Malnutrition and Morbidity Profile of Under Five Children: A Cross-Sectional Scenario in a Rural Area of Bangladesh

Abstract

Introduction: Malnutrition particularly undernutrition has long been a major public health concern in southeast regions of Asia as a leading cause of child morbidity and mortality. The study was aimed to assess the malnutrition and morbidity profile in under five children in a rural area of Bangladesh.

Methods: The present cross-sectional study was carried out for a period of one year. A total of 205 children aged 1-5 years were studied using purposive sampling technique. Mothers of the eligible participants were interviewed by predesigned questionnaire. Every child was subjected to thorough anthropometric measurements. Malnutrition was assessed using WHO recommended Z-score category.

Results: About one-third (33.5%) of the children were stunted in Height for Age Z score. While 23.3% were moderately wasted and 6.5% were severely wasted in Weight for Height Z score. Severely underweight was 8.6%, 20.6% were moderately underweight and 70.8% of the children's weight was within the normal limit for their age. In MUAC measurement, about one-fourth (21.8%) were moderate acute malnutrition (MAM) and 1.1% were severe acute malnutrition (SAM). Most prevalent disease (45.0%) was the diarrhoeal disease with respiratory tract infection was 32.0% and pneumonia was 18.0%.

Conclusions: The burden of common morbidities and prevalence of malnutrition among under-five children in this community is very high. Multi-pronged approaches aimed at improving child health care, including nutrition education, growth monitoring, exclusive breastfeeding, complementary feeding, standard case management of diarrhea and ARI would be beneficial to combat the problem of malnutrition.

Keywords: Malnutrition; Morbidity Profile; Under five Children; Diarrhea; Critical window

Research Article

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Abbreviations: WHO: World Health Organization; IMCI: Integrated Management of Childhood Illness initiative; MUAC: Mid upper arm circumference; CIOMS: Council for International Organizations of Medical Sciences

Introduction

Adequate nutrition during infancy and early childhood is fundamental to the development of each child's full human potential [1]. It is well recognized that the period from birth to two years of age is a "critical window" for the promotion of optimal growth, health and behavioral development [2]. Poor nutrition leads to ill-health and ill-health contributes to further deterioration in nutritional status [1,2]. Approximately 12 million children younger than 5 years of age die every year; most of these children live in developing countries. More than 50% of these deaths are attributed to diarrhoea, acute respiratory illness, malaria, or measles, conditions that are either preventable or treatable with low-cost interventions [3]. Although malnutrition is prevalent in developing countries, it is rarely cited as being among the leading causes of death [2,3]. In the early 1990s Pelletier and colleagues used a different approach to estimate the contribution of malnutrition to all-cause mortality in children [4]. Their analytical framework takes the underlying causes of death into account and it suggested that malnutrition (measured as poor anthropometric status) is an associated cause in about half of all deaths occurring among children in developing countries [4,5]. Although the association between malnutrition and all-cause mortality is well documented, the association between malnutrition and mortality attributed to specific causes is less well described. If malnutrition does not increase the risk of mortality from all causes of death equally, intervention programmes that succeed in improving nutritional status may not have the same potential for reducing children's mortality in regions with different disease profiles [6].

The synergistic relation between malnutrition and infection is well known, and nutritional interventions have been recognized as an important approach for reducing mortality from acute respiratory illness and diarrhoea [7]. The WHO Integrated

Management of Childhood Illness initiative is based on the premise that combining efforts to promote the appropriate case-management of serious infectious diseases with nutritional interventions, immunization programmes, and other disease prevention and health promotion activities will be more effective in decreasing child mortality than implementing any one of the components alone [8,9]. Infectious diseases remain the most important immediate cause of death among children and of disability worldwide [6]. The burden of ill-health associated with these conditions is especially high in developing countries. Despite the progressive rise in chronic diseases as important causes of mortality, the epidemiological transition that is under way in the developing world does not reduce the need to continue investigating appropriate strategies for reducing child mortality from infectious diseases. In fact, these developments will make dealing with the unfinished agenda of mortality from infectious diseases even more of a challenge [7,9]. A number of studies carried out during emergency and non-emergency situations have demonstrated the association between increased mortality and increasing severity of anthropometric deficits. Data from six longitudinal studies on the association between anthropometric status and mortality of children aged 6-59 months revealed a strong association between the severity of weight-for-age deficits and mortality rates [10]. The most commonly collected indicators of nutritional status are anthropometric measurement of children under five years of age. Children are more vulnerable to infection and their rapid rate of growth is easily affected by poor nutrition, thus measures of children's nutritional status are a good barometer of overall community health [11]. Therefore this study was undertaken to assess the nutritional status and disease profile of under-5 children.

