

Outcome of management of severe acute malnutrition at nutrition rehabilitation centre and follow up

Suguna S.

Associate Professor, Dept. of Paediatric, Chamarajanagar Institute of Medical Sciences, Chamarajanagar, Karnataka, India

***Corresponding Author:**

Email: sugunasmysore@gmail.com

Abstract

Objective: To know the sustained weight gain of severe acute malnutrition children during in patient care and during follow-up visits at nutrition rehabilitation centre and to assess the overall performance of Nutrition rehabilitation centre.

Material and Methods

Setting: Nutrition rehabilitation centre, District hospital, Chamarajanagar attached to Chamarajanagar Institute of Medical Sciences, Chamarajanagar

Design: This is a retrospective study involving the review of existing programme records.

Population: Those children who are admitted to NRC, district hospital Chamarajanagar, Karnataka, India, between January 2017 to January 2018 with severe acute malnutrition.

The programme included 2 weeks of in-patient care, and four follow-up visits to the NRC subsequently as follows ; 1st visit at 7 days, 2nd at 14 days, 3rd at 1 month and 4th at 2 months after discharge.

Result: Among total 61 admissions between January 2017 and January 2018, 57 children completed 14 days treatment (93.44%). 4 children were discharged against medical advice

and could not complete 14 days treatment and were taken as defaulters (6.55%).

57.8% children reached <-2SD and 21.06% children reached <-1SD at the time of discharge.

Those children who could achieve <-1SD during entire programme including follow up were 32(56%) among 57 admissions.

Conclusion: Satisfactory weight gain could not be achieved as per national programme requirement either during inpatient care or during follow up visits. There was sustained weight gain with cure of associated illnesses during NRC care satisfying discharge criteria. The follow up visits to NRC after discharge was satisfactory (>93%) till the target weight gain of <-1SD is achieved.

Keywords: Severe acute malnutrition (SAM), NRC (Nutrition rehabilitation centre), Anthropometric measurements, RBSK (Rashtriya Bal Swasthya Karyakram).

Introduction

In 2013, an estimated 2.9 million children under five were admitted globally for treatment of severe acute malnutrition (SAM). This figure represents significant progress when compared with just over 1 million reported during 2009 (UNICEF Nutrition Section 2013) yet is clearly insufficient when compared to the global burden of 17 million children affected by SAM (UNICEF, WHO, World Bank 2014). Children with SAM are nine times more likely to die than well-nourished children.¹

As per National Family Health Survey (NFHS)-4 (2015-16), In India, 38 percent of children under age five years are stunted (too short for their age). This is a sign of chronic undernutrition. Twenty-one percent of children under age five years are wasted (too thin for their height), which is a sign of acute undernutrition, while 36 percent of children under age five years are underweight. The prevalence of stunting and underweight has decreased since 2005-06, especially for stunting, which declined from 48 percent in 2005-06 to 38 percent in 2015-16. Over this same time period, the prevalence of wasting has remained about the same.²

Decision for home or outpatient and inpatient care depends on the facility available for management of

these children and the associated complications. There is growing evidence that SAM without complications does not require inpatient treatment and can be effectively managed at the community level. Children who are discharged early from inpatient care also may be managed at the community level. SAM children with medical complications should be admitted and managed in a health facility.³ (Fig. 1).

Nutritional rehabilitation Centre is the Facility Based unit made available in many Indian states with the advent of the National Rural Health Mission⁴ for the treatment of SAM children.⁵

Material and Methods

Design: This is a retrospective study involving the review of existing programme records.

Population: Those children who are admitted to NRC, district hospital Chamarajanagar, Karnataka, India, between January 2017 to January 2018 with Severe acute malnutrition. The NRCs has been operational for more than 5 years, Karnataka, India.

The study aimed to know the sustained weight gain of SAM children during NRC in patient care and during

follow-up visits and to assess the overall performance of NRC functioning in Chamarajanagar.

