Nutritional Impact of Infant and Young Child Feeding Practices among Children Aged 6–24 Months in a Tertiary Hospital of Bangladesh

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Abstract

Introduction: Nutritional status in infancy and early childhood depends largely on Infant and Young Child Feeding (IYCF) practices. Optimal practices, including exclusive breastfeeding and timely complementary feeding, are essential to ensure adequate growth and development. Although breastfeeding is traditionally practiced in Bangladesh, inappropriate or delayed complementary feeding remains a major contributor to child malnutrition.

Objective: This study aimed to evaluate the relationship between IYCF practices and nutritional status among children aged 6–24 months attending a tertiary care hospital.

Methods: A cross-sectional study was conducted at the Pediatric Outpatient Department of Rajshahi Medical College Hospital from December 2020 to May 2021. A total of 207 children aged 6 to 24 months were enrolled. Data were collected on breastfeeding practices, timing of complementary feeding, and anthropometric measurements. Nutritional status was assessed using WHO Z-score classifications for weight-for-age (WAZ), length-for-age (LAZ), and weight-for-length (WLZ). Statistical analysis was performed using SPSS, with chi-square tests employed to determine associations between feeding practices and nutritional outcomes.

Results: Among the 207 children studied, the male-to-female ratio was 1.3:1. Age distribution revealed that 15.46% were 6–8 months old, 24.15% were 8–11 months, and 60.39% were 12–24 months. Most children (91.79%) received both breast milk and complementary foods; 5.80% were exclusively breastfed, and 2.42% received no breast milk. Exclusive breastfeeding for the first six months was reported in 74.40% of cases, while 83.66% of mothers-initiated breastfeeding within the first hour after birth. Complementary feeding was timely in 64.62% of children, and 21.54% received it earlier than recommended. Continued breastfeeding along with complementary foods was maintained in more than 94% of children, including all those under 12 months and 94.26% of those aged 12–24 months. The prevalence of underweight, wasting, and stunting was 33.33%, 18.36%, and 34.78%, respectively-highest in the 12–24 month age group. A statistically significant association ($P < 0.05$) was observed between appropriate IYCF practices and improved nutritional status. Children who received both breast milk and timely complementary foods showed higher rates of normal WAZ (75.40%), LAZ (73.81%), and WLZ (88.89%).

Conclusions: This study reinforces the importance of optimal feeding practices in early life to prevent malnutrition. Strengthening maternal education and health system support for breastfeeding and complementary feeding is critical in improving child health outcomes in Bangladesh.

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Introduction

Nutritional status during infancy and early childhood is a critical determinant of survival, growth, and development, particularly in the first two years of life - a period often referred to as the "critical window" for child health interventions. While food availability is a major contributor to child nutrition, infant and young child feeding (IYCF) practices play an equally vital role in shaping health outcomes. Appropriate feeding practices, including timely initiation of breastfeeding and the provision of nutritionally adequate complementary foods, are essential for preventing malnutrition and reducing child mortality. The World Health Organization (WHO) recommends initiation of breastfeeding within the first hour after birth, exclusive breastfeeding (EBF) for the first six months of life, and continued breastfeeding for up to two years alongside age-appropriate complementary feeding introduced at six months of age. These guidelines form the basis of the optimum IYCF practices, which are globally endorsed and monitored using a set of standardized indicators.[1]

Bangladesh has a strong cultural foundation for breastfeeding. However, optimal IYCF practices remain inconsistently followed. According to national data, the current rate of exclusive breastfeeding is approximately 65%, yet only 34% of children aged 6–23 months receive age-appropriate and nutritionally adequate feeding as per IYCF recommendations.[2] Delays or inadequacies in introducing complementary foods can significantly hamper a child's growth trajectory, with irreversible consequences for cognitive and physical development. The quality and timing of complementary feeding are often suboptimal. Challenges include early or late initiation, insufficient feeding frequency, and inadequate energy density of foods. Inappropriate complementary feeding not only fails to meet a child's growing nutritional needs but may also reduce breast milk intake if poorly sequenced. In Bangladesh, only 18% of infants aged 6–11 months receive a minimally acceptable diet, and over one-third of infants aged 6–8 months experience delayed complementary feeding.[3]

Poor IYCF practices are a leading cause of child malnutrition, which remains a major public health concern in Bangladesh. Nationally, 48% of children under five are underweight and 42% are stunted. The prevalence of underweight increases sharply from 22% at six months to 60% at 12 months, coinciding with the transition to complementary foods.[4]

