Assessment of 24 Hour Dietary Recall in under 5 Children with Acute Malnutrition

*Dr. Mahbubur Rahman[1], Dr. Dilruba Ibrahim Dipti[2], Dr. Meherdad Yousuf Ahmed[3]

[1]Associate Professor, Department of Pediatric Cardiology, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

[2]Assistant Professor, Department of Pediatric Cardiology, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

[3]Registrar, Department of Pediatric Cardiology, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

*Corresponding Author: *Dr. Mahbubur Rahman, Associate Professor, Department of Pediatric Cardiology, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh.*

Abstract

Background: *Acute malnutrition remains a major public health concern among under-five children in Bangladesh, leading to increased morbidity and mortality. Dietary intake and feeding practices play a crucial role in preventing and managing malnutrition. This study aimed to assess the 24-hour dietary recall, dietary diversity, and meal frequency among malnourished children admitted to a tertiary hospital.*

Methods: *A cross-sectional study was conducted at the Department of Paediatric Surgery, Bangladesh Shishu Hospital & Institute from January 2020 to June 2020, including 100 children aged 6–59 months with acute malnutrition. Data were collected using 24-hour dietary recall and WHO-recommended dietary assessment tools. Nutrient intake was compared with Recommended Daily Intake (RDI), and dietary diversity was evaluated using the Dietary Diversity Score (DDS). Data analysis was performed using SPSS 25.*

Results: *The mean energy intake was 860 ± 145 kcal, with 75% of children consuming below RDI. Protein (61%), fat (56%), iron (81%), vitamin A (68%), and zinc (78%) intake were also below recommended levels. The mean DDS was 3.4 ± 1.2, with a high reliance on cereals (92%) but low consumption of animal-source foods (39%), vegetables (29%), and fruits (22%). Only 64% met the minimum meal frequency, 41% consumed fortified foods, and 28% of mothers received nutrition counseling.*

Conclusion: *The study highlights inadequate dietary intake, poor dietary diversity, and low maternal nutrition awareness among malnourished children. Nutritional interventions, dietary diversification, and improved maternal education are needed to address these gaps.*

Keywords: *Acute malnutrition, 24-hour dietary recall, dietary diversity, feeding practices, under-five children.*

1. INTRODUCTION

Acute malnutrition, including Moderate Acute Malnutrition (MAM) and Severe Acute Malnutrition (SAM), represents a significant public health concern, particularly in developing countries [1]. In Bangladesh, where the prevalence of malnutrition remains high, children under the age of five are especially vulnerable.

According to the National Micronutrient Survey and various reports by the World Health Organization (WHO), malnutrition contributes to a substantial burden of disease, with poor nutritional status being a leading cause of morbidity and mortality in young children [2]. Acute malnutrition is associated with a higher risk of infections, developmental delays, and long-term health consequences, making its timely identification and management crucial for improving child health outcomes [3].

In addressing acute malnutrition, an accurate assessment of dietary intake is essential. One of the most effective methods for evaluating dietary patterns in young children is the 24-hour dietary recall method, which provides a detailed snapshot of the types and amounts of food consumed over the previous 24 hours [4]. This method is particularly useful in clinical settings, where accurate and feasible assessment tools are required to inform intervention strategies [5]. The dietary recall method has been widely utilized in research to understand nutrient intake and identify deficiencies in populations with nutritional challenges [6].

The Bangladesh Shishu Hospital & Institute in Dhaka, a leading pediatric care facility in Bangladesh, is at the forefront of providing specialized care for children with acute malnutrition. Despite significant efforts in malnutrition management, there is a lack of comprehensive data on the dietary habits and nutrient intake of children under five with acute malnutrition in this region [7]. Thus, there is a need for studies that evaluate the dietary patterns of children with MAM and SAM, to understand the extent of malnutrition and nutritional deficiencies more accurately.

Dietary deficiencies, particularly in macronutrients like protein, fats, and energy, as well as micronutrients such as vitamin A, iron, and zinc, are commonly observed in children with acute malnutrition [8]. These deficiencies not only hinder growth and development but also compromise the immune system, increasing susceptibility to infections [9]. Furthermore, inadequate complementary feeding practices and low dietary diversity contribute significantly to the persistence of malnutrition in children [10]. A proper understanding of these dietary patterns is essential for developing targeted nutritional interventions and improving child feeding practices [11].

This study aimed to assess the dietary intake of children under five years of age with acute malnutrition, using the 24-hour dietary recall method. It also sought to identify key nutritional gaps and dietary diversity in this vulnerable population. By analyzing the macronutrient and micronutrient intake, as well as the meal frequency and dietary diversity, this research provides insights into the dietary patterns of children with MAM and SAM in Bangladesh. Such information is vital for informing public health interventions and shaping national nutrition policies.