The operational guidelines of NRC setup were according to National Rural Health Mission/RCH-phase II.³

The NRCs consist of 10 bedded ward with a kitchen, toilet facility and demonstration room. Children aged

6 months to 5 years are referred to the NRC by RBSK, Anganwadi workers/ASHA workers, pediatricians, or approached by parents themselves in some cases.

The admission and discharge criteria are laid out in the national guidelines.³ NRCs function along the lines of the WHO and revised Indian Association of Paediatrics (IAP) protocols.⁶

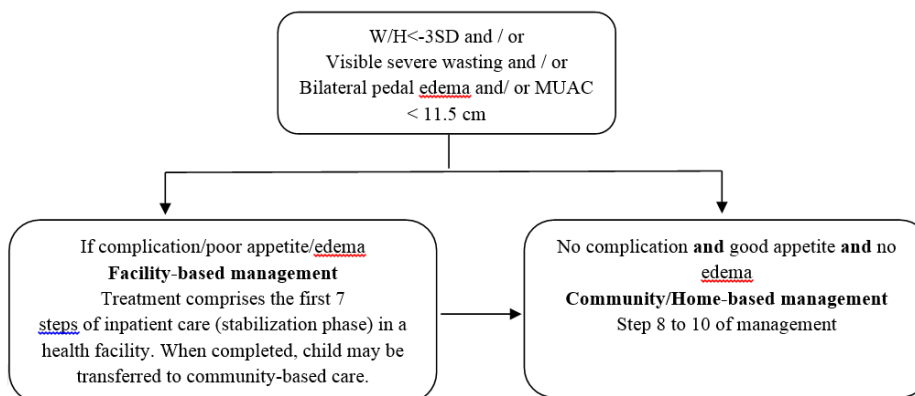


Fig. 1: Criteria for Facility-based care

Table 1: 10 Steps of routine care

1.	Treat/prevent hypoglycaemia
2.	Treat/prevent hypothermia
3.	Treat/prevent dehydration
4.	Correct imbalance of electrolytes
5.	Treat infections
6.	Correct deficiencies of micronutrient
7.	Start cautious feeding
8.	Rebuild wasted tissues (catch-up growth)
9.	Provide loving care and play
10.	Prepare for follow-up

Admission criteria³

Severe acute malnutrition (SAM) among children aged 6–59 months with

1. Weight-for-height/length Z-score (WHZ) < -3 (Z-score in standard deviations [SDs] reflects the deviation from the median of World Health Organization [WHO] child growth standards)
2. Mid-upper arm circumference (MUAC) < 115 mm or
3. Presence of nutritional oedema.

Indicators³:

1. 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.
2. Defaulter: number of beneficiaries that defaulted during the reporting period divided by the total exits. Defaulter will be a child with SAM admitted to the ward but absent (from the ward) for three consecutive days without been discharged.
3. Non-respondent: this exit category includes those beneficiaries who fail to respond to the treatment.

4. Referral By- RBSK/Asha worker/pediatric OPD/self.

5. Weight gain achieved target weight (15% weight gain)

6. Referral to higher center

7. Case fatality rate

Performance of NRC may be assessed based on the criteria described below (Table 2).

Table 2: Quantitative Indicators

	Acceptable	Alarming
Recovery rate	>75%	50%
Death rate	<10%	>15%
Defaulter rate	<15%	>25%
Weight gain	>8g/kg/day	<8g/kg/day
Length of stay	<4 wks	>6 wks

Guidance for calculation of indicators³:

Weight Gain (g/kg/d)

Weight gain = {discharge weight in gms – minimum weight in gms} / {minimum weight in kg x number of

days between date of minimum weight and discharge day}

All SAM children should be followed up by health providers in the program till s/he reaches weight-for-height of – 1SD.

Therapeutic diet is made of locally available food for a minimum of 14 days and accompanied by the mother / the primary care giver.

Initial feeding begins with F-75 with 75 kcal and 0.9g protein per 100ml. when child is stabilized (usually after 2-7 days) Catch up diet (F-100) with 100 kcal and 2.9 g proteins per 100 ml is given.

