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Original Article

Nutritional Status of Under-Five Children in the Climate Vulnerable Area of Bangladesh

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Abstract

Children, due to their physiological and metabolic vulnerabilities, are particularly sensitive to climate-related changes. Factors such as heat waves, extreme weather events, temperature variations, increased precipitation, and drought directly impact food and nutrition. This cross-sectional study was aimed to assess the nutritional status of under-5 children in a flood-prone district in northern Bangladesh. A total of 207 children aged 24-59 months were conveniently selected for the study. Data collection involved face-to-face interviews and observations using a semi-structured questionnaire. Data analysis was performed using SPSS version 16.0. Demographic information, educational background, immunization status, breastfeeding practices, health history, and dietary intake were considered for assessing nutritional status. More than half (55.6%) of the children was in age group 48-59 months, and the male-female ratio was 1.25:1. Most of the (70%) children belonged to nuclear families and more female children (53.6%) had completed their primary education than male (44%). All children were immunized, where three-fifth (60.4%) of the mothers acknowledged breastfeeding after birth, and three-fourth (75.4%) had completed exclusive breastfeeding. The majority were not ill in the month preceding the data collection. Dietary assessment revealed that most of the (94%) children consumed rice in the morning as breakfast, 97% at midday as lunch, and 94% at night as dinner. Among the children all of them had experienced flooding (100%) and significant proportion had experienced river bank erosion (97.6%). According to measurements, 81.2% were normal by MUAC, 62.8% by height for age Z scores, 71% by weight for age Z scores, and 83.1% by weight for height Z scores. The study identified higher proportions of underweight and severe wasted cases in male children, severe stunted cases with mothers having primary education, and severe wasted cases in extended families. Although certain trends were observed, the relationships between nutritional status and variables such as gender, maternal education, family type, and duration of residence were not statistically significant. Given the potential long-term impact of malnutrition, early intervention, and prioritization of nutritional considerations during the under-five age group are imperative.

Keywords: *nutritional status, under-5 children, climate vulnerable area of Bangladesh*

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INTRODUCTION

Nutrition is concerned primarily with the part played by nutrients in body growth, development, and maintenance.[27] Malnutrition comprises four forms- under nutrition, over nutrition, imbalance, and specific deficiency. Malnutrition begins quite commonly in womb and ends in the grave.[27] Nutritional status is influenced by three broad factors: food, health, and care. These factors directly influence nutrient intake and the presence of disease. The interaction between under nutrition and infection creates a potentially lethal cycle of worsening illness and deteriorating nutritional status.[6.35,36,37,38,39] In modern age malnutrition continues to be a serious public health problem.[6.35,36,37,38,39] Despite the economic growth observed in developing countries, malnutrition and particularly under-nutrition is still highly prevalent.[23] In children, malnutrition is synonymous with growth failure. Malnourished children are shorter and lighter than they should be for their age. [6.35,36,37,38,39] Assessment of nutritional status is the current body status, of a person or a population group, related to their state of nourishment (the consumption and utilization of nutrients). The nutritional status is determined by a complex interaction

between internal/ constitutional factors and external environmental factors: i) Internal or constitutional factors like: age, sex, nutrition, behavior, physical activity and diseases; ii) External environmental factors like: food safety, cultural, social and economic circumstances. An ideal nutritional status occurs when the supply of nutrients conforms to the nutritional requirements or needs.[33] Anthropometric measurements remain the most practically useful means for the assessment of the nutritional status of a population.[18] Anthropometry is the measurement of body height, weight, and proportions. It is used to evaluate both under and over nutrition.[33] Anthropometric measurement is an almost mandatory tool in any research to assess health and nutritional condition of children. Physical measurement like body weight, height, circumference of arm, triceps, skin fold etc. and mainly Z-score are extensively used to determine the nutritional status of children. Based on age, height, and weight, a number of indices such as height for age Z-score (stunting), weight for age Z-score (underweight), weight for height Z-score (wasting) and BMI for age (Thinness) have been suggested.

Climate is the statistics of weather over long periods of time. It is measured by assessing the patterns of variation in temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particle count and other meteorological variables in a given region over long periods of time. Climate differs from weather, in that weather only describes the short-term conditions of these variables in a given region.

