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Prevalence of Malnutrition and Contributory Factor among Under Two Years Children in Central Bangladesh

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ABSTRACT

Background: Children undernutrition is one of the common problems in Bangladesh. The aim of this study was to observe the prevalence of malnutrition and its contributory factors among children under two years. **Methods:** A descriptive cross-sectional study was conducted over 384 children in some selected rural areas in Bangladesh. The participants' data were collected such as anthropometric, demographic, socioeconomic, and child feeding behavior using pre-tested structured questionnaires. **Results:** In age groups of 6-11, 12-17, and 18-23 months, 23.7, 42.1, and 45.1% of children were underweight; 31.6, 36.8, and 58.8% were stunted; and 21.1, 7.9, and 15.7% were wasted, respectively. A significant association was found between malnutrition of children with presence of disease, education of mother, and their monthly family income. Mothers with higher knowledge on fed colostrum (94%) initiated breastfeeding after the first hour of birth significantly (73%). Majority of the mothers (61.4%) started their weaning practice by cow milk and powder milk (17.3 %). The highest number of children suffered from malnutrition due to mother's illiteracy and less monthly family income. **Conclusions:** Awareness, multi stakeholder's effort, and care practice should be conducted to reduce the malnutrition of under two years children in the study area.

Keywords: *Stunting; Wasting; Underweight; Disease; Complementary Feeding*

Introduction

Malnutrition of children is the result of minimum dietary intake during the growing up age. The main causes are marginal dietary intake, households' food insecurity, lack of safe drinking water, lack of knowledge on hygiene and sanitation, inadequacy of breastfeeding, early initiation of weaning feeding, and lack of alternative sources of income (Rahman *et al.*, 2016). The levels of malnutrition are high in Bangladesh, about two million children aged 6 months to 5 years are affected by acute malnutrition; among them, half a million are suffering from severe acute malnutrition (Alam *et al.*, 2019). Reports show that 48.6% of children are too short for their age, and 37.4 % of the same children are underweight (Mitra *et al.*, 1994). One-third of all deaths among children in

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Bangladesh are associated with severe malnutrition (Mozumder *et al.*, 2000). The risk of dying from severe malnutrition is higher among girls compared to boys. The main contributing factors for malnutrition of children less than 5 years are previous birth interval, size at birth, mother's body mass index at birth, monthly family income, and parent's education (Rahman *et al.*, 2009).

Maternal malnutrition is another leading problem in low-middle income countries. It hinders the fetal growth during pregnancy and increases the risk of neonatal deaths in survivors of stunting by two years of age (Black *et al.*, 2013). Another crucial factor in malnutrition of children is diversity of diet. Almost half of the children aged 6 to 24 months did not receive the minimum meal frequency and two-third of the children of the same age group did not meet the minimum dietary diversity. About one-half of mothers exclusively breastfeed their children under 6 months. The complementary foods were introduced inappropriately and insufficient dietary diversity was practiced (Mosiur *et al.*, 2009).

The nutritional status of children under 5 years of age is a sensitive indicator of a country's health status as well as economic condition. Several studies investigated children malnutrition, but most of them were conducted among children under 5 years of age. This study considered children below 2 years of age in central part of Bangladesh. In this study, we determined the nutrition status and its relevant barriers among children under two years of age. Bangladesh could achieve several targets on health indices regarding the Sustainable Development Goals (SDGs) except the nutritional status of children. Therefore, the main purpose of this study was to identify the prevalence of malnutrition and contributory factors among children under two years of age in central part of Bangladesh.

Materials & Methods

***Study area*:** The study was conducted in four villages (Charipara, Doshchira, Gohorpur, and Shimulia) of Shibalay upazilla/sub-district under Manikganj district of Bangladesh. Among children who were identified as under-weight and height, 54% were male and 46 %were female.

Sample size determination: The sample respondents included 384 children. The sample size was calculated using the following formula:

$$n = \frac{Z2\ xpq}{\mathrm{d2}}$$

Where, n = Number of sample size, Z= level of significance (at 0.05 level of significance value of Z is 1.96), p = 50%, q= 1-p, d= Acceptable margin of error (.05). Actual sample size = 1.96 x 1.96x 0.5x0.5/0.05x0.05= 384.16

However, 127 children were enrolled in the study due to the time limitation and sample attrition during the study.

