Education, Language and Sociology Research
ISSN 2690-3644 (Print) ISSN 2690-3652 (Online)
Vol. 6, No. 2, 2025
www.scholink.org/ojs/index.php/elsr

Original Paper

Study on Nutritional Status of Rural Primary School Children in Bangladesh

Mst. Gulshan Ara[1], Most. Sumi Akter[1] & Mahmuda Awal[2]

[1] Lecturer at Enam Nursing College, Dhaka, Bangladesh

[2] Lecturer at Enam Nursing College, Dhaka, Bangladesh

[3] Lecturer at CRP Nursing College, Dhaka, Bangladesh

Received: April 15, 2025 Accepted: May 1, 2025 Online Published: May 16, 2025

doi:10.22158/elsr.v6n2p109 URL: http://dx.doi.org/10.22158/elsr.v6n2p109

Abstract

Background: *This study investigates the nutritional status of rural primary school children in Bangladesh, a demographic that is particularly vulnerable to malnutrition due to socio-economic challenges, limited access to healthcare, and inadequate dietary practices.* ***Objective:*** *The research aims to assess the prevalence of undernutrition, including stunting, wasting, and underweight, among children aged 6 to 12 years in selected rural areas. Utilizing a cross-sectional design, data were collected from 139 children through anthropometric measurements, dietary assessments, and socio-economic surveys.* ***Methodology:*** *The findings reveal a concerning prevalence of malnutrition, with approximately 30% of the children classified as stunted, 15% as wasted, and 25% as underweight. These rates are significantly higher than the national averages, indicating a critical public health issue in rural settings. Factors contributing to poor nutritional status include low household income, inadequate maternal education, and limited access to diverse food sources.* ***Results:*** *The implications of these findings are profound, suggesting an urgent need for targeted interventions to address malnutrition among rural primary school children in Bangladesh.* ***Conclusion:*** *This study highlights the critical intersection of nutrition, education, and socio-economic factors in shaping the health of rural children in Bangladesh.*

1. Background of the Study

Nutrition can be defined as the science of food and its relationship to health. It is concerned primarily with the part played by nutrients in body growth, development and maintenance. Good nutrition means maintaining a nutritional status that enables us to grow well and enjoy good health (Park, 2023).

School-going age is very significant because this is the main period of life to make the body store nutrients. These stores help in the rapid growth of children. Good nutrition means a stronger immune

system, low illness, better health, and a productive society. The children who do not get an adequate quantity of required macro and micronutrients, including carbohydrates, proteins, fats, vitamins, and minerals (iron, calcium, potassium, magnesium, phosphorus, iodine, etc.) may not be in a position to perform to their full potential in their academics. It is usually seen that the quality and quantity of food in children usually change with time from childhood to adolescence (Singh & Sharma., 2021).

The nutritional status of children is a potential health indicator of development in a country. A person's energy and/or nutrient intake shortages, excesses, or imbalances are referred to as malnutrition. Malnutrition includes all forms of under nutrition (wasting, stunting, and underweight), insufficient vitamin and mineral intake, obesity, and the ensuing non-communicable diseases linked to diet. The consequences of acute childhood malnutrition include a greater chance of dying from childhood diseases such as diarrhea, pneumonia and malaria and many other psychological problems (WHO, 2024).

Child health is a growing concern all over the world with rapid economic growth and social changes. Nutritional status in childhood is the most important determinant of the health status of an adult person as its impact is seen on the socio-economic development of a nation. Malnutrition is a global problem that is affecting under five children easily. It is seen that 20-80% of primary school children are suffering from nutritional deprivation. Assessment of the nutritional status of children is an essential strategy for improving overall health. Primary school age is a dynamic growth period that begins after the high mortality risk period in the preschool years and corresponds to the period from kindergarten to the secondary school period when adequate cognitive, affective and psychomotor achievement occurs. About 24% population of the less developed and 15% of that of the industrialized world are primary school children (Fatema et al., 2023).

Recent Bangladesh Demographic and Health Survey (BDHS) data on 2022 key indicators revealed that among children, 24% were stunted, 22% were underweight and 11% were wasting (National Institute of Population Research and Training (NIPORT) and ICF, 2023).

Nutritional status is assessed usually by anthropometry based on age, body weight, and height; several indices such as height-for-age, weight-forheight, and body mass index. The children are class to three categories: stunting defined by low height-forage, underweight defined by low weight-for-age, and wasting defined by low weight-for-height. Body mass index is a simple index commonly used to classify underweight, overweight, and obese. Usually stunting measures past (chronic) childhood under-nutrition, and underweight measures past (chronic) and present under nutrition and wasting reflects current or acute under nutrition (Fatema et al., 2023).

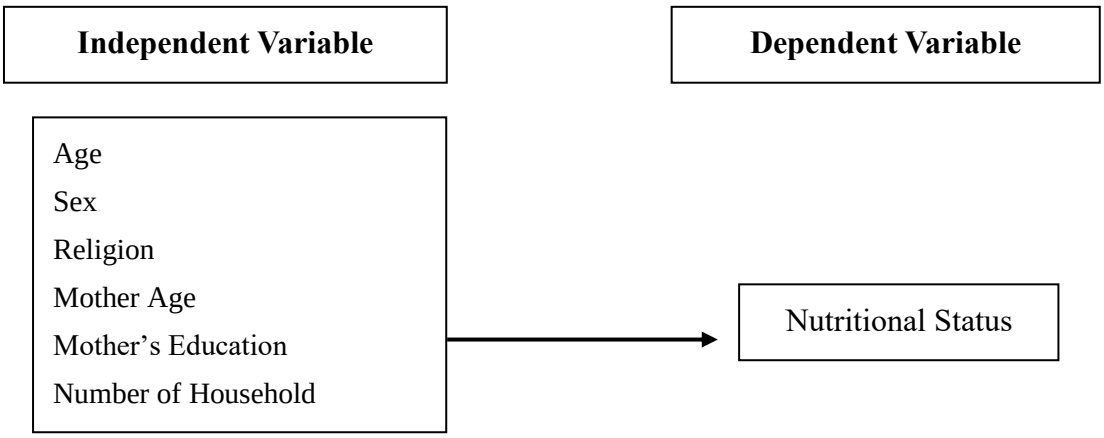
1.1 General Objective

To assess the nutritional status of rural primary school children in Bangladesh, focusing on the prevalence of undernutrition, dietary habits, and socio-economic determinants, in order to inform policy and program development aimed at improving child nutrition in these communities.