Communities across the globe are already experiencing the impacts of more extreme weather events, temperature changes and disease outbreaks. Though no one will be immune to the effects of climate change, children are particularly vulnerable. The types of climate risks confronting children are diverse, ranging from direct physical impacts, such as cyclones, storm surges and extreme temperatures, to impacts on their education, psychological stress and nutritional challenges. Higher temperatures have been linked to increased rates of malnutrition, cholera, diarrhoeal disease and vector-borne diseases like dengue and malaria. Yet children's underdeveloped immune systems put them at far greater risk of contracting these diseases and succumbing to their complications. [6.35,36,37,38,39]

Climate change impacts are also projected to increase the numbers of children affected by natural hazards, from an estimated 66.5 million per year in the late 1990s to as many as 175 million per year (globally) in the coming decade. [6.35,36,37,38,39] Under nutrition remains one of the world's most serious but least addressed socioeconomic and health problems, hitting the poorest the hardest, especially women and children. The number of people suffering from hunger stood at 925 million in 2010, and maternal and child under nutrition persists. In developing countries, nearly one-third of children are underweight or stunted, and under nutrition is the cause of more than one-third of deaths among children under 5 years of age.[19]

Urbanized areas of Bangladesh are expanding, but only 34% of the total population lives in urban areas. The remainder lives in rural areas and towns. This may seem like a large amount.[41] Malnutrition is one of the principle public health problems, affects large numbers of children in developing countries. Nutritional assessment in the community is essential for accurate planning and implementation of intervention programmers to reduce mortality and morbidity associated with malnutrition. Malnutrition which refers to an impairment of health either from a deficiency or excess or imbalance of nutrients is public health significance among children all over the world specifically in developing countries.[2]

Two billion people in the world suffer from various forms of malnutrition (IFAD/FAO/WFP, 2011). Malnutrition is an underlying cause of death of 2.6 million children each year, which is a third of child deaths globally.[9,6.35,36,37,38,39] One in four of the world's children are stunted.[10] In developing countries this is as high as one in three. Under nutrition accounts for 11% of the global burden of disease and is considered the number one risk to health worldwide.[9]

Calorie availability in 2050 is likely to decline throughout the developing world resulting in an additional 24 million undernourished children.[40] Global land temperatures in the past decade, 2006-2015, were 1.0◦C (1.8◦F) warmer than the twentieth-century average.[30] Lower respiratory tract infections, diarrhea, and malaria are responsible for > 50% of childhood deaths and these disease categories could worsen with climate change. Diarrheal disease is primarily attributable to environmental factors, specifically contaminated food and drinking water, and is affected by changing temperature and precipitation events. Thirty-five percent of excess child mortality is secondary to malnutrition, a risk factor also expected to worsen with climate change because of increasing food insecurity.

Micronutrient deficiencies, common with malnutrition, can exacerbate infectious disease morbidity.[28] Intergovernmental Panel on Climate Change (IPCC) reinforced adaptation needs. Over coming years for health adaptation in developing countries such as Bangladesh Community-based strategic interventions will be needed. In low-income countries the number of studies is very limited than developed countries. Bangladesh has topped the IPCC's risk index since 2007 for climate change.[17]

MATERIALS AND METHODS

This community based cross sectional study was conducted to assess the nutritional status of under-5 years of children. The Study was carried out in Chauhali upazilla in Sirajgonj district. This area was selected because it is a climate vulnerable which was prone to flood and river erosion. The study was conducted for a period of 12 months from 1stJanuary to 31st December and data were collected from 24th August to 20th September 2017. Study population was 207 children aged 24 to 59 months of both sexes. Parents or legal guardians were interviewed on behalf of children as respondents.

Convenient sampling was carried out to select the samples from the communities and fulfilled the selection criteria were interviewed and observed. A pretested semi-structured questionnaire in Bengali and checklist were used for data collection instruments. Data collection tools includes weighing scale, measuring tape and MUAC (Mid-upper arm circumference) measuring tape were used for anthropometric measurement. Data were collected by face-to-face interview of respondents, observation and reviewing record.

