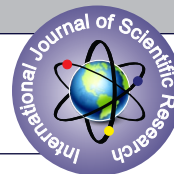


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TO EVALUATE THE EFFECT ON WEIGHT OF NUTRITIONAL INTERVENTION MEASURES ON CHILDREN WITH SEVERE ACUTE MALNUTRITION ADMITTED IN NUTRITION REHABILITATION CENTER AT NSCB MEDICAL COLLEGE, JABALPUR, MADHYA PRADESH



Pediatrics

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ABSTRACT

Background: Nutritional rehabilitation Center is a unit in a district health facility where children with severe acute malnutrition are admitted and provided with the nutritional & therapeutic care.

Methods: Analysis of data of all the children admitted to Nutritional Rehabilitation Centre of NSCB medical college MP from July 2015 to August 2016. Statistical analysis was done using SPSS.

Results: A total of 251 children were included in the study. The overall mean weight at admission was found 6.99 kg with standard deviation of 1.7 kg and the mean weight at the time of discharge was 7.61 kg with standard deviation of 1.96 kg. Diarrhoea was found to be the associated medical condition in majority of the children.

Conclusions: Present study reflected that Nutritional Rehabilitation Centers have been playing a key role to cope with malnutrition as demonstrated by weight gain rate as well as high recovery rate.

KEYWORDS

Severe acute malnutrition, Nutritional rehabilitation centre, Nutritional intervention

INTRODUCTION: Malnutrition is a major public health problem of developmental concern with both health and socio-economic consequences. In the developing world, prevalence of malnutrition among under-fives is 41% with an estimated 230 million (39%) children being chronically malnourished [1,2].

Data from UNICEF global data base on child malnutrition in 2001 showed that 10% of under-fives were moderately and severely wasted [3].

Prevalence of malnutrition varies from one country to another and is more in developing countries. Abrupt weaning with diluted animal milk and lack of breast feeding contribute to malnutrition in the first year of life, while in the second year it is due to the inadequate intake of protein and calories which lead to starvation [4].

In developing countries, malnutrition contributes to more than 50% of under-five mortality. Deaths due to malnutrition increase when there is an increase of food insecurity, absolute poverty, famine, ignorance and poor maternal nutrition, all of which are among other major contributory factors for malnutrition [5-8].

Malnourished survivors are left with mental developmental delay, poor school performance and reduced intellectual achievements [2, 5, 9].

Severe acute malnutrition (SAM) remains a major killer of children as mortality rates in children with severe wasting - a widespread form of SAM - are nine times higher than those in well-nourished children [10].

India's third National Family Health Survey (NFHS-3) indicates that the prevalence of severe wasting is 7.9% as per WHO Child Growth Standards [11]. Therefore, at any point in time an average 8 million Indian children under age five years are severely wasted [12] and are dangerously undernourished to survive, grow and develop to their full potential.

The state of Madhya Pradesh has the largest number of malnourished children in India; 6 million children under five are malnourished including 1 million moderately malnourished and 1.3 million severe malnourished children [13]. To combat this menace, the Government of Madhya Pradesh initiated the bal sanjeevani drive in the year 2001 with support from United Nations Children Fund (UNICEF) aimed at identifying and treating malnourished children. To prevent deaths among severe malnourished children identified under the drive, the

Government further started the Nutrition rehabilitation centers (NRCs) under the Bal Shakti Yojna with support from UNICEF. The objectives of the programme are to control malnutrition among the children aged 1-5 years in the state and to bring down the percent of severe malnourished children to less than 1% [14].

The first of such centers was set up in 2007 and in a short span of 2 years the number of such centers has increased to 175. The inputs being put in the NRCs have to be adequately analyzed to evaluate whether the desired objectives are being fulfilled. The present work tries to analyze the effect of the NRCs in improving the health and nutritional status of severe malnourished children admitted at the centers by studying the effect of the interventional measures on the admitted children in our centre.

OBJECTIVE: To evaluate the effect on weight of nutritional interventional measures undertaken at NRC in our centre at the time of admission and discharge and during their stay at the center and on 1, 2nd and 3rd follow up.

MATERIALS AND METHODS: The present study was conducted in NRC associated with NSCB medical college Jabalpur from July 2015 to August 2016 with the study group comprised the study of children 1-60 months of age, admitted in NRC.

