

A Study to Understand Pattern of Weight Gain among Undernourished Children Admitted to Nutritional Rehabilitation Centre in a Tertiary Health Care Setting- A Retrospective Study

Research Article

Karn M^{1*}, Angolkar M¹, Herekar V², Adhikari H¹, Sharma R¹ and Karn A³

¹Department of Public Health, J.N. Medical College, India

²Department of Paediatrics, J.N. Medical College, India

³MPH, Chitwan Medical College, Nepal

***Corresponding author:** Mukesh Karn, MPH, Department of Public Health, J.N. Medical College, KAHAR, Belagavi, Karnataka, India Email: m.mukace@gmail.com

Article Information: Submission: 02/04/2020; Accepted: 08/09/2020; Published: 12/09/2020

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Abstract

Background: Malnutrition in developing countries causes 45% of deaths among under-five children according to WHO health statistics 2016. India is one among the many developing countries where child malnutrition is a major problem and severe. India is home to more than one-third of the world's undernourished children.

Objective: The aim of the study was to understand pattern of weight gain among undernourished children admitted to nutritional rehabilitation centre in a tertiary health care setting.

Methodology: A retrospective study was conducted using records from Nutritional Rehabilitation Centre ward. This study has been taken up to analyse data of last three years to determine its impact on weight gain pattern. 320 children aged between 1-60 months were recruited and their records were analyzed. Demographic information was collected by telephonic interview. SPSS 20.0 and WHO Anthro software was used to analyze the data.

Results: Majority (75.3%) children were severe acute malnourished. 58% of children were male of which 40% were below the age of one. Mean (SD) duration of stay in the nutritional rehabilitation centre was 8.9 (4.9) days. There was a statistically significant ($p < 0.05$) difference between mean weight at admission and mean weight at discharge, socioeconomic status and clinical impression.

Conclusion: NRC had a good impact on weight gain among admitted children. The weight gain was statistically significant. Though stay at NRC has shown improvement in the weight gain, but during the time of discharge most of the children are still undernourished due to shorter duration of stay at NRC.

Keywords: Severe acute malnutrition; Nutritional Rehabilitation Centre; Under five; India

Introduction

Adequate nutrition in early years of childhood is an essential element for ensuring healthy growth, a strong immune system, proper organ formation and function, leading to neurological and cognitive development. A well nourished population is a base on which the economic growth and human development of the community rests.

Malnutrition can be defined as a pathological condition, which occurs due to the deficient assimilation of the components of the nutrient complex. It manifests in varying degrees of severity and diverse clinical manifestations [1]. A child can be said to be suffering from Severe Acute Malnutrition (SAM) if his/her weight for height is less than $-3SD$ (as recommended by the WHO) and/or if they suffer from visible severe wasting and/or oedema of both feet (excluding

other causes of oedema), and if their mid arm circumference less than 11.5 cm (in infant more than 6 months of age) [2]. According to the National Family Health Survey 4, cases of stunted and underweight children have decreased by 10% and 6.8% respectively in the last ten years, among under five children in India. Wasting, however, has increased by 1.2% and severe wasting (SAM) by 1.1% in the same duration of time [3].

In the state of Karnataka NFHS-4, has shown that the prevalence of wasting has increased by 8.5% and severe wasting by 3.8% in the last decade [4]. The district of Belgaum has a very high prevalence of wasting with 33.1% and severe wasting with 18%, which are much more than the national and state data [5]. The increasing number of children being affected of severe wasting should lead a serious concern to be taken for the improvement of nutritional status among the children so that they can lead a normal life without any forms of malnutrition.

Under NRHM4, many Indian states have established Nutritional Rehabilitation Centres (NRCs) that provides integrated facilities of initial treatment at the health facility and after that community follow ups. With the support of UNICEF, GOI further started, the NRCs under Bal Shakti Yojna with objective of bringing down the prevalence of SAM <1% [6,7]. Although lately, 966 of NRC's have been established in private and public settings in India, however their impact in correcting the problem needs to be studied. In KLE's Dr. Prabhakar Kore Charitable Hospital, the NRC unit was established in 2013. This study has been taken up to analyse data of last three years to determine its impact on weight gain pattern.

Materials and Methods

The present retrospective study was carried out amongst 320 children's data who were admitted in NRC aged between 1 to 60 months. The necessary data required for the study was obtained as primary and secondary. Accordingly, secondary data was collected from patient's case sheets, weight at admission, weight at discharge, height, number of days of hospital stay etc as required. Primary data was collected by telephonic interview with the parents for collecting the socio-demographic information. Data from February 2014 to Dec 2016 was taken into account. Duration of the study was 10 months from February 2016 to November 2016.

Sample size: Complete enumeration. Record of 320 participants was analysed out of total record of 380 patients. If the children weight for height z scores were below -3 SD then they were considered as SAM and if the weight for height of children lies between -3 SD to -2 SD then they were considered as MAM according to WHO standards.

Record of all haemodynamically stable children of age 1 to 60 months were included. Incomplete record and children with severe multiple congenital anomalies were excluded from the study. A Pilot study was conducted on record of 35 participants before starting the actual study to check validity and reliability of study tool.

Ethical consideration: Before conducting the present study, written permission was obtained from Medical Director, KLE's Dr. Prabhakar Kore Charitable Hospital, Belagavi. Ethical clearance for this study was obtained from the Institutional Ethics Committee of

the J.N. Medical College, Belagavi. Verbal consent was obtained from parents before data collection via telephonic interview.

Data analyses

Data entry and analyses were done by using both WHO Anthro software version 3.2.2 and SPSS 20.0. The nutritional survey option in WHO Anthro software version 3.2.2 (WHO, Geneva, Switzerland) for assessing growth and development was used to calculate weight-for-height z-scores on the basis of WHO standards.

