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Original Article

Effectiveness Of Nutritional Rehabilitation in Severe Acute Malnutrition Children Admitted to District Nutrition Rehabilitation Center

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ABSTRACT

Background: Malnutrition among under-five children is a major public health problem in India. Severe acute malnutrition is responsible for high morbidity and mortality, serious long term sequelae in children between 6 months to 59 months. Children with severe acute malnutrition require immediate attention along with proper nutritional rehabilitation not only to decrease mortality but also to achieve full potential after recovery. In addition to critical care, a nutritional therapy followed by nutritional rehabilitation is a very important aspect for these children.
Methods: A hospital based simple prospective observational study, was carried out among 75 SAM children during the period from January 2021 to January 2022, in District NRC, VIMS Ballari. SAM children were fed in appropriate composition and quantity as per Indian academy of paediatrics guidelines (initial and rehabilitation phase;F75, F100 and staple food). All children were assessed daily for weight gain, improvement in clinical status, feeding problem, compliance with the treatment and improvement in the appetite. The effectiveness of nutritional rehabilitation at NRC assessed according to criteria and documented. All the data statistically analysed.
Results: A total of 75 SAM children were included in the study over the duration of 13 months. Majority i.e., about 30.7% belonged to the age group of 24-35 months. About 53.3% of children were males, and 74.7% were from lower middle class. About 53.4% of children gained weight of average 5-10 g/kg/day. The mean duration of stay was 12.45 days with a standard deviation of around 4.21 days. After the completion of 4 follow-ups, all children had gained weights, which confirm the efficiency of the nutritional rehabilitation centre. Overall, the recovery rate was 90.6%, non-responders were 9.4%, 1child was defaulter in the program, 5 children had relapse and no mortality was noted.
Conclusion: The interventions provided in the NRC have effectively improved the nutritional status of admitted SAM children as observed by the significant average weight gain. The benefits of the intervention were not sustained following discharge due to increased drop-out rates, and lack of compliance.

Keywords: SAM, NRC, Malnutrition, Nutritional rehabilitation.

INTRODUCTION

Severe Acute Malnutrition (SAM) is the most extreme and visible form of under nutrition. NFHS-5/ 2015-16 survey in India, clearly shows that 35.5% of under 5 children are stunted, 32.1% are under weight, 19.3% are wasted and 7.7% are severely wasted.[1] WHO defines SAM (severe acute malnutrition) if the children between 6 months to 5years of age fulfilling any one of the following criteria .Weight for height/ length < -3 Z score, By the presence of bilateral pitting edema, Visible severe wasting, Mid upper arm circumference (MUAC) <11.5cm[2]. Nutritional rehabilitation centre (NRC) which is a unit in a district health facility where SAM children are admitted and provided medical and nutritional

therapeutic care as per SAM management guidelines by World Health Organization (WHO) and Indian academy of paediatrics.[3] Management of children having malnutrition in nutrition rehabilitation centres has given promising results and can reduce mortality by 55% (95% CI 0.32-0.62) compared with conventional treatment protocolled care with family involvement in a supervised manner could be the key to proper management of malnutrition.[4] In Karnataka despite 28 NRCs, the percentage of severely malnourished children has increased from 6% to 11%. Thus it is necessary to analyze the effects of NRCs in improving the health and nutritional status of children.[5]

AIMS AND OBJECTIVES OF THE STUDY:

1. To study the effectiveness of nutritional interventions done at District NRC, Ballari in improving the nutritional status of admitted children (6 months to 59months) with Severe Acute Malnutrition through the assessment of selected indicators for 2months.
2. To access the outcome of SAM children at NRC

MATERIALS AND METHODS

Source of data: Present study was conducted in District NRC Ballari.
Study period: After ethical clearance, study was started from January 2021 to January 2022.

Inclusion criteria:

All children between 6 to 59 months of age with Severe Acute Malnutrition (SAM) admitted at District Nutritional Rehabilitation Centre were included.

Exclusion criteria:

1. Secondary causes of severe acute malnutrition like cleft lip, cleft palate, GERD, pyloric stenosis and other surgical conditions, chronic renal failure, congenital heart diseases, liver disorders, asthma, mental retardation, cerebral palsy, suspected case of inborn errors of metabolism etc.
2. Children of less than 6 months of age
3. Children with history of NICU admission

Methods of collection of Data:

Study Design: prospective observational study
Sample size: 75 (based on mean number of cases admitted District NRC Ballari).
Sample size calculation: According to data obtained from the reports of Medical Record Department in District NRC Ballari.
Number of primary Severe Acute Malnutrition cases admitted in past year was 65.Keeping 10% as extra proportion to compensate the loss to follow up the sample size was estimated to be:

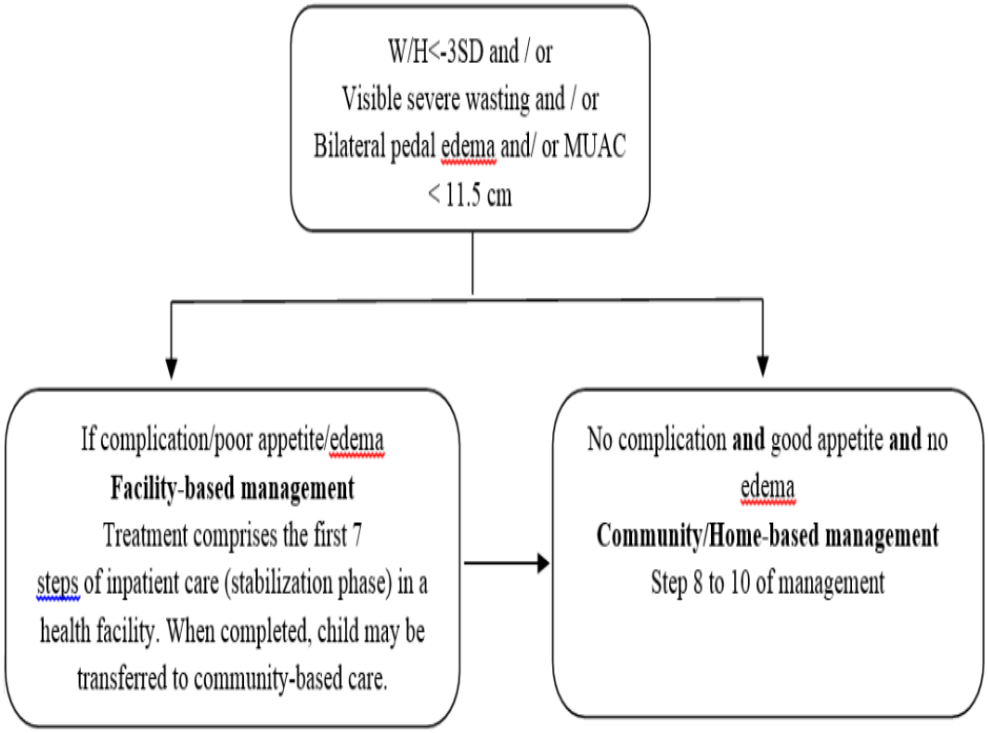
65+10% of 65
65+ 6.5 = 71.5

Finally the sample size was rounded up to 75 cases.
Study subjects: SAM children between 6 months to 59 months(after applying exclusion criteria) admitted in District Nutrition Rehabilitation centre, Ballari, Karnataka.
Duration of assessment of the subjects: 2 months (14days in NRC and with follow up visits at 7days, 14days and 1 month after discharge from NRC.

METHODALOGY:

This observational study was carried out in the District NRC Ballari. All SAM children between 6 months to 59 months after intial stabilization phase admitted in District NRC Ballari were included. WHO criteria is used to define Severe Acute Malnutrition, after taking written and informed consent from the parents, detailed history and systemic examination is done and the clinical signs of micronutrient deficiencies are assessed and noted.

WHO criteria is be used to define Severe Acute Malnutrition



For all the admitted children following laboratory tests were done

- Blood glucose
- Hemoglobin or packed cell volume in children with severe palmar pallor
- Serum electrolytes eg; (sodium, potassium, and calcium whenever possible)

For Screening for infections; Total and differential leukocyte count, blood culture, Urine routine examination, Urine culture, Chest x-ray, Mantoux test were done here and then required. Screening for HIV after counseling (only when suspected, based on history and clinical signs and symptoms).Other specific tests are done as and when required.

Appetite test:
Once the child was stabilized, child was subjected to appetite test feed .Based on the nutritional needs, the suggested method of testing of appetite is as follows: For children 7–12 months: Offer 30-35 ml/kg of Catch-up diet(F-100). If the child takes more than 25 ml/kg then the child should be considered to have good appetite.
For children >12 months: Feed prepared with locally food items may be offered. It is made sure that the child had not taken any food for the last 2 hrs and the child is not be forced to take the food offered. When the child has finished, the amount taken is judged or measured.

Amount of local therapeutic feed that a child with SAM should take to PASS the appetite test

Body weight (kg)	Weight in grams
Less than 4 kg	15 g or more
4–7 kg	25 g or more
7–10 kg	33 g or more

Rehabilitation:
Intiation of feeding: After intial stabilization phase, children were considered for rehabilitation phase in NRC. In this phase initially F75 diet was given to the child. After 3 to 4days when the child starts tolerating this feeding, then switched to more energy dense diet F100 along with supplements. In addition to F75 and F100 diet, child was given staple foods made with the locally available food items like mashed roti / rice/ bread mixed in thick dhal with added ghee/oil or khichri/pongal/sevian/dalia/kheer prepared in milk or any cereal porridge cooked in milk or mashed boiled/fried potatoes.

