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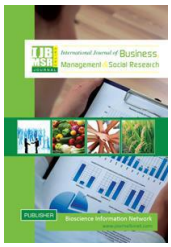

Household food security and nutrition assessment among children: A study on some selected slum areas of Khulna City

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ABSTRACT

Food insecurity and malnutrition is a severe public crisis that has been linked to increasing risk of morbidity and mortality. To evaluate food security and nutrition status among children at some selected slum areas of Khulna city the study conducted during January to June 2019. Investigations had been made to identify different factors that are influencing food insecurity and malnutrition among children. The study aimed to determine food and nutrition status among children in selected four slum areas of Khulna city and provided some guidelines for improving food security and nutrition status among children. A cross sectional descriptive study had been conducted in four slum areas of Khulna city to assess food security and nutrition status of 0 to 60 months children. Interview schedule, questionnaire survey, anthropometric measurement and online document analysis had been used to achieve necessary data. The study was conducted using both qualitative and quantitative methods. Here purposive sampling procedure was used to determine sample size from the study areas where the total sample size was 90. The anthropometric results of the present study were interpreted using the WHO 2011 Z-score classifications. The major findings of this study were that nearly 34.5 percent of children were food secure, 24.4 percent was found mildly food insecure, 28.9 percent was moderately food insecure and 12.2 percent was found severely food insecure. Prevalence of wasting was 37.7 percent whereas that of stunting and underweight were 28.9 percent and 40.7 percent respectively. Several socio-economic factors such as income level, employment status of parents and expenditure on food are associated with food security and nutrition status of children. The study made suggestions for an integrated food security policy and nutrition based counseling in slum areas of Khulna city.

Key Words: *Food insecurity, Malnutrition, Nutrition status and Socio-economic factors*

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I. Introduction

Food security consists of three basics: availability, accessibility and utilization (USAID, 1996). Food availability generally focuses on the target existence of food at various levels from household to national level, be that not only from own production but also through markets (FANTA, 2012). On the other hand, food accessibility refers to the flexibility to realize a correct and nutritious diet and is specifically linked to resources at the household level. On the other hand, food utilization mainly builds a concern to the appropriate use of food, which has the existence of proper food dispensation and storage practices, proper knowledge and general application of nutrition and child care, and enough health and sanitation facilities and other health related activities and practices (FANTA, 2012). Nutrition is one in all the fundamentals of health and development, and specifically, in Bangladesh, malnutrition has played a crucial role in childhood illness and mortality (WHO, 2010).

Food insufficiency can also affect physiological mechanisms that are usually related to an individual's nutritional status (Campbell, 1991). It was found that food insecure children had fair or poor health nearly twice as great and being hospitalized since birth almost a 3rd larger than food-secured children did. Food insecurity is related to health problems for young, low-income children (Frank et al., 2014). Bangladesh is the ninth most populous country in the world (WFS, 2016). 1,203 persons per sq. km are living in Bangladesh and Khulna is the third largest city of Bangladesh, one of the most densely populated cities in the country (WB, 2015). The population in the slums of Khulna city is increasing at a shocking rate due to migration of the rural poor people (BBS, 2015). Increasing income disparity turns as warning in reducing poverty, hunger and malnutrition at a faster pace. This is evident from the facts that not only in Bangladesh, but also India and Pakistan more than two out of every five children are stunted (low height for age), one in three are underweight (low weight for age), and over 15% are wasted (low weight for height) (Ahmed, 2006).

Day by day, urban food insecurity has become a rising humanitarian crisis in most developing countries because of high rate of population, rural-urban migration, extensive poverty and ever-increasing cost of food. These urban slums are primarily at high risk of vulnerability to food insecurity and child malnutrition and thus require close monitoring of matters (Frank et al., 2014). The sustainable development goals (SDGs), which come into effect in 2016, include a target to end poverty everywhere, and one to end hunger, accomplish food security, develop nutrition and endorse sustainable agriculture (WB, 2015). Hence, this study seeks to estimate food and nutritional security of children in Khulna city especially slum areas. Bangladesh is one of the forerunners in acquiring the first of eight Millennium Development Goals severe poverty rates by half (from 58% to 29%) between 1990 and 2015 (Ahmed, 2006). This study starts from the view that is possible to estimate the existing food and nutrition security and identify the factors associated with food security of children living in slum areas. The present study was undertaken to estimate the realistic view of food security and nutrition status of children (0 to 60 months) in the selected area. The general objective of the study is to determine the household food security and nutritional status of children (0-60 months) and the definite objective is to recognize socio-economic factors influencing food insecurity of the children in the slum areas of Khulna city.

