

Research Article

Determinants of Infant and Young Child Feeding (IYCF) Practices of Children (6-23) Among Mothers in Rural Area of Noakhali District, Bangladesh

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Abstract

Background: Infant and young child feeding (IYCF) practices offer the opportunity to guarantee the survival, growth, and development of children under the age of two. Thus, the goal of this study was to identify the determinants of IYCF practices of children 6 to 23 months among the rural mothers of Noakhali district, Bangladesh.

Methods: A descriptive cross-sectional study was conducted with a standard questionnaire to collect the data regarding IYCF practices according to WHO guideline and a convenient sampling technique was used with a sample size of 100 mothers who had child less than 2 years of age, in Subornocho, Noakhali, Bangladesh.

Results: 63% mothers fed colostrum to their child, 57% of the mothers fed exclusive breastfeeding; 73% and 57% children had minimum level of dietary diversity (MDD) and minimum acceptable diet (MAD) respectively. Mother's education, household income and the age of the child had positive association of varying degrees with feeding iron rich foods, exclusive breast feeding (EBF), MDD and MAD. Mother's with secondary education (AOR 0.136; 90% CI 0.028, 0.664) were more likely to feed iron rich foods to their children than other mothers. Having low monthly family income (AOR 5.78; 90% CI 1.061, 3.154) negatively affects iron rich foods consumption. Children aged 6-11 months were 5.65 times (AOR 5.36; 90% CI 1.15, 2.50) more likely not to achieve minimum dietary diversity than children with 18 to 23 months old. MDD also found to be associated with child stunting; stunted children were less likely to have achieved MDD (AOR: 0.358; 90% CI 0.145, 0.887) compared to normal children.

Conclusion: Exclusive breast feeding, complementary feeding practices with dietary diversity and acceptance needs to be in alignment with the standards. More exquisite interventions are needed for targeting the groups with sub-optimal practices, while addressing socioeconomic factors that affect the practice.

Keywords: IYCF practices; Exclusive breastfeeding practices; Minimum dietary diversity; Minimum acceptable diet; Bangladesh

Introduction

Sufficient nourishment is crucial for maintaining optimum health, which includes children's physical and mental development. [1]. A young child's specific nutritional and physiological demands are meant to be met by infant and young child feeding practices (IYCF). It is therefore generally advised that mother begin timely nursing and provide safe, supplementary food that is nutritionally enough by the time the child's reaches month six. [2]. The first two years of life are recognized as the "window of opportunity" for ensuring survival, growth, and development, and IYCF practices are essential during this period. Breastfeeding and supplemental feeding are part of the IYCF practice, and they have a significant impact in a child's nutritional health. [3].

Exclusive breastfeeding (EBF) is the exclusive feeding of a newborn for the first six months of life; complementary feeding, which begins at 181 days of life and includes other nutrient-dense meals such cereals,

dairy products, meat products, fruits, and vegetables, is the term used beyond this period. [4]. Breastfeeding for a full six months, together with an adequate supply of safe, suitable, nutritious solid, semi-solid, and soft food, all contribute to a child's overall health and immunity to many diseases. [5].

An early start to nursing, ideally within the first hour of birth, has been shown to have a considerable positive effect on lowering newborn mortality overall. For the first six months of life, exclusive breastfeeding (EBF) can lower the chance of death, foster healthy development, and shield newborns and babies from many disorders. [6]. According to estimates, 1.4 million deaths of children under five in underdeveloped countries may be avoided each year if children under two years old were to receive adequate breastfeeding care. [7]. EBF increases the chance of dying from pneumonia or diarrhea by more than two times. [8]. Three guidelines for IYCF practices are provided by the WHO for children between the ages of 6 and 23 months. i) Continue nursing or, if not, feed with calcium-rich foods; ii) feed solid or semi-solid food for a minimum number of times a day based on age and breastfeeding status; and iii) feed foods from a minimum number of food groups on a daily basis based on breastfeeding status. [9]. There are several indicators for optimal IYCF. It is recommended that infants begin nursing within one hour of birth, exclusively nurse during the first six months of life, and continue to consume breast milk until they are two years old and older. Age-appropriate complementary foods with the ideal feeding frequency and nutrient density should be provided starting at six months of age. In order to assess IYCF behaviors and evaluate treatments, the WHO developed a set of core and optional indicators in 2008. These indicators can be used in population-based surveys.[10].

