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Impact of Facility Based Dietary Management on Severe Acute Malnutrition in Children Aged 6 to 60 Months Admitted in Nutritional Rehabilitation Centre of KLES's Dr. Prabhakar Kore Hospital of Belagavi City – A Longitudinal Study

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Abstract: ***Background: India is home to more than one-third of the world's under-nourished children, according to WHO Health statistics 2012 and 54% of deaths among under five children are due to malnutrition in developing countries. Objective: To assess the impact of facility based dietary management on severe acute malnutrition among children aged 6 to 60 months. Materials and Methods: The present longitudinal study was carried out among the children aged between 6 to 60 months admitted in Nutritional Rehabilitation Centre of KLES Dr. Prabhakar Kore Hospital. Pre-designed and pre-tested questionnaire was used to collect the required information. Paired t test was calculated to see the association. Results: Majority (80%) children were severe acute malnourished and (20%) were moderate acute malnourished. The mean weight, height, MUAC and Hb% of children increased at the time of discharge and during follow up visits. A statistically significant relationship was found between weight, height, MUAC and Hb% at different intervals (p<0.05). Conclusion: Nutritional rehabilitation centre has a positive impact on the nutritional status of the children who were admitted to the hospital while after the discharge of the children from the hospital there was a slow but steady and apparent increase in the weight, height, MUAC and Hb%.***

Keywords: Nutritional Rehabilitation Centre (NRC), Severe Acute Malnutrition (SAM), Moderate Acute Malnutrition (MAM), Impact, Children.

1. Introduction

Severe Acute Malnutrition (SAM) is defined as weight for height less than -3SD and/or visible severe wasting and/or edema of both feet (excluding other causes of edema), mid arm circumference less than 11.5 cm (in infant more than 6 months of age) (Mason et al., 2005).

Poor nutrition during childhood causes severe cognitive and physical damage. It is a violation of a child's human right. It has been observed that the rate of poorly nourished children is exceptionally high among few regions and groups. Alma Ata Declaration (1978) envisaged "Health for All" goal till 2000. A large number of women and children are suffering from severe malnutrition, especially in developing countries like India (Babatunde et al., 2011).

Severe acute malnutrition is both a medical and social disorder. The socio-cultural and poor economic conditions have massive effect on health status eventually leading to situations like malnutrition. Lack of exclusive breast feeding, late introduction of complementary feeds, feeding diluted feeds containing less nutrients, repeated enteric infection, respiratory tract infections, ignorance, poverty are some of the factors responsible for severe acute malnutrition (Sadler et al., 2008). According to National Family Health Survey III 2005-06, 45%, 23% and 40% of children below three years suffer from stunting, wasting and underweight respectively (NFHS-3, 2005-06).

To fight with malnutrition, the collaboration of WHO and UNICEFF developed the concept of facility based dietary management which is accepted and adopted by the Government of India. Under the NRHM all over India, in March 2011, the concept of facility based dietary management in tertiary care hospital which is named as Nutritional rehabilitation centre (NRC), nutrition programme was started with establishment of NRCs at district level. Also private medical colleges and tertiary hospitals were encouraged to join hands to attain the goal of eliminating malnutrition (UNICEF, 2004).

As an extension of this, KLE society's Dr. Prabhakar Kore charitable hospital has started Nutritional Rehabilitation Centre supported by department of Pediatrics on 14th February 2012, which was inaugurated by Miss Linda Wright (Secretary of National Institute of Health). The objective of this study is to assess the impact of facility based dietary management on severe acute malnutrition among children aged 6 to 60 months.

