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An experience of facility based management at one of the malnutrition treatment centre in district Baran of Rajasthan, India

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ABSTRACT

Background: To assess performance of one of the Malnutrition Treatment Centre (MTC) in district Baran of Rajasthan. India.

Methods: An observational prospective study was conducted at MTC where 132 Severe Acute Malnutrition (SAM) children were recruited. Their socio-demographic details and anthropometric measurements were recorded. These SAM children were followed till the period of 4 follow-up visits to measure their weight. MTC performance indicators were assessed.

Results: Majority of SAM children belong to age group less than 2 years, gender female, caste OBC (Other Backward Class), SC (Scheduled Caste) and ST (Scheduled Tribe). ASHAs (Accredited Social Health Activists) are playing key role in referring them to MTC. Death rate was 0%, cure (recovery) rate 42.4%, defaulter rate 25.8%, mean length of stay (days) at MTC was 8.04 and mean weight gain was 5.926 g/kg/day. Performance indicators are significantly affected by length of stay at MTC. Follow-up rate was poor with no significant weight gain observed after discharge.

Conclusions: MTCs are effective in saving lives of SAM children but not in maintaining long term control on malnutrition.

Keywords: Malnutrition treatment centre, Severe acute malnutrition, Weight gain, Mid upper arm circumference

INTRODUCTION

As per UNICEF (United Nations International Children's Emergency Fund) data, nearly half of all deaths in children under 5 are attributable to under-nutrition. This translates into the loss of about 3 million young lives a year. Under-nutrition puts children at greater risk of dying from common infections and contributes to delayed recovery. Poor nutrition in the first 1000 days of a child's life can also lead to stunted growth, which is irreversible and associated with impaired cognitive ability and reduced school and work performance. ¹

Malnutrition continues to be a significant health problem for children in India. Though there has been decline in the percentage of children who are underweight from 42.5% in NFHS-3 (National Family Health Survey) to 35.7% in NFHS-4, the magnitude of malnutrition is still high.²

Severe acute malnutrition (SAM) is defined by very low weight-for-height/length (Z- score below -3SD of the median of World Health Organization child growth standards), a mid-upper arm circumference <115 mm, or by the presence of nutritional edema. SAM increases significantly the risk of death in children less than five

years of age. It is proven by the NFHS data and confirmed by Ministry of Health and Family Welfare, GOI (Government of India) and also after the assessment of the Rajasthan data that the problem of children with SAM is mostly in deprived populations like scheduled tribes, primitive tribes and in scheduled caste communities, children under 2 years and in girl children.

In Rajasthan, a total of 88 malnutrition treatment centres (MTCs) were fully operational and 59 were in the process of operationalisation in the year 2014-15.³ Current study was conducted at one of MTCs in district Baran to know its efficacy in terms of reducing morbidity and mortality of SAM children in the community.

METHODS

Observational prospective study was conducted at MTC Anta, District Baran, Rajasthan, India. Recruitment of children in the study was done from March 2014 up to September 2015, a period of around one and half year. During this period, all children admitted in MTC Anta were included in the study. 'Operational guidelines for facility based management of children with severe acute malnutrition (SAM), Ministry of Health and Family welfare, Government of India, 2011 were being followed at this centre.⁴ Children included in the study were followed up for 2 months after discharge from the centre. There were 4 follow ups fortnightly. On the day of follow up the child was expected to revisit the centre. Hence, along with the recruitment process in the current study, follow-up was started simultaneously from mid-March 2014 considering minimum stay of one day. Thus, including follow-up period, total study period was from March 2014 to November 2015.

Before commencement of the study, ethical approval was obtained from the Institutional Ethics Committee. Informed consent was obtained from either mother or guardian of each child recruited in the study.

Predesigned structured proforma was used for data collection. Basic details of children like age in months, gender, caste and referred by who were entered in the proforma. Weight of child was noted which is regularly checked on digital weighing machine at MTC. Weight at the time of admission and discharge were recorded from the MTC registers. Total weight gain was calculated to see if it was in accordance with the available guidelines.⁴ Average acceptable stay should be 7-28 days as per operational guidelines. Outcome for each child was assessed in the form of cured, referred, non-responders or defaulters. Children who achieved target weight gain were labeled as 'Cured' and those who could not achieve it were 'non-responders'. Some children had to be referred to higher centre because of medical complications. While some who did not stay in MTC for adequate duration were 'defaulters'.

A total of 132 children were recruited in the current study. Not all children turned up for total 4 follow up visits. On each follow up, weight of the child was recorded.

Mid upper arm circumference (MUAC) is also recorded at this MTC. MUAC and weight for age are two of the various methods used for nutritional assessment. As both measures were available in the current study for each child, categorization of malnutrition by both methods was compared.