1.2 Specific Objectives

To determine the prevalence of undernutrition (stunting, wasting, and underweight) among rural primary school children in selected regions of Bangladesh.

1.3 Conceptual Framework and Theoretical Framework:



The conceptual framework for assessing the nutritional status of rural primary school children in Bangladesh can be visualized as a multi-dimensional model that incorporates various factors influencing nutrition. This framework highlights the interrelationships between different determinants and their impact on nutritional outcomes.

1.4 Variables

Independent variables:

- Age
- Sex
- Religion
- Mother age
- Mother's Educational
- Number of Household member
- Occupation of household head
- Family income

Dependent variables:

Nutritional Status

1.5 Literature Review

Different related literatures were reviewed thoroughly to gain in-depth knowledge of the problems of the study. A literature review is the systematic search of published work to gain information about the research topics. Literature related to the study has been collected by review of different available scholarly journals, books, thesis reports, articles, etc. either electronic or printed versions. An Internet

search for electronic resources has been carried out by using academic research library databases like PubMed, Science Direct, Google Scholar, etc.

Nutrition is vital for preservation of health and prevention of diseases, particularly the food-related deficiency diseases (WHO, 2020). A descriptive cross-sectional study using a structured questionnaire was conducted and a convenience sampling method was used in the selection of 400 students (200 from Sandwip and 200 from Bandarban) and their mothers. For each of the included children, socio-demographic data, and anthropometric data such as age, weight and height were taken. Statistical analysis was performed to identify significant determinants for stunting (height for age), wasting (weight for height) and underweight (weight for age). Chi square tests were used to establish the association of the nutritional status of the children with key variables under interest and level of significance was set at $p < 0.05$. The study results showed that in Sandwip 38.5% of the children were underweight, 20.5% of the children were wasted and 45% of the children were stunted and in Bandarban 40.5% of the children were underweight, 18.5% of the children were wasted and 48% of the children were stunted. Child's age group, gender, mother's nutritional status, mother's education, mother's occupation, birth order of children, diarrhea, pneumonia, worm infestation and immunization status of children were associated with the nutritional status of primary school going children (Rahman, M., 2022).

A cross-sectional study was conducted among randomly selected 400 children of aged 5–10 years using semi-structured questionnaire, in the *haor* areas of Kishoreganj district in Bangladesh. The outcomes variables considered were stunting, wasting and underweight calculated following the World Health Organization anthropometric guidelines of 2006. Children and their parents' socio-demographic characteristics were considered as the exposure variables. Descriptive statistics were used to describe the characteristics of the respondents. Binary logistic regression model was used to determine the factors associated with the malnutrition. Around half (48%) of the total children were wasted at the time of the survey following around 40.5% were underweight and 38% were stunted. The likelihoods of occurring stunting, wasting and underweight were found higher among female children than their male counterpart. The prevalence of stunting, wasting and underweight were 39%, 54% and 45% among girls whereas the prevalence was 36%, 42% and 36% among the boys, respectively. Increased meal frequency, solvency with land ownership were found associated with the reduced odds of becoming malnourished. (Khanam & Haque, 2021).

Malnutrition and infectious diseases, such as helminthic infections, are widespread among primary school children, especially in low- and middle-income countries. However, there are limited studies on school health in Bangladesh, particularly in rural settings. This study aimed to explore the nutritional status and prevalence of helminthic infections in relation to associated health behavior, awareness, and knowledge regarding malnutrition and helminthic infections which were evaluated by school nurses among primary school children in Bangladesh.

This was a descriptive, cross-sectional survey study with a total duration of 1 month, from September to October, 2021. This study formed part of a school nurse project as a cluster non-randomized clinical trial

in Bangladesh. Selected variables from that clinical trial were analyzed and reported in the results section. The study participants were primary school children from four schools in rural Bangladesh.

In total, 604 children participated in the baseline survey and health checkups. Among them, 163 (27.0%) children were classified as malnourished according to the World Health Organization growth reference standard 2007. The prevalence of helminthic infections was 53 (8.8%). Approximately >50% of the children responded that they never/rarely practiced hygiene-related behaviors and had no awareness and knowledge regarding malnutrition and helminthic infections. However, differences between the variables were not statistically significant (Aivey et al., 2024).

A descriptive cross-sectional study was done in 2020 among 780 children aged 6 to 12 years to determine the nutritional status of school age children in Abakalika metropolis, Nigeria. Random sampling method was used to select participants. A self-developed structured questionnaire was used for the study. The study found that the prevalence of under nutrition was 15.7% and that of over nutrition was 2.1% (Umeokonkwo et al., 2020)

Khan et al. (2022) conducted a systematic review presents the pooled prevalence of nutritional status and dietary intake among school-going children and adolescents (5-15 years of age) in an LMIC of Pakistan and the perspective for broader global nutrition in this age group. An electronic search of databases was run on Pubmed and Medline (viaOvid) along with gray literature and archives of local scientific journals till 2nd January 2021. Studies meeting the eligibility criteria were included and relevant data were extracted, and a pooled proportional analysis was performed. A total of 51 studies including 62,148 children of 5-15 years met the inclusion criteria, of which 30 studies reported on anthropometric indices alone, eight on dietary intake patterns while 13 reported both. All of the included studies had a cross-sectional study design. There were 20 studies from the province of Punjab, 15 from Sindh, eight from Khyber Pakhtoonkhwa, two from Balochistan, and three from multiple cities across Pakistan. The pooled proportional analysis showed that the proportion of underweight children and adolescents was 25.1% (95% CI 17.3-33.7%); stunting 23% (95% CI 11.8-36.7%); wasting 24% (95% CI 15.2-34%); thinness 12.5% (95% CI 9.4 16.1%); overweight 11.4% (95% CI 7.2-16.3%); and obesity 6.9% (95% CI 3-12%). A relatively high intake of carbohydrates, soft drinks, and sweets/chocolates; and a low intake of protein-rich foods, fruits, and vegetables, compared to the recommended daily allowance (RDA), was reported.