II. Materials and Methods

Study design: The descriptive cross-sectional study was conducted during January-June 2019 to assess food security and nutritional status among children in four slums areas of Khulna city of Bangladesh. These four slums were i. Slum of Nuru Contactor, Gollamari Dakshin; ii. Slum of Haidar (Nazirghat Road); iii. PaschimBania and iv. KhamarBihari colony slum, Khulna. Where livelihood and daily life is so complicated compared to other areas of urban resident and children of these slum areas are suffering from malnutrition for the poor condition of living standard and quality of life. Any research or study wasn't conducted before in these slum areas so the author tried to conduct study here. Both qualitative and quantitative methods had been followed to avail the research objectives. Statistical techniques were used to analyze the surveyed data.

Study population: The study population was the children aged between 0-60 months old living in these selected slum areas of Khulna city.

Sample procedure and sample size: The sample size was determined using the formula by Kothari (2003) for a finite population. The prevalence (p) of malnutrition in these selected slum areas among children aged 0-60 months was assumed by 20% in this study. The population of these slums were 688. By using this formula, the sample size was 90.

Sampling technique: Sampling procedure consisted of the following steps.
1) Four slums were selected by random sampling in Khulna city.
2) Households from four slums were selected by purposive random sampling.
3) Children (0-60) months were selected by purposive sampling from selected households of four slum areas of Khulna city.

Research instrument and data collection: Three methods were used to collect primary data; these were questionnaire survey, anthropometric measurement and KII. Secondary data had been collected from different articles, journals, published books, government documents, research articles, policy papers, and internet documents and so on. A structured questionnaire was used for this study.

Anthropometrical measurements: Anthropometry measurement involved use of a weight machine to measure weight in kilograms, a length board to measure the height and the birth certificate or immunization card to get the age of the child. The data collected on children was used to compute three most common indices used for children, which are; Weight-for-Height (W/H), Weight-for-Age (W/A), and Height-for-Age (H/A). Each of the indices provides different information about growth and body composition, which were used to assess nutritional status. The results of anthropometric indices regarding children can be described in terms of Z-scores, percentages and percent of the median (Cogill, 2003; Gorstein et al., 2014). In this study, only Z-scores for W/A, W/H and H/A were used as indicators of nutrition status and standard deviations (SD) were used as a measure of variability of the indicator in statistical analysis. The analysis of anthropometric data from children was done using WHO Anthro.3.2.2 Software package. The -2Z-score cut off was used in this study for under nutrition implying children with a value of -2SD below the mean of the reference population was recognized as undernourished as also discussed by Cogill (2003). The formula for calculating the Z-score is:

Z-score (or SD-score) = (observed value - median value of the reference population) / standard deviation value of reference population

According to Table 01, the nutritional status of children was estimated.

Table 01. Anthropometric measurement scale

z-scores	Weight for height	Weight for age	Height for age
Below -2z	Acute Malnutrition	Underweight	Stunting
<-2 z>=-3 z	Moderate Acute Malnutrition	Moderate Underweight	Moderate Stunting
<-3 z	Severe Acute Malnutrition	Severe Underweight	Severe Stunting

Source: Anthropometric Measurement Scale for Child's Malnutrition given by WHO in 2011

To ensure getting a meaningful result regarding the objectives of the study, data were computerized, coded, analyzed and processed by using various statistical techniques and software like IBM SPSS-19, Microsoft Excel-7, Microsoft Word-7, WHO Anthro v3.2.2. etc.

III. Results

Status of household food security among children

The nature of household food security among children are categorized in the respect of food accessibility using selective questions. For this study, household food security categorizes into four levels: food secure, mildly, moderately and severely food insure. Those households always having enough food for their children is classified into food secure levels and those who have sometimes not enough food for their children is grouped into mildly food insecure. Moderate food insecurity prevails them who often have not enough food to eat and those households never having sufficient food for their children are categorized into severely food insecure. This study represented that, 34.4 percent of

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the households in those slum areas were food secure, 24.4 percent mildly food insecure, 28.9 percent moderately food insecure and 12.2 percent severely food insecure (Table 02).