The data were entered into Microsoft excel spreadsheet and analyzed using SPSS version 20. For qualitative data, Pearson's Chi-square test was applied to test the relationship of categorized independent and dependent variables. For quantitative data, mean, standard deviation and standard error were calculated. Student t test was applied to assess level of significance between mean weight at discharge and mean weight at each follow up. Pearson's correlation coefficient (r) was calculated to find out correlation between Stay at MTC and total weight gain. A p value (significance) of <0.05 is deemed statistically significant, <0.01 as highly significant and <0.0001 as very highly significant.

RESULTS

Total 132 SAM children were enrolled during study period. Particulars of these children including sociodemographic profile are shown in Table 1.

From Table 1, it can be noted that majority of SAM children belong to age group less than 2 years, gender female, caste OBC, SC and ST. Sahariya tribe comes under ST. It was recorded separately in this study, as the Sahariyas living in Baran district came to national attention in 2002 because of several hunger deaths in the community followed by deaths in 2004 and 2009.⁵

One of the notable observations in this study was that maximum (62%) children were referred by ASHA. To know the efficacy of MTC, few categories were compared in study population (Table 2).

Cured children are those who have reached discharge criteria within the stay at MTC. Discharge criterion for children is 15% weight gain and no signs of illness. As per operational guidelines, acceptable MTC performance indicators include average weight gain of minimum 8 gm/kg/day. Based on these facts, target weight was recorded for each child at MTC. Table 2 shows that only 42% SAM children achieved target weight, but simultaneously it was observed that 47% SAM children did not stay at MTC for adequate duration. Same observation was replicated in the outcome. Strikingly, among 62 SAM children who did not stay for adequate duration, 40 children stayed at MTC for just one day.

To summarize output indicators, the most appreciable output was death rate 0%. Cure (recovery) rate was 42.4%, defaulter rate 25.8%, mean length of stay (days) at MTC was 8.04 and mean weight gain was 5.926 g/kg/day.

When degree of correlation between stay at MTC and

total weight gain was measured by Pearson's correlation coefficient (r), it was very highly significant as shown in Table 3.

Impact of Stay at MTC was also observed on Outcome of SAM children by applying Pearson's χ^2 test as shown in Table 4

Table 1: Preliminary details of children with severe acute malnutrition at malnutrition treatment centre anta, district Baran, Rajasthan, India.

Vowighles	Catagoria	Distribution	Distribution		
Variables	Categories	Number	Percentage (%)		
Age groups	Birth- 12 months	48	36.4		
	13 months- 24 months	68	51.5		
	25 months- 36 months	12	9.1		
	37 months- 48 months	3	2.3		
	49 months- 60 months	1	0.8		
Condon	Female	88	66.7		
Gender	Male	44	33.3		
	General	2	1.5		
	Other backward class (OBC)	61	46.2		
Caste	Sahariya tribe	7	5.3		
	Scheduled caste (SC)	52	39.4		
	Scheduled tribe (ST)- excluding sahariyas	10	7.6		
	ANM (auxillary nurse midwife)	5	3.8		
	ASHA (accredited social health activist)	82	62.1		
Defended by	Anganwadi supervisor	1	0.8		
Referred by	AWW (anganwadi worker)	12	9.1		
	CHC (community health centre)	30	22.7		
	Self	2	1.5		

Table 2: Performance of malnutrition treatment centre anta, district Baran, Rajasthan.

Variables	Categories	Distribution			
variables	Categories	Number	Percentage (%)		
Target weight	Achieved	56	42.4		
gain	Not achieved	76	57.6		
Store in MTC	Adequate (7-28 days)	70	53.0		
Stay in MTC	Not adequate (1-6 days)	62	47.0		
	Cured	56	42.4		
Outcome	Defaulters	34	25.8		
Outcome	Non responders	11	8.3		
	Referred to higher centre	31	23.5		

Table 3: Correlation between stay at malnutrition treatment centre and total weight gain.

Variables	Mean	Standard deviation	Number
Stay at MTC	8.04	6.709	132
Total weight gain	5.93	6.304	132

Pearson's Correlation coefficient (r) = 0.59; p = <0.0001.

Follow up rate was observed to be very poor. Over 4 follow ups, visit rate progressively decreased and none of them visited for the fourth follow up. Number of children, who attended follow up visits, was 77, 66, 54 and 0 respectively for 1st, 2nd, 3rd and 4th visit.

Weight at each of the follow up visits was compared with weight at discharge individually as shown in Table 5. At all three follow ups, difference between weight at discharge and weight at follow up visit was statistically non-significant.