Umeokonkwo et al. (2020) conducted adescriptive cross-sectional study among 780 children aged 6 to 12years from 10 primary schools in Abakaliki metropolis. The finding shows that overall prevalence of under nutrition was 15.7% and that of over-nutrition was 2.1%. The prevalence of underweight, thinness and stunting, overweight and obesity were 8, 7.2, 9.9, 1.4 and 0.7% respectively. The proportion of pupils who were thin was higher among males (8.7%), those attending public schools (8.6%) and those dwelling in rural parts of the metropolis (14.3%) compared to females (5.8%) private school attendees (1.9%) and urban dwellers (4.6%). Stunting was found to be higher among pupils attending public schools (11.8%) compared to those attending private schools (2.5%). The prevalence of stunting was 19.3% among the

pupils residing in rural areas and 5% among the pupils living in urban areas of the metropolis. No pupil in private schools was underweight. Over nutrition was not found among the pupils in rural areas.

Singh & Sharma (2021) thirty studies reviewed by using different sources such as Research Gate, PubMed, Google Scholar, American Journal of Clinical Nutrition, and surveys of different agencies such as websites of the Ministry of Women and Child Development Government of India and different state governments to know the prevalence of wasting, stunting, overweight, and obesity among children in rural as well as urban areas of different areas in India. Results from the various studies show that the underweight children range from 6.6% to 83%. Prevalence of stunting ranges from 13.8% to 56.1%, prevalence of wasting ranges from 6.7% to 75%, and prevalence of underweight ranges from 6.6% to 83%.

Aboagye et al. (2022) a school-based cross-sectional study among 423 school children aged 6–12 years in the South Tongu District of Ghana. The result indicates overall prevalence of under nutrition and overweight/obesity 21.5% (CI = 17.7, 25.7) and 24.8% (CI =20.8, 29.2), respectively. Specifically, the prevalence of stunting, thin ness, underweight, overweight, and obesity were 10.4%, 12.1%, 3.8%, 11.1%, and 13.7%, respectively. School children whose household used water from non-portable sources were more likely to be undernourished. The overweight/obesity was higher among school children whose mothers had attained formal education, those who consumed beverages between meals per day and those who had adequate dietary diversity. School children aged 10–12 was less likely to be overweight/obese compared to those aged 6–9.

2. Research Methodology

2.1 Research Approach

The research approach was used for this study is a descriptive approach. The research approach for assessing the nutritional status of rural primary school children in Bangladesh is a mixed-methods approach, integrating both quantitative and qualitative research methodologies. This approach allows for a comprehensive understanding of the nutritional status and the various factors influencing it, combining statistical analysis with in-depth insights from the community.

2.2 Study Design

A cross-sectional study design was adopted to carry out the present study. The nutritional status of rural primary school children in Bangladesh is a critical public health concern, characterized by high rates of malnutrition, including stunting, wasting, and micronutrient deficiencies. This study aims to assess the nutritional status of these children and identify the factors influencing their health outcomes. A well-structured study design is essential to achieve these objectives effectively.

This research employs a cross-sectional study design, which is suitable for capturing a snapshot of the nutritional status and associated factors at a specific point in time. This design allows for the collection of data from a large population efficiently and is particularly useful for identifying prevalence rates of malnutrition.

2.3 Duration of Study

The study was conducted over a period of 6 months from the approval of IERB.

2.4 Population

The nutritional status of rural primary school children in Bangladesh is a critical public health issue, as malnutrition can have profound effects on physical growth, cognitive development, and overall health. This population study aims to assess the prevalence of malnutrition among rural primary school children and identify the factors contributing to their nutritional status.

Primary school children studying in a government school was selected for the study. This age group is particularly important for assessing nutritional status, as it encompasses key developmental milestones and is a critical period for growth and learning.

2.5 Sample

The sample was taken for the present study of the primary school children in rural area of Kahaloo Upazila, Bogura District.

Study Setting:

The study was conducted at Narhatta Govt. Primary School Kahaloo, Bogura.

Sample size:

The sample size was calculated by using the following formula for finite population

$$n = \frac{\frac{Z^2 * p(1-p)}{e^2}}{1 + [\frac{Z^2 * p(1-p)}{e^2 * N}]}$$

$$n = \frac{\frac{1.96^2 * 0.5(1-0.5)}{0.05^2}}{1 + [\frac{1.96^2 * 0.5(1-0.5)}{0.05^2 * 187}]}$$

$$n = \frac{\frac{0.9604}{0.0025}}{1 + [\frac{0.9604}{0.4675}]}$$

$$n = \frac{384.16}{1 + 2.054}$$

$$n = \frac{384.16}{3.054}$$

$$n = 125.79$$

Where,

- N is the population size =187
- Z is the Z-score = 1.96 [at a confidence level of 95%]
- e is the margin of error = 0.05
- p is the standard of deviation = 0.5 [if the

The calculated sample size is 126

10% Attrition / Non responsive = 126 x 10% = 12.6 = 13. So, the sample size for this study is (126+13)= 139.

The sample size calculation is a crucial step in designing a study, as it determines the number of participants needed to achieve reliable and valid results. In this case, the sample size was calculated using

a formula for finite populations, which accounts for the total population size when estimating the required sample size. Below is a detailed analysis and elaboration of the calculations provided.

2.6 Inclusion Criteria

To ensure a representative sample, the following inclusion criteria was applied:

Age: Children aged 6 to 12 years.