Data processing and analysis

After data collection, the questionnaires were checked for consistency and completeness. The data were entered, cleaned and re-coded using Statistical Package for Social Sciences (SPSS) version 16. Missing data were checked through frequency run and an analysis plan was made. Descriptive statistics was used and statistical significance of association was analyzed by the chi-square test. The level of significance was set as 0.05.

Ethical Consideration

A letter of informed written assent in Bengali was used to take from the respondents (parents or legal guardian). Before starting the interview, the respondents were informed about the purpose and objectives of the study. Respondents were assured about the confidentiality of the data. They were informed about the full rights to participate or to refuse in this study at any time.

RESULTS

This study was conducted to assess nutritional status of 207 under five children. Data has presented in following ways: Socio demographic characteristics of children, immunization history, exclusive breast feeding, illness history, dietary pattern, climate vulnerability condition, nutritional status of the children. All children (207) under this study were immunized (100% coverage rate).

Table 1 states the distribution of socio-demographic characteristics of children; among 207 children, 38.2%, 35.3% and 26.6% were in age group 48-59, 24-36 and 36-48 months, where male female ratio was 1.25:1 and 70% of them were from nuclear family. The range of monthly family income of 62.8% children's family was 10000-30000 BDT. Among the children 97.6% lived in kancha house and 53.6% mothers and 44% fathers of the children had completed primary level of education.

Table-I: Socio-demographic characteristics of respondents (N=207)

Characteristics	Frequency	Percent
Age of the respondents (in months)		
24-36	73	35.3
36-48	55	26.6
48-59	79	38.2
Mean ±SD	41.33(10.915)	
Sex of the Respondents		
Male	115	55.6
Female	92	44.4
Religion of the Respondents		
Islam	206	99.5
Hindu	1	0.5
Type of Family		
Nuclear	145	70
Extended	62	30
Total number of family members		
≤5	129	62.3
6≥	78	37.7

Table-I *(Cont'd)* **: Socio Demographic characteristics of respondents (N=207)**

Characteristics	Frequency	Percent
Monthly Family income		
<10,000	76	36.7
10,000-30,000	130	62.8
>30,000	1	0.5
Mean+ SD	11466.18(4566.27)	
Types of houses		
Semi-pacca	4	1.9
Pacca	1	0.5
Kacha	202	97.6
Mothers Education		
Illiterate	54	26.1
Primary	111	53.6
Secondary	25	12.1
Higher Secondary and above	17	8.2
Father's Education		
Illiterate	69	33.3
Primary	91	44
Secondary	25	12.1
Higher Secondary and Above	18	8.7
Non-formal education and others	4	1.9

Respondents' exclusive breast-feeding status and Illness within 1 year

Table II shows the distribution of exclusive breast feeding and illness within one year among the children. Result shows that majority 156 (75.4%) children had continued exclusive breast feeding and rest 51 (24.6%) did not maintain continuous breast feeding. About 94.2% of children had no illness during the last 1 month. Among the ill children 5 (2.4%) had breathlessness, 3 (1.4%) had measles, 2 (1%) faced diarrhoea and 2 (1%) had malnutrition problems.

Table- II: Respondents' exclusive breast-feeding status and Illness within 1 year (n=207)

Continuing breast feeding	Frequency (f)	Percent (%)
Yes	156	75.4
No	51	24.6
Total	207	100
Illness within 1 year		
Diarrhoea	2	1.0
Breathlessness	5	2.4
Measles	3	1.4
Malnutrition	2	1.0
Total illness	12	5.8
No illness	195	94.2
Total	207	100

Childrens' 24 hours recall of food consumption

Table III shows the distribution of children regarding 24 hours recall of food consumption; in the morning 74% eat rice, 69% leafy vegetables, 49% Pulses, 43% milk. Mid-day 97% take rice, 94% leafy vegetables, 92% pulses and 43% egg. At night the respondents used to take rice 94%, leafy vegetables 92% and pulse 43%.