Socio demographic factors associated with included maternal age, education, income and health facility births [11]. Research indicates that maternal education is linked to meal frequency, dietary diversity, timely introduction of supplemental feeding, and minimum recommended diet [12]. Around 3•1 million children in this age range die each year due to malnutrition, which accounts for nearly half (45%) of all fatalities in children under five worldwide. [13]. The primary causes of Bangladesh's high infant death rate are respiratory infections, diarrheal illnesses, low birth weights, congenital defects, malnutrition, and a lack of access to healthcare services, among other community variables. [14]. In Bangladesh, as in many other low-income nations, malnutrition among children is a serious public health issue. Approximately 41% of children under five are stunted, 16% are wasted, and 36% are underweight. [15].

The government of Bangladesh has implemented numerous projects aimed at enhancing the nutritional status of children under two years old. In this situation, community-based IYCF counseling and assistance can be crucial in enhancing these procedures as well as guaranteeing that the poorest and most vulnerable groups have access to these services, making it a crucial tactic for programming with an equity focus. [18]. Comprehending how dietary diversity affects children's nutritional status can help guide nutrition policy and suggest initiatives that aim to enhance the quality of complementary meals. Therefore, the results of this study will be significant to Bangladeshi public health specialists and aid in the pursuit of the Sustainable Development Goal-2 (SDG-2) agenda, which seeks to eradicate all kinds of malnutrition by 2030. The purpose of the current study was to

ascertain the eating practices of infants and young children aged 6 to 23 months, as well as the patterns and factors that influence them in Subarnochor, Noakhali, Bangladesh.

Methods

Study design

To gather information, a descriptive cross-sectional survey was carried out during June-July 2022 in the study area. In addition to providing some additional sociodemographic data about the study population, the survey was designed to gather information on IYCF practices and baseline indicators, such as early initiation of breastfeeding, exclusive breastfeeding (EBF), age-appropriate supplemental feeding, minimum dietary diversity (MDD), minimum meal frequency, minimum acceptable diet (MAD), feeding iron-rich food, and bottle feeding.

Study area and population

The study was conducted among mothers who had child less than 2 years of age, in subarnochor, Noakhali, Bangladesh. Noakhali, a south-eastern coastal district of Bangladesh in Chottogram division. The area was selected randomly from this district by multistage cluster sampling procedure. The study location was selected to offer context- and area-specific information, and the houses and study participants who consented to engage in the research were readily picked.

Sample size and Sampling technique

The study collected data conveniently from households according to their availability by considering the following assumptions: 90% confidence interval, 80% power, the proportion of EBF is 64% (one of the important indicators of IYCF) [20] with design effect of 1.5 and non-response of 10% which takes the sample size to $97 \approx 100$.

Data collection

Data were gathered using an organized pretested questionnaire that followed IYCF guidelines. The answers to these questions give the WHO's main indicators for IYCF, which describe exclusive breastfeeding and supplemental feeding, the information needed to compute them. In compliance with WHO guidelines, details regarding the child's diet for the preceding 24 hours were gathered, encompassing the kinds of foods consumed and how often they were consumed. Seven categories of food items were identified: cereals, legumes and nuts, dairy products, meat products, eggs, fruits and vegetables high in vitamin A, and other fruits and vegetables. [10].

Description of variables used in the study

The background information that was recorded included child age in months, height, weight, sex, family size, educational status of the parents, monthly income of the family, occupation of the father since almost all the mothers were unemployed housewives etc. Moreover, stunting, one of the anthropometric indicators of

children's nutritional status was considered. The study also included IYCF baseline indicators that were described below (Table 1):

Table 1: Definitions of WHO-recommended core Infant and Young Child Feeding (IYCF) indicators [1]

Indicators	Definition
Early initiation of breast feeding	Proportion of children born in the last 24 months who were put to the breast within one hour of birth
Exclusive breast-feeding under 6 months	Proportion of infants 0–5 months of age who are fed exclusively with breast milk
Continued breast-feeding at 1 year	Proportion of children 12–15 months of age who are fed breast milk
Introduction of solid, semi-solid or soft foods	Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods
Minimum dietary diversity	Proportion of children 6–23 months of age who receive foods from 4 or more food groups
Minimum meal frequency	Proportion of breastfed and non-breastfed children 6–23 months of age, who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more
Minimum acceptable diet	Proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk)
Consumption of iron-rich/iron-fortified food for children 6-23 months	Proportion of children 6–23 months of age who receive an iron-rich food or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home.