Materials and Methods

This cross-sectional study was conducted to determine the level of nutritional status and morbidity profile of under five children. The study was conducted in Upazila Health Complex (UHC) Vhuapur, Taingail. The study period was from 1st January 2015 to 31st December 2015. Total 205 mothers with their under five children were selected by purposive sampling method on the basis of defined selection criteria. The World Health Organization recommended height for age, weight for age and height for weight Z score was uses to assess the nutritional status of the children12. Mid upper arm circumference (MUAC) also used to assess the nutritional status of the children. Morbidity pattern of the children were identified by reviewing the related documents. The research instrument was a pre-tested semi-structured questionnaire and one checklist. Data were collected by face to face interview following questionnaire. Before starting data collection, institutional permission from concerned authorities was taken. As the research participants were not vulnerable, the procedures followed for this study were in accordance with the CIOMS guidelines. After data collection, it was checked and verified. Data were analyzed by using both Statistical Package for Social Sciences (SPSS) version 20 and WHO Anthro Plus. Informed written consent was taken from the parents or children's legal guardian considering all ethical issues. Confidentiality was maintained both verbally and documentarily.

Result and Discussion

Results

In this study, maximum (64.9%) of children were in the age group 25 to 59 months with a mean of 31.1 ± 16.2 months (Table 1). Out of 205 children total 118 (57.6%) were girls and 87 (42.4%) were boys (Figure 1). Among the total 205 mothers, more than half (56.59%) were in the age group between 18-25 years. The mean age of the mothers was 26.2 ± 4.9 years. The minimum age was 18 years and maximum was 38 years (Table 2). Regarding mother's educational background, maximum (40.5%) were secondary educational level followed by primary (33.2%) and illiterate (19.5%) (Table 3). The average monthly family income was 14544.4 ± 1086.5 taka and more than one third (36.1%) of the respondent's monthly family income between 6000-10000 taka, 23.90% respondent's income between 11000-15000 taka (Table 4).Among 205 children, maximum (66.5%) children were normal in height for age, followed by 21.2% were moderately stunted and 12.3% were severely stunted (Table 5). Out of total 205 children, maximum (70.8%) of the children's weight was within normal limit for their age followed by 16.1% children were mild underweight, 9.3% children were moderate underweight and 3.8% children severely underweight (Table 6). Among the total 205 children, maximum (87.3%) children were normal in height for weight category followed by 9.7% children were moderately wasted (MAM), 1.5% were overweight and only 1.5% children were severely wasted (SAM) in height for weight category (Table 7). Among the total 205 children, 19 children's age was below 6 months therefore excluded from MUAC measurement. Hence 186 children were included for MUAC measurement. Out of 186 children, maximum (79.0%) children were normally nourished in MUAC measurement followed by 19.9% children were moderate acute malnutrition (MAM) and only 1.1% were severe acute malnutrition (SAM) in MUAC measurement (Table 8). Among the 205 children, most prevalent disease (45.0%) was diarrhoeal disease followed by respiratory tract infection was (32.0%), pneumonia (18.0%), febrile disease (6.0%), tonsillitis (5.0%), scabies (2%), otitis media (1.3%), and protein energy malnutrition was (0.9%) (Table 9).

Table 1: Distribution of the children by age.

Age of the babies	Frequency	Percentage	Mean (± SD)
1-12 months	35	17.1	
13-24 months	37	18.0	31.1±16.2
25-59 months	133	64.9	
Total	**205**	**100.0**	

Table 2: Distribution of the mothers by age.

Age of the mothers	Frequency	Percentage	Mean (± SD)
18-25 years	116	56.6	
26-30 years	54	26.4	
31-35 years	29	14.1	26.2 ± 4.9
36 and above	6	2.9	
Total	**205**	**100.0**	

Table 3: Distribution of the mothers by educational status.