Table- III: Distribution of children regarding 24 hours recall of food consumption

Food	Morning		Mid-day		Night	
	Yes	No	Yes	No	Yes	No
Rice	152 (74%)	55 (26%)	200 (97%)	7 (3%)	194 (94%)	13 (6%)
Bread	53 (26%)	154 (74%)	7 (3%)	200 (97%)	13 (6%)	194 (94%)
Leafy Veg	142 (69%)	65 (31%)	194 (94%)	13 (6%)	190 (92%)	17 (8.2%)
Non-leafy veg	52 (25%)	155 (75%)	119 (58%)	88 (43%)	90 (43%)	117 (57%)
Fruits	55 (27%)	152 73%)	10 (4.8%)	197 (95%)	2 (1%)	205 (99%)
Pulses	102 (49%)	105 (51%)	190 (92%)	17 (8.2%)	90 (43%)	117 (57%)
Fish	2 (1%)	205 (99%)	94 (46%)	113 (55%)	55 (27%)	152 (73%)
Meat	2 (1%)	205 (99%)	20 (10%)	187 (90%)	52 (25%)	155 (75%)
Milk	90 (43%)	117 (57%)	2 (1%)	205 (99%)	10 (4.8%)	197 (95%)
Egg	10 (4.8%)	197 (95%)	90 (43%)	117 (57%)	2 (1%)	205 (99%)
Milk Product	12 (6%)	195 (94%)	2 (1%)	205 (99%)	2 (1%)	205 (99%)

Climate vulnerability condition

Table IV states distribution of respondents by their duration of stay in the locality; here mmajority of respondents (67.6%) were residing there for less than 30 years, 26.6% were staying in that area for more than 30 years.

Table-IV: Distribution of respondents by their duration of stay in the locality (n=207)

Staying period in years	Frequency (f)	Percent (%)
<30	140	67.6
30	12	5.8
>30	55	26.6
Total	207	100

Table V contains the ddistribution of respondents by natural calamity which they faced; among 207 respondents, 100 respondents faced flood, 202 faced river bank erosion, 58 faced cyclone and only 6 faced earthquakes.

Table-V: Distribution of respondents by natural calamity which they faced (n=207)

Natural Calamity	Flood		Drought		Cyclone		Earthquake		River Bank erosion	
	f	%	f	%	f	%	f	%	f	%
Yes	207	100	184	88.9	58	28	6	2.9	202	97.6
No	0	0	23	11.1	149	72	201	97.1	5	2.4
Total	207	100	207	100	207	100	207	100	207	100