Location: Children attending primary schools located in rural areas of selected districts in Bangladesh.

Parental Consent: Written informed consent from parents or guardians must be obtained for participation in the study.

2.7 Exclusion Criteria

Children were excluded from the study if they meet any of the following criteria:

Chronic Illness: Children with chronic illnesses or disabilities that affected their nutritional status or dietary intake.

Non-Residents: Children who do not reside in the selected rural areas or who are not enrolled in the participating schools.

Refusal to Participate: Children whose parents or guardians do not provide consent for participation.

2.8 Study Instrument

To assess the level of nutritional status of primary school children a self-developed structured questionnaire was used. The questionnaire was developed in English and then will be translated into Bangla and will be verified by research guide and at least 3 experts on this field for validation and reliability and further corrections was made if according to expert opinion.

2.9 Description of Tool:

Self-developed semi structure data collection tool was used to identify the nutritional status of school aged children. The question was divided into 3 parts.

Part-1: Distribution of socio-demographic information.

Part-2: Nutritional assessment scale to measure nutritional status of school children.

Part-3: Measurement of nutritional status by using BMI formula.

2.10 Data Collection Technique

Data was collected after getting approval of the Institution Ethical Review Board (IERB), Enam Medical College, Savar, Dhaka. Then permission was obtained from the Head Teacher of the selected school. The objective of the study will be briefed to the teachers and students and verbal consent will be taken. Data was collected by face-to-face interview & measurement of vitals by the researcher himself / herself. Data collection was done between 11 am to 3 pm, when they are free especially during lunch break or leisure period. Height was measured to the nearest 0.1cm by using portable stadiometer (The reliability of instrument was checked before using tools) standing upright on a flat surface without shoes. Body weight was measured with light clothing to the nearest 0.1Kg with balance placed on hard flat surface and checked and adjusted for zero. Each student was interviewed for about 10 -15 minutes.

2.11 Plan for Data Analysis

The gathered data was checked for accuracy and completeness. Data was edited, organized and coded manually and entered into Statistical Package for Social Science (SPSS) version 30. Descriptive statistics was used to calculate mean, median, standard deviations, and frequency of subjects and inferential statistics was done. The finding of data was presented through relevant table, bar graphs and pie chart.

2.12 Ethical Considerations in the Setting

The study setting was designed to ensure ethical considerations were prioritized. Researchers obtained permission from local education authorities and school administrators before initiating the study. Informed consent was secured from parents or guardians, ensuring that they understood the purpose of the study and their rights as participants.

The study setting for assessing the nutritional status of rural primary school children in Bangladesh was carefully selected to reflect the realities of rural life. By focusing on schools and their surrounding communities, the research aimed to capture a comprehensive picture of the factors influencing child nutrition. The insights gained from this setting were expected to inform targeted interventions and policies aimed at improving the nutritional status of children in rural Bangladesh.

2.13 Data Presentation

Data was presented with tables so that data can be visualized at a glance easily. Descriptive statistics were presented with frequency tables and inferential statistics were presented with tables.

3. Result and Discussion

In this chapter, the results of this study are presented under the following headings:

Table 1. Distribution of Socio Demographic Characteristics of the Participants (n=139)

Variables	Categories	Frequency	Percentage (%)	Mean ± SD
Age (Years) (Minimum-6; Maximum-12)	6	12	8.6	9.03 ± 1.655
	7	18	12.9	
	8	22	15.8	
	9	21	15.1	
	10	41	29.5	
	11	18	12.9	
	12	7	5.0	
Gender	Male	64	46.0	
	Female	75	54.0	
Religion	Islam	121	87.1	
	Hindu	18	12.9	
	24	1	.7	

	25	6	4.3	
	26	2	1.4	
	27	7	5.0	
	28	10	7.2	
Mother Age	29	4	2.9	
(Minimum-24;	30	13	9.4	
Maximum-48)	31	3	2.2	
	32	15	10.8	
	33	8	5.8	33.85 ± 5.355
	34	7	5.0	
	35	19	13.7	
	36	8	5.8	
	37	3	2.2	
	38	9	6.5	
	40	5	3.6	
	41	4	2.9	
	42	7	5.0	
	43	1	.7	
	45	2	1.4	
	46	4	2.9	
	48	1	.7	
	No formal education	3	2.2	
Mother's	Primary	72	51.8	
Education	SSC	33	23.7	
	HSC	18	12.9	
	Bachelor Degree	5	3.6	
	Master Degree	8	5.8	
Number of	3	14	10.1	
Household Member	4	74	53.2	
(Minimum-3;	5	28	20.1	4.49 ± 1.017
Maximum-8)	6	16	11.5	
	7	6	4.3	
	8	1	.7	
	Service holder	30	21.6	
	Business	18	12.9	

Occupation of	Day laborer	76	54.7	
Household Head	Emigrant	15	10.8	
Primary Source of	Tube well	51	36.7	
water of household	Supply	88	63.3	
	6000	1	.7	
	8000	13	9.4	
	10000	24	17.3	
Family income	12000	19	13.7	
(Minimum-6000;	15000	20	14.4	
Maximum-50000)	18000	1	.7	
	20000	20	14.4	
	22000	2	1.4	
	25000	10	7.2	18460.43 ±
	28000	2	1.4	9534.275
	30000	17	12.2	
	35000	2	1.4	
	40000	5	3.6	
	45000	2	1.4	
	50000	1	.7	

This chart shows the mean age of the participant was 9.03 (SD = 1.655) years. More than (29.5%) of the participants belong to the age of 10 years. Most of the (54%) participants were female and Most of the (87.1%) participants religion is Islam. The mean age of Mother is 33.85 (SD = 5.3559) years. Among them (29.5%) mother was under 35 years old. It was found that 51.8% mother has only primary education. 53.2% children belong to the family having 4 members only. Occupation of the head of household was found day labors constitute 54.7%. In terms of drinking water 63.3% children depends on supply water on and 36.7% children used tube well water. Monthly income ranges from 6000 to 50000 Taka where 17.3% family owned 10000 Taka.