Table 02. Frequency and percentage distribution of household food security status of children according to their age

Age of children (in months)	Household food security status			
	Food secured	Mildly food insecure	Moderately Food insecure	Severely food Insecure
0-12	5 (5.6%)	2 (2.2%)	2 (2.2%)	0
13-24	4 (4.4%)	3 (3.3%)	2 (2.2%)	3 (3.3%)
25-36	2 (2.2%)	2 (2.2%)	2 (2.2%)	1 (1.1%)
37-48	5 (5.6%)	9 (10%)	6 (6.7%)	4 (4.4%)
49-60	15 (16.7%)	6 (6.7%)	14 (15.6%)	3 (3.3%)
Total	31 (34.4%)	22 (24.4%)	26 (28.9%)	11 (12.2%)

Frequency of children's nutritious food intake

Lack of material resources can affect children's health directly through under nutrition as well as through poverty elicited longstanding stress for both parents and children. The study also revealed that 75 (83.3%) of parents were able to give foods (starchy cereals) every day, 73.4% gave non-cereals daily, 5.5 % gave vegetables and about 5.5% gave meats, eggs. 20 % ate proteins (1-2) times in a week. A good number of 64.4% were able to give protein at once or twice a week. Very few 25.5% of parents were not able to give liquids (fruit juice, energy drink) at all or ate after a long time. Starchy foods (cereals and non-cereals) were very common and mainly consumed almost daily by about 78.9% of the respondents. According to the findings, eggs, meat, fish, liquids were consumed very rarely (Table 03).

Table 03. Food frequency in a week of total studied children

Food group	Specific food	Frequencies				
		Everyday	3-6 times per week	Once or twice in a week	Once per month	After a long time or never
Milk	Breast milk, Cow's milk, Infant formula milk	24 (26.8%)	22 (24.4%)	39 (43.3%)	5 (5.5%)	--
Starchy (cereals)	Rice, Wheat	75 (83.3%)	14 (15.6%)	1 (1.1%)	-	--
Starchy (non-cereals)	Potatoes, Green peas	66 (73.4%)	20 (22.2%)	3 (3.3%)	1 (1.1%)	--
Protein	Egg, Meat, Fish	5 (5.5%)	18 (20%)	58 (64.4%)	9 (10%)	--
Fat	Oil, Animal fat, Vegetable fat	9 (10%)	72 (80%)	9 (10%)	--	--
Vitamin	Fruits, Vegetables	5 (5.5%)	69 (76.7%)	14 (15.6%)	2 (2.2%)	--
Iron	Beans, Lentil	3 (3.3%)	71 (78.9%)	15 (16.7%)	1 (1.1%)	--
Liquid	Fruit juice, Energy drink	17 (18.9%)	21 (23.3%)	13 (14.4%)	16 (17.8%)	23 (25.5%)

Nutrition status of children

Weight-for-Age index (Underweight): Among the children in the study, 12 (13.4%) children had WFA Z scores less than -3 indicating severe underweight, 21 (23.3%) children had normal weight according to their age. 13.3 percent (12) and 8.9 percent (8) were moderately underweight and overweight according to their age. Most of the children were underweight according to their age. (49-60) month children were overweight for age more than any other age group of children. (37-48) month children were underweight compared to any other age group of child (Table 04).

Weight-for-Height index (Malnutrition): The study illustrated weight for height index according to sex of children. 23.3 percent of boy children were suffered from acute malnutrition whereas 14.4 percent of girl children were the victim of acute malnutrition. There was no boy child of suffering

from severe acute malnutrition. Both 14.4 percent boy and girl children had normal weight according to their height (Table 05).

Table 04. Cross tabulation of children's weight for age

Age groups in month	Z value for weight for age (n=90)				
	Underweight	Moderate underweight	Severe underweight	Normal weight	Overweight for age
0-12	3 (3.3%)	0	1 (1.1%)	3 (3.3%)	2 (2.2%)
13-24	6 (6.7%)	2(2.2%)	0	4 (4.5%)	0
25-36	3 (3.3%)	0	1 (1.1%)	2 (2.2%)	1 (1.1%)
37-48	13 (14.1%)	5 (5.5%)	3 (3.3%)	2 (2.2%)	1 (1.1%)
49-60	12 (13.3%)	5 (5.6%)	7 (7.9%)	10 (11.1%)	4 (4.5%)
Total	37 (41.1%)	12 (13.3%)	12 (13.4%)	21 (23.3%)	8 (8.9%)