2. METHODOLOGY & MATERIALS

This cross-sectional study was conducted at the Department of Paediatric Surgery, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh,

from January 2020 to June 2020. The study aimed to assess the dietary intake of under-five children with acute malnutrition using the 24-hour dietary recall method. The study population consisted of 100 children aged 6–59 months diagnosed with Moderate Acute Malnutrition (MAM) or Severe Acute Malnutrition (SAM), based on the WHO weight-for-height Z-score (WHZ) criteria. Participants were selected using a purposive sampling method from both admitted patients and outpatient cases.

Children meeting the inclusion criteria were those aged between 6 and 59 months, diagnosed with either MAM or SAM, and whose parents or caregivers were willing to provide a 24-hour dietary recall of their child's food intake. Children with chronic illnesses such as congenital heart disease, chronic diarrhea, or metabolic disorders, and those suffering from severe infections or congenital anomalies requiring specialized nutrition, were excluded. Additionally, children whose caregivers were unable to recall the child's food intake accurately were also excluded from the study.

Data collection involved using the 24-hour dietary recall method, where caregivers were interviewed about all foods and beverages consumed by the child in the previous day. Portion sizes were estimated using standard household measures. The foods consumed were categorized into seven food groups, which were used to calculate the Dietary Diversity Score (DDS). Anthropometric measurements, including weight, height/length, and mid-upper arm circumference, were taken using standard techniques to classify the degree of malnutrition based on WHO growth standards.

All data collected were entered and analyzed using IBM SPSS Statistics 25. Descriptive statistics were applied to calculate the mean intake of macronutrients and micronutrients. The prevalence of inadequate nutrient intake was determined based on Recommended Daily Intake (RDI) values. Additionally, dietary diversity and meal frequency were assessed using WHO guidelines.

3. RESULTS

Table 1. *Demographic and Clinical Characteristics of Study Participants (N = 100)*

Characteristics	n	%
Age (months)		
6–12	18	18%
13–24	27	27%
25–36	32	32%
37–59	23	23%

Sex		
Male	55	55%
Female	45	45%
Weight-for-height Z-score (WHZ)		
Moderate Acute Malnutrition (MAM) (-3 to -2 SD)	61	61%
Severe Acute Malnutrition (SAM) (< -3 SD)	39	39%
Breastfeeding Status		
Currently Breastfeeding	73	73%
Not Breastfeeding	27	27%

Table 1 presents the demographic and clinical characteristics of the study participants. The majority of children (32%) were aged 25–36 months, while the lowest proportion (18%) belonged to the 6–12 months age group. Males (55%) slightly outnumbered females (45%). Based on the weight-for-height Z-score (WHZ) classification, 61% of children had Moderate Acute Malnutrition (MAM), whereas 39% had Severe Acute Malnutrition (SAM). Regarding breastfeeding status, 73% of the children were still breastfeeding, while 27% had stopped breastfeeding.

Table 2. *Dietary Intake (Macronutrient and Micronutrient Consumption)*

Nutrient	Mean Intake (±SD)	RDI for Age Group	% Below RDI
Energy (kcal)	860 ± 145	1000–1300 kcal	75%
Protein (g)	18.2 ± 3.5	20–25 g	61%
Fat (g)	25.8 ± 5.2	30–40 g	56%
Iron (mg)	4.5 ± 1.2	7–10 mg	81%
Vitamin A (µg)	190 ± 52	300–400 µg	68%
Zinc (mg)	3.2 ± 0.8	4–5 mg	78%

Table 2 presents the dietary intake of macronutrients and micronutrients among study participants. The mean energy intake (860 ± 145 kcal) was below the Recommended Daily Intake (RDI) of 1000–1300 kcal, with 75% of children failing to meet their daily energy requirements. Similarly, deficiencies were observed in protein (61% below RDI), fat (56% below RDI), iron (81% below RDI), vitamin A (68% below RDI), and zinc (78% below RDI).

Table 3. *Dietary Diversity Score (DDS) Among Study Participants*

Food Group	n	%
Cereals (rice, wheat, bread)	92	92%
Dairy (milk, yogurt, cheese)	48	48%
Meat/Fish/Eggs	39	39%
Legumes/Nuts	31	31%
Fruits	22	22%
Vegetables	29	29%
Fats/Oils	56	56%
DDS Score (Mean ± SD)	3.4 ± 1.2	

Table 3 summarizes the dietary diversity among the study participants. Cereals (92%) were the most commonly consumed food group, followed by fats/oils (56%) and dairy products (48%). Consumption of animal protein sources (meat, fish, eggs) was low (39%), while intake of legumes/nuts (31%), vegetables (29%), and fruits (22%) was even lower. The mean Dietary Diversity Score (DDS) was 3.4 ± 1.2.