Evidence from previous studies supports the link between suboptimal IYCF and poor nutritional outcomes. Campbell et al. reported that among children under 24 months, 15% were stunted, 5% wasted, and 12% underweight.[5] In another study, Sheikh et al. found that only 55% of mothers practiced exclusive breastfeeding, 27% maintained minimum dietary diversity, and merely 23% met the criteria for a minimum acceptable diet.[6] Similarly, Anees et al. reported that just 45% of mothers exclusively breastfed for six months, and only 38% introduced complementary foods at the recommended age.[7] Aziz et al. found 19.2% of children were underweight, 31.2% stunted, and 10.1% wasted.[8]

In response to these challenges, WHO, UNICEF, and the Government of Bangladesh have prioritized the promotion, protection, and support of breastfeeding and complementary feeding. The national IYCF strategy and implementation guidelines were launched in 2007 to address the widespread prevalence of suboptimal feeding practices.[4]

Despite these efforts, recent data on the IYCF status and its relationship with nutritional

outcomes in Bangladesh remain limited. Therefore, this study aims to evaluate the current feeding practices and examine their impact on the nutritional status of children aged 6–24 months attending a tertiary care hospital. Findings from this study may provide critical insights to guide programmatic and policy-level interventions aimed at improving child nutrition in the country.

Methods

This cross-sectional descriptive study was conducted at the Pediatric Outpatient Department and EPI Center of Rajshahi Medical College Hospital (RMCH), Rajshahi, over a period of six months from December 2020 to May 2021. The study population comprised children aged 6 to 24 months who attended the outpatient department and met the inclusion criteria. A total of 207 children were selected using purposive sampling. Children were included in the study if they were between 6 and 24 months of age and attended the pediatric outpatient department during the study period. Children who were very ill or had known chronic organic conditions such as cardiac, neurological, gastrointestinal, renal, or hepatic diseases were excluded. The independent variables in the study included exclusive breastfeeding, complementary feeding, supplementary feeding, age, and sex, while the dependent variables were stunting, wasting, and undernutrition.

Data collection was performed using a structured questionnaire administered by the principal investigator. Feeding history was gathered through a 24-hour dietary recall, including any food items occasionally given. Anthropometric measurements were taken using a standardized infantometer and a digital weighing scale. Nutritional status was assessed using WHO growth standards and categorized based on Z-scores: stunting (length-for-age), wasting (weight-for-length), and undernutrition (weight-for-age). Exclusive breastfeeding was defined as providing only breast milk (with no other food or drink except medications) for the first six months. Complementary feeding referred to the introduction of nutritionally adequate and hygienically prepared local foods after six months, while supplementary feeding was defined as providing any food before six months, with or without breast milk. Children were considered stunted, wasted, or underweight if their respective Z-scores fell below -2 standard deviation (SD), and very severe disease was defined based on clinical features such as convulsions, lethargy, severe infections, or complicated malnutrition.

Ethical approval for the study was obtained from the Ethical Review Committee of Rajshahi Medical College. Participation was voluntary, and written informed consent was obtained from parents or guardians. Interviews were conducted in the local language (Bangla), and patient confidentiality was strictly maintained throughout the study.

Data analysis was conducted using Statistical Package for Social Science (SPSS) version 27. Chi-square and independent t-tests were used to examine the association between variables, with a p-value less than 0.05 considered statistically significant. Study findings were presented using tables, charts, graphs, and descriptive statistics. To ensure data quality, the study employed an adequate sample size, applied clear inclusion and exclusion criteria, followed standardized procedures for history taking and anthropometric measurements, and maintained consistency in data recording and analysis.

Results

A total of 207 infants and children aged 6–24 months attending the outpatient department of RMCH were enrolled. Data on feeding history,

anthropometric measurements, demographics, and current illness were collected to assess and analyze their nutritional status. As shown in According to Figure 1, 74.4% received exclusive breastfeeding for the first 6 months, while 25.6% did not. Figure 2 shows that 64.62% of mothers started complementary feeding at the appropriate time, 21.54% started before 6 months, and 13.85% delayed it; twelve children continued to be exclusively breastfed.