Table 05. Frequency and percentage distribution of children's weight for height

Z -value for weight for height	Boy		Girl	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Acute malnutrition	21	23.3	13	14.4
Moderate Acute malnutrition	5	5.6	8	8.9
Severe Acute malnutrition	0	0	3	3.3
Normal weight for height	13	14.4	13	14.4
Over weight for height	6	6.7	8	8.9
Total	45	50%	45	50%

Height-for-Age index (Stunting): Statistically analyzed frequency and percentage distribution showed that 6 (6.6%) had HFA z scores less than -3 SD indicative of severe stunting. Most of the children had suffered from stunting (49-60) month age group of children. 21.1 percent (19) children had over height according to their age. (37-48) month children had the highest frequency over height for age. Most vulnerable groups were (13-24) month and (49-60) month also. 27 (30%) children had normal height according to their age. 19 children had over height for age according to their age. A total of 28.9 percent of children had suffered from stunting (Table 06).

Table 06. Cross tabulation of children's height for age

Age groups in month	Z value for height for age (n=90)				
	Stunting	Moderate stunting	Severe stunting	Normal height	Overheight for age
0-12	3 (3.3%)	1 (1.1%)	1 (1.1%)	2(2.2%)	2 (2.2%)
13-24	2 (2.2%)	4 (4.5%)	2 (2.2%)	0	4 (4.5%)
25-36	1 (1.1%)	2 (2.2%)	1 (1.1%)	1 (1.1%)	3 (3.3%)
37-48	4 (4.5%)	4 (4.5%)	0	9 (10%)	6 (6.7%)
49-60	16 (17.8%)	1(1.1%)	2 (2.2%)	15 (16.8%)	4 (4.5%)
Total	26 (28.9%)	12 (13.4%)	6 (6.6%)	27 (30%)	19 (21.1%)

Influencing factors of food insecurity

In our country, various determinants are responsible for generating food insecurity for slum areas children. These influencing factors are income status, amount of expenditure on children's food. In this study, it was found that expenditure on food (Table 07) and household employment status (Table 08) largely affected household food security status of children.

Expenditure on food in context of food insecurity

In the study, it was found that no food secured household having the expenditure on food Tk. less than 1000. Most of the food secured household expensed for child's food Tk. 2000-3000. No severely food insecure household found expending for child's food Tk. 3000-4000. The largest numbers of households (9) were severely food insecure and moderately food insecure having the expenses on food Tk. 1000-2000. 14.4 percent of households had the status of mildly food insecure because of expending Tk. 2000-3000 monthly for their children's food (Table 07).

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Table 07. Household expenditure on food in context of food security status of children

Household food expenditure (Tk.)	Food security status of children			
	Food secured	Mildly food insecure	Moderately food Insecure	Severely food insecure
<1000	0	1 (1.1%)	1 (1.1%)	1 (1.1%)
1000-2000	4 (4.4%)	5 (5.6%)	9 (10%)	9 (10%)
2000-3000	25 (26.7%)	13 (14.4%)	13 (14.4%)	2 (2.2%
3000-4000	2 (2.2%)	3 (3.3%)	3 (3.3%)	0
Total	31 (34.3%)	22 (24.4%)	26 (28.9 %)	11 (12.3 %)

Food insecurity in context of employment status of household

The study also determined that 26.7 percent of households having the status of food secured, they were self-employed. Naturally, unemployment increases the risk of severe food insecurity. 3.3 percent of households had the status of severe food insecurity because of unemployment. There was no household who had a private shop or other private sources of income. Temporarily employed households (8.8%) belonged to the moderate food insecure status (Table 08).

Table 08. Food security status in context of employment status

Type of employment	Food security status of children			
	Food secured	Mildly food insecure	Moderately food Insecure	Severely food insecure
Permanent	1 (1.1%)	0	0	1 (1.1%)
Temporary	4 (4.4%)	6 (6.6%)	8 (8.8%)	5 (5.5%)
Private	2 (2.2%)	2 (2.2%)	1 (1.1%)	0
Self-employed	24 (26.7%)	13 (14.4%)	17 (18.9%)	2 (2.2%)
Unemployed	0	1 (1.1%)	0	3 (3.3%)
Total	31 (34.4%)	22 (24.4%)	26 (28.9 %)	11 (12.2 %)