Study population: The study was conducted among children with 6 to 24 months of age and among their mothers. All children and mothers were assessed regarding weight and height. Mothers who had children below 24 months of age were selected purposively.

Inclusion and exclusion criteria: Mothers within the age range of 15 to 35 years who had 6-24 month children and lived in the selected villages were included in this study. Mothers over 35 years of age and those who were unwilling to participate in the study were excluded.

Data collection: The data were collected using structured questionnaires. The baseline information including socio-demographics, knowledge, attitude, practices with respect to child nutrition, and maternal health were collected by face-to-face interview and recorded in questionnaires. The dependent variables were weight, height, disease, treatment of child and weight, height, body mass index (BMI), place of delivery, weaning practices, feeding behavior, history of antenatal care, and mothers' postnatal care. The independent variables included mothers' age, family income, mothers' education, and sanitation condition. A separate checklist was also developed to collect additional information from the respondents regarding child health.

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Data analysis: The collected data were inserted into SPSS software (version 14) and analyzed. The categorical variables were reported in proportion, while continuous variables were reported by means and standard deviations when distributions were considered approximately normal. The chi-square test statistic was used to assess the statistical significance of the bivariate associations. Student *t-test* was also run to detect any difference among continuous variables.

Ethical considerations: The data were collected considering the research protocols and ethical issues. Before data collection, the research protocol was discussed with the local ethical committee and written approval was obtained from the local ethical committee, so that no question emerged during data collection. The committee was ensured that all information and records would be kept confidential and the findings would be used only for the research purposes. Consent was taken from mothers prior to data collection.

Results

The finding shows that mothers were mostly housekeepers while only 2.4% of mothers were service holders. Among the mothers who participated in the study, 40.2% did not have any literacy and 48.8% completed their primary school education, while very few of them completed the secondary school education (4.7%) or higher levels (6.3%). According to the findings, 65 households (51.2%) had low income (BDT below 5,000), 50 households (39.4%) were at moderate level of income (BDT 5,000-10,000), and only 12 households (9.4%) had high levels of annual income (BDT above 10,000).

The findings showed that more than 94% of mother's colostrum feed their babies one hour after birth while 5.5% of mothers did not colostrum feed their babies after an hour of birth. **A** significant number (73.2%) of mother's breast fed (early initiation of breastfeeding) their newborn babies after birth, while 15% of them fed their children with honey before breast milk. It was also observed that a few percent of mothers were fed their children with powder milk, cow milk as a substitute of breast milk.

Figure 1, **Table1** and **Table 2** show the weaning and complementary feeding practices. The majority of mothers started their weaning practice with cow milk (61.4%) followed by powder milk (17.3%). Very negligible percentage of mothers mentioned that they fed their babies with fruit juice, *paish* (rice based sweet), rice, hodgepodge and sago. Carbohydrates e. g. rice, potato, bread were the dominant regular food for children followed by cow milk. Mothers also provided proteins such as meat, fish, egg, and pulse but vitamin A and other fruits and vegetables was not in right direction.

Table 3 and **Table 4** show prevalence of malnutrition in children**.** Based on the findings, 29 boys (42.6%) and 19 girls (32.2%) were underweight. Similarly, 48.5% of boys and 39 percent of girls were stunting. In addition, 16.2 percent of boys were suffering from wasting, while it was 13.6 percent for the girls. The results also showed that 9 (23.7%), 16 (42.1%), and 23 children (45.1%) were underweight within age of 6-11, 12-17, and 18-23 months, respectively. Within the same age range, 12 (31.6%), 14 (36.8%), and 30 children (58.8%) were stunting, respectively. It was also observed that 8 (21.1%), 3 (7.9%), and 8 children (15.7%) were suffering from wasting within the similar age group, respectively. Findings also showed that 14.2% of children had severe underweight, 14.2% were severely stunted, and 3.9% were severely wasted**.** Among **c**hildren, who suffered from fever, 70.6% were underweight, 70.6% were stunting, and 17.6% were wasting. Similarly, among children who suffered from common cold and other respiratory diseases, 50 percent were underweight, 45.8% were stunting, and 25% were wasting. Among children who suffered from diarrhea, 28.6% were underweight, 25 percent were stunting, and 14.3% were wasting. It is important to note that the children who suffered from fever during the last 15 days were more likely to develop malnutrition followed by respiratory disease and diarrhea.