Data analysis

All the data was entered in SPSS 23.0. The data was cleaned and all outliers were discarded after verification with actual questionnaires. Data editing, coding, recoding, missing values and other problems about data was identified and rechecked if necessary. Data was analyzed using SPSS Software package (SPSS 23.0), and ENA (Emergency Nutritional Assessment).

Categorical variables were presented as frequencies and percentages. Chi-square test of some variables with outcome variables was performed. Multivariable logistic regression analysis was used for the impact of each variable by odds ratio with 90% CI and p-value <0.1 being considered statistically significant. Initiation of breastfeeding, EBF, MDD, MAD and iron containing foods feeding were defined as binary variables in multivariate analysis. Effect of important IYCF indicators on stunting was also performed by bivariate logistic regression.

Ethical approval was obtained as per the rule of conduct. Approval was also taken from local administration and the participants were well aware about the pros and cons of the study; with proper consent the study was performed.

Results

Characteristics of study sample

The mean age of children was 14 months (SD \pm 5.95 months); 55% of the mothers did not pass more than primary education. More than 50% of fathers were day laborer or small businessman, 46% families had three or more children and the gender proportion of the child was almost equal (56% and 44%). About 41% of family's monthly income were between ten to twenty thousand-taka BDT (Table 2).

Table 2: Characteristics of study sample

Socio-demographic variables	n = 100	Socio-demographic variables	n = 100
Sex of the child	n	Occupation of the Father	n
Boys	56	Day laborer	29
Girls	44	Farmer	3
Age of the child		Small Business	25
6-11 months	32	Large Business	4
12-17 months	33	Gove employee	6
18-23 months	35	Other	33
Average age (Mean \pm SD)	14 \pm 5.95	Total Child of the Family	
Education of the father		2 or less	54
Illiterate	20	3 to 4	39
Primary	35	5 or more	7
Secondary	23	Monthly family income	
Higher Secondary	22	<10000	34
Education of the Mother		10000 to 20000	41
Illiterate	19	>20000	25
Primary	35	Stunting (Height for age)	
Secondary	28	Stunted	41
Higher Secondary	18	Normal	59

Infant and young child feeding practices

The IYCF practices in the research area are shown in Table 3. More over half of the women (63%) gave their kids colostrum; 57% breastfed their kids exclusively for the first six months of life, and 53% continued to nurse their kids for a year after that. Before six months and between six and eight months of age, 57% of moms started introducing solid, semi-solid, or soft foods to their infants. In the 24 hours prior to the study, only 74% of breastfed children (6–23 months) received the minimal meal frequency, 73% received the suggested MDD, and 57% received the MAD. In total, 40% of moms bottle-fed their children (39% of boys and 40% of girls). There were no appreciable differences in other IYCF practices between the genders.

Table 3: IYCF practices for the children in the study sample

IYCF Practices	Overall n (%)	Boy n (%)	Girl n (%)	p - value
Feeding colostrum child after birth	65 (63)	33 (58.9)	32 (72.7)	.151
Exclusive breastfeeding at 6 months	57 (57)	29 (51.8)	28 (63.6)	.284
Continued breastfeeding at 1 year	53 (53)	26 (46.4)	27 (64.4)	.204
Bottle feeding	40 (40)	22 (39.3)	18 (40.9)	.869
Children taking confectionary food	66 (66)	34 (60.7)	32 (72.7)	.208
Minimum dietary diversity (6–23 months)	73 (73)	38 (67.9)	35 (79.5)	.191
Minimum meal frequency of breast feed child (6–8 months)	11 (47.8)	6 (40)	5 (62.5)	.304
Minimum meal frequency of breast feed child (9–23 months)	53 (74.6)	30 (78.9)	23 (69.7)	.372
Minimum meal frequency of non-breast feed child (6–23 months)	4 (67.7)	1 (33.3)	3 (100)	.083
Minimum acceptable diet (6–23 months)	57 (57)	29 (51.8)	28 (63.6)	.235
Starting solid/semi-solid food (before 6 month)	17 (57)	9 (16.1)	8 (18.2)	.400
Starting solid/semi-solid food (after 6 month)	59 (59)	32 (57.1)	27 (64.40)	.375