Table 2. Anthropometric Measurement

Variables	Categories	Frequency	Percentage (%)
	9	1	.7
	11	1	.7
	12	8	5.8

BMI	13	15	10.8
	14	35	25.2
	15	24	17.3
	16	10	7.2
	17	10	7.2
	18	3	2.2
	19	12	8.6
	20	7	5.0
	21	4	2.9
	22	3	2.2
	24	3	2.2
	25	2	1.4
	26	1	.7

Out of 139 respondents only 22.3% (31) respondents found within the normal range of BMI according to WHO and rest of others respondents fall into under nutrition category.

Table 3. Disease Suffered from Last Six Months

Variables	Categories	Frequency	Percentage (%)
Have you suffered from Diarrhea for the last 6 month	Yes	36	25.9
	No	103	74.1
Have you suffered from ARI for the last 6 month	Yes	72	51.8
	No	67	48.2
Do you have Worm infestation	Yes	21	15.1
	No	118	84.9

Table 3 shows that among 139 respondents most of them (74.1%) did not suffer from diarrhea in previous 6 months. On the other hand, 51.8% children suffered from ARI at the same time. Interestingly 84.9% participants mentioned that they do not have any worm infestation.

Table 4. Dietary Habit

Variables	Categories	Frequency	Percentage (%)
Which of these meals did you eat yesterday?	Breakfast	139	100.0
	Morning snack	98	70.5
	Lunch	126	90.6
	Evening snack	101	72.7
	Dinner	139	100.0

Table 4 displays that 100% respondents have their breakfast and dinner; 70.5% have morning snack, 90.6% lunch and 72.7% have their evening snack. That means only 70.5% respondents have had all type meals the day before date of data collection.

Table 5. Dietary Habit and Health Conditions of Participants

Variables	Categories	Frequency	Percentage (%)
Did you skip breakfast three or more times last week	Yes	24	17.3
	No	115	82.7
Did you skip Lunch three or more times in last week	Yes	15	10.8
	No	124	89.2
Do you eat a meal from a fast food restaurant two or more times last week	Yes	106	76.3
	No	33	23.7
Are you on a special diet for medical reasons	Yes	14	10.1
	No	125	89.9
Are you a vegetarian	Yes	6	4.3
	No	133	95.7
Do you have any problems with your appetite like not feeling hungry	Yes	27	19.4
	No	112	80.6
Do you have any problems with your appetite like feeling hungry all the time	Yes	8	5.8
	No	131	94.2

From this chart it is found that A small percentage of participants (17.3%) reported skipping breakfast three or more times in the past week. This indicates that the majority of participants prioritize breakfast. The vast majority (82.7%) did not skip breakfast, suggesting that breakfast is an important meal for most of the respondents. Only 10.8% of respondents skipped lunch three or more times, which is a relatively low percentage. The majority of respondents (89.2%) did not skip lunch, which suggests that lunch is typically not missed by most participants. A significant proportion of respondents (76.3%) reported

eating fast food two or more times in the past week. This indicates a high consumption of fast food among the group, pointing to potentially unhealthy eating habits. Only 23.7% of respondents avoided fast food, which implies that a smaller number of participants are mindful of their fast-food intake. A small percentage of respondents (10.1%) follow a special diet due to medical reasons, indicating that dietary restrictions for health reasons are relatively uncommon in this group. The majority (89.9%) are not on a special diet for medical reasons, suggesting that most participants do not face medical dietary restrictions. Only 4.3% of respondents are vegetarians, which is a very small proportion, showing that vegetarianism is not common in this sample. A very high percentage (95.7%) of participants are not vegetarians, indicating that the vast majority of people in this group consume meat. About 19.4% of respondents report issues with appetite, particularly not feeling hungry. This suggests that a notable proportion of people may face irregular eating habits or conditions affecting appetite. The majority (80.6%) do not report issues with appetite, indicating that most participants do not have significant problems with hunger or appetite. Only 5.8% of respondents report feeling hungry all the time, which is a relatively low percentage, indicating that excessive hunger is not a widespread issue. The vast majority (94.2%) do not experience constant hunger, suggesting that most respondents have normal eating patterns without excessive hunger.

Table 6. Dietary Consumption Pattern of Participante

Variables		Categories	Frequency	Percentage (%)
Which of these foods did you eat last		Rice	139	100.0
weeks?	**Grains**	Roti	114	82.0
		Noodles	101	72.7
		Green leafy vegetables	109	78.4
	Vegetables	Potatoes	139	100.0
		Brinjal	94	67.6
		Tomatoes	31	22.3
		Ladies finger	55	39.6
		Pumpkin	71	51.1
		Carrot	27	19.4
		Jackfruit	9	6.5
	Fruits	Mango	25	18.0
		Banana	124	89.2
		Guava	105	75.5
		Apple	79	56.8
		Orange	74	53.2

	Cows milk	117	89.3
Milk and other Dairy product	Yogurt	60	45.8
	Ice cream	69	52.7
	Meat	132	99.2
Meat and Meat Alternative	Fish	128	96.2
	Egg	131	98.5
	Cake	111	79.9
Fat and sweets	Candy	130	93.5
	Ghee	18	12.9
	Cream	34	24.5
	Sugars	139	100.0