All the children with SAM admitted in the NRC during the study period were included in the study. At the NRC, age, weight, height/length, MUAC, presence or absence of bilateral edema and appetite were assessed in all the children. SAM was defined as per WHO recommendations by the presence of bilateral edema or presence of severe wasting. Severe wasting was defined as per WHO guideline by a MUAC below 115 mm and/ or a weight for height/length z-score (WHZ) below -3 SD of WHO child growth standards.^[5]

A detailed data of the patients including name, age, sex, caste, address, religion, anthropometric and outcome indicators were taken over the predesigned Performa. Weight at the time of admission, at the time of discharge and next 3 follow up which were done at an interval of 1 month. Daily weights were recorded from the NRC registers; average weight gain was calculated to see if it was in accordance with the available guidelines. [5] The data were entered into Microsoft excel spreadsheet and analyzed.

RESULTS:

Sociodemographic profile of Subject [Table 1]: A total of 251

children were included in the analysis amongst them 136 (54.2%) boys and 115 (45.8%) girls. Majority 95(37.85%) was in the age group of 13–24 months and 72(28.68%) in the age group of 6-12 months. Majority 137(54.6) of the study population belonged to the scheduled tribe (ST) group, 58(23.1) were SC and the rest were OBC (13.5%) and general (8.8%) .234(93.2%) children were belonging to low socioeconomic group whereas only 17(6.8%) were from middle socioeconomic group. 88.4% children belonged to the rural area and 11.6% children were from urban area.

Effect on anthropometric Indicators[Table 4].: The overall mean weight of admission for these children was 6.99 kg and the mean weight at discharge for the study group was 7.61 kg and this difference was statistically significant ($t=3.18$, $P<0.005$) [Table 2]. The average weight gain for the study group during their stay at the centers was 8.12 g/kg/day.

Outcome Indicators [Table 3]: The outcome indicators are detailed in table 3. Of the total exits (deaths, defaulters and discharged), the proportion of children who defaulted was 6% and 226 children (86 %) were discharged from the programme when they met the discharge criteria. Amongst discharged children 66.3% were recovered.

Follow up [Table 4]: Children were followed up and their weight was recorded in each visit .it was observed that the mean weight gain was 7.88 ± 1.97 , 8.16 ± 2 and 8.42 ± 1.92 in 1st, 2nd and 3rd visit consecutively

Table1 :- Sociodemographic characteristics

Characteristics	Frequency	Percent
Gender		
Male	136	54.2
Female	115	45.2
Age in months		
6-12	72	28.68
13-23	95	37.85
24-35	44	17.53
36-47	28	11.16
48-59	12	4.78
Caste		
ST	137	54.6
SC	58	23.1
OBC	34	13.5
General	22	8.8
Socioeconomic status		
Lower & upper lower	234	93.2
Lower middle(iii)	17	6.8
Locality		
Urban	29	11.6
Rural	222	88.4

Table 2:- Comorbidities associated with malnutrition

Comorbidities	Frequency	Percent
NAD	19	7.6
ANAEMIA	21	8.4
ANGULAR STOMATITIS	7	2.8
DIARRHOEA	60	23.9
HIV	5	2.0
ITS	1	.4
KERATOMALACIA	1	.4
MALARIA	18	7.2
PNEUMONIA	37	14.7
PTB	10	4.0
PTB+HIV	3	1.2
RICKETS	1	.4
SCABIES	6	2.4
SEPTICEMIA	21	8.4
URTI	28	11.2
UTI	13	5.2
Total	251	100.0

Table3:- Output indicators

	Frequency	Percent
CURED IN FOLLOW UP I	34	13.5
CURED IN FOLLOW UP II	59	23.5

CURED IN FOLLOW UP III	76	30.3
CURED IN NRC	44	17.5
DEFAULTER	15	6.0
MEDICAL TRANSFER	5	2.0
NON RESPONDER	17	6.8
Total	251	100.0