Table 5, **Table 6** and **Table 7** show the distribution malnourished children by mother's age, education and monthly family income. It was

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observed that 28.6% children were underweight whose mother's age was below 20 years and 50% children were underweight whose mother's age was more than 30 years. Highest number (58.8%) children were stunted whose mother's age more than 30 years whereas lowest percent in the age range of 25 to 30 years. It was also found that only 7.1% children were wasted whose mother's age was below 20 years while 29.4% were in the age range of more than 30 years.

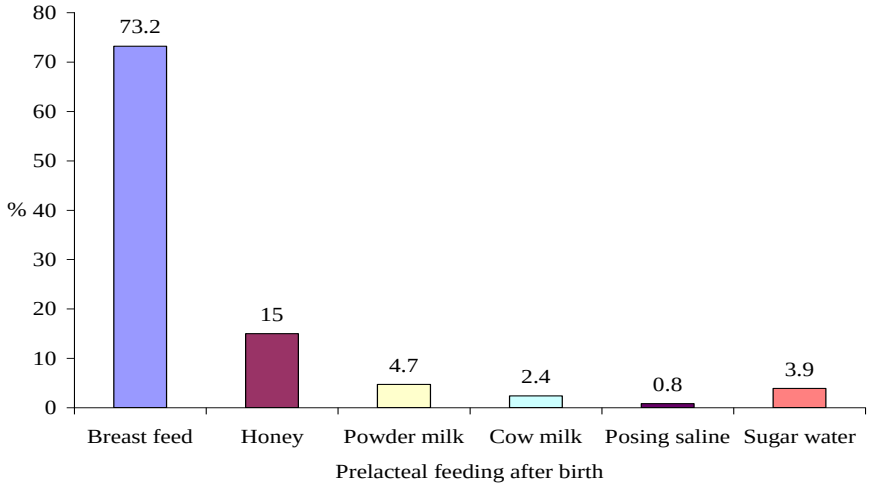


Figure 1. Distribution of the children by pre-lacteal feeding after birth

Table 1. Distribution of the children by first weaning food practice

Variables	N	%
Cow milk	78	61.4
Powder milk	22	17.3
Fruit juice	8	6.3
Paish	2	1.6
Hodgepodge	3	2.4
Rice	2	1.6
Sagu	1	.8
Egg	4	3.1
Sugi	1	.8
Biscuit	2	1.6
Others	4	3.1
Total	**127**	**100.0**

Table 2. Distribution of the children by complementary feeding practice in 24 hours recall

Variables	N	%
Cereals and tubers	126	99.2
Pulses	79	62.2
Meat, fish and poultry products	76	52.7
Eggs	71	55.9
Milk and milk products	83	63.5
Vitamin A rich fruits and vegetables	62	48.8
Others fruits and vegetables	75	59.0
Miscellaneous	127	(100

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Table 3. Distribution of malnourished children by gender and age

Malnutrition	*Gender*		Age (month)			Total
	Boys (n=68)	Girls (n=59)	6-11 (n=38)	12-17 (n=38)	18-23 (n=51)	
Underweight	29 (42.6)[a]	19 (32.2)	9 (23.7)	16 (42.1)	23 (45.1)	48 (37.8)
Stunting	33 (48.5)	23 (39.0)	12 (31.6)	14 (36.8)	30 (58.8)	56 (44.1)
Wasting	11 (16.2)	8 (13.6)	8 (21.1)	3 (7.9)	8 (15.7)	19 (15.0)

[a]: N (%)

Table 4. Distribution of malnourished children the based on weight for age, height for age, and weight for height