P-value derived from chi-square test

Relationship of IYCF indicators with different variables

From table 4 it can be stated that mother's education was a strong determinant of knowledge about exclusive breastfeeding duration ($p < 0.01$); mother's with secondary and higher secondary education had better knowledge than other women. Age came out as an important variable which describes with the increase of age the percentage of MDD increases. Moreover, only 34.2% stunted children achieved MDD and the percentage of children who consumed more iron containing foods increased with improved income; 36% children whose family income was >20000 BDT received iron rich foods always compared to only 5.9% children whose family income was below <10000 BDT.

Table 4: Prevalence of IYCF practices and nutritional status among children age 6-23 months

Education of the mother	Knowledge of the duration of exclusive breastfeeding		P value	Education of the mother	Exclusive breast-feeding duration of 6 months			P value
	Know	Don't know			Yes	No		
Illiterate	11 (57.9)	8 (42.1)		Illiterate	9 (47.4)	10 (52.6)		
Primary	18 (51.4)	17 (48.6)	0.01	Primary	21 (60)	14 (40)	0.808	
Secondary	24 (85.7)	4 (14.3)		Secondary	16 (57.1)	12 (42.9)		
Higher Secondary	15 (83.3)	3 (16.7)		Higher Secondary	11 (61.1)	7 (38.9)		
Age of the Child	Minimum Dietary Diversity		P value	Height for Age (Stunted)	Minimum acceptable diet of the child			
	Yes	No			Yes	No		
6 to 11 months	10 (31.2%)	22 (68.8%)		Normal	34 (57.6)	25 (42.4)		
12 to 17 months	30 (90.9%)	3 (9.1%)	.000	Stunted	23 (56.1)	18 (43.9)	0.521	
18 to 23 months	33 (94.3%)	2 (5.7%)						
Height for Age (Stunted)	Minimum Dietary Diversity		P value	Monthly Income of the Family	Feeding Iron Rich Food			
	Yes	No			Always	Sometimes	Never	
Normal	48 (65.8)	11 (40.7%)	0.024	< 10000	2 (5.9)	17 (50)	15 (44.1)	
Stunted	25 (34.2)	16 (59.3%)		10000 to 20000	7 (17.1)	22 (53.7)	12 (29.3)	
				>20000	9 (36)	12 (48)	4 (16)	
Height for Age (Stunted)	Bottle Feeding		P value					
	Yes	No						
Normal	25 (43.9)	34 (57.6)						
Stunted	15 (36.6)	26 (63.4)	0.561					
Over nourished	0 (0)	2 (100)						

P-value derived from chi-square test

Factors associated with infant and young child feeding practices

The factors that influence how infants and young children are fed in the research region are shown in Table 5. A mother's level of secondary education (AOR 0.345; 90% CI 0.094, 1.26) was strongly correlated with the six-month EBF. EBF practice was significantly correlated with monthly household income of ten thousand to twenty thousand taka (AOR 0.565; 90% CI 0.208, 1.53) and children aged six to eleven months (AOR 0.727; 90% CI 0.294, 1.89). Children between the ages of 12 and 17 months also showed a negative, significant correlation with the EBF. Children aged 6-11 months were 5.65 times (AOR 5.36; 90% CI 1.15, 2.50) more

likely not to achieve MDD than children with 18-23 years old and the association was statistically significant. Age was also found to be strong factors to achieve minimum acceptable meal frequency

Children aged 6-11 months (AOR 7.91; 90% CI 1.73, 4.44) and twelve to seventeen months (AOR 5.71; 90% CI 1.22, 2.66) were more likely not to receive iron rich food feeding as compared to older children which showed strong association. Children belonged to a family income <10000 BDT had more than 5 times (AOR 5.786; 90% CI 1.061-3.154) more chance not to get iron rich food than the children with family income >20000 BDT. Mother's education also found to be strong determinant for getting iron rich foods and mothers with secondary education had less chance not feeding iron rich food than illiterate mothers (AOR .136; 90% CI .028-.664).