The required daily amount for each child was calculated using Catch-up diet Reference chart. During this period care takers were taught about importance of safe and hygienic diet that they could prepare at home with available means. Emotional

and physical stimulation was given,mothers and care givers were involved in all aspects of management of her child. Mothers were taught to prepare food, feed children, bathe and change; play with children, supervise play sessions and make toys. Mothers were educated about the importance of play and expression of her love as part of the emotional, physical and mental stimulation that the children need. Parent/caregivers were educated about the causes of malnutrition and how to prevent its recurrence by following correct breastfeeding and feeding practices (frequent feeding with energy and nutrient dense foods).The parents were informed regarding the follow-up visits made at 2 weeks in first month and then monthly thereafter until weight for height reaches -1 SD or above.

The effectiveness of nutritional rehabilitation at NRC, was assessed by following criteria.

Primary outcome criteria:

- Recovery: SAM children who have reached discharge criteria according to WHO guidelines14.

(Discharge criteria from NRC :38

Child

- Oedema has resolved.
- Child has achieved weight gain of > 15% of admission weight and has satisfactory weight gain for 3 consecutive days (>5 gm/kg/day).
- Child is eating an adequate amount of nutritious food that the mother can prepare at home.
- All infections and other medical complications have been treated.
- Child is provided with micronutrients.
- Immunization is updated.

Mother/caregiver

- Knows how to prepare appropriate foods and to feed the child
- Knows how to give prescribed medications, vitamins, folic acid and iron at home.
- Knows how to make appropriate toys and play with the child
- Knows how to give home treatment for diarrhoea, fever and acute respiratory infections and how to recognise the signs for which medical assistance must be sought
- Follow-up plan is discussed and understood.

Secondary outcome criteria:

- Relapse: a patient who has been discharged as cured from the programme within the last 2 months but is again eligible for admission to NRC.
- Defaulter child with SAM admitted to the ward but absent (from the ward) for three consecutive days without been discharged.
- Non- respondent.: This exit category includes those beneficiaries who fail to respond to the treatment.

Failure to Respond

Criteria	Approximate time after admission
Failure to regain appetite	Day 4
Failure to start to lose edema	Day 4
edema still present	Day 10

Failure to gain at least 5 g/kg/day for 3 successive days after feeding freely on Catch- up diet.

- Mortality.
- Adverse effects like associated with antibiotics, drug resistance,rapid weight gain/re feeding syndrome, micronutrient toxicity.

Follow up: Follow-up visits after discharge to NRC were made; 1st visit at 7 days, 2nd at 14 days, 3rd at 1 month and 4th at 2 months after discharge. All SAM children are followed up till he/she reaches weight-for-height of -1 SD.

The ANM posted at the nearest PHC or sub-centre was informed in order to ensure follow up. And were instructed such that All SAM children should be followed up by health providers in the program till s/he reaches weight-for-height of –1SD.

Statistical Analysis

The information collected regarding all the selected cases were recorded in a master chart. Continuous data was represented in terms of means and standard deviations. And the categorical data was represented in the form of frequencies and proportions. Graphical representation of the data was done using Microsoft Excel and Microsoft Word. Statistical Software SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse the data. Appropriate tests of significance

were used based on the type of data. p-value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

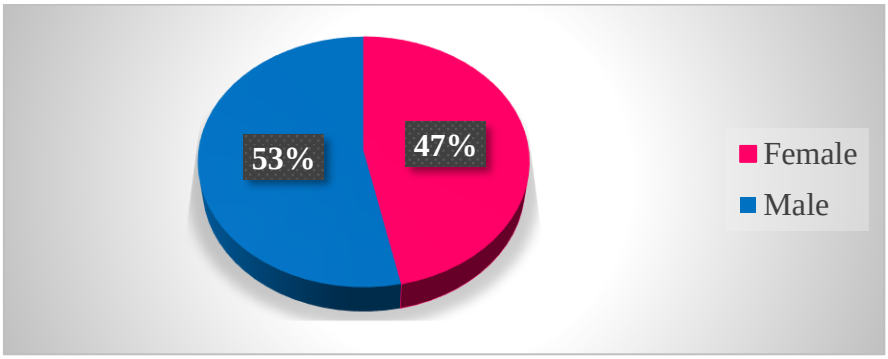
RESULTS

In our study, Among 75 children, majority (48.7%) of the children were between 1 to 3years of age, followed by 6-11 months (18%) and less than one fourth of the children were aged above 36 months.