Table 4. *Meal Frequency and Feeding Practices*

Feeding Practice	n	%
Minimum Meal Frequency Met (WHO Standard)	64	64%
Received Complementary Feeding	77	77%
Consumption of Fortified/Therapeutic Foods	41	41%
Mother Received Nutrition Counseling	28	28%

Table 4 presents meal frequency and feeding practices among the study participants. 64% of children met the minimum meal frequency recommended by the WHO, while 77% received complementary feeding. However, only 41% consumed fortified or therapeutic foods, and 28% of mothers reported receiving nutrition counseling.

4. DISCUSSION

Malnutrition remains a critical public health issue among children under five, particularly in developing countries like Bangladesh. The findings from this study highlight significant gaps in dietary intake, dietary diversity, and meal frequency among malnourished children. Our results align with previous research conducted in various regions, emphasizing the multifaceted nature of childhood malnutrition and its associated risk factors.

The dietary intake analysis revealed that a substantial proportion of children failed to meet the Recommended Daily Intake (RDI) for essential nutrients, with 75% consuming inadequate energy, 61% consuming insufficient protein, and 81% having low iron intake. These deficiencies can contribute to poor growth and weakened immunity, increasing susceptibility to infections [12, 13]. Similar findings have been observed in studies from Ethiopia and South Africa, where malnourished children had significantly lower energy and micronutrient intake than well-nourished counterparts [14, 15]. Deficiencies in iron (81%) and zinc (78%) are particularly concerning, as both play crucial roles in immune function and cognitive development [16].

The dietary diversity score (DDS) of 3.4 ± 1.2 suggests that the majority of children consumed only 3–4 food groups, with heavy reliance on cereals (92%) but inadequate intake of fruits (22%), vegetables (29%), and animal proteins (39%). Similar trends have been observed in malnourished populations, where dietary patterns are predominantly carbohydrate-based with limited protein and micronutrient-rich food sources [17]. Studies indicate that inadequate dietary diversity is a key determinant of stunting and wasting in young children [18]. Additionally, the low consumption of animal-source foods in our study is consistent with findings from rural Malawi, where increased intake of meat, fish, and dairy was associated with improved height-for-age Z-scores [19].

In terms of meal frequency, 64% of children met the WHO-recommended minimum meal frequency, while 36% did not receive the recommended number of meals per day. This is consistent with findings from Ethiopia, where inadequate meal frequency was linked to poor growth outcomes and increased risk of acute malnutrition [20]. The 41% consumption rate of fortified or therapeutic foods further indicates that many malnourished children do not receive sufficient dietary interventions, which could hinder recovery from malnutrition.

A key factor influencing child nutrition is maternal awareness and feeding practices. Our study found that only 28% of mothers received nutrition counseling, which is significantly lower than recommended levels. Studies have shown that maternal education on proper feeding practices plays a crucial role in improving child nutrition and dietary diversity [21, 22]. In Burkina Faso, higher maternal nutrition awareness led to increased utilization of ready-to-use therapeutic foods (RUTF), reducing severe acute malnutrition rates [16]. The low level of maternal counseling in our study suggests the need for enhanced community-based nutrition programs to educate caregivers on appropriate child feeding strategies.

5. LIMITATIONS OF THE STUDY

This study relied on 24-hour dietary recall, which may be subject to recall bias and underreporting, potentially affecting the accuracy of dietary intake data. The cross-sectional design limits the ability to establish causal relationships between dietary intake and malnutrition. Additionally, the study was conducted in a hospital setting, which may not fully represent the dietary patterns of malnourished children in community settings.

6. CONCLUSION

The study highlights significant gaps in dietary intake, poor dietary diversity, and inadequate maternal nutrition awareness, all contributing to acute malnutrition in under-five children. A high prevalence of energy, protein, and micronutrient deficiencies, particularly in iron and zinc, was observed. Limited dietary diversity and low intake of animal-source foods further exacerbate the risk of malnutrition. Expanding maternal nutrition counseling, promoting fortified foods, and improving dietary diversity are essential to addressing these issues. Strengthening nutrition-focused policies and integrating them into child health services will be crucial for sustainable improvements in child nutrition.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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