Table 5: Factors associated with infant and young child feeding practices (Multivariate logistic regression)

Variables	Exclusive breast-feeding duration of 6 months (Yes/No)		Minimum Dietary diversity of the child (Yes/No)		Minimum acceptable diet of the child (Yes/No)		Iron rich food feeding (Yes/No)	
	Adjusted OR 90% CI	p-value	Adjusted OR 90% CI	p-value	Adjusted OR 90% CI	p-value	Adjusted OR 90% CI	p-value
Education of the mother								
Illiterate	1		1		1		1	
Primary	.456(0.154-1.349)	0.234	1.757(.308-10.007)	.594	1.142(.308-4.232)	.868	.607(.140-2.625)	.575
Secondary	.639(0.223-1.835)	0.485	0.642(.135-3.053)	.640	1.788(.506-6.312)	.449	.136(.028-.664)	.038*
Higher Secondary	.345(0.094-1.265)	0.178	6.193(.860-44.613)	.129	3.520(.776-15.955)	.171	.626(.118-3.318)	.644
Monthly Income of the Family								
< 10000	1.320(0.417-4.182)	0.680	.764(.110-5.324)	0.820	1.108(.276-4.441)	.904	5.786(1.061-3.154)	.089**
10000 to 20000	0.565(0.208-1.536)	0.123	1.1479(.305-7.174)	0.684	1.752(.554-5.542)	.423	2.348(.513-1.074)	.356
>20000	1		1		1		1	
Age of the Child								
6 to 11 months	0.727(0.294-1.799)	0.563	5.369(1.152-2.502)	0.000**	2.213(.773-7.578)	.000*	7.915(1.734-4.445)	.000**
12 to 17 months	2.714(1.113-6.618)	0.063**	1.055(.202-5.516)	0.958	2.558(.901-7.261)	.139	5.717(1.227-2.663)	.062**
18 to 23 months	1		1		1		1	
** Significant at <0.1; * significant at <0.05; the study also considered total children, father's education and occupation for controlling their effects; "No" being the reference in the outcome variables								

Table 6 describes the effect of different important IYCF indicators on the physical status of children in the form of stunting (height for age). The results indicate that stunted children were less likely to achieve EBF than normal children. Very strong association has been found between MDD and stunting; the chances of having MDD were very low for stunted children (OR: 0.358; 90% CI: 0.145-0.887) compared to normal children. The same trend followed for achieving MAD and having iron rich food for stunted children though the results did not show statistical significance.

Table 6: Effect of important IYCF indicators on stunting

Indicators	Stunting (height for age) Bivariate logistic regression Odds ratio (95% CI)	p-value
Exclusive breast-feeding duration of 6 months	0.759 (0.337-1.705)	0.504
Minimum Dietary diversity of the child	0.358 (0.145-0.887)	0.026*
Minimum acceptable diet of the child	0.566 (0.252-1.271)	0.168
Iron rich food feeding	0.533 (0.226-1.257)	0.150

*Significant at <0.1 level

Discussion

Addressing child malnutrition and mortality can help accomplish Sustainable Development Goals 1 and 4; the three most important interventions are early breastfeeding initiation, extended breast feeding (EBF) for six months, and prompt introduction of supplemental feeding. [3, 21, 22], thus the present study was conducted to

assess the IYCF practices and also identify the determinants of the IYCF practices in Noakhali region, Bangladesh.