Table I: Distribution of children by types of foods received (n=195)

Name of food	Number of children	Percentage
Rice	190	97.44
Suzi	163	83.59
Khichuri	152	77.95
Formula milk	40	20.51
Cow's milk	68	34.87
Dal	131	67.18
Egg	138	70.77
Meat	132	67.69
Fish	129	66.15
Fruits	171	87.69
Muri	37	18.97

Table I presents the types of complementary foods given: rice (97.44%), suji (83.59%), khichuri (77.95%), formula milk (20.51%), cow's milk (34.87%), dal (67.18%), egg (70.77%), meat (67.69%), fish (66.15%), fruits (87.69%), and muri (18.97%). Twelve infants who were exclusively breastfed were not included in this chart. In WLZ, 81.64% of the study children were well nourished, 13.53% were mildly wasted, 4.35% were strongly wasted, and 0.48% was severely wasted shown in Table II. In terms of LAZ, 135 children were well fed. WAZ showed 56 slightly underweight children and 1 severely underweight child.

Table II: Assessment of children's nutritional status using WHO Z-Score standards (n=207)

Weight for Length (WLZ)	+2 to -1 Z (normal)	169	81.64%
	-2 to <-1 Z (mild wasting)	28	13.53%
	-3 to <-2 Z (moderate wasting)	9	4.35%
	<-3Z (severe wasting)	1	0.48%
	Total wasting	38	18.36%
Length for Age (LAZ)	+2 to -1Z (normal)	135	65.22%
	-2 to <-1 Z (mild stunting)	59	28.50%
	-3 to <-2 Z (moderate stunting)	11	5.31%
	<-3Z (severe stunting)	2	0.97%
	Total stunting	72	34.78%
Weight for Age (WAZ)	+2 to -1Z (normal)	138	66.67 %
	-2 to <-1 Z (mild underweight)	56	27.05%
	-3 to <-2 Z (moderate underweight)	12	5.80%
	<-3Z (severe underweight)	1	0.48%
	Total underweight	69	33.33%

Table III: Impact of breastfeeding initiation timing post-birth on the nutritional status of infants and young children (n=202)

Weight for age	Normal Mild underweight Moderate underweight Severe underweight	120 (71.00%) 44 (26.04%) 5 (2.96%) 0 (0%)	15 (45.45%) 11 (33.33%) 6 (18.18%) 1 (03.03%)	P=.0002
Weight for length	Normal Mild wasting Moderate wasting Severe wasting	145 (85.80%) 19 (11.24%) 5(2.96%) 0 (0%)	21 (63.63%) 8 (24.24%) 3(09.09%) 1 (03.03%)	P=.005
Length for age	Normal Mild stunting Moderate stunting Severe stunting	116 (68.64%) 46 (27.22%) 6 (03.55%) 1 (0.59%)	16 (48.48%) 12 (36.36%) 4 (12.12%) 1 (03.03%)	P=.041

As shown in Table III, 169 infants received breast milk within one hour of birth and 33 after one hour. Normal weight-for-age was found in 71.0% of the early-fed group versus 45.45% in the delayed group, with both groups having 29.5% underweight children (P = 0.0002). Weight-for-length was normal in 85.8% of both groups, while wasting was higher in the delayed group (36.37% vs. 14.2%, P = 0.005). Stunting occurred in 31.36% of the early-fed group and 51.52% of the delayed-fed group (P = 0.041). All P-values were <0.05, indicating statistically significant associations. Five non-breastfed infants were excluded.

Table IV: The impact of feeding practices in the first six months of life on infant nutritional status

Nutritional Status	Category	EBF (154)	%	Other Feed (5)	%	Both (48)	%	χ^2	df	p-value
Underweight (Weight for Age Z-score)	Normal	111	72.08	2	40	25	52.08	21.29	6	0.002
	Mild Underweight	38	24.68	1	20	17	35.42			
	Moderate Underweight	5	3.25	2	40	5	10.42			
	Severe Underweight	0	0	0	0	1	2.08			
Wasting (Weight for Length Z-score)	Normal	130	84.42	2	40	37	77.08	20.36	6	0.002
	Mild Wasting	19	12.34	1	20	8	16.67			
	Moderate Wasting	5	3.25	2	40	2	4.16			
	Severe Wasting	0	0	0	0	1	2.08			
Stunting (Length for Age Z-score)	Normal	104	67.53	2	40	29	60.42	25.82	6	0.0002
	Mild Stunting	41	26.62	1	20	17	35.42			
	Moderate Stunting	9	5.84	1	20	1	2.08			
	Severe Stunting	0	0	1	20	1	2.08			