Educational status	Frequency	Percentage
Illiterate	40	19.5
Primary	68	33.2
Secondary	83	40.5
Higher secondary	6	2.9
Graduate	5	2.4
Madrasha	3	1.5
Total	**205**	**100.0**

Table 4: Distribution of children by monthly family income.

Monthly family income (in taka)	Frequency	Percentage	Mean (± SD)
Up to 5000 taka	26	12.68	
5001-10000 taka	74	36.10	
10001-15000 taka	49	23.90	
15001-20000 taka	26	12.68	14544.4 ± 1086.5
20001-25000 taka	7	3.41	
Above 25000 taka	23	11.23	
Total	**205**	**100.0**	

Table 5: Distribution of the children by height for age category (Stunting).

Height for Age Category (Stunting)	Frequency	Percentage
Normal (≥ -1 SD to +2 SD)	136	66.5
Mild Stunting (≥ -2 SD to < -1 SD)	44	21.2
Moderate Stunting (≥ -3 SD to < -2 SD)	25	12.3
Total	**205**	**100.0**

Table 6: Distribution of the children by weight for age category (Underweight).

Weight for Age Category (Underweight)	Frequency	Percentage
Normal (≥ -1 SD to +2 SD)	145	70.8
Mild Underweight (≥ -2 SD to < -1 SD)	33	16.1
Moderate Underweight (≥ -3 SD to < -2 SD)	19	9.3
Severe Underweight (< -3 SD)	8	3.8
Total	**251**	**100.0**

Table 7: Distribution of the children by height for weight category (Wasting).

Height/Length for Weight Category (Wasting)	Frequency	Percentage
Overweight (> +2 SD)	3	1.5
Normal (≥ -2 SD to ≤ +2 SD)	179	87.3
Moderate Wasting (≥ -3 SD to < -2 SD)	20	9.7
Severe wasting (<-3SD)	3	1.5
Total	**205**	**100.0**

Table 8: Distribution of children by MUAC measurement.

Mid Upper Arm Circumference (MUAC)	Frequency	Percentage
Normal (≥ 12.5 cm)	147	79.0
MAM (11.5 to 12.4 cm)	37	19.9
SAM (≤ 11.4 cm)	2	1.1
Total	**186**	**100.0**

Table 9: Distribution of the children by morbidity pattern.

Morbidity pattern	Frequency	Percentage
Diarrhoeal disease	97	45.0
Pneumonia	37	18.0
Respiratory Tract Infection	65	32.0
Febrile disease	12	6.0
Tonsillitis	6	5.0
Scabies	5	2.0
Otitis media	3	1.3
Protein Energy Malnutrition	2	0.9

* Multiple response

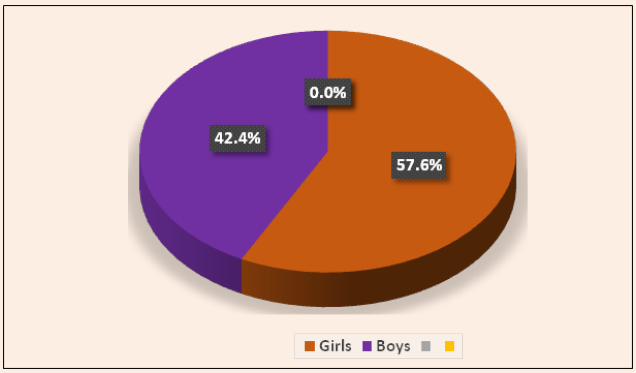

Figure 1: Distribution of the children by gender.