According to the BDHS 2019, 55% mothers are practicing EBF which is almost similar to our findings (57%) [20]. A study conducted in rural Bangladesh found that, only 13.6% mothers had initiated breastfeeding early and 57.3% mothers exclusively breastfed to their children [3], but in our study we have found some different scenario, 65% mothers had initiated early breastfeeding and 57% exclusive breastfed. Better EBF practice was found in the intervention region, where it was 79% and 71% in the intervention and control areas, respectively, according to another study that was carried out in rural Bangladesh. [18], though the result is quite higher than the present study. But a study conducted in two districts of Pakistan have found that only 49% of mothers had initiated breastfeeding early within one hour of birth and 37% mothers exclusively breastfed to their child [23], which was lower than the present study.

Saizuddin & Hasan found that most of the mothers had knowledge about exclusive breast feeding though the practice of it for four to six months was low [3], another study conducted by Rahman et al. found that 84.3% and 75.4% mothers had knowledge about exclusive breast feeding in intervention and control group respectively, but the practice was little bit lower than the practice, 78.7% in intervention group and 71.2% in control group [18]. The present study found that the knowledge was quite higher (68%) than the practice (57%), which is different than the previous studies.

In our study the percentage of infants receiving MDD (73%), minimum meal frequency of breast feed child 6 to 8 months (47.8%), minimum meal frequency of breast feed child 9 to 23 months (74.6%), minimum meal frequency of non-breast feed child 6 to 23 months (67.7%) and MAD (57%) was higher than the BDHS 2019 [20]. According to a multi-country study carried out in five South Asian nations, including Bangladesh, children between the ages of six and twenty-three months received the MDD at a rate that varied from 15% in India to 71% in Sri Lanka. [19]. However, compared to other studies carried out in numerous underdeveloped nations, the percentage of babies receiving recommended MDD & MAD in our research setting was comparable but significantly higher. [9, 19, 24]. This discrepancy could be caused by the availability and accessibility of particular foods, such fish, rice, wheat, and potatoes, or it could be the result of cultural dependence on foods low in vital nutrients.

Education of mother is also one of the important significantive which can affect IYCF practices and from the study conducted in Asian countries, an significant association was found between mothers education and initiation of breastfeeding [19], but ours study found an association between mothers education and the feeding of iron rich foods (AOR 0.136; 90% CI 0.028,0.664) to their child.

We found a significant association of EBF duration, MDD, MAD and iron rich food feeding with the age of the child. The BDHS 2019 reported that child aged 18 to 23 months have fed more iron rich food (75.2%) [20] which coincides with our study findings. Our study found that children aged 18-23 months were more likely to

get iron rich foods more often than other aged children; children aged 6-11 months were almost 8 times (AOR 7.915; 90% CI 1.734-4.445) less likely to consume iron containing foods than children aged 18-23 months. Apart from that the study also found significant association between the monthly income of the family and the feeding of iron rich foods to their children (AOR 5.786; 90% CI 1.061, 3.154) and another one of the important findings of this study was the association between height for age with the MDD of child.

Though there were number of limitations which includes not being able to reach larger population and more depth cultural variables which may have effect in all the associations we have found. However, despite of all that, the findings cannot be overlooked and can be a baseline to study more in-depth.

Conclusions

This study reported a major gap in IYCF practices in rural area of Noakhali district considering achieving recommended MDD and MAD; though the figures were not that bad compared to other developing countries. In Bangladesh, undernutrition has been a significant issue that can get worse when babies aren't fed properly. Improved socio-economic policies, increased emphasis on educating mothers and other caregivers, and additional programs that include infant feeding guidelines in health worker training manuals could all contribute to better newborn and early child feeding practices.

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Authors Contributions

Md Ruhul Kabir, Susmita Ghosh and Nahian Rahman conceptualized the idea, study design and collected and analyzed updated evidence, conducted the study, developed the document and drafting after conducting a data analysis. Zannatul Ferdowsi also helped in data analysis, preparation of manuscript and comparison with other studies. Other authors helped in data collection and drafting process.

Competing interests

The authors declare that they have no competing interests.

Ethics declarations

In accordance with the code of conduct, ethical permission was received from the Ethical Committee of Noakhali Science & Technology University in Bangladesh. Approval was also taken from local administration and the participants were well aware about the pros and cons of the study with proper consent the study was performed.

Data availability

Data can be available upon request.

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