Nutritional status of under-five children

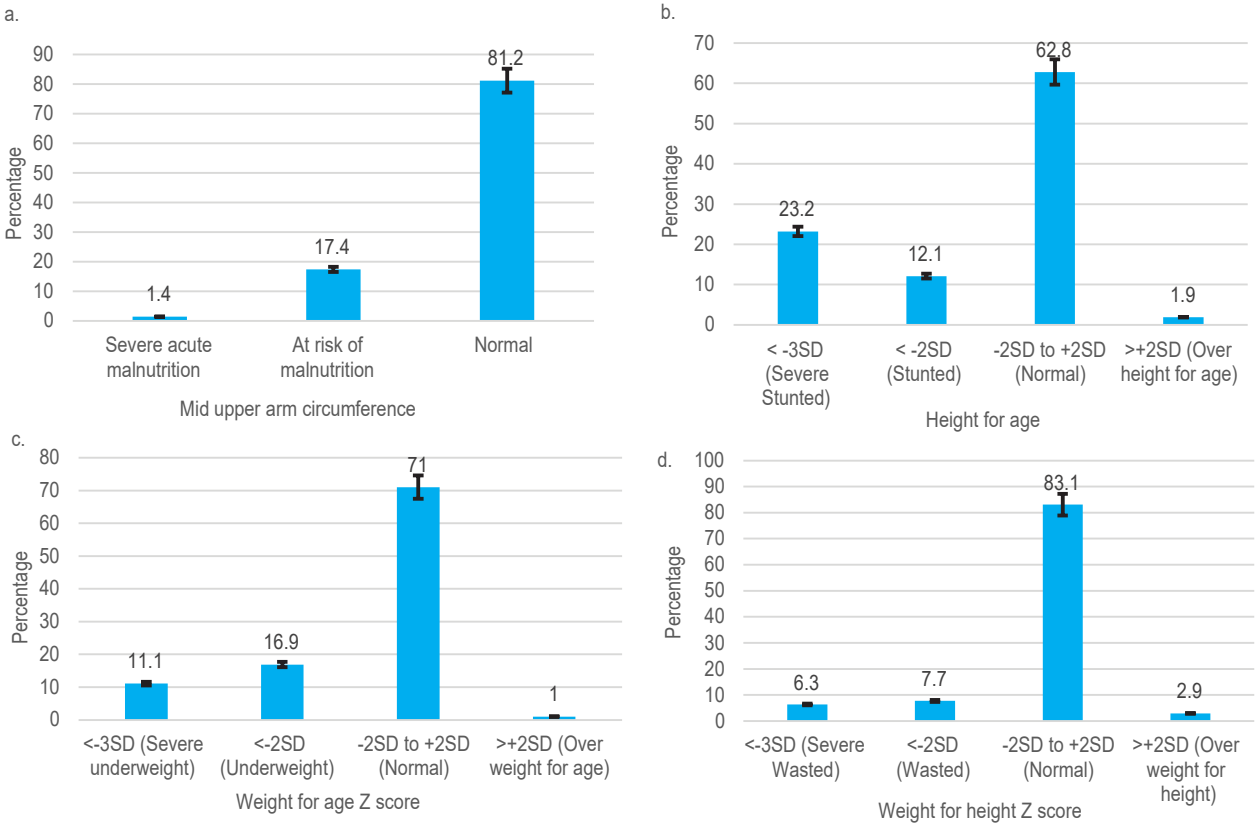

Figure 1. Malnutritional status of the under-five children in the climate vulnerable area of Bangladesh

Figure 1 represents the under-five children's nutritional status. In the mid upper arm circumference measurement, only 3 (1.4%) were at severe acute malnourished, 36 (17.4%) were at risk or moderate and majority 168 (81.2%) were normal (Figure 1.a). According to height for age z score, the majority 130 (62.8%) were normal height for age Z score, 48 (23.2%) were severe stunted, 25 (12.1%) were stunted and 4 (1.9%) were over height for age Z score (Figure 1.b). According to weight for age z score, a maximum 147 (71%) were with normal weight for age Z score, 35 (16.9%) were underweight, 23 (11.1%) were severe underweight for age Z score and only 2 (1%) were overweight for age Z score (Figure 1.c). According to weight for height z score, 172 (83.1%) were normal weight for height Z score, 16 (7.7%) were wasted, 13 (6.3%) were severe wasted and 6 (2.9%) were overweight for height Z score (Figure 1.d).

Socio-demographic variation of children's weight for age

Table VI shows that most male (67.8%) and female (75%) respondents had a normal weight-for-age z score, with higher underweight prevalence (20.9%) among males. Chi-square analysis revealed no significant association ($p > 0.05$). Children with normal weight-for-height z scores often had mothers with higher secondary education or above, while severe underweight was prevalent among children of mothers with similar education levels, showing no significant association with father's education ($p > 0.05$).

Table-VI: Socio-demographic variation of children's weight for age z score

Characteristics	Severe underweight, f(%)	Underweight, f(%)	Normal f(%)	Overweight f(%)	Test statistics f(%)
Sex of Children					
Male	13 (11.3)	24 (20.9)	78 (67.8)	0(0)	$\chi2$=4.817
Female	10 (10.9)	11 (12)	69 (75)	2 (2.2)	p=0.150*
Mothers' education					
Illiterate	7 (13)	7 (13)	139 (72.2)	1 (1.9)	$\chi2$=9.487
Primary	11(9.9)	20 (18)	79 (71.2)	1 (0.9)	p=0.346*
Secondary	1 (4.0)	3 (12)	2 (84)	0 (0)	
Higher secondary and above	4 (23.5)	5 (29.4)	8 (47.1)	0 (0)	
Fathers' education					
Illiterate	7 (10)	13 (18.8)	13 (18.8)	47 (68.1)	$\chi2$=12.23
Primary	16 (11)	13 (14.3)	68 (74.7)	0 (0)	p= 0.416*
Secondary	1(4%)	6 (24.0)	18 (72)	0 (0)	
Higher secondary and above	5 (27.8)	3 (16.7)	16 (55.6)	0 (0)	
Non-formal Education & others	0 (0)	0 (0)	4 (100)	0 (0)	

*Fisher's exact test

Socio-demographic variation of children's height for age

Table VII reveals that the majority of male and female respondents had a normal height-for-age z score, with higher severe stunting (24.3%) observed in males. No significant association was found between sex and height-for-age z score ($p > 0.05$). Children with severe stunting often had mothers with only primary education, and a similar trend was noted with fathers, but without a significant association with parental education levels ($p > 0.05$).

