



MANAGEMENT OF CHILDREN WITH SEVERE ACUTE MALNUTRITION; EXPERIENCE OF A NUTRITION REHABILITATION CENTER FROM INDORE

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ABSTRACT

Background: Severe acute malnutrition, defined as weight for height <-3 SD or weight for height <-2 SD with mean upper arm circumference (MUAC) of less than 11.5 cm or bilateral pedal edema as per WHO. These children presents with various complications, which are managed following the WHO guidelines for management of SAM. **Material and methods:** Total 200 children of SAM aged between 6 months to five years were admitted during October 2012 to December 2013 in the nutrition rehabilitation center of this medical

institute. Of them majority were aged less than 18 months. All patients stayed for inpatients treatment of 14 days. Reasons for bringing children to the hospital were associated major illnesses & associated co morbidities observed were bronchopneumonia followed by acute gastroenteritis. Observed complications of SAM in our study were some and severe dehydration were (20%), hypoglycemia (10%), hypothermia (10%), hyponatremia (9%), hypokalemia (8%), hypernatremia (8%), hyperkalemia (4%), septic shock (4%), severe anemia (60%). **Results:** Majority of patients(60%)had good weight gain $> 10\text{g/kg/day}$, 20% had moderate weight gain of $5\text{-}10\text{ gm/kg/day}$ and 20% had poor weight gain of less than 5gm/kg/day . for height between 61-70% on admission and between 71-80% on discharge. Case fatality rate in our study was only 1%. **Conclusion:** In patient management of children of severe acute malnutrition with complications as per WHO's protocol leads to overall decrease in case fatality.

KEYWORDS: Severe acute malnutrition (SAM), WHO protocol, Nutrition rehabilitation center.

INTRODUCTION

Malnutrition remains one of the most common causes of morbidity and mortality among children throughout the world.^[1,2] Every year some 10.6 million children die before they reach their fifth birthday. Seven out of every 10 of these deaths are due to diarrhea, pneumonia, measles, malaria or malnutrition.^[3] Community based studies done in Ethiopia showed that malnutrition is common^[4,5] So malnutrition remains a major public health problem throughout the developing world and is an underlying factor in over 50% of the children deaths under 5 years who die each year of preventable causes.^[6,7,8,9] Approximately 9% of sub-Saharan African and 15 % South Asian children suffer from moderate acute malnutrition^[10] and approximately 2% of children living in developing countries suffer from severe acute malnutrition.^[11] In India, national family health survey-3, shows a sluggish decline in childhood malnutrition over the past decade and half. NFHS-3 data shows about 46% of the children in India under 5 years of age are moderately to severely underweight, 38% are moderately to severely stunted, and approximately 19% are moderately to severely wasted.^[12] Malnutrition leads to the likelihood of chronic disease and hence high child morbidity and mortality. It also reduces long term physical development, cognitive skills, and consequently has a negative effect on school enrollment and productivity in later life. Severe Acute Malnutrition (SAM) is an important preventable and treatable cause of morbidity and mortality in children below 5 years of age in India. In early 1990s, the mortality rate in SAM was as high as 49%, which was due to faulty case management and due to lack of trained staff and absence of prescriptive guidelines.^[13] There was a need to have standardized guidelines for management of SAM. Therefore, the WHO developed guidelines in year 1999 for improved in patient management of SAM, as “The WHO manual for management of severe malnutrition.” for physicians and other health workers. These were revised in year 2002. Considering high mortality rate among malnourished children in India, Indian academy of pediatrics undertook the task of developing guidelines for the management of SAM based on adaptation from WHO guidelines in the year 2006. If these guidelines (WHO) are carefully followed the mortality rate can be brought down to less than 5%, even in areas with a high prevalence of HIV/AIDS. Experience over the past decade indicates that the survival of malnourished children improves substantially if the WHO guidelines are followed

systematically. A halving of deaths, from 40% to 20% has been regularly reported when the guidelines are followed to a large extent (e.g. special feeds day and night, antibiotics, electrolytes, avoiding intravenous fluids except in shock, and not giving diuretics for edema). Mortality can be reduced to below 10%, when the guidelines are meticulously followed.^[14]

