

**ADHERENCE TO THE WHO GUIDELINES OF MANAGEMENT OF SEVERE ACUTE MALNUTRITION IN CHILDREN 6 MONTHS TO 5 YEARS**

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(Received, 11<sup>th</sup> February 2022, Revised 27<sup>th</sup> October 2022, Published 4<sup>th</sup> November 2022)

**Abstract:** To evaluate the management of severe acute malnutrition according to WHO guidelines in children. A prospective study was conducted at Paediatrics Department of Mother and Children Complex DHQ Hospital Sheikhupura from August 2021- August 2022. A total of 200 children with age range between 6 months and 5 years were included in the study. Personal information of patients was supposed to be recorded along with malnutrition classification, diagnostic signs, treatment and its outcomes according to the WHO guidelines. All the data was assessed by SPSS version 22. The staff did not record complete information such as family history, health condition of the child, and diagnostic signs. The weight for height Z score was calculated in all patients (100%). The classification of malnutrition was also not in adherence with WHO i.e seven types were recorded instead of two. Laboratory tests other than blood film, blood sugar and hemoglobin concentrations were not performed in any of the children. 82 (41%) children received intravenous dextrose. Rehydration solution for malnutrition was not administered to any of the children. Poor adherence to WHO guidelines regarding severe acute malnutrition was observed in children younger than 5.

**Keywords:** Severe acute malnutrition, World Health Organization, Children

### Introduction

Malnutrition constitutes about one third of total 8 million deaths in children below 5 years of age due to which it is regarded as a significant cause of mortality in this age group (Guideline, 2013). About 20 million children, majorly from South Asian and Africa, are affected by Severe acute malnutrition (SAM) (Organization, 2020). In children aged between 6-59 months, severe malnutrition is characterized either by oedema or weight-for-height/length < 70% of the reference values given by median National Center for Health Statistics/World Health Organization (WHO) or below -3 Z-score (Guideline, 2013). Globally, 19 million children are affected by SAM (Victoria et al., 2021). Studies conducted in Asia and Africa have only partially assessed the WHO protocol for management of severe malnutrition (Ahmed, 2019; Chepng'etich, 2018). It is reported that these guidelines are only partially adhered upon, though adherence to SAM classification is acceptable. Prevalence of child malnutrition in Pakistan is far more than other developing states (Di Cesare et al., 2015). The National health survey reported that 33% of children are anemic, 33% are underweight, 15% are wasted and 44% are stunted. In Pakistan, over the last twenty year, reduction in malnutrition is negligible

(Asim and Nawaz, 2018). Standard protocols must be followed to reduce morbidity and mortality associated with acute malnutrition. WHO has recommended use of its guidelines in hospitals for managing malnutrition (Keats et al., 2021). The aim of these guidelines is to reduce morbidity and mortality of malnutrition in children < 5 years. However, studies have not been conducted to assess adherence to these guidelines. The aim of this study is to evaluate the management of severe acute malnutrition according to WHO guidelines in children.

### Methodology

This prospective study was conducted in the Pediatric Department of Mother and Children Complex DHQ Hospital Sheikhupura from August 2021 to August 2022. After seeking permission of the administration, the medical history of children with severe acute malnutrition admitted during this period was reviewed. Data of the children aged between 6 months to 5 years was collected from the hospital record. The medical history was reviewed anonymously. The study was approved by the Ethical Board of the hospital. The expected data was



according to WHO management of children with SAM. As per WHO guidelines, data included identity of patient, family history, immunization, dietary and medical history. Moreover, the demographic data (height, weight, temperature, bilateral lower limb edema mid-upper arm circumference (MUAC) and weight for height Z-score) was also reviewed. Diagnostic signs (respiratory rate, pulse, anemia, cough, volume of urine passed/day, signs of dehydration, stools per day and episodes of vomiting per day) and classification of malnutrition were included as well. Treatment and its outcome were labeled. In hospital, children with SAM are admitted by the general practitioner. A pediatrician reexamines children and provides treatment as recommended by WHO guidelines (Organization, 2021). Complicated cases were stabilized and were fed using F100 and F70 special formulas. Subjects were discharged according to discharge criteria of protocol guidelines. SPSS, version 22 was used for data analysis. For qualitative data frequency distribution was measured. Mean and standard deviation were measured for numerical data. Proportion and percentage were calculated, groups were compared using Fisher's exact test. P <0.05 was considered statistically significant.