Vitamin A is given to all severely malnourished children on Day 1. Timing and oral dosage of Vitamin A includes - < 6 months, 50 000 IU; 6-12 months or if weight <8Kg, 100000 IU; > 12 months, 200000 IU³.

Weight, height and MUAC, are monitored using standard techniques guidelines. Mother / primary care giver is counseled and educated on the composition and preparation of therapeutic diets.

Children are discharged according to the criteria given below (Table 3)

Table 3: Prepare for discharge and follow up after recovery³

Criteria for discharge from inpatient care	
Child	<ol style="list-style-type: none"> 1. Edema has resolved 2. Achieved weight gain of $\geq 15\%$ and has satisfactory weight gain for 3 consecutive days (>5 gm/kg/day) 3. Child eating an adequate amount of nutritious food that the mother can prepare at home 4. All infections and other medical complications have been treated 5. Child is provided with micronutrients 6. Immunization is updated
Mother/caregiver	<p>Knows how to prepare appropriate foods and to feed the child</p> <p>Knows how to make appropriate toys and play with the child</p> <p>Knows how to give home treatment for diarrhea, fever and acute respiratory infections, and how to recognize the signs that/he must seek medical assistance</p> <p>Follow-up plan is completed</p>

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

Data variables, sources and definitions

The data are collected from NRC admission registers maintained at Medical record section, district hospital, chamarajanagar. The follow up records are collected from follow up registers maintained at NRC.

Results

Among total 61 admissions between January 2017 and January 2018, 57 children completed 14 days treatment(93.44%). 4 children were discharged against medical advice and could not complete 14 days treatment and were taken as defaulters(6.55%). There were no referral to higher centre and no deaths during the above said period.

Data analysis

Data is analysed done by SPSS version 16. Descriptive statistics and chi-square test for independence used for statistics.

The mean weight at the time of admission was 7.46 kg, and standard deviation of 1.53; minimum weight of 4.5 kg and maximum weight of 11.5 kg.

At the time of discharge there was increase in the mean weight of 7.92kg and standard deviation of 1.57; minimum weight of 5.05 kg and maximum 12.65kgs.

Mean age of admission was 23.3 months with minimum of 10 months and maximum of 54 months.

Females were 30 and males 27 among 57 cases. There was no statistical significant association with sex ratio either in number of admissions or in severity of malnutrition ($p=0.451$) (Table 4).

The mean mid arm circumference was 11.74 with standard deviation of 0.613.

Majority of children were identified at pediatric OPD (41%), 5% from RBSK, 8% from Asha /AWW and 12% were approached by parents themselves.

At the time of admission, majority of children were <-3 SD (61.4%) weight for height (WFH), <-2 SD were 29.8%, 7% were <-4 SD and 1 child was <-1 SD (1.8%) with severe loss of appetite and associated anaemia (Table 5).

WFH at the time of discharge were, children with <-3 SD were 19.3%, <-4 SD were 1.8%; 57.9% children

reached $<-2SD$ and 21.1% children reached $<-1SD$ (Table 6).

5 (8.7%) among 57 children could gain weight of >8 gram/kg/day in 14 days NRC care; as per quantitative indicator of satisfactory weight gain (Table 2).

25 among 57 children (43.9%) could sustain weight gain of >5 grams/kg/day as per one of the discharge criteria (Table 3). 13 were females and 12 were males (Fig. 2). Chi-square test for independence showed no association between sex of child and gaining weight ($p=0.933$) (Table 7).

Those children who could achieve $<-1SD$ during entire programme including follow up were 32(56%) among 57 admissions. 12 children (21%) reached $<-1SD$ at the time of discharge, 7(12%) at the time of first follow up visit(7th day), 3(5%) at second follow up visit(14th day) , 6(11 %)at third follow up visit(1month), 2(3%) children at 2nd month and 2(4%) children one month later (Fig. 3).