Discussion

The World Health Organization working group's report on measuring the nutritional status of children recommends the use of Z-scores system as they have significant advantages over other approaches [12]. In brief, Z-scores indices are linear, sex independent and allow for further computation of summary statistics such as means and standard deviations to directly classify a population's nutritional status [13]. The present study results revealed that the total prevalence of stunting, wasting and underweight were 33.5%, 11.2% and 13.1%, respectively of which 12.3%, 9.7% and 9.3% of children were moderately stunted, wasted and underweight respectively. These findings indicate that the severity of stunting and underweight are within a very high range and wasting has a high prevalence rate according to WHO-classification [14] which confirm malnutrition is a serious public health problem [15]. The current study findings of stunting

(33.5%) was lower than national figure16. This might be due to purposive sampling and small study area coverage. A study conducted by Rahman and Biswas [17] in Bangladesh and found that 44.0% children were stunted. This finding was inconsistent with the present study findings. Another study [18] in Chittagong Hill Tract showed that the prevalence of underweight was stunting 48.0%. Above finding also dissimilar with the present study findings. To evaluate the prevalence of underweight, in the study 13.1% of under five children were under weight. The present findings of underweight (13.1%) was the lower than the national figure (33.0%) of Bangladesh [16]. This might be due to small sample size and purposive sampling technique. A multi-stage cross sectional study [19] done in Vietnam also revealed that the prevalence of underweight was found to be 31.8%. The difference might be due to variation in characteristics and level of progress. A study conducted by Rahman and Biswas [17] in Bangladesh and found that 47.0% children were stunted. This finding was inconsistent with the present study findings. In our study, the overall prevalence of wasting was 11.2%. The current finding of wasting (11.2%) was almost equivalent to the national figure (14.0%) of Bangladesh [16]. This might be due to same socio-cultural and demographic characteristics of the children. A cross-sectional study conducted in Bangladesh [17] and result found that the prevalence of wasting was 10.0% which was almost equal to the present study findings. Another cross-sectional study [20] conducted by Avachat et al. and findings revealed that 15.7% children were wasted. There was a dissimilarity between these findings and the present study findings. A cross-sectional community-based survey [21] was conducted among 15408 children under 5 years of age in Iran. The rates of stunting, underweight, and wasting were 9.53%, 9.66% and 8.19%, respectively. These findings are lower than the present study findings. In a study from India it was shown that the overall prevalence of underweight, stunting and wasting was 63.7%, 47.85% and 32.7% respectively [22]. Above findings of nutritional status are quiet high than the present study findings. These may be due to regional variation and socio-economical influences. Available evidences show that MUAC is the best (i.e. in terms of age independence, precision, accuracy, sensitivity and specificity) case detection method for severe and moderate malnutrition and that it is also simple, cheap and acceptable [23].

The present study stated that 19 children's age was below 6 months therefore excluded from MUAC measurement. Hence 186 children were included for MUAC measurement. Out of 186 children, maximum (79.0%) children were normally nourished in MUAC measurement followed by 19.9% children were moderately acute malnutrition and only 1.1% were severe acute malnutrition in MUAC measurement. In a cross sectional study [24] in west Bengal of India, MUAC was measured using standard technique among 2028 children. The age-combined rates of overall (moderate and severe) under nutrition among boys (38.49%) was higher than among girls (32.22%).The age combined rates of moderate under nutrition were 36.34% and 31.03% among boys and girls, respectively. The rates of severe under nutrition were 2.15% and 1.20% among boys and girls, respectively. There were sex differences in both moderate and severe under nutrition. Above findings are inconsistent with the current MUAC measurement. It was noted in the present study that majority (45.0%) of the children suffered from one or multiple episodes of diarrhoea followed by respiratory tract infection was (32.0%), pneumonia (18.0%). This is similar to the findings of Bhavsar et al [25]. Gupta conducted a study in Punjab and had found that 46.0% of under-five children with diarrhoea suffered from malnutrition [26] Bisai et al. reported that children with prevalent morbidities like diarrhea, ARI or measles were more likely to be under-nourished [27]. In a study conducted by Thakur et al. [28] and found that upper respiratory tract infection (21.6%) & diarrhoea (18.2%) were the most commonly reported morbidities. Above findings are inconsistent with the present study findings. The higher prevalence of diarrhoea and other communicable diseases could be due to poor environmental conditions, improper cooking practices, overcrowding etc.

Conclusion

Despite the decreased trend of under-nutrition in the last years, still malnutrition in young children must be considered as a public problem because of its major effect on morbidity and mortality of children and impairment of intellectual and physical development in long-term. So, there is a need to plan strategies and preventive public policies based on these regional specific risk factors to alleviate early malnutrition.

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