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Clinical profile and outcome of SAM cases in the Nutritional Rehabilitation Centre of the Department of Paediatrics, Gauhati Medical College Hospital, A Retrospective Study

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Abstract:
Background: *Malnutrition is common in pediatric age group and is responsible for high morbidity, mortality and serious long-term sequelae. A nutritional therapy along with rehabilitation is very Important aspect of its management. Nutritional rehabilitation centres (NRC) have been introduced in India to manage SAM*
Aims: *To assess the clinical profile of SAM in children aged in children and the evaluation of clinical outcome of the children admitted in NRC*
Methods: *A retrospective study based on the data of case records of the children aged 1 to 59 months admitted with SAM in the NRC, Department of Pediatrics, Gauhati Medical College Hospital. The children were admitted between 1st January 2019 to 31st July 2020 were included in the study.*
Results: *A total of 171 children were admitted during the study period of which majority were males (58.4%). 55% of the children presented during the first two years of life. Presenting symptoms were Fever (50%), Pneumonia (67%) and Diarrhoea (24%). Mean duration of stay was 11 days and 56.1% of children showed good weight gain after a period of 7-10 days of >10g/kg/day.*
Conclusion: *Hospital based management of SAM in the form of NRC go a long way in alleviating severe malnutrition. More work needs to be done the at the societal level to arrest SAM.*
Keywords: *Rehabilatation centres, Malnutrition, Weight gain, Immunisation.*

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I. Introduction

Malnutrition is common in pediatric age group and is responsible for high morbidity, mortality and serious long term sequelae. The prevalence of Severe Acute Malnutrition (SAM) in under 5 children in India is said to be 6.4%[1]. In the state of Assam, according to the fifth National Family Health Survey (NFHS-5, 2019-20)[2], 32,8% of children under the age of five (5) were underweight. Also, the same survey indicated that 9.1% children were severely wasted (Weight for Height), which however was an increase from 6.2% of the NFHS-4 (2015-16)[3] . These data indicate that malnutrition in severe form does exist in Assam and is a problem that requires intensive assessment and management. Moreover, malnourished children end up with complications such as pneumonia, diarrhoea and sepsis.

Lack of suitable food and purchasing power of the family along with traditional beliefs as to what the baby should eat, often lead to an insufficient balanced diet, resulting in malnutrition. In children, malnutrition is synonymous with growth failure. Malnourished children are shorter and weigh less than they should, for their age and height.

A nutritional therapy along with rehabilitation is very important aspect of its management. Nutritional rehabilitation centres (NRC) have been introduced in India to manage SAM. The first NRC in India was started in Madhya Pradesh in 2007 [4].It has led to uniform management of SAM children. Recovery rates vary across different children and different NRC's. In Bihar it was found to be 95% [6] whereas in Karnataka it was 81% [8]. There is a lack of data regarding the functioning of NRC in Assam in general and North Eastern states in particular.This study has been carried out to ascertain the outcome SAM children in the NRC of our set up, the effectiveness of NRC in treating SAM and to the timely initiation of complementary feed on nutritional status of children. The NRC in our setup has 10 beds, with staff consisting of a dietician, 4 sisters, 1 cook, 1 cleaner, and 1 care taker. We have a separate kitchen for NRC and a counselling room.

II. Aims & Objectives-

To assess the clinical profile of SAM in children aged in children aged 1 to 59 months in the NRC of a tertiary Hospital and evaluation of clinical outcome of the children admitted in NRC

III. Materials and Methods

A retrospective study was conducted based on the data of case records of the children admitted with SAM in the NRC, Department of Pediatrics, GMCH. The children admitted between 1st January 2019 to 31st July 2020 were included in the study, after due clearance from the Institutional Ethics Committee vide letter number MC/190/pt-II/Dec-2020/45

Inclusion criteria:

All children between 1 to 59 months who fulfilled the criteria of SAM by WHO [14] were included in the study.

Exclusion criteria:

Cases of SAM with severe sickness requiring ICU care are. excluded from the study.

Children upto the ages of 59 months who fulfilled the WHO [14] criteria of SAM were included in the study.

SAM is defined as the presence of any of of the following features (in the age group 6 months to 59 months)

1. Weight for height <-3SD
2. Mid upper arm circumference (MUAC) <11.5cm
3. Visible muscle wasting
4. Bipedal edema.

Children who visit the Out Patient Department for various complaints and are found to fulfill the above criteria are advised to attend the NRC.

Detailed history, physical examination and anthropometric measurements in the admitted children was collected from the available data. Anthropometric measurement was analyzed using WHO growth charts. The investigations done at the time of admission included complete blood count, serum electrolytes, blood C/S, urine C/S, CXR and Mantoux test (to rule out infection as a secondary cause of SAM).

The children are started on F-75 diet followed by F-100 which was prepared in the department's NRC kitchen. The parents were counselled regarding the diet and for active participation in the feeding of children. The data collected were entered and analyzed statistically as proportion and percentage.

IV. Results & Observations

A total of 171 children fulfilled the criteria for admission in the study. All of them had weight for height below -3SD. The number of males was 100 (58.4%) and females were 71 (41.6%).

Table 1: Age & Gender distribution

Age	Male	Female
<6 months	20	18
6mths -12mths	28	20
12mths -24mths	24	21
>24 mths	28	12
Total	100 (58.4%)	71 (41.6%)

The age distribution showed an even distribution across all age groups. However, children in the first two years of life comprised of majority of the cases, with the highest number being in the age group of six (6) months to twelve (12) months of life (n= 48, 29%).