Associated factors at the time of admission were, Anemia in 41children (71.9%), anorexia in 13 children, infection in 6 children, 3 with RTI and 3 with enteric fever. Vitamin A deficiency noted in 2 children and nutritional dermatitis in 2 children.

Discussion

There was no statistically significant gender difference either in completion of facility care or

sustained weight gain and follow ups as it is important to know the gender discrimination in the society.

Only 1 child had successfully been discharged with weight gain of $>15\%$ (1.75%) at the time of discharge as compared to similar study by Singh, K et al where 46.8% children were discharged after recovery (weight gain $>15\%$).⁷ 56% of children could achieve weight gain of WFH $<-1SD$ at 4 follow ups (Fig. 3) as compared to 314 (77%) in study done by Kumar B et al.⁸

Participation of community health workers (Asha/AWW) was not satisfactory either in identifying and admitting SAM children to NRC or in follow up of discharged children at community level. Referral from RBSK was also not satisfactory.⁹ Good thing was excellent paediatricians' effort in identifying, admitting and management of SAM during facility care at NRC.

The lack of satisfactory weight gain of $>15\%$ and >5 grams/kg/day at the time of discharge from NRC can be attributed to lack of adequate counselling and involvement of mother in SAM food preparation and also monitoring the feeding of the children adequately by dietician / staff nurse. Purely milk based (F-75 and F-100) formula can also be considered for no satisfactory weight gain.¹⁰ Other factors can be associated infections, anemia and lack of commitment by the mother in understanding and following the instructions given by NRC staffs.

Table 4: Chi-Square Test

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.636 ^a	3	P=0.451
Likelihood Ratio	3.064	3	.382
Linear-by-Linear Association	.229	1	.633
N of Valid Cases	57		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .47.

Table 5: SD for WFH at the time of admission

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-4	4	7.0	7.0	7.0
	-3	35	61.4	61.4	68.4
	-2	17	29.8	29.8	98.2
	-1	1	1.8	1.8	100.0
Total		57	100.0	100.0	

Table 6: SD for WFH at the time of discharge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-4	1	1.8	1.8	1.8
	-3	11	19.3	19.3	21.1
	-2	33	57.9	57.9	78.9
	-1	12	21.1	21.1	100.0
Total		57	100.0	100.0	

*Chi-square test for independence

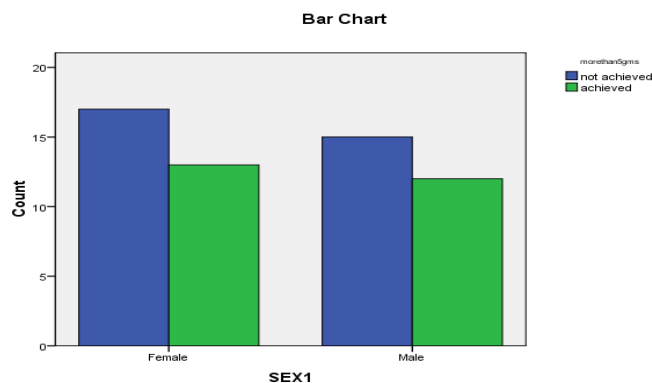


Fig. 2: Sex ratio gaining >5gms/kg/day

Hypothesis: There is no association between sex of child and gaining weight.

Table 7: Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.011	.933
N of Valid Cases		57	

Using chi-square test for independence test we get p value as 0.933 at 1% level of significance we do not reject hypothesis and we conclude that there is no association between sex and weight gain.

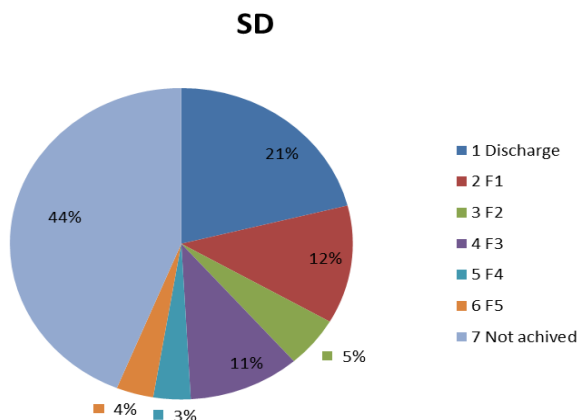


Fig. 3: Children achieved weight gain of <-1SD

Conclusion

In-patient care at NRC was effective in improvement in medical illnesses and management of general health but satisfactory weight gain at NRC could not be achieved as per national programme requirement either during inpatient care or during follow up visits.