Table IV compares nutritional outcomes of 154 exclusively breastfed infants to 48 non-exclusively breastfed infants. Among exclusively breastfed infants, 72.08% had normal weight, 24.68% were mildly underweight, 3.25% significantly underweight, and none severely underweight. In contrast, the non-exclusive group had 52.08% normal, 35.42% mildly underweight, 10.42% moderately underweight, and 2.08% severely underweight (P = .002). WLZ scores showed 84.42% normal, 12.34% mildly wasted, 3.25% moderately wasted, and none severely wasted in the exclusive group. Among non-exclusive feeders, 77.08% were normal, 16.67% mildly wasted, and 2.08% severely wasted (P = .002). LAZ scores revealed that 67.53% of exclusively breastfed infants were normal, 26.62% mildly stunted, and 5.84% moderately stunted. Among non-exclusive feeders, 60.42% were normal, 35.42% mildly stunted, and 8.33% each moderately and severely stunted (P = .0002). Thus, malnutrition was more prevalent among non-exclusively breastfed children. According to Table 7, 75.43% of children had normal weight-for-age, 88.89% normal weight-for-length, and 73.81% normal length-for-age. Only one child (0.79%) was severely stunted, with no cases of severe wasting or underweight in this group. In contrast, among non-normally nourished children, 49.28% were underweight, 31.88% wasted, and 53.62% stunted. The observed differences were statistically significant. Twelve children who were exclusively breastfed throughout were not included in this table.

Table V: Impact of age at complementary feeding initiation on nutritional outcomes

Parameter		Complementary feed		Statistics
		Timely started (n=126)	Early or late (n=69)	
Weight for age	Normal Mild underweight Moderate underweight Severe underweight	95 (75.40%) 27 (21.43%) 4 (3.17%) 0(0.0%)	35 (50.72%) 26 (37.68%) 7 (10.14%) 1 (1.45%)	P=0.003
Weight for length	Normal Mild wasting Moderate wasting Severe wasting	112 (88.89%) 10 (79.94%) 4 (3.17%) 0(0.0%)	47 (68.12%) 16 (23.19%) 5 (7.25%) 1 (1.45%)	P=0.004
Length for age	Normal Mild stunting Moderate stunting Severe stunting	93 (73.81%) 29 (23.02%) 3 (2.38%) 1(0.79%)	32 (46.38%) 29 (42.03%) 7 (10.14%) 1(1.45%)	P=0.001

