An Experience of Facility-based Management of Severe Acute Malnutrition in Children Aged Between 6-59 Months Adopting the World Health Organization Recommendations

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Objective: To study the output indicators of a nutritional rehabilitation center to assess its performance. **Methods**: Data of 182 children aged between 6-59 months with severe acute malnutrition in a nutritional rehabilitation center were analyzed retrospectively. Identification and treatment of severe acute malnutrition was done according to World Health Organization recommendations. **Results**: The recovery rate, death rate, defaulter rate, mean (SD) weight gain and mean (SD) duration of stay in the nutritional rehabilitation center were 68%, 2.2%, 4.4%, 13.0 (9.0) g/kg/d, 12.7 (6.8) days, respectively. **Conclusion**: Nutritional rehabilitation centers are effective in management of severe malnutrition.

Keywords: *Nutritional rehabilitation center, Output indicators, Protein energy malnutrition.*

United Nations Children's Fund (UNICEF) estimated malnutrition (45%) to be the most common cause of under-five mortality, with India and Nigeria accounting for more than one-third of the deaths [1]. In India, prevalence of severe malnutrition (SAM) is 6.4% in children below 5 years with 100 focus districts having high prevalence of malnutrition being situated in 6 states: Bihar, Jharkhand, Madhya Pradesh, Rajasthan, Orissa and Uttar Pradesh [2,3]. For proper utilization of funds and manpower, there is phase-wise implementation of nutritional rehabilitation centers (NRC) in these areas by UNICEF. It is important to identify the treatment outcome from these existing nutritional rehabilitation centers.

METHODS

The data of all the children with SAM admitted in the NRC were analyzed retrospectively in the Department of Pediatrics of MLN Medical College in Allahabad from January 2011 to December 2011. Children aged 6-59 months having SAM were admitted in the NRC if fulfilling the following criteria: (*a*) bilateral pitting edema and/or (*b*) weight-for-height < –3 SD and/or (*c*) mid-upper-arm circumference <115 mm.

All patients who were admitted in the NRC were treated according to the recommendations given by World health Organization (WHO) [4]. Appetite test was done by giving desired amount of therapeutic food (15 g for child weight ≤4 kg, 25 g for >4 Kg) to the child and looking for

its complete consumption in 2 hours. The patients were given F-75 diet in stabilization phase if they failed appetite test and/or had medical complications. After stabilization, when the appetite started improving and edema started decreasing, they were shifted to the transition phase in which F-100 was started without increasing the volume of feeds. Gradually, the volume of feeds was increased and the patients were shifted to rehabilitation phase with F-100 diet, therapeutic food and some home-based foods like *khichdi* (without salt), *dalia*, banana, and biscuits. Therapeutic food was prepared by mixing 1 kg roasted groundnut powder, 1200 g milk powder, 600 g coconut oil and 1120 g sugar. The patients were discharged when they fulfilled the discharge criteria [4] as per WHO guidelines: 15% weight gain from the day of admission and/or free of medical complication, and/or disappearance of edema; or on request subject to: good weight gain (>10 g/kg/d) for 3 consecutive days, being free of complications and the caregivers having been trained enough to give diet and supplements at home [2]. The patients were followed-up 2 weekly after discharge in the outdoor department of NRC for 4 times or until cured. The outcome and output indicators of NRC were determined after 4 follow-ups [5]. The study was approved by the Institutional Ethical and Research committee.

RESULTS

One hundred and eighty two patients with SAM were admitted in the NRC during the study period. The mean

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WHAT THIS STUDY ADDS?

• Nutritional rehabilitation center functions effectively to reduce the mortality and morbidity related to severe acute malnutrition.

(SD) age of patients was 17.8 (12.5) months; there were 96 males and 86 females. Edematous malnutrition was present in 31 (17%) patients. More than half (59.3%; n=108) were not breast fed and the rest were breastfeeding along with complementary foods at the time of admission. Edematous patients started losing edema at mean (SD) 3.2 (3.3) days. Non-edematous patients started gaining weight at mean (SD) 4.4 (3.9) days, and edematous patients started doing so at 11.4 (7) days. Twenty-six patients were discharged after fulfilling discharge criteria and 129 patients were discharged on request. Eighty-four patients out of 129 were cured during follow-ups. The outcome after 4 follow-ups was: 110 (60.4%) cured, 4 (2.2%) died, 4 (2.2%) not responded, 7 (3.3%) defaulted, 2 (1.1%) relapsed, 39 (21.4%) incomplete follow-up, and 16 (8%) medical transfers. Output indicators derived from these outcomes are given in *Table* I.

DISCUSSION

The study shows that output indicators were within the acceptable range (except for the cure rate) when children with SAM were managed in NRC. The primary failure was low as most of the patients also started gaining weight by day 4, edematous patients started losing edema by day 4 and were free of edema by day 10 [2].

The limitation of our study was that many patients were discharged on request for personal and social reasons. This led to high number incomplete follow-ups. The discharged patients were not seen by ASHA (Accredited social health activist) or ANM (auxilliary nurse midwife) which could have increased the follow-up.

Recovery rate in studies done by Teferi, *et al*. [5] and Hossain, *et al*. [6] was in the acceptable range (>75%) but in ours and in another recent study [7] it was below the acceptable range. This could be because of high number of defaulters along with less experience and teething problems of new NRCs. Most of the studies report average weight gain, average length of stay and death rate in the acceptable range [5-8]. The defaulter rate was low in our study as compared to study by Singh K, *et al*. [7]. This could be because we discharged many patients on request; many of them were cured during follow-ups, and were not included as defaulters. Some studies on home-based treatment reported higher relapse rate (6-11%) than ours because NRC staff conducted counseling sessions for care takers about nutrition and health of child [9].

We conclude that NRCs are effective in reducing mortality related to malnutrition. Patients can be discharged on request before the discharge criteria are met to decrease the defaulter rate. At the same time, NRCs should be attached with the community health schemes for proper management and follow-ups.

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TABLE I OUTPUT INDICATORS OF NRC

Output Indicators	Output
#Recovery rate (cured / total exits*)	68.8%
Death rate (deaths / total admissions	2.2%
Defaulter rate (defaulter / total exits)	4.4%
Weight gain (g/kg/day) Mean (SD)	13.0 (9.0)
Length of stay of exits (days) Mean (SD)	12 (6.8)

#*Recovery rate or cure rate was defined as total number of patients who achieved discharge criteria i.e. at least 15 % weight gain from the time of admission and/or free of edema for 10 days and /or were free of medical complications divided by total number of exits.*

exits includes- cured, non-responder, defaulter, relapse and incomplete follow-up and excludes death and medical transfers.

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