Table 1: Age wise distribution of children

Age in categories	Frequency (N)	Percentage (%)
6 – 11 months	14	18.7
12 – 23 months	21	28.0
24 – 35 months	23	30.7
36 – 47 months	8	10.7
48 – 59 months	9	12.0
Total	**75**	**100.0%**

Fig 1: Distribution of children based on the gender



Majority of the participants in the study i.e., about 53.3% of children were males. Remaining 46.7% of children were females.

Table 2: Distribution of children based on the socio-economic status

Socio-Economic Status	Frequency (N)	Percentage (%)
Middle Class	2	2.7
Lower Middle Class	56	74.7
Lower Class	17	22.7
Total	**75**	**100.0%**

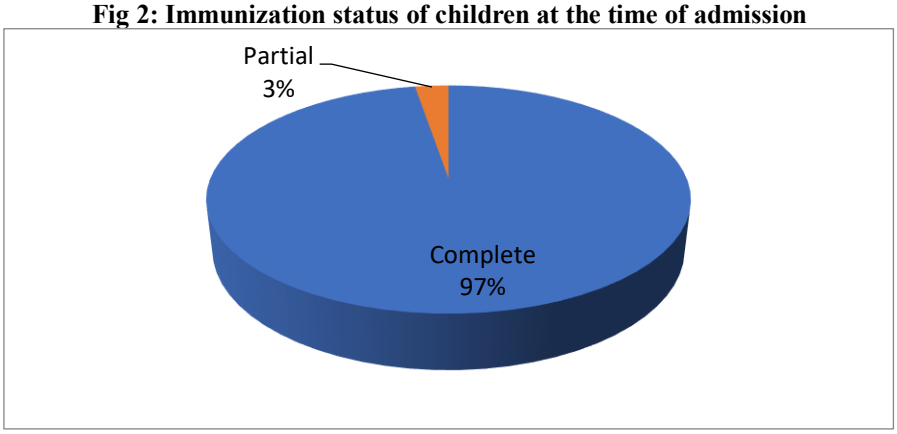
Modified BG Prasad classification was used in the study to assess the socio-economic status of family of the children. Accordingly, predominantly i.e., about 74.7% were from lower middle class. The next common socio-economic group were lower class which accounted for about 22.7%. Remaining 2 children in the study were from middle class.

Table 3: Nutritional assessment of children at the time of admission

Parameters		Frequency (N)	Percentage (%)
Mid Upper Arm Circumference	<11.5 cm	28	37.3
	≥11.5 cm	47	62.7
Weight for Length/Height	<-3SD	75	100.0
	>-3SD	0	0.0
Visible Severe Wasting	Present	25	33.3
	Absent	50	66.7
Bilateral Edema	Present	9	12.0
	Absent	66	88.0

The children in the study were examined at the time of admission and the nutritional status was assessed. On measuring the mid upper arm circumference, it was less than 11.5 cm in about 62.7% cases. All 75 children were falling less than 3SD in terms of weight for length/height. Moreover severe wasting was visible especially in 33.3% cases, while bilateral edema was present in 9 children.

Fig 2: Immunization status of children at the time of admission



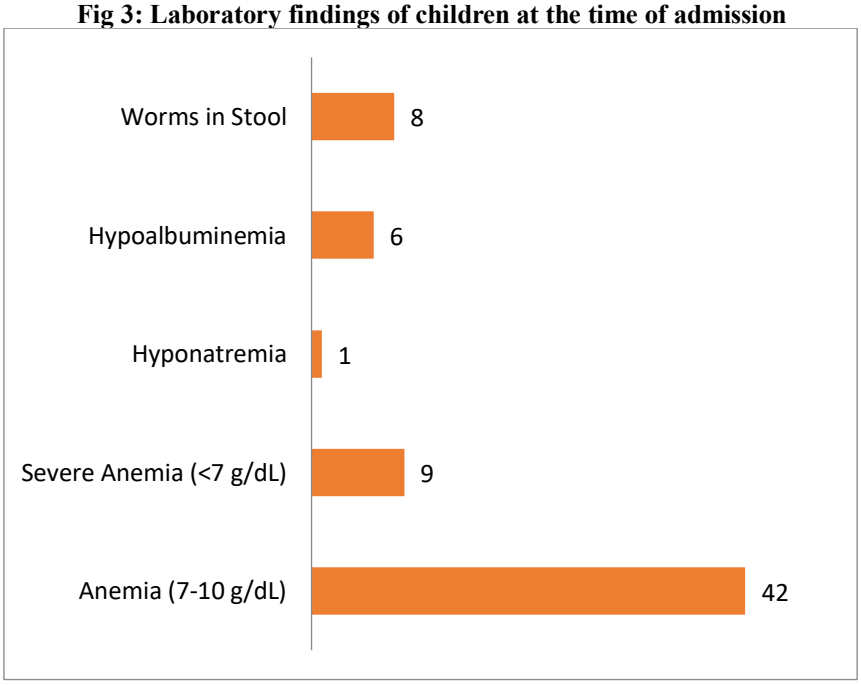
In majority cases i.e., about 97.3% of children had obtained the required immunization as per their age. However, only 2 children had missed the vaccines due to unavoidable circumstances, and the immunization status was found to be partial.