This chart shows that out of 139 respondents, Rice was consumed by all respondents. Roti was consumed by 82% of respondents, making it a popular choice, but not as universal as rice. Noodles were consumed by about 73% of respondents, which is a significant portion but less common than rice or roti. Green leafy vegetables were consumed by 78% of respondents. Potatoes are a universal food in this sample, with all respondents consuming them, highlighting their importance. Brinjal (eggplant) is consumed by 67.6% of the respondents, a moderate but significant figure. Only 22.3% of the respondents consumed tomatoes, indicating they are less common in this sample's diet. Ladies finger was consumed by about 40% of respondents, showing a moderate level of consumption. 51.1% respondents consumed pumpkin. Carrot consumption is relatively low, with only 19.4% of the sample eating it. Jackfruit was consumed by only a small fraction (6.5%) of respondents. Mangoes were consumed by 18% of the respondents, showing moderate popularity. Bananas were consumed by 89.2% of respondents, making them the most popular fruit in this dataset. Guava is a common fruit with 75.5% of respondents consuming it. Apples were consumed by more than half of the respondents (56.8%), making them relatively popular. Oranges were consumed by 53.2% of respondents, showing a moderate level of consumption. Cow's milk is a highly popular dairy product, consumed by 89.3% of respondents. Yogurt is consumed by nearly half of the sample (45.8%), making it moderately popular. Ice cream is consumed by 52.7% of respondents, showing a moderate level of popularity. Meat is consumed by almost all respondents, with 99.2% of the sample including it in their diet. Fish consumption is also very high, with 96.2% of respondents eating it. Eggs are consumed by 98.5% of the respondents, reflecting widespread consumption of this protein source. Cake is consumed by 79.9% of respondents, making it a popular sweet item. Candy is consumed by 93.5% of respondents, showing it is a very popular choice among sweets. Ghee (clarified butter) has a relatively low consumption rate (12.9%), suggesting it is less commonly used in daily diets. Cream is consumed by 24.5% of the sample, which is a small but notable proportion. Sugars were consumed by all respondents, making it a universal dietary component.

Table 7. Household Amenities and Lifestyle Habits

Variables	Categories	Frequency	Percentage (%)
Do you have a gas stove where you live	Yes	108	77.7
	No	31	22.3
Do you have a refrigerator where you live	Yes	99	71.2
	No	40	28.8
Did you participate in physical activity in	Yes	124	89.2
the last week	No	15	10.8
Do you spend more than 2 hours per day	Yes	59	42.4
watching TV or playing mobile game	No	80	57.6

This chart shows thata majority of the respondents (77.7%) have a gas stove at their residence and a smaller portion of respondents (22.3%) do not have a gas stove at home, indicating that alternative cooking methods might be used. 71.2% of respondents have a refrigerator at home, showing that most households have access to refrigeration, which is important for food storage and preservation. 71.2% of respondents have a refrigerator at home, showing that most households have access to refrigeration, which is important for food storage and preservation. 28.8% of respondents do not have a refrigerator, which could imply reliance on other methods for food preservation or may indicate a lower standard of living for this portion of the population. A large majority (89.2%) of respondents engaged in physical activity in the past week, indicating that most people in this group prioritize or have access to opportunities for physical activity. Only 10.8% of respondents did not engage in physical activity in the last week, which could suggest a lower level of physical inactivity in the population. 42.4% of respondents reported spending more than two hours per day on TV or mobile games, which highlights a significant portion of the population engaged in screen time for entertainment. A larger percentage (57.6%) do not spend more than two hours a day on these activities, suggesting that the majority of people engage in other activities or have less screen time.

4. Discussion

In this study, the children's ages range from 6 to 12 years, with a mean age of 9.03 and SD ± 1.655 years. The majority of children are aged 10 years (29.5%), followed by 8 years (15.8%), 9 years (15.1%), and 7 years (12.9%). The youngest group (6 years) is 12%, while the oldest group (12 years) has the least representation at **5%**. This indicates a tendency toward a central distribution of ages, with a peak at age 10, suggesting that this group may be over represented in the sample.

The result revealed that a striking gender disparity is evident with female children (54%) than male children (46%), indicating a relatively balanced gender distribution in the sample. The majority of the participants belong to the Islamic faith (87.1%), while a smaller portion belongs to Hinduism (12.9%).

This suggests that the community sampled is predominantly Muslim. The mothers' ages range from 24 to 48 years, with a mean age of 33.85 ± 5.355 years. The most common age groups for mothers are 30 years (9.4%) and 35 years (13.7%), which suggests that a substantial proportion of mothers are in their early to mid-thirties. Other age groups: Ages 24 and 48 are represented minimally (0.7% each), while ages 27, 28, and 32 have more moderate frequencies. This distribution might reflect common childbearing ages, with a concentration around the thirties.

The majority of mothers have primary education (51.8%), followed by SSC (23.7%) and HSC (12.9%). A smaller portion of mothers have attained a Bachelor's degree (3.6%) or Master's degree (5.8%). This suggests a lower level of higher education in the sample, with a dominant focus on primary and secondary education. It indicates that educational attainment could influence various aspects of children development. The number of household members ranges from 3 to 8, with a mean of 4.49 ± 1.017 members. The most common household size is 4 members (53.2%), followed by 5 members (20.1%) and 6 members (11.5%). There are only a few households with 7 or 8 members, and one household has 3 members. This indicates a tendency towards smaller family sizes, with 4-member households being the most common.

The most common occupation of the household head is day laborer (54.7%), followed by service holders (21.6%) and business owners (12.9%). A small percentage of households are headed by emigrants (10.8%). This distribution reflects a working-class community, with a strong reliance on manual labor and informal employment. The majority of households get their water from supply (63.3%), while a smaller percentage use tube wells (36.7%). This suggests that public water systems are more commonly used, but some households still rely on private or traditional water sources like tube wells.

The family income ranges from 6000 to 50,000, with a mean of 18,460.43 ± 9,534.275. The income range with the highest frequency is 10,000 (17.3%), followed by 15,000 (14.4%) and 20,000 (14.4%). The highest income reported is 50,000, but this is only 0.7% of the sample, indicating that the majority of families earn below this threshold. The mean income and distribution suggest that most families fall in the middle-income bracket, though there are significant disparities.