Table-VII: Socio-demographic variation of children's height for age

Characteristics	Severe Stunted f(%)	Stunted, f(%)	Normal, f(%)	Over Height f(%)	Test statistics
Sex of Children					
Male	28 (24.3)	12 (10.4)	75 (65.2)	0(0)	χ2=5.64
Female	20 (21.7)	13 (14.1)	55 (59.8)	4 (4.3)	p=0.119*
Mothers' education					
Illiterate	9 (16.7)	9(16.7)	35 (64.8)	1 (1.9)	χ2 =5.038
Primary	30 (27)	13 (11.7)	66 (59.5)	2 (1.8)	p=0.824*
Secondary	5(20)	2(8)	17 (68)	1(4)	
Higher secondary and above	4 (23.5)	1 (5.9)	12 (70.6)	0 (0)	
Fathers' education					
Illiterate	12 (17.4)	13 (18.8)	42 (60.9)	2 (2.9)	χ2=8.85
Primary	25 (27.5)	8 (8.8)	57 (62.6)	1 (1.1)	p=0.710*
Secondary	6 (24)	3 (12)	15 (60)	1 (4)	
Higher secondary and above	4 (22.2)	1(5.6)	13 (72.2)	0 (0)	
Non-formal Education & other's	1 (25)	0 (0)	3 (75)	0(0)	

*Fisher's exact test

Socio-demographic variation of children's weight for height

Table VIII depicts the socio-demographic variation in children's weight-for-height z scores. The majority of male and female respondents exhibited a normal weight-for-height z score, but the prevalence of severe wasting (7.8%) was higher in males than females. No significant association was found between sex and weight-for-height z score (p-value > 0.05). However, there was a significant association between mother's education and weight-for-height z score (p > 0.05), with children experiencing more wasting when mothers had completed higher secondary education or above.

Table-VIII: Socio-demographic variation of children's weight for height z score

Characteristics	Severe Wasted, f(%)	Wasted, f(%)	Normal, f(%)	Overweight, f(%)	Test statistics
Sex of Children					
Male	9 (7.8)	10 (8.7)	95 (82.6)	1(0.9)	χ2=4.697
Female	4(4.3)	6 (6.5)	77(83.7)	5 (5.4)	p=0.193*
Mothers' education					
Illiterate	3 (5.6)	7(13)	41(75)	3(5.6)	χ2 =17.07
Primary	5 (4.5)	6 (5.4)	98 (88.3)	2 (1.8)	p= 0.019*
Secondary	1 (4.0)	0(0%)	23 (92)	1(4)	
Higher secondary and above	4 (23.5)	3 (17.6)	10 (58.8)	0 (0)	

*Fisher's exact test

Socio-demographic variation of children's mid upper arm circumference

Table IX illustrates the socio-demographic variation in children's mid-upper arm circumference. The majority of male (82.6%) and female (79.3%) respondents had a normal mid-upper arm circumference, and a chi-square test revealed no significant association ($p > 0.05$). Children at risk of moderate malnutrition (24%) were more likely to have mothers with a secondary level of education, although no significant association was found between mid-upper arm circumference and mother's education ($p > 0.05$).

Table-IX: Socio-demographic variation of children's Mid upper arm circumference

Characteristics	Severe Acute Malnutrition, f(%)	At risk or moderate Malnutrition, f(%)	Normal, f(%)	Test statistics
Sex of Children				
Male	1 (0.9)	19 (16.5)	95 (82.6)	$\chi2$=0.882
Female	2(2.2)	17 (18.5)	73(79.3)	p=0.639*
Mothers' education				
Illiterate	0 (0)	11 (20.4)	43 (79.6)	$\chi2$ =3.443
Primary	3(2.7)	16 (14.4)	92 (82.9)	p= 0.736*
Secondary	0(0)	6 (24)	19 (76.0)	
Higher secondary and above	0 (0)	3 (17.6)	14 (82.4)	

*Fisher's exact test

DISCUSSION

Good nutritional status is an indispensable requirement for maintaining good health[7]. Any compromise to nutritional status and health during childhood can lead to significant harm and adverse health consequences, creating unavoidable circumstances. The study involved 207 respondents, aiming to assess the nutritional status of under-five children in a climate-vulnerable area. The majority of respondents fell within the age range of 48-59 months, and a significant proportion belonged to Muslim families (70%), with 62.3% having a family size of less than or equal to 5 members.