Successful implementation of the IAP protocol in hospital settings has been reported in studies from the international centre for diarrheal disease research, Bangladesh, showing reduction in case fatality rate from earlier 17% to 9% and subsequently to 3.9%. and, relief organizations in South-Africa had successfully used the guidelines to treat severe acute malnutrition in tents.^[15-17]

Both these studies showed improved quality of care and reduced case fatality rate with implementation of the WHO guidelines. India, unfortunately is lagging behind in achieving above mentioned parameters. Data regarding implementation of WHO guidelines in patients with severe acute malnutrition in India is scarce; therefore this study was conducted from October 2012 to December 2013 at Nutritional Rehabilitation Center (NRC), from a tertiary level teaching hospital and institute at Indore as an effort to assess the operational aspects, management and outcome of SAM patients using WHO guidelines.

MATERIAL AND METHODS

It was an observational study in which total of 200 children of SAM between 6 months to 5 years treated for complications of severe acute malnutrition using WHO protocol were enrolled and their course during hospitalization including complications and outcome were followed and recorded. The study group comprised of children 6 months to 5 years of age, having weight for height/length $<-3SD$ or $\leq 2 SD$ with mean upper arm circumference (MUAC) of less than 11.5 cm or bilateral pedal edema as per WHO's definition for SAM.

A detailed bio-data of the patients including name, age, sex, caste, address, religion, socio economic status was taken by oral questionnaire method. A thorough head to toe examination of the child especially assessing for nutritional status by weight-height-mid arm circumference-weight for age-height for age-weight for height, signs of micronutrients and macronutrients, signs suggestive of respiratory distress, dehydration, electrolyte imbalance, septic shock, congestive cardiac failure, infection, any organomegaly and associated co-morbidities was done.

Management of children with SAM

Upon arrival the patients were screened for hypoglycemia, hypothermia, or signs of dehydration or shock. Upon arrival blood glucose was tested by a glucometer and the temperature was measured by a low reading thermometer. Patient's hydration status in terms of examining skin turgor oral mucosa, pulse volume, blood pressure, urine output (on history) and sensorium was assessed. The patient's status of anemia was clinically assessed and signs of failure looked for in case of severe anemia (All patients were started on nutritional supplementation as soon as possible after arrival). All morbidities were managed according to WHO guidelines. All the patient were then started on tube feeding with starter formula, antibiotics, electrolytes and micronutrients (vitamin A, multivitamins, potassium, zinc, folic acid magnesium) were supplemented to all routinely as per the WHO guidelines. Regular eye and skin care were provided. Those with knuckle pigmentation and glossitis, stomatitis were taken as signs of vitamin B₁₂ deficiency clinically. Iron was started on day 7, when the patient was free of infection and has entered the catch up phase. The nutritional requirement of the patient was calculated on the basis of the presentation or rehydrated weight and continued in the same amount during the stabilization phase. The patients without edema were given tube feeding with F-75 formula. After 3-5 days of F-75 when appetite improves then shifted to F-100 gradually. Strict gavage technique of feeding was used; feed (F-75) was prepared in the nutritional rehabilitation center. Breast feeding was encouraged in between the feeds. Patients were weighed daily on the same weighing scale and provided sensory stimulation and tender loving care. The patients were watched for signs of recovery viz return of smile, appetite, they were entered the phase of transition and rehabilitation consecutively when fed high calorie and protein in the form of culturally acceptable food items. The mothers were educated about the importance of immunization, breast feeding and healthy weaning practices, maintenance of hygiene and prevention of infections, use of oral rehydration therapy, family planning, female literacy etc.