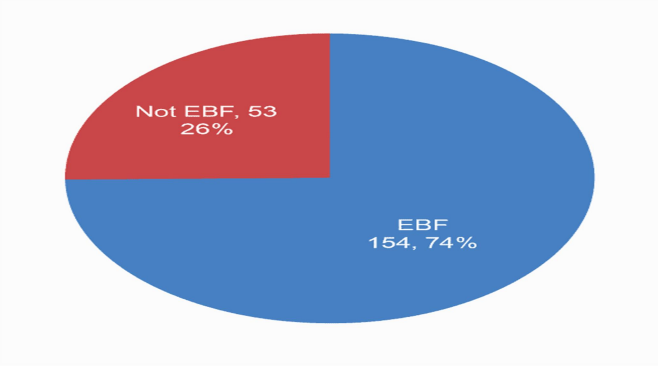

Figure 1. Exclusive breastfeeding practices among infants aged 0–6 months

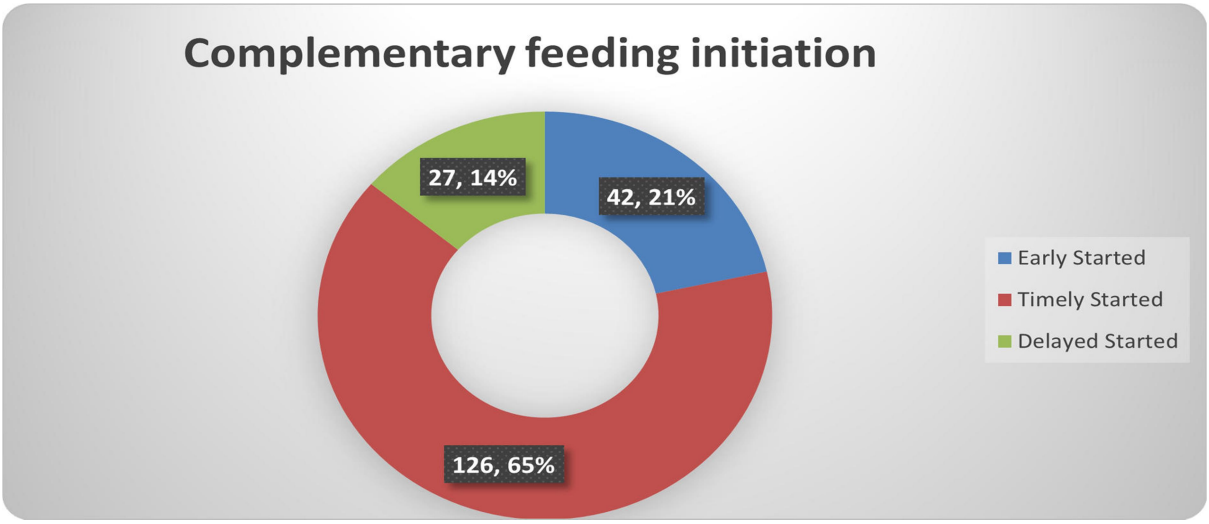

Figure 2. Distribution of children by age at initiation of complementary feeding (N=207)

Discussion

This descriptive cross-sectional study assessed infant and young child feeding practices and nutritional status among children attending Rajshahi Medical College Hospital using WHO growth standards and caregiver-reported feeding history. Among the 207 children, 15.46% were aged 6–8 months, 24.15% were 8–11 months, and 60.39% were 12–24 months. Exclusive breastfeeding during the first six months was reported in 74.4% of cases, higher than the 65% reported by BDHS 2018 and 46% in India, indicating a positive trend likely driven by nationwide breastfeeding promotion campaigns.[2,9] Early initiation of breastfeeding was seen in 83.66% of mothers, significantly higher than findings by Subba et al. (43.5%) and BDHS 2014(51%).[10,11] This reflects improved awareness and effective health interventions. Timely complementary feeding at six months occurred in 64.62%, with delayed introduction in 13.85%. These rates are more favorable than those in Subba et al., where 40% started early and 22.5% delayed.

Nutritional status by Z-score revealed 81.64% had normal weight-for-length (WFL), 13.53% had mild wasting, and 4.83% moderate to severe wasting. Based on length-for-age (LFA), 65.22% were normal, 28.5% mildly stunted, and 6.28% moderately to severely stunted. Weight-for-age (WFA) showed 27.05% mild underweight. Overall, 33.33% were underweight, 18.36% wasted, and

34.78% stunted. These results are comparable to Giasuddin et al. (38.1% stunted, 38% underweight) and BDHS 2018 (31% stunted, 8% wasted, 22% underweight)[2]. However, Muaz et al. found much higher prevalence (stunting 80.2%, underweight 73%, wasting 42.3%), and Kumar et al. reported 51.6% stunting.[12-14] All P-values in this study were <0.05, indicating statistically significant associations between feeding practices and nutritional outcomes. Among exclusively breastfed children, 72.08% had normal WFA, while 24.68% were mildly underweight and none severely underweight. In contrast, among the five non-breastfed children, 40% were moderately underweight, and one was severely underweight. Of the 48 children who received early complementary foods, 35.42% were mildly and 10.42% moderately underweight. WFL Z-scores showed 84.42% of exclusively breastfed children were normal, while 12.34% were mildly and 3.25% moderately wasted. In the non-exclusive group, 16.67% were mildly wasted, and 2.08% severely wasted (P = .002), indicating a significant association ($\chi^2 = 20.36 > 12.59$). LFA Z-scores among exclusively breastfed children revealed 67.53% were normal, 26.62% mildly stunted, and 5.84% moderately/severely stunted. Among non-exclusive breastfed children, 35.42% were mildly and 2.08% moderately stunted (P = .0002; $\chi^2 = 25.82 > 12.59$). These findings align with Salim et al., who reported higher malnutrition rates in non-exclusively breastfed children.[15]

Limitations

This study has several limitations, including potential recall bias from maternal self-reporting, limited generalizability due to the hospital-based sample, financial constraints from being self-funded, and incomplete data from a few non-participating subjects.

Conclusions

This study demonstrates a strong link between children's nutritional status and maternal feeding practices. While early initiation (81.64%) and exclusive breastfeeding for six months (74.40%) indicate increasing awareness, overall practices remain inadequate. Early complementary feeding occurred in 21.54% of cases, and only 64.62% received timely and appropriate complementary foods.

With 33.33% of children underweight, 18.36% wasted, and 34.78% stunted, malnutrition was notably higher among those lacking exclusive breastfeeding and proper complementary feeding. These findings reinforce the need to improve maternal education and strengthen health system support to promote optimal feeding practices and reduce malnutrition in Bangladesh.

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