**Results**

The data of 200 children with SAM was included in the study. The mean age was 19.5 months (range: 6-59 months). There were 120 (60%) males and 80 (40%) females in the study. WHO guidelines on history and examination were not followed. Personal history was not recorded by the health personnel. In medical history data on weight loss, hair changes, intestinal parasite, diarrhea, vomiting and appetite was not mentioned in any of the files. Immunization and dietary history were also missing. Missing clinical characteristic data ranged from 2% - >5% (Table I). The weight-for-height Z-score was calculated in 100% of the children. Diagnostic signs were missing from all the files. In the records, seven classifications of SAM were mentioned, while as per WHO guidelines there are only two (severe or moderate); therefore, protocol was not followed. 34 (17%) children had -2 weight-for-height Z-score and 52 (26%) had oedema were otherwise classified into 7 groups. Data on classification was majorly missing. Non edematous or edematous SAM were not recorded according to guidelines. On the basis of low MUAC, 11 of 12 (91.6%) subjects (classified as nonspecific) could have been diagnosed with SAM. Tests for blood film, blood sugar and hemoglobin concentration were done in 58 (29%), 142 (71%) and 18 (9%) children respectively. The remaining "tests that may be useful" were done in any of the children. 82 (41%) children received intravenous dextrose.

Treatment for hypothermia including blanket use and kangaroo technique was almost similar in all. Rehydration solution for malnutrition was not administered to any of the children (Table II). 116 (58%) children with SAM were treated and discharged, 50 (25%) were under treatment during study period. 12(6%) left hospital, 12(6%) died and 4 (2%) were referred. Treatment outcome record was not found for 6 (3%) children with SAM. The average length of hospital stay (ALOS) was 12.0 ± 9.6 days.

**Table I Recorded data of children with SAM**

Variable	Data recorded Frequency (%)	Data not recorded Frequency (%)
Bilateral lower limb oedema	196 (98%)	4 (2%)
Clinical signs of infection	190 (95%)	10 (5%)
Pallor	196 (98%)	4 (2%)
Signs of vitamin A deficiency	192 (96%)	8 (4%)

**Table II Treatment of children with SAM**

Variable	Treatment given Yes	No	Treatment not given or not recorded
Intravenous dextrose	82 (41%)	114 (57%)	4 (2%)
Kangaroo technique	30 (15%)	153 (76%)	17 (8.5%)
Covering using blanket	38 (19%)	156 (78%)	6 (3%)
F70 milk formula	125 (62.5%)	57 (28.5%)	18 (9%)
F100 milk formula	134 (67%)	60 (30.1%)	6 (3%)
Vitamin A	35 (17.5%)	159 (79.5%)	6 (3%)
Antimalarial	12 (6%)	183 (91.5%)	5 (2.5%)
Antibiotic	197 (98.5%)	2 (1.0%)	1 (0.5%)

**Discussion**

The study reported poor adherence to WHO guidelines in hospital settings. The record of history was majorly flawed. Diagnostic signs were missing from files of all the children with SAM. Classification of SAM was not in line with guideline classification. Recommended laboratory tests were not done in all patients and treatment steps including use of therapeutic food (F100 and F70), intravenous

[Citation: Mushtaq, K., Mushtaq, A., Yaqoob, Z., Hanif, I. (2022). Adherence to the WHO guidelines of management of severe acute malnutrition in children 6 months to 5 years. *Biol. Clin. Sci. Res. J.*, 2022: 132. doi: <https://doi.org/10.54112/bcsrj.v2022i1.132>]

dextrose and treatment of hypothermia were not followed. Follow up history of all patients was missing. A study reported that implementation of WHO protocol for management of SAM result in reduction of CFR (Scott et al., 2020). Unlike our study, other Asian and African studies show that classification of malnutrition was according to WHO guidelines of SAM classification (Bhatnagar et al., 2019). Classification of SAM did not consider MUAC and children were labelled nonspecific. Nevertheless, classification terminologies like marasmus and Kwashiorkor were used in previous studies (Derseh et al., 2018; Rizwana et al.). The prevention of hypoglycemia in this study is same as reported in a previous study conducted in similar setting (Fatima et al., 2021). In this study management of hypothermia was not satisfactory, specially heated rooms were not available and children were kept in paediatrics ward. Similarly, management of dehydration using IV fluids was inadequate, though dehydration is a complication of malnourishment. Despite noncompliance with guidelines, CFR of 6% was less as compared to other similar studies conducted in Kenya (13.4%) (Warfa et al., 2014) and Bangladesh (10.9%) (Hossain et al., 2009). According to WHO guidelines, mortality rate in current study is moderate (5% to 10%). The WHO aims to lower it below 5%. Medical record of children does not contain cause of death. The ALOS was lower as compared to similar low resource Asian settings (Ahmed et al., 2014). In this study. Maximum duration of hospital stay was 60 days, which is longer than recommended standard of less than weeks stay (Bitew et al., 2021). The limitation of this study is that equipment, training of staff and hospital setting were not evaluated to assess level of non-adherence.

### Conclusion

Poor adherence to WHO guidelines regarding severe acute malnutrition was observed in children younger than 5 years which can be improved by training and improvement in hospital infrastructure.

### Authors Contribution

Komal, Zarka, Islam, conceived, designed and did statistical analysis & editing of manuscript, Ammal, Zarka, Islam, did data collection and manuscript writing Komal, did review and final approval of manuscript.

### Conflict of interest

The authors declared absence of conflict of interest.

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