The educational status of parents, as revealed in this study, indicated that 53.5% of mothers and 44% of fathers had completed primary education[7]. Notably, all children in the study had achieved complete immunization status, aligning with the national statistics reported by the Bangladesh Demographic and Health Survey. Breastfeeding practices also mirrored national trends, with 60.4% of children positively experiencing breastfeeding after birth. However, 18.8% resorted to alternatives like sugar and honey instead of breast milk.

Regarding health indicators, the study reported a low incidence of illness, with 94.2% of respondents not experiencing any health issues in the month preceding data collection. Those who were ill presented with various conditions, such as breathlessness, measles, diarrhea, and malnutrition problems. The study emphasized the impact of climate vulnerability on the health of the population, particularly in an area like Sirajganj, where 67.6% of respondents had resided for less than 30 years, facing challenges such as floods, river bank erosion, cyclones, and displacement[7].

Globally, child malnutrition remains a critical issue, with stunting affecting 26% of under-5 children.[6,35,36,37,38,39] In Bangladesh, the prevalence of stunting, wasting, and underweight[7], aligns closely with the findings of this study. The study identified cases of severe acute malnutrition, stunting, underweight, and wasting based on various anthropometric measurements. Notably, the study observed higher rates of underweight and severe wasting in males, with variations in malnutrition rates based on maternal and paternal education levels and family types. However, these relationships were not statistically significant ($p>0.05$).

The discussion highlighted the improvements in child nutritional status over the past decade, with a decline in stunting from 51% in 2004 to 36% in 2014. While

wasting increased initially and then gradually declined, underweight decreased from 43% in 2004 to 33% in 2014[7]. The study reinforced the importance of proven interventions, such as women's education, increasing community awareness, and ensuring proper nutrition, to address stunting and undernutrition among children. Overall, these findings underscore the complex interplay of factors influencing child nutrition in a climate-vulnerable area and emphasize the need for targeted interventions to mitigate adverse health outcomes.

Several limitations were identified in the study. Firstly, a notable limitation stemmed from the lack of enthusiasm among some participants to engage in the study, which may have introduced a potential selection bias. Additionally, the study's scope was confined to assessing the nutritional status of under-5 children in a specific sub-district of a selected district, which may not adequately represent the diverse climate vulnerabilities across the entirety of Bangladesh. The study's focus on a single time points without follow-up or comparison with a control group hindered the establishment of causal relationships between malnutrition and various contributing factors. To enhance the study's generalizability and strengthen causal inferences, future research should consider a larger sample size and a more comprehensive approach that includes follow-up assessments and comparisons across different regions.

The findings of the study underscore the need for comprehensive actions. Firstly, it is recommended that a large-scale study be conducted, encompassing a more substantial sample size, to enhance the generalizability of the results. Secondly, given that the current study focused on a specific locality, it is imperative to extend the research to different regions to capture the diversity of nutritional challenges faced by under-5 children across Bangladesh. Furthermore, there is a crucial call for a broad-spectrum evaluation of the nutritional status of under-5 children by both governmental and private sectors in Bangladesh. This comprehensive assessment is essential for informing and implementing preventive and curative measures at a national level to address the identified nutritional issues effectively. Such multifaceted efforts are pivotal in safeguarding the health and well-being of the vulnerable under-5 age group in the face of climate-related challenges.

CONCLUSION

In this study, MUAC children with normal nutritional status were found more than malnourished children. The Study revealed that proportion of underweight and severe wasted were more in male than female proportion of underweight and severe wasted were more in extended family than nuclear family. These relationships were not found as statistically significant ($p>0.05$). Multidimensional approach is needed to prevent the malnutrition in this area.

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