Table 4: Distribution of children based on the diagnosis during present admission at the hospital

Diagnosis	Frequency (N)	Percentage (%)
SAM with Pneumonia	20	26.7
SAM with Acute GE	18	24.0
SAM without complications	11	14.7
SAM with Severe Anemia	9	12.0
SAM with Viral Fever	6	8.0
SAM with Sepsis	5	6.7
SAM with CCF	4	5.3
SAM with Pulmonary TB	2	2.7
Total	**75**	**100.0%**

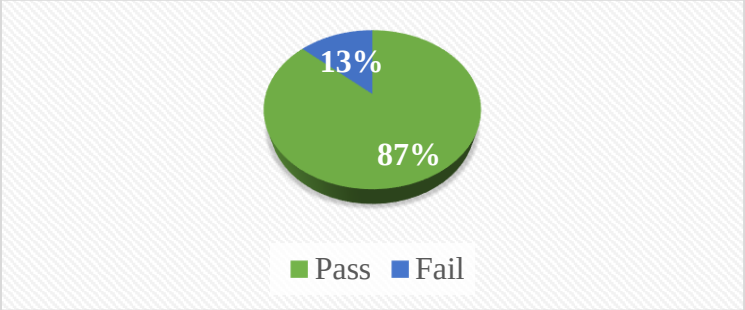
In the study, about 26.7% cases were associated with pneumonia. The next commonly associated condition was acute gastroenteritis. Among the remaining, 14.7% cases were diagnosed with just sever acute malnutrition without any complications.

Fig 3: Laboratory findings of children at the time of admission



Based on the findings from the laboratory examination, about 56.0% of children were anemic whose hemoglobin level was in the range of 7-10g/dL, while 9 other cases were found to be severely anemic as their hemoglobin level was less than 7g/dL. Hyponatremia was seen in 1 child, while hypoalbuminemia was observed in 6 cases. Also on examining the stools of the children, worms were present in 8 cases.

Fig 4: Distribution of children based on the results from the appetite test



In the study, all the children were subjected to appetite test to identify the occurrence of any medical complications which require hospitalization. Predominantly i.e., about 86.6% of children passed the test. However, irrespective of the test results, all the children were transferred to nutritional rehabilitation centre.

Table 5: Feeding of SAM children during the stay at nutritional rehabilitation centre

Diet Started on Day 1	Frequency (N)	Percentage (%)
F-75	31	41.3
F-100	33	44.0
Staple Food (Home based)	11	14.6
Total	**75**	**100.0%**

The diet was provided based on the condition of the children in the study. Accordingly, staple food was provided to only 14.6% of children, which was given for the duration of 14 days. Among the remaining, about 41.3% cases consumed F-75, while other 44.0% of children consumed F-100, and each were provided for the duration of 4 days.

Table 6: Average weight gain of children during the stay at nutritional rehabilitation centre

Average weight gain	Frequency (N)	Percentage (%)
<5 g/kg/day	5	6.6
5-10 g/kg/day	40	53.4
11-15 g/kg/day	22	29.4
16-20 g/kg/day	5	6.6
>20 g/kg/day	3	4.0
Total	**75**	**100.0%**

The weight of the children was measured periodically in the study with the anticipation of improvement from the baseline value. Most of the children i.e., about 53.4% gained weight of average 5-10 g/kg/day, while the average weight gain was around 11-15 g/kg/day in about 29.4% cases. Only 3 children in the study showed a lot of improvement with >20 g/kg/day average weight gain. On the contrary, 5 children failed in achieving the minimum level of 5 g/kg/day of average weight gain.

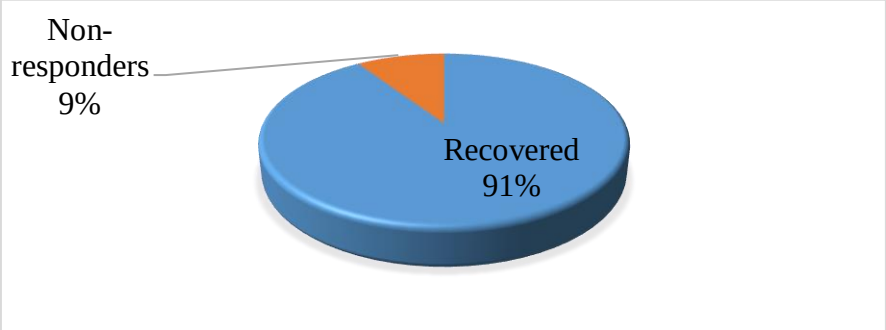
Table 7: Proportion of children achieved the criteria for discharge from nutritional rehabilitation centre