Frequency, percentage, mean and standard deviation were calculated. Non parametric test was used to see the difference between two means. Level of significance was considered at $p < 0.05$.

Results

Table 1 showed that out of 320 participants, 186 (58.1%) were male and 134 (41.9%) were female. With regard to age distribution it was observed maximum number, 125 (39.1%) participant were found in 1-12 months age group, where male children were 74 (59.2%) and 51 (40.8%) were female children (Table 2).

There is an increment on weight among children at NRC. Overall mean weight at admission was 6.86 ± 2.15 kg. For males, it was 6.88 ± 2.26 kg and for females, it was 6.83 ± 2.00 kg. The overall mean weight at discharge was 7.04 ± 2.18 kg. For males, it was 7.06 ± 2.29 kg and for females, it was 7.02 ± 2.02 kg. Clinically, at the time of admission the mean (SD) weight was 6.86 ± 2.15 kg which increased to 7.04 ± 2.18 kg. Statistically, the weight gain was analysed by Wilcoxon Rank test and it was found that the weight gain was statistically significant ($p=0.000$). When it was analysed for gender and mean weight at admission and discharge, statistical significance was found at $p=0.01$.

Table 3 shows that, there was statistical significance found between the no. of days at hospital stay and the mean weight gain. This says that the weight increased as the duration of stay in the hospital increased.

Discussion

A study conducted in Belagavi city showed that 36.7% of participants belonged to age group of 13-24 months [8]. In a study conducted in Waynad district of Kerala city showed that more than 30% of the participant were of less than 2 years of age [10]. A similar finding was reported by a study conducted in Bhopal, where majority 42.1% were in the age group of 13-24 months [11].

In the present study, mean \pm SD weight at admission and discharge were 6.86 ± 2.15 kg and 7.04 ± 2.18 kg. The mean weight gain was 0.18kg. There is difference in mean weight at admission and

Table 1: Distribution of participants according to age and gender.

Age Groups (in Months)	Male		Female		Total	
	No.	%	No.	%	No.	%
1-12	74	59.2	51	40.8	125	39.1
13-24	50	53.2	44	46.8	94	29.4
25-36	29	61.7	18	38.3	47	14.7
37-48	17	54.8	14	45.2	31	9.7
49-60	16	69.6	7	30.4	23	7.2
Grand Total	186	58.1	134	41.9	320	100.0

Table 2: Comparison of Mean Weights of Study Participants at Admission and Discharge

Age Group (Months)	Mean Weight at Admission (Kg)			Mean Weight at Discharge (Kg)		
	Male	Female	Total	Male	Female	Total
1-12	4.92±1.16	5.19±1.90	5.03±1.14	5.08±1.20	5.35±1.15	5.20±1.18
13-24	6.70±0.93	6.74±1.06	6.73±0.99	6.89±0.95	6.99±1.08	6.95±1.01
25-36	8.52±1.08	8.35±1.27	8.45±1.15	8.72±1.09	8.53±1.32	8.65±1.17
37-48	9.17±0.88	9.48±1.49	9.36±1.18	9.32±1.00	9.55±1.51	9.47±1.20
49-60	11.08±1.56	10.12±1.54	10.68±1.62	11.38±1.51	10.36±1.53	10.95±1.61
Total	6.88±2.26	6.83±2.00	6.86±2.15	7.06±2.29	7.02±2.02	7.04±2.18

Table 3: Distribution of Study Participants and their mean Weight According to Total Duration in Hospital

No. days at hospital stay	Number of Participants (%)	Mean weight at admission	Mean weight at discharge	t value	p value
<7	134 (41.9)	7.03±2.31	7.15±2.37	-8.219	0.000
8-14	148 (46.3)	6.99±2.01	7.20±2.03	-4.710	0.000
14-21	27 (8.4)	5.71±1.93	6.06±1.92	-4.017	0.004
>21	11 (3.4)	5.84±1.48	6.12±1.52	-4.506	0.001

mean weight at discharge, and the difference is statistically significant ($p<0.05$). A similar finding was reported by a study conducted in Nellore. A statistically significant difference was found between mean weight at admission and mean weight at discharge for all children ($p<0.001$) [13]. A study conducted in Madhya Pradesh also had the similar finding as our study. A statistically significant difference was observed between the mean weight at discharge and the mean weight at admission for the study group ($t=14.552$, $P<0.001$) [14]. In contrast, another study also conducted in Madhya Pradesh reported that no significant difference was found between mean weight at admission and mean weight at discharge for participants ($p>0.05$) [15]. A study conducted in Ghana at four day NRC care also reported a significant increase in weight for age for the admitted children [16].

In the present study, the mean (SD) number of days of hospital stay was found to be 8.99(4.94) days. In a study conducted in Allahabad city, the findings regarding to length of stay at hospital was 12(6.8) days [17]. In a study conducted in UP, the mean (SD) length of hospital was 13.2(5.6) days [18]. A similar result to that of UP was found in a study conducted in Madhya Pradesh where, average (SD) duration of stay was 13.51(2.73) days. A similar finding to these was seen in a study conducted in Baroda city, where mean duration of hospital stay was 15.6 days.

Conclusion

A statistically significant weight gain was observed among SAM children treated at NRC, as analyzed by comparing the weight at admission and discharge. The length of stay at NRC was found statistically significant with weight gain at discharge. NRC has a good impact on improving nutritional status of undernourished children. Though stay at NRC has shown improvement in the weight gain, but during the time of discharge most of the children are still undernourished due to shorter duration of stay at NRC. Lower socioeconomic status is also significantly associated with malnutrition which is primarily because of inability of guardian to resume work and because of that they have to compromise their daily wages which in turn makes them to get their children discharge from hospital much earlier than recommended period of stay.

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