IV. Discussion

This study showed that 34.4% percent of the households in those slum areas were food secure, mildly food insecure, moderately food insecure and severely food insecure were 25.6%, 27.8% and 12.2% respectively of the households in those slum areas (Table 01). Hossain et al. (2005) found that poor people are spend almost 70% of their income on food and 35% of spending on food only is used to buy rice. According to KII findings, poverty had significantly influenced the food security status of the children in these slum areas. Also, lack of parental skills resulting from lower maternal education better explains disparities in children's health than lack of fabric resources resulting from low family income. The ever-increasing financial pressure on the urban poor has reduced their diversity and frequency of food intake drastically, which causes food insecurity and malnutrition among children as key reasons especially in the slum areas in various parts of the globe (Khan, 2009). As evidenced by the findings and the information of KIIs, a good number of households (70%) were not able to give a variety of nutritious foods to their children. This was because of the poor purchasing power due to the low income which is a characteristic of the population here. FAO's statistical report has described that in 2010 main agricultural production kinds of cereal (rice, wheat) were harvested in 12,073,173 hectare areas. Cereals (rice, wheat) were consumed by 75 children every day. Food and Agricultural Organization remarked that 1780 kcal/capita/day is the least dietary requisite in terms of energy. Ensuring food security, a minimum of 25% more food should be available for the people of Bangladesh. Consequently, the full energy requirement is that the sum of minimum requirement and 25% of the minimum requirement that is 2225 kcal/capita/day is not up to total dietary consumption (Rahman, et al. 2015). Previous studies revealed that consumed cereal diets met nutritional demand in terms of energy needs also as protein requirements. Alternatively, a minimum of 12% energy should come from protein and 20% energy should come from fat in our country (FANTA, 2012). According to past studies, poor diets drive malnutrition in early childhood in urban slum areas in Bangladesh: 44 percent of children aged 6 to 60 months were not fed fruits or vegetables and 59 percent were not intaking protein contained foods. For healthy growth and proper brain development, only 1 in 5 children aged (6-60) months were intaken the minimum suggested diverse diet from the poorest households in rural areas in Bangladesh (UNICEF, 2011). This study revealed that most of the children

(64.4%) consumed protein once or twice a week in these selected four studied slum areas in Khulna city (Table 03). According to key informants, breastfeeding was the available and main source of children's food in these slum areas.

It is the fact that the frequency of malnutrition is higher in Dhaka slums than the national average, which is 49% for stunting, 17.5% for wasting and 56% for underweight, and indicates extremely high levels of malnutrition as judged against World Health Organization criteria (WHO, 2015). Regarding Z-scores, it was found in the present study that, 48.9% of children were suffering from stunting from which 13.4% moderately stunned and 6.6% severely stunted. A total of 41.1% of children were underweight, 13.3% of children moderately underweight and 13.4% severely underweight (Table 04). Among the children under five years of age 23.3% suffered from acute malnutrition, 5.6% moderate acute malnutrition (Table 05). This study also found that 23.3 percent of children were having normal weight, 30% of children normal height and 28.8% of children normal weight for height according to their age (Table 06). There was no record on children's nutritious status according to key informants. Girl children had been suffering from malnutrition, stunting and wasting more than boy children in these studied areas. Key informants agreed that a high number of children within those slums require immediate attention due to their poor nutritional status. According to them, poverty, ignorance and unconsciousness were some of the factors that contribute to the poor nutritional status in these slum areas.

V. Conclusion

Conferring to the findings in this study, malnutrition and food insecurity of the slum children were largely prevalent in Khulna city. There were some factors related to children's food insecurity such as household income, expenditure on food, number of income holders and employment status of parents and food storage accessibility of households. The morbidity status of the slum children were not so high but the children have suffered from numerous diseases. Better nutrition and food security status of children is a precondition for a healthy and happy life for every child. To achieve sustainable development goals, it is necessary to ensure food security and better nutrition status of the slum children. The study, through its findings and detailed analysis, will help to bring out the most up-to-date scenario of food security and nutrition status of children at urban slums in Khulna city. Bangladesh government has already taken strategic measures for ensuring children's food security and improved nutrition status so that those children can enjoy a healthy and disease free life.

To ensure food security and better nutrition status of the slum children following measures should be taken:

i. Promote better general and nutritional education to eliminate illiteracy and improve knowledge in the selection of a safe and adequate diet and food production, processing, storage and handling techniques at all levels, especially the household level.
ii. Community nutrition is a branch of human nutrition focuses on serving all people, especially in children and to meet their food and nutrition.
iii. A concentrated approach to improve awareness among all regarding the importance of nutrition for children is likely to be very useful and breastfeeding practices should be encouraged among the lactating mothers.

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