>	
Mild stunting	45 (25.7%)		38 (30%)	P=0.002
Moderate stunting	0		12(9.6%)	
Severe stunting	0		4(3.2%)	

**Table 6:** Among the timely started complementary feeding group, only 3.4% were severely underweight, but no one was severely wasted or stunted. In the other group, 10.4% children were moderately wasted, 9.6% were moderately stunted, and 3.2% were severely stunted. So a significantly higher percentage of children were underweight, wasted, and stunted among inappropriately started complementary feeding.

## Discussion

It is observed that a good number of children, 68.2%, were given exclusive breastfeeding in the first six months of age (Fig-1). According to Bangladesh demographic and health survey (BDHS) 2014, the rate of exclusive breastfeeding in Bangladesh is 55%.<sup>5</sup> In our study rate of exclusive breastfeeding was higher than in the previous study. The difference in these findings indicates the gradual increase in exclusive breastfeeding practices. In this study, we found that 70.7% of mothers initiate breastfeeding within one hour after birth (Table 1). According to BDHS, 2014 report 51% of children breastfed within one hour of birth.<sup>5</sup> Our study showed a

higher rate of breastfeeding initiation within one hour of birth.

In our study, 55.7% of mothers started complementary feeding along with breastfeeding timely at six completed months, and 30.3% of children received complementary feeding before six months of age (Fig.2). BDHS preliminary report 2014 showed 70% of infants started complementary feeding at 6 -9 months which was higher than that of our study.<sup>5</sup> Haque M J et al. showed a countable number of mothers (21.7%) weaned their child much earlier, i.e., before attaining the age of 4 months.<sup>9</sup> Delayed introduction of complementary were found in 9.2% of the child in our study. Subbaet et al.

showed 22.5 % of mothers started complementary feeding beyond the recommended age.<sup>10</sup>

Common complementary food given by the mother in our study was Rice 73%, khichuri 48.4%, egg 44.8%, Suzi 23.2%, formula milk 12%, and cows milk 8.9% (Table 2). Burhan Uddinet et al. showed Garo and non-Garo mothers used complementary foods such as cow's milk, Suzi, and rice in most of the cases. Only a few families used baby formula, goat milk, banana, and green vegetables, khichuri, and fruit juice.<sup>11</sup> D. K. Paul et al. found in their study as a weaning food (51.5%) used mashed rice, 16.5% used suji, 6.5% used khichuri, 23.5% used normal foods and 2% used rice flour.<sup>12</sup> Basnet et al. documented in their study that 22% of the mothers were using infant formula.<sup>13</sup>

Among 214 exclusively breastfed babies, weight for age Z score was normal in 49.5% of children, 36.4% children were mildly underweight, and only 2.8% were severely underweight. Among 97 infants who gave early complementary food before six months, 12.4% children were moderately and severely underweight (Table 5A). According to weight for length for Z score, 65.7% of children were in normal nutritional status, 32.7% of children were mildly wasted among exclusively breastfed children, no one was severely wasted, but 11.4% of children were moderate to severely wasted in non-exclusive breastfeeding group (p value= 0.04. Table 5-B). According to length for age Z score, 67.1% had normal nutritional status, 33.6% were mildly stunted, and only 1.4% were moderate to severely stunted among the exclusively breastfed group; on the other hand, 19.1% were mildly stunted, and 15% of children were moderate to severely stunted in the non-exclusive breastfed group (p-value = 0.0001, Table 5-C). So our study showed that a significantly higher proportion of non-exclusively breastfed children were suffering from a different grade of malnutrition than the children who were on exclusive breastfeeding. Salim M et al. showed similar types of observation that wasting, stunting, underweight, and bilateral pedal edema were mostly prevalent in non-exclusively breastfed children.<sup>14</sup>

Among the timely started complementary feeding group, 53.7% of children were normal according to WAZ, 34% were mildly underweight, and only 1.7% children were severely underweight, but in the other group who were not given complementary food timely, 48% were normal, 13% and 7.2% were moderate and severely underweight respectively (P=.004, Table-6). In weight for length classification, 67% of children were normal, 29% were mildly wasted, and 3.4% were moderately wasted in the timely started complementary food group, but among the not timely started group, 23.3% had mild wasting, 10.4% had moderate wasting and 2.1% had severe wasting (p=0.001, Table-6) Among timely started group according to length for age 74.3% children had normal, 25.7% mildly stunted, no one moderately or severely stunted. In the other group, 56% were normal, 30% were mildly stunted, 9.6% were moderately stunted 3.2% were severely stunted. (p=0.002, Table-6). So a significant number of children had a higher percentage of malnutrition than those who did not receive complementary food timely. A similar observation was found by Salim M et al. showed that the number of malnutrition (stunting and wasting) was common in those children who were not initiated complementary feeding timely, either early or delayed initiation.<sup>14</sup>

## Conclusion

A significant number of children are suffering from malnutrition. Moderate to severe wasting and stunting were significantly higher among those children who were not in exclusive breastfeeding. The percentage of wasting, stunting, and being underweight were high among those children who did not receive complementary feeding timely than timely received complementary feeding. So, this study concludes that there is a significant impact of Infant and Young Child feeding (IYCF) practice on the nutritional status of children.

**Conflict of interest:** None declared

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