

Research Article

Management of children with severe acute malnutrition: experience of nutrition rehabilitation centre at Baroda, Gujarat

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ABSTRACT

Children with severe acute malnutrition, defined as weight for height <70% of reference median or bilateral pedal edema or midarm circumference <11 cm having complications were managed following the WHO guidelines, in the nutrition rehabilitation centre of medical college, Baroda. Total 60 children aged less than five years were admitted during October 2011 to September 2012. Of them majority were aged less than two years, & the predominant age presented was 6-12 months. Severe malnutrition is more among females. 86.65% & 5% study population formed by marasmus & kwashiorkor respectively. Most patients stayed for inpatients treatment between 16-20 days, mean duration of stay was 15.6 days. Reasons for bringing children to the hospital were associated major illnesses & complaint such as fever in 65% of patients, 40% had diarrhea. 96.6% had pallor, and associated co morbidities observed were bronchopneumonia followed by acute gastroenteritis. Observed complications of SAM in our study were hypoglycemia (5%), hypothermia (1.66%) some and severe dehydration were (18.33%) and (13.33%) respectively, hyponatremia (13.33%), hypokalemia (8.33%), hypernatremia (5%), hyperkalemia (1.66%), septic shock (11.6%), severe anemia (58.33%), congestive cardiac failure (28.5%). Majority of patients had weight for height between 61-70% on admission and between 71-80% on discharge. Average weight for height on admission was 68.5% and average weight for height on discharge was 77.2%. 29 % patients reached more than 90% weight for height. Mean weight gain was 9.3 gm/kg/day. 78.33% patients who were admitted were discharged, 8.33% absconded, 5% expired. Case fatality rate in our study was 5%.

Keywords: Child malnutrition, Severe acute malnutrition, WHO protocol, Facility based treatment

INTRODUCTION

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.¹ 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.² 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.³ 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.⁴ 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.⁵⁻⁷ Both 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 2011 to September 2012 at Nutritional Rehabilitation Center (NRC), SSG Hospital a tertiary level teaching hospital and institute at Vadodara as an effort to assess the operational aspects, management and outcome of SAM patients using WHO guidelines.

METHODS

It was an observational study in which total of 60 consecutive patients of SAM less than 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 less than 5 years of age, having weight for height/length <70% NCHS median or ≤ 3 SD, with visible wasting, or bipedal edema, with mid arm circumference <11 cm. Children with CNS disorder like tuberculous meningitis, static or chronic encephalopathy. Gastro-intestinal, renal, cardiac congenital defects, chronic medical disease - chronic renal failure, chronic hepatitis, a known case of HIV positive with clinical signs and symptoms were excluded.

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 protocol

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 when the patient was free of infection and has entered the catch up phase. Vitamin C and vitamin D deficiency was taken on the clinical and on radiological background.

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 130 ml/kg tube feeding with F-75 formula and with edema 100 ml/kg tube feeding given. 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 (75%) and males contributed to 25% of total. 76.4% of total children in 6-12 months age group contributed to malnutrition.

Table 1: Showing percentage of malnutrition.

Type of malnutrition	PEM grade	Number	Percentage
Mild/moderate malnutrition	I	0	0
	II	5	8.3%
Marasmus	III	31	51.6%
	IV	21	35%
Kwashiorkor		3	5%
Total		60	100

It can be seen from the table that majority of patients with SAM have marasmus (PEM Grade III or IV). Maximum patients stayed for inpatient treatment were between 16-20 day. All the patients were kept in nutrition rehabilitation Centre and they were fed according to guidelines, play therapy was also encouraged during stay. Mean duration of stay was 15.6 days in our study. In study, most of the children were immunized for age accounting for 43.33%.

Table 2: Showing weight gain pattern among admitted patients.

	Weight gain pattern	Number of patients	Percentage
Good weight gain	>10gm/kg/day	23	38.3%
Moderate weight gain	5-10gm/kg/day	24	40%
Poor weight gain	<5gm/kg/day	10	16.6%

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 9.3 gm/kg/day.

In this study, 78.33% 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, 3 patients expired out of 60 total patients studied. All these patients expired due to septic shock.

Out of total 60 patient admitted in our study, 7 had septic shock out of which 3 expired. Among 3 patients who expired due to septic shock also had other morbidities like hypothermia (1), hypoglycemia (1), severe dehydration (1), hyponatremia (1), hypokalemia (1), hyperkalemia (1), moderate anemia (2) and severe

anemia (1), bronchopneumonia (1). Case fatality rate in our study was 5% (Table 3).

Table 3: Showing percentage of complications among SAM patients.

Complication	Number	Percentage	Mortality*
Hypoglycemia	3	5	1
Hypothermia	1	1.66	1
Some dehydration	11	18.33	-
Severe dehydration	8	13.33	1
Hyponatremia	8	13.33	1
Hypernatremia	3	5	-
Hypokalemia	5	8.33	1
Hyperkalemia	1	1.66	
Septic shock	7	11.66	3
Abscess	2	3.33	-
Total	60	100	-

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 5% 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.

DISCUSSION

Severe acute malnutrition 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 <70%, severe wasting, bipedal edema, and mid arm circumference <11 cm, 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 9.3 gm/kg/day, and average duration of stay in hospital was 16 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 <70%) in to moderate malnutrition (wt/ht >80%). 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.

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Ethical approval: The study was approved by the institutional ethical committee

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