2. Materials and Methods

The present longitudinal study was carried out amongst the Children admitted in NRC aged between 6 to 60 months and who resided in the Belgaum district during the period of study. The necessary data required for the study was obtained both as primary and secondary. Accordingly, Secondary data was collected from inpatient case sheets ex-past history, immunization status etc as required. Primary data was collected by interviewing informers (mother, father, grandmother and others) by anthropometric measurements etc. Duration of this study was 10 months from January 2013 to October 2013. Data collection was done in 5 phases:
Phase 1: On the day of admission,
Phase 2: On the day of discharge,
Phase 3: 30 days after the discharge from NRC, Phase 4: 30 days after the first follow-up,
Phase 5: 30 days after the second follow-up.
Sample size calculation: 15% increased for pre post weight
As clinically significant with
α =0.05 and power of 90% (β=0.1)

$$n = \frac{(Z\alpha + Z_\beta)^2 \times \sigma^2}{d^2}$$

$$n = \frac{(1.96 + 1.26)^2 \times 15^2}{10^2}$$

n = 23.3 = 25 approximated to 30 (additional 5 samples are take to address the drop outs). The questionnaires were designed as per the operational guidelines given by WHO on facility based management of children with severe acute malnutrition which consist of following sections.

Section A: Information on the first day of admission which includes
1) Part-I: Basic information (Child information).
2) Part-II: Family information
3) Part-III: Complaints
   Medical History
   Immunization History
   Dietary History
4) Part IV: Anthropometry and signs and symptoms
5) Part v: Systemic Examination and investigations related
6) Clinical impression of examining Doctor
7) Management.

Section B: Information on the day of discharge, which includes
Part -1: Anthropometry and condition of child.
Part-2: Discharge instructions and services provided at NRC.
Part-3:Knowledge of mother regarding seeking medical care.

Section C: follow-up 1/2/3. Includes
Part-1: Anthropometry
Part-2: Information given by service provider, at any follow-up
Part-3: Knowledge and practice of mother regarding seeking medical care towards baby.

If the children weight for age, height for age and 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. Depending on a child's age and ability to stand, measurement of child's length or height was taken. The weighing of baby was done about one hour before or after a feed. As per recommended a scale with the following features were used:

- Solidly built and durable
- Electronic (digital reading)
- Measures to a precision of 0.01 kg (10g)
- Allows tared weighing

A child's length was measured in lying down (recumbent) position. Height was measured with child standing upright position. Haemoglobin (Hb%) was measured by Coulter method (electronic cell method) at NRC and during follow up visits it was measured by Sahlis method in PHCs. MUAC of children was measured with the Shakir's tape.Data related to our study objective were recorded. Data was collected from parents who were willing to give written consent for their children. Children with congenital anomalies, mental retardation and congenital heart disease were excluded from this study. Before conducting the present study, written permission was obtained from Medical Director, KLE's Dr. Prabhakar Kore Hospital, Belagavi. Ethical clearance for this study was obtained from the Institutional Ethics Committee of the JNMC, KLE University.

A scheduled plan was prepared to visit all the 30 participants accordingly for 30 days gap at each follow-up (total three follow-ups were done) with prior information to mothers or family members, ASHA`s and ANM`s. The participants unavailable on scheduled day were visited on the next available day to reduce the drop-out rate. The collected data were entered and analyzed into the SPSS software version 20. Frequency, percentage, mean and standard deviation were calculated. Paired t test was used to determine the association. Level of significance was considered at $p<0.05$.

3. Results

In the present study, more than quarters 11 (36.7%) children belonged to the age group of 13-24 months, followed by 25-36 months 9 (30%), 6-12 months 7 (23.3%) and 49-60 months 3 (10%). None of the children were from the age group of 37-48 months. Majority 17 (56.7%) were male and 13 (43.3%) were female. Loss of appetite was the main complaint by 22 (73.3%) of participants, followed by cough 20 (66.7%), fever 19 (63.3%) and diarrhoea, vomiting, swelling of limbs/body were 13 (43.3%), 10 (33.3%), 7 (23.3%) respectively while urinary complaints was least with 1 (3.3%). Vaccination coverage was seen in which, majority 28 (93.3%) children had taken BCG and OPV all doses. DPT all doses were found in 27 (90%) children where as only 21 (70%) children were vaccinated with measles. Booster dose of DPT and OPV was seen in 12 (40%). Hepatitis-B 1 vaccination was seen in 7 (23.3%) children while Hepatitis-B 2 and 3 were least with 6 (20%) each. (Figure 1)