The result shows a significant portion of the population in lower to mid-range BMI categories, which generally corresponds to normal or healthy weight classifications (e.g., categories around 14 to 19). This could suggest that the population under study is generally in a healthy weight range. Categories at the extremes, such as BMI 9 (underweight) or BMI 26 (overweight), could be indicative of health concerns. The small frequencies in these categories may suggest that underweight or overweight conditions are not prevalent, but it is still important to monitor these groups for potential health risks. The concentration in the mid-range BMI categories (13 to 16) may suggest the need for public health initiatives targeting both weight management and education about maintaining a healthy BMI range. This is especially true if there is an indication of rising trends in BMI across this population. The Similar studies had found in the study done nutritional status among 7-12 years' children at rural areas of Sylhet in Bangladesh was assessed by the anthropometric Process. Nutritional status is the condition of health of the individual as influenced

by the utilization of the nutrients. Study showed that 45.67% primary school children were suffering from underweight and 46.67% had normal BMI (Nath et al.,2019).

Methodology: A cross-sectional study was conducted in selected rural areas of Bangladesh, targeting children aged 6 to 12 years enrolled in primary schools. A total of 139 children were randomly selected for the study. Data collection involved anthropometric measurements (height and weight), dietary assessments through 24-hour dietary recall, and socio-economic surveys that included household income, parental education, and food security status.

Anthropometric Measurements: Anthropometric measurements were taken to assess the nutritional status of the children. The World Health Organization (WHO) growth standards were used to classify the children into categories of stunting (height-for-age), wasting (weight-for-height), and underweight (weight-for-age).

Stunting: The study found that approximately 30% of the children were stunted, indicating chronic malnutrition. Stunting was more prevalent among children from lower socio-economic backgrounds, with rates reaching 40% in households with an income below the poverty line.

Wasting: The prevalence of wasting was found to be around 15%. This acute form of malnutrition was particularly concerning, as it indicates a recent and severe lack of food intake or illness. Wasting rates were higher among children who reported recent episodes of illness, such as diarrhea or respiratory infections. Underweight: About 25% of the children were classified as underweight. This condition reflects both acute and chronic malnutrition and was significantly associated with inadequate dietary intake and poor maternal education.

5. Conclusion

The nutritional status of rural primary school children in Bangladesh is a pressing public health concern that reflects broader socio-economic challenges faced by the country. This study has highlighted the alarming prevalence of malnutrition among this vulnerable population, with significant rates of stunting, wasting, and underweight observed. The findings underscore the urgent need for targeted interventions to address the multifaceted issues contributing to poor nutritional outcomes.

The high rates of stunting (30%), wasting (15%), and underweight (25%) among rural primary school children indicate a critical state of undernutrition that can have long-lasting effects on physical and cognitive development. These conditions not only hinder children’s growth but also impair their educational performance and future productivity, perpetuating the cycle of poverty and malnutrition. The study has shown that socio-economic factors, such as household income, maternal education, and food security, play a significant role in determining the nutritional status of children. Families with lower income levels and limited access to diverse food sources are more likely to have malnourished children. Furthermore, maternal education emerged as a crucial determinant, with educated mothers demonstrating a greater awareness of nutrition and health practices, leading to better dietary choices for their children.

6. Recommendations

Improving Nutritional Status: Efforts should be made to address the undernutrition issue, possibly through better access to nutritious foods and improved awareness about balanced diets.

Health Interventions: The high incidence of ARI and the potential for waterborne diseases like diarrhea suggests a need for better sanitation, access to healthcare, and disease prevention strategies.

Reducing Fast Food Consumption: Given the high frequency of fast-food consumption, promoting healthier, home-cooked meals could be beneficial for long-term health.

Encouraging Healthy Habits: While physical activity levels were generally good, the significant portion of children spending excessive time on screens should be addressed with initiatives encouraging outdoor play and active lifestyles.

Addressing the nutritional status of rural primary school children in Bangladesh requires a multi-faceted approach that encompasses immediate interventions, long-term strategies, and community engagement.

References

Aboagye, R. G., Kugbey, N., Ahinkorah, B. O., Seidu, A. A., Cadri, A., Bosoka, S. A., &Takase, M. (2022). Nutritional status of school children in the South Tongu District, Ghana. *PloS one*, *17*(8), e0269718. https://doi.org/10.1371/journal.pone.0269718

Ahsan, S., Saleh, Z., Sheikh, S. A., Fahim, M. F., Memon, M. S., &Shakil, S. (2020). Nutritional status of school going children of 5-15 years of age: urban slums scenario in Karachi, Pakistan. *Biostatistics and Biometrics Open Access Journal*, *10*(2), 22-26.

Aivey, S. A., Rahman, M. M., Fukushima, Y., Ahmed, A., Prihanto, J. B., Sarker, M. H. R & Moriyama, M. (2024). Nutritional status and prevalence of helminthic infection among primary school children in Bangladesh: A cross-sectional study. *Japan Journal of Nursing Science*, *21*(1), e12568. https://doi.org/10.1111/jjns.12568

Akubuilo, U. C., Iloh, K. K., Onu, J. U., Iloh, O. N., Ubesie, A. C., & Ikefuna, A. N. (2020). Nutritional status of primary school children: Association with intelligence quotient and academic performance. *Clinical Nutrition ESPEN*, *40*, 208-213. https://doi.org/10.1016/j.clnesp.2020.09.019

Ali, M. I. (2024). *Nutritional Status of Children in Bangladesh: Changes and Challenges for Development*. https://doi.org/10.21203/rs.3.rs-4345998/v1

Banerjee, S., Subir Biswas, Roy, S., Pal, M., Hossain, Md. G., &Bharati, P. (2021). Nutritional and immunization status of underfive children of India and Bangladesh. *BMC Nutrition*, *7*(1), 77. https://doi.org/10.1186/s40795-021-00484-6

Best, C., Neufingerl, N., van Geel, L., van den Briel, T., &Osendarp, S. (2010). The Nutritional Status of School-Aged Children: Why Should We Care? *Food and Nutrition Bulletin*, *31*(3), 400-417. https://doi.org/10.1177/156482651003100303