RESULTS

The majority of study group were female (45%) and males contributed to 55% of total. 72% of total children in 6-18 months age group contributed to malnutrition. All patients stayed for inpatient treatment were between 14 days. All the patients were kept in nutrition rehabilitation Centre and they were fed according to guidelines, play therapy was also encouraged during stay. In study, most of the children were immunized for age accounting

for 64.79% In this study, we studied that majority of patients have gained weight between 5-10 gm/kg/day, which indicates moderate weight gain. Mean weight gain was 8.5 gm/kg/day [Table 1]. In this study, 80% of patients who were admitted with morbidities were discharged after adequate weight gain and mother of children during hospital stay were sensitized and taught for preparing nutrition rich food at home. In our study, 2 patients expired out of 200 total patients studied. All these patients expired due to sepsis. Out of total 200 patients admitted in our study, 10 had septic shock out of which 2 expired [Table 2]. Among 2 patients who expired due to septic shock also had other morbidities like hypothermia hypoglycemia ,severe dehydration, hyponatremia, hypokalemia ,severe anemia and bronchopneumonia. Case fatality rate in our study was 1%. According to the WHO, a case fatality rate of more than 20% is considered to be unacceptable in the management of severe malnutrition, 11-20% is poor, and 5-10% is moderate, 1-4% is good and less than 1% is excellent. Accounting for sphere standards, management of severe malnutrition is effective when the case fatality rate is less than 10%. So in our study, the case fatality rate is 1% which shows effectiveness of WHO protocol. Following WHO guidelines is efficacious and cost effective in resource limited settings. Early discharge of patients is possible with limited complication and mortality.

Table 1: Showing weight gain pattern among admitted patients

Wt. gain	Wt. gain in gm/kg/day	No.	%
Good	>10	120	60
Moderate	5-10	40	20
Poor	<5	40	20

Table 2: Showing percentage of complications among children with SAM

Complication	No.	%
Hypoglycemia	20	10
Hypothermia	20	10
Some dehydration	20	10
Severe dehydration	20	10
Hyper natremia	16	8
Hyponatremia	18	9
Hypokalemia	16	8
Hyperkalemia	8	4
Septic shock	8	4
Abscess	2	1

DISCUSSION

Severe acute malnutrition (SAM) is preventable and treatable cause of childhood morbidity and mortality. For treatment of severe malnutrition, systematic guidelines required, thus this study indicates that following WHO guidelines, it has become easier to manage SAM in hospital settings, with least possible stay at hospital. children with malnutrition fulfilling criteria for SAM such as weight for height $<-3SD$, or weight for height $<-2SD$ with mid arm circumference <11.5 cm or bilateral pitting edema were admitted and acute complications were managed according to WHO guidelines, after stabilization gavage feeding started using starter formula F- 75, it was given till child's appetite improved, average duration for using F-75, was 3 days, and subsequently F-100 diet given for average 3 days, followed by high calories and protein diet. Patient's improvement status monitored by weight, appetite, activity and interest in surroundings. Average weight gain in our study was 8.5 gm/kg/day, and duration of stay in hospital was 14 days. Earlier before this guidelines patients had to stay for at least 6 weeks, but due to financial constraints it was not possible for parents to stay at hospital along with patients, but now it is possible to treat and discharge SAM patients using facility based guidelines, and after discharge continuing home based treatment using ready to use therapeutic food, so now it has become possible to convert severe malnutrition (wt/ht $<-3SD$) in to moderate malnutrition (wt/ht of 2SD to-3SD). In WHO protocol for management of severe acute malnutrition weight for age is not considered for management related decisions, this is so because weight for height and height for age reflect physiological parameter (wasting or stunting respectively), weight for age is composite calculation of both and does not reflect any physiological parameter. In this study those patients who were admitted as severe malnutrition became moderate malnourished.

CONCLUSION

In patient management of children of severe acute malnutrition with complications as per WHO's protocol leads to overall decrease in case fatality.

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