Parameters	Frequency (N)	Percentage (%)
Completed Antibiotic Treatment	75	100.0
Good Appetite	68	90.6
Micronutrients Supplemented	75	100.0
Satisfactory Weight Gain	70	93.3
Edema Resolved	74	98.7
Caretaker Sensitized	75	100.0
Immunization Up-to-date	75	100.0

Duration of stay at NRC: Mean = 12.45 days, SD = 4.21 days

The improvement in the child was assessed by observing few parameters on 14th day of stay at nutritional rehabilitation centre. Based on the criteria with these parameters, the children were discharged. Accordingly, all the children had completed antibiotic treatment. Also supplementation of micronutrients, sensitisation of caretaker, and up-to-date immunization were evident in all 75 children. However, appetite was found to be good in about 90.6% cases, and weight gain was satisfactory in about 93.3% cases, while edema was resolved in 98.7% cases.

Fig 5: Distribution of children based on the response to the treatment



Based on the proportion of the children achieving the criteria for discharge, the response to the treatment obtained during the stay at nutritional rehabilitation centre was estimated. Accordingly, about 90.6% of children responded well to the treatment. Whereas remaining 7 children did not respond to the treatment at the expected level as the appetite was poor in all of them. Also weight gain was not satisfactory in few cases, while edema was not resolved in 1 individual.

Table 8: Observations from the examination of the child during the follow-ups

Follow-Up		Frequency (N)	Percentage (%)
1st Follow-Up	Weight Gained	54	72.0
	No Weight Gain	6	8.0
	Not Available	15	20.0
2nd Follow-Up	Weight Gained	53	70.7
	No Weight Gain	5	6.6
	Not Available	17	22.7
3rd Follow-Up	Weight Gained	51	68.0
	No Weight Gain	2	2.6
	Not Available	22	29.4
4th Follow-Up	Weight Gained	50	66.7
	No Weight Gain	0	0.0
	Not Available	25	33.3

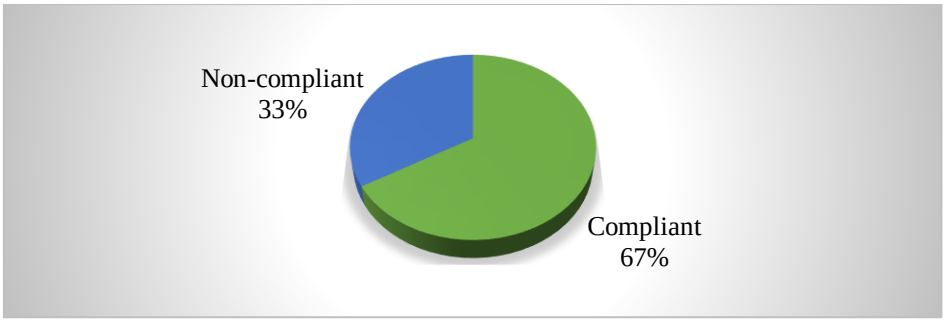
The follow-ups were done after discharging the child from the nutritional rehabilitation centre on 4 occasions i.e., 1st, 2nd, 4th and 8th weeks from the day of discharge. Accordingly, the number of participants who were not available for follow-ups although minimal in proportion got increased gradually in proportion. This was seen especially among the caretakers of those children who showed improvement, thereby depicting the clear negligence of the caretakers thereafter. Further on observing those who attended the follow-ups, majority of children showed the gain in their weights significantly. By the end of the 4th follow-up, all children had gained weights, which confirm the efficiency of the nutritional rehabilitation centre.

Table 9: Proportion of children achieving significant weight gain

Weight Gain	Frequency (N)	Percentage (%)
<1SD	40	80.0
≥1SD	10	20.0
Total	**50**	**100.0**