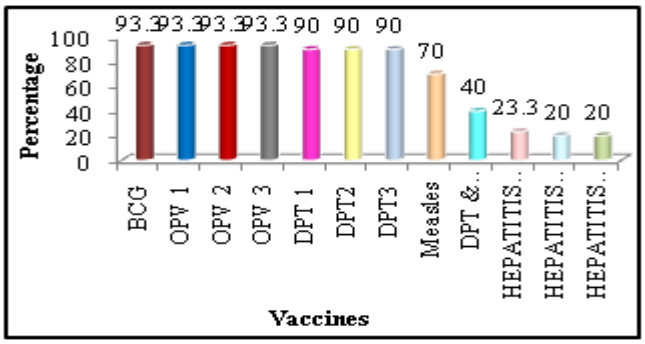

Figure 1: Distribution of participants according to immunization status.

Improvement is seen in 25 (83.3%) children. (Figure 1)

Table 1: Impact of NRC on weight

Mean weight at admission	Mean weight at discharge	Total mean weight gain
6.27± 2.15 Kg	6.78 ± 2.28 Kg	0.51 Kg
*t= -6.795, df= 58, p= 0.000**		
Mean weight at discharge	Mean weight at 1st follow up	Total weight gain
6.78 ± 2.28 Kg	6.90 ± 2.29 Kg	0.12 Kg
t= -1.587, df= 58, p= 0.123		
Mean weight at 1st follow up	Mean weight at 2nd follow up	Total weight gain
6.90 ± 2.29 Kg	7.03 ±2.33 Kg	0.12 Kg
t= -1.552, df= 58, p= 0.132		
Mean weight at 2nd follow up	Mean weight at 3rd follow up	Total weight gain
7.03 ±2.33 Kg	7.12 ± 2.35 Kg	0.09 Kg
t= -1.196. df= 58. p= 0.241		

*** - Significant**

In this study the mean weight at admission was 6.27±2.15 Kg and mean weight at discharge was 6.78 ± 2.28 Kg. The total mean weight gain was 0.51 Kg and this difference was found to be statistically significant. The mean weight at discharge was 6.78± 2.28 Kg and mean weight at 1st follow up was 6.90 ± 2.29 Kg. Total gain in mean weight was 0.12 Kg and the difference was not statistically significant. Mean weight at 1st follow up was 6.90± 2.29 Kg and mean weight at 2nd follow up was 7.03 ± 2.33 Kg, the total mean weight gain was 0.12 Kg while in the third follow up total mean weight gain was 0.09 Kg. The difference between mean weight in 2nd and 3rd follow up was not statistically significant. (Table 1)

Table 2: Impact of NRC on height

Mean height at admission	Mean height at discharge	Total mean height gain
71.98 ± 15.29 cm	72.06± 15.36 cm	0.07 cm
t= -2.841, df= 58, p= 0.008*		
Mean height at discharge	Mean height at 1st follow up	Total mean height gain
72.06± 15.36 cm	72.32± 15.37 cm	0.26 cm
t= -3.278, df= 58, p= 0.003*		
Mean height at 1st follow up	Mean height at 2nd follow up	Total mean height
72.32± 15.37 cm	72.65± 15.41 cm	0.33 cm
t= -4.460, df= 58, p= 0.000*		
Mean height at 2nd follow up	Mean height at 3rd follow up	Total mean height
72.65± 15.41 cm	72.93± 15.47 cm	0.27 cm
t= -4.115, df= 58, p= 0.000*		

*** - Significant**

The mean height of participants at admission was 71.98±15.29 cm and at the time of discharge mean height was 72.6 ± 15.36 cm. The total mean height increase was 0.07 cm and this difference was found to be statistically significant. Similarly the mean height at discharge was 72.06 ±15.36 cm and mean height at 1st follow up was 72.32 ± 15.37 cm. The total mean height increase was 0.26 cm and the difference was statistically significant. Mean height at 2nd and 3rd follow up also increased and the difference in mean weight detected a significant difference. (Table 2)