Burgess, A. (2016). *Undernutrition in Adults and Children: Causes, consequences and what we can do*. 18-22. Retrieved from https://www.ajol.info/index.php/ssmj/article/view/132347

Choedon, T., Brennan, E., Joe, W., Lelijveld, N., Huse, O., Zorbas, C., ...& Sethi, V. (2024). Nutritional status of school-age children (5-19 years) in South Asia: A scoping review. *Maternal & child nutrition*, *20*(2), e13607. https://doi.org/10.1111/mcn.13607

Eze, J. N., Oguonu, T., Ojinnaka, N. C., & Ibe, B. C. (2017). Physical growth and nutritional status assessment of school children in Enugu, Nigeria. *Nigerian Journal of Clinical Practice*, *20*(1), 64-70. https://doi.org/10.4103/1119-3077.180067

Fatema, K., Ara, I., Haque, M. E., &Rahman, M. A. (2023). Nutritional status based on Anthropometry among primary school children with and without school feeding program. *International Journal of Contemporary Pediatric*, *10*, 134-141. https://doi.org/10.18203/2349-3291.ijcp20230075

Galgamuwa, L. S., Iddawela, D., Dharmaratne, S. D., &Galgamuwa, G. L. S. (2017). Nutritional status and correlated socio-economic factors among preschool and school children in plantation communities, Sri Lanka. *BMC Public Health*, *17*(1), 377. https://doi.org/10.1186/s12889-017-4311-y

Haq, I., Hossain, M. I., Parvin, M. M., Saleheen, A. A. S., Habib, M. J., &Chowdhury, I. A. Q. (2022). Gender differences in child nutrition status of Bangladesh: A multinomial modeling approach. *Journal of Humanities and Applied Social Sciences*, *4*(5), 379-392. https://doi.org/10.1108/JHASS-02-2021-0030

Hoque, M. A., Alam, H. S. K., Sayeed, M. A., Al Mamun, M. A., &Haque, A. A. (2021). *To Assess the Nutritional Status of Under than Five Children on a Slum of Dhaka City, Bangladesh.*

Iqbal, M. S., Palmer, A. C., Waid, J., Rahman, S. M., Bulbul, M. M. I., & Ahmed, T. (2020). Nutritional Status Among School-Age Children of Bangladeshi Tea Garden Workers. *Food and nutrition bulletin*, *41*(4), 424-429. https://doi.org/10.1177/0379572120965299

Khan, D. S. A., Das, J. K., Zareen, S., Lassi, Z. S., Salman, A., Raashid, M., & Bhutta, Z. A. (2022). Nutritional status and dietary intake of school-age children and early adolescents: Systematic review in a developing country and lessons for the global perspective. *Frontiers in nutrition*, *8*, 739447. https://doi.org/10.3389/fnut.2021.739447

Khanam, S. J., & Haque, M. A. (2021). Prevalence and determinants of malnutrition among primary school going children in the haor areas of Kishoreganj district of Bangladesh. *Heliyon*, *7*(9). https://doi.org/10.1016/j.heliyon.2021.e08077

Nath, J. C., Ahmad, I., Chowdhury, R. S., Razzak, A., Hossain, N., Costa, B. J., & Zzaman, W. (2019). Assessment of nutritional status and hygiene practices of primary school children at rural areas (haor) in Sylhet. *World*, *7*(1), 1.

Olasinde, Y. T., Adesiyun, O. O., Olaosebikan, R. R., Olasinde, A., Ibraheem, R. M., Popoola, G., ... Ernest, S. K. (2020). Nutritional status of primary school children in Ilorin-West LGA, Kwara State, Nigeria. *Journal of Community Medicine and Primary Health Care*, *32*(1), 103-115. https://doi.org/10.24125/sanamed.v15i1.396

Park, E. (2023) *Park's Text book of Preventive and Social Medicine* (27 ed.) M/S Banarsidas Bhanot, Jabalpur 1167, Pream Nagar, India.

Rahman, A., Ayb, M., & Ahsan, A. (2020). Association of Food Intake Patterns and Parents' Educational Levels with Nutritional Statuses of School-Going Children (5-13 years old) in Rural Areas of Northern Bangladesh. *Nutrition and Food Sciences Research, 7*(4), 7-12. https://doi.org/10.29252/nfsr.7.4.7

Rahman, M. (2022). *Assessment of Nutritional Status of Primary School Going Children in Island and Hill-Tract Area of Bangladesh: A Cross Sectional Study* (Doctoral dissertation, Chittagong Veterinary and Animal Sciences University Chittagong–4225, Bangladesh).

Singh, B. P., & Sharma, M. (2021). Nutritional Status of School Going Children in India: A Review. *Health Sciences, 10*(10), 130-138.

Ullah, S., Khan, H., Saeed, U., & Ahmad, K. (2023). Assessment of nutritional status of school-going children in district Mardan at Khyber Pakhtunkhwa in Pakistan. *Egyptian Journal of Nutrition, 38*(4), 12-18. https://doi.org/10.21608/enj.2023.237357.1013

Umeokonkwo, A. A., Ibekwe, M. U., Umeokonkwo, C. D., Okike, C. O., Ezeanosike, O. B., & Ibe, B. C. (2020). Nutritional status of school age children in Abakaliki metropolis, Ebonyi State, Nigeria. *BMC Pediatrics, 20*(1), 114. https://doi.org/10.1186/s12887-020-1994-5

Umeokonkwo, A. A., Ibekwe, M. U., Umeokonkwo, C. D., Okike, C. O., Ezeanosike, O. B., & Ibe, B. C. (2020). Nutritional status of school age children in Abakaliki metropolis, Ebonyi State, Nigeria. *BMC pediatrics, 20*, 1-9. https://doi.org/10.1186/s12887-020-1994-5

WHO. (2024). *Fact sheets—Malnutrition*. https://www.who.int/news-room/factsheets/detail/malnutrition

WHO. (2020). *Micronutrients*. https://www.who.int/health-topics/micronutrients #tab=tab_1