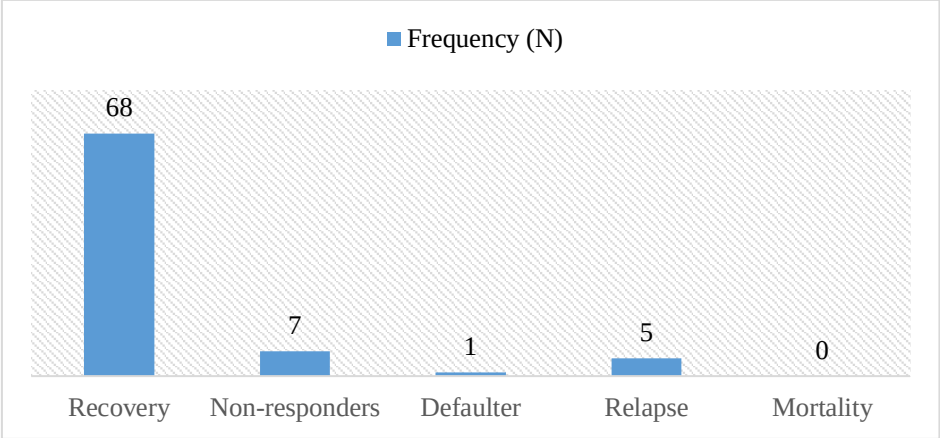
In the study, at the end of final follow-up i.e., on 8th week from the day of discharge from the nutritional rehabilitation centre, only 50 children were available for assessment of significant weight gain. Among them, 40 children achieved more than 1SD weight gain. However, remaining 10 children, although gained the weight to a satisfactory level, but did not cross 1SD.

Fig 6: Distribution of children based on the compliance of caretakers towards nutritional rehabilitation



In our study,At 8th week from the day of discharge from the nutritional rehabilitation centre, The compliance of caretakers towards nutritional rehabilitation was assessed, where 67% were compliant and 33% were non compliant.

Fig 7: Final outcome of SAM children in the study



The outcomes in SAM children admitted in our NRC were categorized as recovery, non-responder, defaulter, relapse and mortality. There was recovery rate of 90.6%, non-responders were 9.4%,one child was defaulter in the program, 5 children had relapse and no mortality was noted.

DISCUSSION

The present prospective observational study was conducted for a period of 13 months on around 75children between 6 and 59 months of age with Severe Acute Malnutrition (SAM), who got admitted at District Nutritional Rehabilitation Centre.
In our study, Among 75 children, majority (48.7%) of the children were between 1 to 3years of age, followed by 6-11 months (18%) and less than one fourth of the children were aged above 36 months. This resembles the study by Malhotra et al[6], where the majority belonged to the age group of 25-34 months.

In the study, majority i.e., about 53.3% of children were males. Remaining 46.7% of children were females. This sort of male predominance was evident in the studies such as Nagar RP et al[4] and Paul P et al[7], where it accounted for about 74.6% and 58.2% respectively. On the contrary, many studies such as Rastogi et al[8] and Hashmi G et al[9], females were present in majority with the proportion of about 51.7%, 59.8% and 52.5% respectively.

In our study, Majority i.e., about 74.7% were from lower middle class. This is completely contrast to the studies by Hashmi G et al[9], by Singh NP et al[10], where majority i.e., about 56.4% and 58.3% respectively were from lower class.
In our study, on measuring the mid upper arm circumference, it was less than 11.5 cm in about 62.7% cases. All 75 children were falling less than 3SD in terms of weight for length/height. This mimics the findings of the study by Rastogi et al[8] where the mid upper arm circumference was less than 11.5 cm in about 67.8% cases, and weight for height fell less than 3SD in about 85.7% cases. In the present study, severe wasting was visible especially in 33.3% cases, while bilateral edema was present in 9 children. Even in the study by Nagar RP et al[4], around 11 children had presented with edema.

In the study, majority cases i.e., about 97.3% of children had obtained the required immunization as per their age. However, only 2 children had missed the vaccines due to unavoidable circumstances, and the immunization status was found to be partial. This is quite better compared to the study by Dhanalakshmi K et al[11] where the immunization coverage was up to date in about 89.0% cases.

In the study, majority of children i.e., about 26.7% cases were associated with pneumonia. The next commonly associated condition was acute gastroenteritis. Among the remaining, 14.7% cases were diagnosed with just sever acute malnutrition

without any complications. Whereas in the study by Dhanalakshmi K et al[11], acute gastroenteritis was the most commonly associated complication which was appreciated in about 35.7% cases. The next common complication was pneumonia which accounted for 28.5%. In another study by Bhimani NR et al[12], dehydration was present in majority i.e., about 32.3% cases, followed by pneumonia which was seen in around 18.7% cases.

In our study, based on the findings from the laboratory examination, about 56.0% of children were anemic whose hemoglobin level was in the range of 7-10g/dL, while 9 other cases were found to be severely anemic as their hemoglobin level was less than 7g/dL. This can be compared with the findings from the study by Tiwari AK et al[13] where anemia was observed in about 53.0% cases, while severe anemia was reported in 24% of children. In another study by Mathur A et al[14], about 67.3% of children ad reported with severe anemia.