Table 3: Impact of NRC on MUAC

Mean MUAC at admission	Mean MUAC at discharge	Total mean MUAC gain
11.07± 1.22 cm	11.30± 1.21 cm	0.23 cm
*t= -3.33, df= 58, p= 0.002**		
Mean MUAC discharge	Mean MUAC Ist follow up	Total mean MUAC gain
11.30± 1.21 cm	11.38± 1.18 cm	0.08 cm
*t= -2.816, df= 58, p= 0.009**		
Mean MUAC 1st follow up	Mean MUAC 2nd follow up	Total mean MUAC gain
11.38± 1.18 cm	11.45± 1.15 cm	0.06 cm
t= -1.790, df= 58, p= 0.084		
Mean MUAC 2nd follow up	Mean MUAC 3rd follow up	Total mean MUAC
11.45± 1.15 cm	11.48± 1.12 cm	0.30 cm
t= -0.84. df= 58. p= 0.384		

*** - Significant**

Table 4: Impact of NRC on Hb%.

Mean Hb% at admission	Mean Hb% at discharge	Total mean Hb% increased
9.36± 1.84	10.06± 1.48	0.7
t= -2.715, df= 58, p= 0.01*		
Mean Hb% at discharge	Mean Hb% 1st follow up	Total mean Hb%
10.06± 1.48	10.28± 1.50	0.22
t= -0.922, df= 58, p= 0.364		
Mean Hb% 1st follow up	Mean Hb% 2nd follow up	Total mean Hb%
10.28± 1.50	10.46± 1.38	- 0.18
t= -1.505, df= 58, p= 0.148		
Mean Hb% 2nd follow up	Mean Hb% 3rd follow up	Total mean Hb%
10.46± 1.38	10.13± 0.95	0.34
t=1.748. df= 58. p= 0.1		

*** - Significant**

Present study showed that the mean mid upper arm circumference (MUAC) at admission was 11.07± 1.22 cm and at the time of discharge it was 11.30±1.21 cm. The total MUAC increase was 0.23cm and this difference was found to be statistically significant. Mean MUAC of children also increase in 1st, 2nd and 3rd follow up and the difference between mean of MUAC was only significant in 1st follow up. (Table 3)

In this study the mean Hb% at admission was 9.36± 1.84 and mean Hb% at discharge was 10.06± 1.48. The total mean Hb% change was 0.7 and the difference was found to

be statistically significant. Mean Hb% of children also increase in the 1st, 2nd and 3rd follow up and the difference between mean of Hb% was not significant. (Table 4)

4. Discussion

In this study, age distribution was seen as majority of the participants (36.7%) were aged between 13 to 24 months. similar to this, study conducted in Peshawar-Pakistan showed that mean age of admission was 11.7 months and (59.2%) were aged below 24 months (Younas et al., 2012). Another study done in Bangladesh showed (66%) were less than 2 years (Md Iqbal et al., 2009). Similar to this, study done in Madhya Pradesh showed (40%) children were of aged 13-24 months and (20%) were of aged 25-36 months (Taneja et al., 2012).

Diarrhoea symptom was present in (80%) children followed by pallor (70%). About (74%) children were suffering from pallor and (11%) from dehydration (Das et al., 2011). (11%) children were suffering from pallor (Younas et al., 2012). Study done in Enugu showed (72.4%) children had dehydration problem (Ubesie et al., 2012).

About (93.3%) children had received BCG vaccine and all doses of OPV. (90%) received DPT full doses, (70%) got measles vaccination while only (40%) received booster doses of DPT and OPV. Less than a quarter (23%), (20%) & (20%) children were vaccinated with HEP B 1, 2 & 3 doses respectively.