Table4:- Mean weights at admission, discharge and follow up

Age			Weight at admission	Weight at discharge	Weight at 1st follow up	Weight at 2nd follow up	Weight at 3rd follow up
<12	M	Mean	5.60	6.27	6.36	6.81	6.99
		Std. Deviation	±1.24	±1.39	±1.21	±0.92	±1.28
		N	32	32	26	23	21
	F	Mean	5.36	5.71	5.96	6.27	6.58
		Std. Deviation	0.85	0.89	0.88	0.72	0.80
		N	40	40	32	27	25
	Total	Mean	5.47	5.96	6.14	6.52	6.77
		Std. Deviation	1.04	1.16	1.05	0.85	1.06
		N	72	72	58	50	46
12-24	M	Mean	7.03	7.66	7.81	7.75	8.08
		Std. Deviation	0.84	0.93	0.98	1.67	0.97
		N	50	50	40	35	36
	F	Mean	6.49	7.00	7.18	7.43	7.68
		Std. Deviation	0.91	1.00	0.86	0.97	0.87
		N	45	45	37	31	31
	Total	Mean	6.77	7.35	7.51	7.60	7.89
		Std. Deviation	0.91	1.02	0.97	1.39	0.94
		N	95	95	77	66	67
24-36	M	Mean	7.94	8.69	9.10	9.35	9.33
		Std. Deviation	1.08	1.17	1.11	1.09	1.30
		N	24	24	19	19	21
	F	Mean	7.50	8.21	8.46	8.58	8.85
		Std. Deviation	1.16	1.26	1.37	1.38	1.35
		N	20	20	19	19	19
	Total	Mean	7.74	8.48	8.78	8.97	9.10
		Std. Deviation	1.13	1.22	1.27	1.29	1.33
		N	44	44	38	38	40
36-48	M	Mean	9.05	9.87	10.30	10.41	10.72
		Std. Deviation	1.08	1.10	1.32	1.08	1.16
		N	19	19	15	15	14
	F	Mean	8.56	8.64	9.85	10.07	10.11
		Std. Deviation	1.20	3.36	1.52	1.73	1.65
		N	9	9	7	8	6
	Total	Mean	8.90	9.48	10.16	10.29	10.53
		Std. Deviation	1.12	2.12	1.37	1.31	1.31
		N	28	28	22	23	20
48-59	M	Mean	10.93	12.17	12.61	12.91	13.23
		Std. Deviation	1.03	1.29	1.41	1.29	1.43
		N	11	11	9	8	8
	F	Mean	9.53	10.20	10.39	10.59	11.18
		Std. Deviation					
		N	1	1	1	1	1
	Total	Mean	10.82	12.00	12.39	12.65	13.00
		Std. Deviation	1.07	1.36	1.51	1.43	1.50
		N	12	12	10	9	9

Total	M	Mean	7.45	8.19	8.43	8.65	8.89
		Std. Deviation	1.82	2.00	2.11	2.18	2.09
		N	136	136	109	100	100
F	Mean	Mean	6.46	6.92	7.25	7.60	7.84
		Std. Deviation	1.39	1.69	1.58	1.61	1.52
		N	115	115	96	86	82
Total	Mean	Mean	7.00	7.61	7.88	8.16	8.42
		Std. Deviation	1.71	1.96	1.97	2.00	1.92
		N	251	251	205	186	182

DISCUSSION: The study findings show that a major proportion of the admitted children were schedule tribe 137 (54.6%) and schedule caste 34 (23.1%). Majority of children were belonging to low socioeconomic status 234 (93.2%). The findings are in accordance with that of NFHS-III, which states that children belonging to the ST, SC, and OBC and that those with illiterate mothers have the highest rates of malnutrition [15]. Weight has been taken as the main anthropometric measure as an improvement in weight of severe malnourished children has the most significant effect in reducing the mortality among them. In present study mean weight on admission was 6.99 kg and on discharge 7.61 kg and statistically significant difference was observed between the mean weight at discharge and the mean weight at admission for the study group (p value < 0.005). Colecraft et al. in a study at four day care NRCs also reported a significant increase in weight for age for the admitted children [16].

The average weight gain for the entire study group was 8.14 g/kg/day. Taneja et al in their study have also found that the average weight gain for the entire study group was 9.25 ± 5.89 g/kg/day [17]. Rinki H. Shah observed that 40% of patients gained weight between 5-10 gm/kg/day [18].

The proportion of children who defaulted was 15 (6%) significantly below the national and international standards of care (< 15%) high defaulter rate was observed by K. Singh et al in their study in Uttar Pradesh, India which was about 45% [19]. In this study the proportion of children discharged was 92% amongst them 66.3% gained at least 15% of their initial weight, the minimum weight gain recommended by WHO and India's ministry of Health to discharge children as recovered [20,21].

CONCLUSION: We have observed that weight of the children admitted in NRC admitted have significantly improved on discharge and this improvement has sustained even on follow up. Co-morbidities associated with malnutrition were Diarrhoea, pneumonia, pulmonary tuberculosis, HIV, urinary tract infection, malaria.

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