Most of the patients were from rural areas, accounting for 120 children whereas urban areas accounted for the rest 51 children.

The study showed that majority of the children were from the BPL families (88%). Also, it was found that around 75% of the mothers were illiterate. Below poverty line being defined in Assam as families whose annual income is less than Rs27,000.

Table 2: Social indicators

Place of residence	Rural-120 (70.2%)

	Urban- 51(29.8%)
Socioeconomic status	BPL-150 (88%)
	APL-21 (12%)
Immunization status	Completed for age-11(6.4%)
	Incomplete- 160 (93.6%)
Exclusive breast feeding	Given- 104 (60.8%)
	Not given- 67 (39.2%)

The chief presenting complaints were fever, diarrhoea, cough and feeding problems.

Table 3: Presenting complaints

Diarrhoea	41(24%)
Pneumonia	115(67%)
Fever	87(50%)
Lethargy	108(63%)
Skin changes	27(15.7%)
Vomiting	50(29.2%)
Urinary tract infection	37(21.6%)

The total number of children who had died were 4 (2.3%) due to complications during the course of the study.

Table 4: Causes of Death

Cause of Death	Number (%)	Age (in months)
Sepsis	2	<6months
Severe Pneumonia	1	18months
Severe Dehydration	1	20months

The children were followed up after 1 week of discharge. Then they were asked to come after 15 days and 1-month intervals and followed up to 6 months of discharge.

Around 80% of the children fulfilled the MUAC (WHO) cut off of less than 11.5 cm.

Table 5: MUAC at admission

<11.5cm	N= 140(82%)
11.5cm-12.5cm	N= 31(18%)

Oedema was found in 70 children (41%). It disappeared in 40 children by Day 4 and in the rest, it disappeared after the fourth day.
The study of weight for height on admission showed that 79.5% (136) children had a Z score of ≤3 SD.
The analysis of duration of stay showed that most of the children, 53.2% were treated for a duration of 7-14 days.

Table 6: Duration of stay

Stay in days	No of cases
<7 days	47(27.5%)
7-14 days	91(53.2%)
>14 days	33(19.3%)

The present study showed that 56.1% of the children showed good weight gain, >10g/Kg/day. Poor weight gain was seen in 20.5% of the children i.e., <5g/Kg/day. The rest were in the moderate group.

Table7: Rate of weight gain

g/kg/day	No of cases
<5	35(20.5%)
5-10	40(23.4%)
>10	96(56.1%)

The quantitative indicators of the NRC in our institution are as follows. The recovery rate was 80%, death rate 2.3%, defaulter rate 14.9% and the mean duration of stay was 9.4 days.

V. Discussion:

Malnutrition in pediatric age group is widely prevalent in India. More than 57 million children suffer from moderate to severe malnutrition. More than 50% of deaths in the age group 0-4 years are associated with

malnutrition [15]. The median case fatality rate is around 23.5% in severe malnutrition, reaching up to 50% in edematous malnutrition [16]. For the management and rehabilitation of SAM children, NRC is an important centre. Here children can be managed in a scientific and structured manner. In our NRC, we have achieved good outcome in terms of recovery rate of 80% and death rate of <10% and weight gain of >10g/Kg/day.

The present study showed a male preponderance of 58.4% which commensurate with various studies such as Ashraf et al [5] (53.7%), and Tiwari AK et al (56.4%) [7]. 29% of the children were in the 6-12 months age group and 26% in the 12-24 months age group in this study. In the study by Tiwari AK et al 29% of the children were in the 6-12 months age group [7].

In the study by Tiwari AK et al 67% of the mothers were illiterate which was comparable to the present study, where 75% of the mothers were illiterate [7].

Only 6.4% children were fully immunised, whereas in Dhanalakshmi K et al 89 % children were fully immunised [9].

Majority of the children in Dhanalakshmi K et al presented with pneumonia (28.49%) and diarrhoea (35.75%) [9]. In this study the presenting complaints were pneumonia, 67%, diarrhoea, 24% and fever in 50%.

Duration of stay is one area where there is scope for improvement. The mean length of stay in Dhanalakshmi K et al was 8.45 days [8]. In this study the average length of stay was 9.4 days.

In the present study defaulter rate was 14.9 % which can be considered high, and 2.3% died, when compared with Tiwari AK et al where 3.4 % defaulted and 1.8% died [7]. Dhanalakshmi et al had a death rate of 6.52% and a defaulter rate of 12.09% [9].

Most of the children in this study showed good weight gain, 56.1%, which was the primary objective of the NRC. In other studies, such as Maurya et al the average weight gain was 13g/Kg/day [11], in Dhanalakshmi et al the average weight gain was 4.4g/kg/day [9].

VI. Conclusion:

The limitation in the present study was inadequate follow up, in the sense that parents didn't show up at the requisite intervals. It has been observed that hospital-based management of severe malnutrition in the form of NRC's go a long way in alleviating the symptoms in the children and lead to faster recovery and weight gain. However, a broader initiative is needed to influence a better outcome. Community health workers are to be made aware of malnutrition and their early detection and referral. Caregivers need to be provided counselling to address the reasons for poor nutrition and health of their child. There is a need to improve the results in terms of better weight gain and better follow up.

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Conflicts of Interest: None
Ethical Approval: The study was approved by Institutional Ethics Committee.

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