Malnutrition	*Weight for age*	Height for age	Weight for height
Severe	14.2	14.2	3.9
Moderate	23.6	29.9	11.0
Normal	66.2	55.9	85.1

Table 5. Distribution of malnourished children the based on weight for age, height for age, and weight for height

Malnutrition	*Weight for age*	Height for age	Weight for height
Severe	14.2	14.2	3.9
Moderate	23.6	29.9	11.0
Normal	66.2	55.9	85.1

Table 6. Distribution of malnourished children by mothers' education

Malnutrition	Illiterate (n=51)	Primary (n=62)	Secondary (n=6)	Higher secondary and above (n=8)
Underweight	25 (49.0)[a]	22 (35.5)	0 (.0)	1 (12.5)
Stunting	34 (66.7)	21 (33.9)	0 (.0)	1 (12.5)
Wasting	9 (17.6)	8 (12.9)	1 (16.7)	1 (12.5)

[a]: N (%)

Table 7. Distribution of malnourished children by monthly family income (in taka)

Malnutrition	≤5000 (n=65)	5001-10000 (n=50)	>10000 (n=12)	Total
Underweight	26 (40.0) [a]	20 (40.0)	2 (16.7)	48 (37.8)
Stunting	34 (52.3)	21 (42.0)	1 (8.3)	56 (44.1)
Wasting	11 (16.9)	6 (12.0)	2 (16.7)	19 (15.0)

[a]: N (%)

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Discussion

The analysis of data showed a significant correlation in children malnutrition and its contributory factor. The respondent socio demographic condition, family income, nutritional knowledge and nutritional status were observed to investigate its relation to children malnutrition. It was found that maximum mothers' education level was up to primary level and maximum monthly family income was less than 5000 BDT. The monthly income of a household is important considering the amount of money invest in food purchase and food consumption of children. Naturally, the households with higher incomes can invest more in different nutritious. The findings also showed that the mothers' education and the family's socio-economic condition had a strong association with the child nutritional status (Roy *et al.*, 2007). The nutritional level was better among the children of mothers who had secondary school education. It was found a positive feeding practice's in terms of colostrum feeding after an hour of birth. It indicates that the mothers who colostrum feed their babies after an hour of birth had higher levels of knowledge about colostrum feeding after birth. Although a few percent of mothers were fed their children with powder milk, cow milk and other food after birth as a substitute of breast milk. According to 24 hour recall method carbohydrates were the dominant regular food for children followed by cow milk. Proteins such as meat, fish, egg, and pulse also provided to children to fulfill their protein requirement. Intake of vitamin A and other fruits and vegetables was not in right direction in this regard. Based on the findings, boy children were more underweight as well as stunted than girl's children. Maximum children were underweight, stunted and wasted whose age between 18 to 23 months. According to weight for age and height for age malnutrition classification around 15% children were severely malnourished while based on weight for height classification about 4% children were severely malnourished. It is important to note that the children who suffered from fever during the last 15 days were more likely to develop malnutrition followed by respiratory disease and diarrhea. Multivariate analysis showed that rates of underweight and stunting increased with increase of mother's age and decrease with mother's education level and monthly family income.

Conclusion

In this study, mothers' malnutrition, educational status, monthly income of the family, and presence of disease in children had a significant role in increasing malnutrition rate in children. The patterns of feeding children, such as colostrum feeding and initiation of breast feeding were not at a good level. The major constraint of this study is that it was conducted among participants selected from four villages. Furthermore, the study data were collected from mothers due to the time shortness. The future studies can observe the caring practices of mothers in the study area. Furthermore, the local actors, stakeholders, and civil society organization should incorporate to raise mothers' awareness regarding children nutrition status.

Acknowledgement

This research was conduct in central part of Bangladesh. The authors appreciate mothers who participated in the study.

Author's Contribution

Rashid O the research and composed the discussion. Md. Barkat Ullah wrote the results and conclusion sections. Md. Jahangir Alam analyzed the data and interpreted the methods. Shahnaj Parvin contributed in conducting the study in the field site. All authors read and approved the final draft of the study.

Conflict of Interest

The authors declare that they do not have any conflict of interest.

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