For comparing categorization of malnutrition by MUAC and weight for age, all children were grouped in mild, underweight and severe grades of malnutrition by both methods. WHO child growth standards 2006, were used for recording weight for age as, below -3SD (severe), between -2 and -3 SD (underweight) and above -2 SD (normal). As per operational guidelines, MUAC less than

11.5 cm is considered as SAM.⁴ Hence in current study, MUAC was categorized as <11.5 cm (severe), 11.5-13.5 cm (underweight) and >13.5 cm (normal). After statistically analyzing malnutrition categories by both methods using Pearson's chi square test, difference was found to be non-significant (χ^2 =6.91, df =4, p =0.141).

Table 4: Outcome of severe acute malnourished children in relation to their stay at malnutrition treatment centre.

Stay at MTC	Outcome of SAM children					
	Cured	Defaulters	Non-responders	Referred		
Adequate	56	1	9	4		
Not adequate	0	33	2	27		
Total	56	34	11	31		

Pearson's $\chi^2 = 107.55$, df= 3, p < 0.0001.

Table 5: Difference between weight (kilogram) at discharge and each of follow up visit.

Follow- up visit	Weight at	Mean	Number	Standard deviation	Standard error	ʻt' value	Degree of freedom	ʻp' value
First	Discharge	6.914	77	1.449	0.165	- 0.851	76	0.398
	First follow up	7.00	77	1.385	0.158	0.831		
Second	Discharge	6.963	66	1.468	0.181	1.000	65	0.317
	Second follow up	7.09	66	1.452	0.179	1.009		
Third	Discharge	7.029	54	1.428	0.194	1 270	53	0.207
	Third follow up	7.23	54	1.422	0.193	1.279		

DISCUSSION

The study findings show that the major proportion of admitted children belonged to marginalized populations like scheduled tribes, primitive tribes and in scheduled caste communities, girls under 2 years; which is in accordance with national data and an Indian study by Taneja et al.^{2,6} Role of ASHA was striking in the current study, who have proved to be important link between health centers and the community.

In terms of performance of MTC Anta, only death rate (<5%) and average length of stay (>7 days) fall in the category of 'Acceptable' outcome as per operational guidelines for facility based management of SAM children. Recovery rate being less than 50%, Defaulter rate being more than 25% and average weight gain being less than 8 g/kg/day; fall in 'Not Acceptable' category of operational guidelines.

It is very clear from this study that we have been successful in reducing death rate in SAM children but not much succeeded in reducing morbidity. Death rate in facility-based managed SAM children has been reported to be declining over years as per various studies. One study conducted on malnourished children in year 2006 reported death rate as 12.9%.⁷ Another Indian study published in year 2014 observed death rate of 2.2% at MTC.⁸

Success of MTC depends upon duration of child stay. If the duration is adequate, MTC gets the opportunity to take appropriate actions for improving child's health condition. In current study, 47% admitted children did not stay for adequate duration (minimum 7 days) at MTC. About 30% children stayed for just one day, half of them because of referral and remaining because of caretaker's unwillingness. These 30% children proved as major hurdle in success of MTC in terms of performance indicators. This factor, 'stay at MTC' was found to have positive correlation with total weight gain by children statistically. Again this factor showed very highly significant impact on outcome of SAM children. Thus, importance of duration of stay at MTC is very well proved in the current study. Another study conducted at MTC of medical college observed longer duration of stay (16 days) with better average weight gain (9.3 gm/kg/day).9

To overcome this hurdle, Government of Rajasthan has started implementing 'Community based management' of SAM children in selected blocks. It is real need of time, which has been started from September 2015 as 'Rajasthan POSHAN strategy'.³

In facility based management of SAM children, caretaker and the child have to visit MTC for follow up. Out of four fortnightly follow ups, none came for the fourth visit. The reason perceived in interrogation during the

study was that incentives were payable for first three visits and not for the fourth visit. This resulted in loss of interest in caretakers as well as ASHA. Even the rate of follow up declined from first to third follow up. This shows that importance of management of SAM children is not incurred in minds of caretakers. No significant difference was observed between discharge weight and each of follow up weights. This indicates that trend of weight gain was not sustained during follow up period. Another study conducted in Rajasthan observed 46% SAM children returned for follow-up visit, 51.7% of children who came for follow-up had poor rate of weight gain, 31% had moderate and 6.89% patients had good rate of weight gain whereas 4.76% children had weight loss on follow up. 10

While comparing two of the most common methods of nutritional assessment, it was found that categorization of malnutrition is comparable by weight for age and MUAC methods. Any one method can be used as a substitute for the other in conditions of unavailability of instruments which is very common for the peripheral workers.

CONCLUSION

MTCs are playing vital role in preventing deaths due to malnutrition. As length of stay and follow-up visits at MTC are greater obstacles in sustaining health status of SAM children, alternative method like community based management may prove helpful in reducing morbidity.

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Ethical approval: The study was approved by the Institutional Ethics Committee of Jhalawar Medical College, Jhalawar, Rajasthan

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