In our study, The diet was provided based on the condition of the children in the study. Accordingly, staple food was provided to only 14.6% of children, which was given for the duration of 14 days. Among the remaining, about 41.3% cases consumed F-75, while other 44.0% of children consumed F-100, and each were provided for the duration of 4 days. Many previous studies such as Bande BA et al[15], Dhanalakshmi K et al[11], and Rastogi et al[8] have focused on the same in detail. The weight of the children was measured daily in the morning with minimal clothing before feed. Majority i.e., about 53.4% of children gained weight of average 5-10 g/kg/day, while the average weight gain was around 11-15 g/kg/day in about 29.4% cases. Only 3 children in the study showed a lot of improvement with >20 g/kg/day average weight gain. On the contrary, 5 children failed in achieving the minimum level of 5 g/kg/day of average weight gain. As a whole, about 93.4% of children in the study had gained average weight of more than 5 g/kg/day. This is far better than most of previous studies such as Tiwari AK et al[13] and Dhanalaksmi K et al[11], where the proportion of children gaining more than 5 g/kg/day were 33.0% and 62.2% respectively. In a study by Shah et al[16], about 40.0% of children gained weight between 5 and 10 g/kg/day.

The improvement in the child was assessed by observing few parameters on 14th day of stay at nutritional rehabilitation centre. Accordingly, all the children had completed antibiotic treatment. Also supplementation of micronutrients, sensitisation of caretaker, and up-to-date immunization were evident in all 75 children. However, appetite was found to be good in about 90.6% cases, and weight gain was satisfactory in about 93.3% cases, while edema was resolved in 98.7% cases. The children in the study were discharged from the nutritional rehabilitation centre only after fulfilment of all the basic criteria. Thus, the duration of the stay differs in each individual. The mean duration of stay at NRC in the study was 12.45 days with a standard deviation of around 4.21 days. This is almost similar to the studies such as Rastogi et al[8], Singh NP et al[10] and Taneja et al[17], where the mean duration of stay at NRC was 12.01 days, 13.2 days and 13.81 days respectively. A study by Pagali D et al[18] found that mean duration of stay was quite longer with the period of 18 days. Whereas the mean duration was shorter in a study by Dhanalakshmi K et al[11], with the period of 8.45 days.

In this study, The follow-ups were done after discharging the child from the nutritional rehabilitation centre on 4 occasions i.e., 1st, 2nd, 4th and 8th weeks from the day of discharge. On observing those who attended the follow-ups, majority of children showed the gain in their weights significantly. By the end of the 4th follow-up, all children had gained weights, which confirm the efficiency of the nutritional rehabilitation centre. However, the number of participants who were not available for follow-ups although minimal in proportion got increased gradually in proportion. This was seen especially among the caretakers of those children who showed improvement, thereby depicting the clear negligence of the caretakers thereafter. This was even appreciated in a study by Ashraf et al[19], where only 69.0% of children successfully completed follow-up visits. In another study by Taneja et al[17], the proportion of dropout rates was 61.76% which makes it clear that the caretakers often get negligent in continuing the follow-ups once the condition of the children shows a little improvement. The important thing is that this sort of behaviour is the main reason the children have got malnourished in the first place.

In our study, at 8th week from the day of discharge from the nutritional rehabilitation centre, the compliance of caretakers towards nutritional rehabilitation was assessed, where 67% were compliant and 33% were non-compliant. In the studies such as Taneja et al[17] and Rastogi et al[8], have commented on the fact that the compliance of the caretakers could be affected mainly by the financial constraints as the amount spent on food was deducted from the compensation provided for the daily wage loss; also lack of provision of food to the accompanying children was an important issue raised by the mothers of the admitted children.

The outcomes in SAM children admitted in our NRC were categorized as recovery, non-responder, defaulter, relapse and mortality. There was recovery rate of 90.6%, non-responders were 9.4%, one child was defaulter in the program, 5 children had relapse and no mortality was noted. The present study has showed extraordinary recovery rate compared to the studies such as Dhanalakshmi K et al[11], Pagali D et al[18], Taneja et al[17], Gaboulaud et al[20] where the recovery rate was 81.0%, 71.0%, 53.0% and 52.7% respectively. In another study by Tiwari AK et al[13], the proportion of recovery and default was 62.0% and 4.0% respectively.

The results in our study may be attributed to the inherent geographical variation, life style of population, short duration of the study as well as the small sample size of the study. Short duration of study and follow-up as well as the sample size are the limitation of the study. Study could be done in large sample and long duration of follow up may get better results.

CONCLUSION

The interventions provided in the NRC have effectively improved the nutritional status of admitted SAM children as observed by the significant average weight gain. The outcomes in SAM children admitted in our NRC were categorized as recovery, non-responder, defaulter, relapse and mortality. There was recovery rate of 90.6%, non-responders were 9.4%, 1(1.33%) child was defaulter in the program, 5(6-6%) children had relapse and no mortality was noted. The benefits of the intervention were not sustained following discharge due to increased drop-out rates, and lack of compliance.

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