The programmatic issues that have to be improved include better referral by health care workers and RBSK, involvement of mother in preparing food and proper counselling, monitoring of feeding of children at each scheduled feed by dietician/NRC staffs and proper integration of community and facility based management.

Complete cure of associated medical illnesses at NRC with sustained weight gain, children reaching <-1SD during facilitation care as well as during follow up

visits in 56% of children and good adherence to the follow up up to 2 months and beyond in >93% of children were positive factors contributing to the success of the programme.

Limitations of the study

The study did not segregate SAM children into those with or without medical complications and only anthropometric measurements were considered. The study involved the review of existing hospital records, the complete reliability of which is questionable.

Funding: No funding sources.

Conflict of interest: None declared.

References

1. Management of severe acute malnutrition in children: Working towards results at scale; https://www.unicef.org/eapro/UNICEF_program_guidance_on_management_of_SAM_2015.pdf
2. NFHS-4 - National Family Health Survey; http://rchiips.org/nfhs/factsheet_NFHS-4.shtml
3. Operational Guidelines on Facility Based Management of Children with Severe Acute Malnutrition, Ministry of Health and Family Welfare Government of India, 2011. <http://rajsvasthya.nic.in/MTC%20Guideline-%20MOHFW>
4. Ministry of Health and Family Welfare. National Rural Health Mission—meeting people's health needs in partnership with states: the journey so far, 2005–2010. New Delhi, India: Ministry of Health and Family Welfare 2010. http://mohfw.nic.in/NRHM/Documents/5_Years_NRHM_Final.pdf Accessed November 2013.

5. Ministry of Health and Family Welfare, Government of India. Operational guidelines on facility-based management of children with severe acute malnutrition. New Delhi, India: Government of India; 2011. <http://rajswasthya.nic.in/MTC%20Guideline-%20MOHFW.pdf> Accessed November 2013.
6. Bhatnagar S, Lodha R, Choudhury P, et al. IAP guidelines 2006 on hospital based management of severely malnourished children (adapted from the WHO Guidelines) *Indian Pediatr* 2007;44:443–61.
7. Singh K1, Badgaiyan N, Ranjan A, Dixit HO, Kaushik A, Kushwaha KP, Aguayo VM. *Indian Pediatr* 2014;51(1):21-5. Epub 2013 Jul 5. Management of children with severe acute malnutrition: experience of Nutrition Rehabilitation Centres in Uttar Pradesh, India.
8. Kumar B1, Shrivastava J2, Satyanarayana S3, Reid AJ4, Ali E4, Zodpey S1, Agnani M5. How effective is the integration of facility and community-based management of severe acute malnutrition in India? *Public Health Action* 2013;3(4):265-70. doi: 10.5588/pha.13.0058.
9. Tekeste A, Wondafrash M, Azene G, Deribe K. Cost-effectiveness of community-based and in-patient therapeutic feeding programs to treat severe acute malnutrition in Ethiopia. *Cost Eff Resour Alloc* 2012;10:4.
10. Taneja G, Dixit S, Khatri A, Yesikar V, Raghunath D, Chourasiya S. A study to evaluate the effect of nutritional intervention measures on admitted children in selected nutrition rehabilitation centers of Indore and Ujjain divisions of the State of Madhya Pradesh (India). *Indian J Community Med* 2012;37:107–15.

How to cite the article: S. Suguna. Outcome of management of severe acute malnutrition at nutrition rehabilitation centre and follow up. *IP Int J Med Paediatr Oncol* 2018;4(3):104-109.