In present study, among the total number of children attended (83.3%) were in improved condition during discharge and (10%) of them deteriorated from initial condition. A study done in New Delhi showed improvement in (79.4%) children and deterioration in (11%) of children (Bhan et al., 2003). Another study done in Enugu showed (58.5%) of recovery rate (Ubesie et al., 2012). The mean weight at admission and discharge were 6.27 Kg and 6.78Kg and the difference between both was statistically significant. Similar findings were reported in a study conducted in Madhya Pradesh (Taneja et al., 2012).

No statistically significant association was found between the differences of weights in all three follow-ups and discharge. Similar results were obtained from study done in Madhya Pradesh (Taneja et al., 2012). Also, statistically significant associations were found between the height of children at admission and discharge. The difference between height in all three follow up and discharge was statistically significant. No data was available from the resources in this regard.

In addition to this, statistically significant associations were found between MUAC of children at admission and discharge. The difference between MUAC was only significant in first follow up and no difference was found in 2nd and 3rd follow up. Similar results were obtained from a study done in Madhya Pradesh (Taneja et al., 2012).

Statistically significant association was also found between the Hb% of children at admission and discharge but no statistically significant difference was found in Hb% of children at three follow up visits. No data was available from the resources in this regard.

5. Conclusion

In the present study, it is evident that there is a significant relationship between weight, height, MUAC and Hb% at different intervals. The study also revealed that NRC has a positive impact on the nutritional status of the children who were admitted to the hospital. Moreover the study demonstrated that after the discharge of the child from the hospital, there was a slow but steady and apparent increase in the weight, height, MUAC and Hb% of the children as compared to the admission and discharge period.

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References

[1] Mason, J.B., Bailes, A., Mason, K.E., Yambi, O., Jonsson, U., Hudspeth, C., Hailey, P., Kendle, A., Brunet, D., Martel. 2005. AIDS, drought and child malnutrition in Southern Africa. Public Health Nutrition, 8(6):551-563.
[2] Babatunde, R.O., Olagunju, F.I., Fakayode, S.B., Sola-Ojo, F.E. 2011. Prevalence and determinants of malnutrition among under five children of farming house in Kwara state Nigeria. Journal of Agricultural Science, 1(3):173-181.
[3] Sadler, K., Kerac, M., Collins, S., Khengere, H., Nesbitt, A. 2008. Improving the management of severe acute malnutrition in an area of high HIV prevalence. Journal of Tropical Pediatrics, 54(6):364-369.
[4] National Family Health Survey (NFHS-3) India 2005-06. Nutrition in India, Ministry of Health and Family Welfare. Government of India.
[5] United Nations Children's Fund (UNICEF). Strategy for Improved Nutrition of Children and Women in Developing Countries. A UNICEF Policy Review. New York, USA 2004.
[6] Younas, M., Khan, M.A., Khan, J., Shah, F., Munir, A. 2012. Systemic analysis of in-patient's care of severely malnourished children at Hayatabad medical complex Peshawar: A tool to improve quality of care. Gomal Journal of Medical Sciences, 10(1):2-6.
[7] Md Iqbal, H., Dodd, N.S., Ahmed, T., Miah, G.M., Jamil, K.M., Nahar, B., Alam, B., Mahmood, C.B. 2009. Experience in Managing malnutrition in a government tertiary treatment facility in Bangladesh. Journal of Health Population and Nutrition, 27(1):72-80.
[8] Taneja, G., Dixit, S., Khatri, A.K., Yeslikar, A.K., Raghunath, D., Chourasiya. 2012. 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 Journal of Community Medicine, 37(2):107-115.

[9] Das, S., Sahoo, H. 2011. An investigation onto factors affecting child undernutrition in Madhya Pradesh. Anthropologist, 13(3):227-233.
[10] Ubesie, A.C., Ibeziako, N.S., Ndiokwelu, C.I., Uzoka, C.M., Nwafor, C.A. 2012. Under-five protein energy malnutrition admitted at the university of Nigeria teaching hospital, Enugu: A 10 year retrospective review. Nutrition Journal, 11(43):1-7.
[11] Bhan, M.K., Bhandari, N., Bahl, R. 2003. Mangement of the severely malnourished child: perspective from developing countries. BMJ, 326:146-151.

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