A Study to Effect of Nutritional Intervention Measures on Admitted Children in Selected Nutrition Rehabilitation Centers of Bhopal District of Madhya Pradesh

Lakshmi Agnihotri
Asst. Professor,
Deptt. of Home Science,
S.N.G.G.P.G. College,
Shivaji Nagar, Bhopal

Akanchha Choudhary
Research Scholar,
Deptt. of Home Science,
S.N.G.G.P.G. College,
Shivaji Nagar, Bhopal

Vinita Mewada
Research Scholar,
Deptt. of Home Science,
S.N.G.G.P.G. College,
Shivaji Nagar, Bhopal

Abstract
The state of Madhya Pradesh has 1.3 million severely malnourished children. Nutrition rehabilitation centers (NRCs) were started in the state to control severe malnutrition and decrease the prevalence of severe malnourished children to less than 1% among children aged 1–5 years.

Keywords: SAM (Severe acute malnutrition), bilateral oedemas, PEM (Protein energy malnutrition), NRC (Nutritional Rehabilitation Centre), therapeutic feeds.

Introduction

Acute malnutrition is one of the major public health problems in developing countries like India and one of the contributing causes for high rates of mortality and morbidities among children and mothers. It is an underlying cause of about 50% deaths in children.

The prevalence of underweight children in India (47%) is among the highest in the world. (Source: NFHS III 2005-06). In India, child malnutrition is mostly the result of high levels of exposure to infection and inappropriate Infant and Young Child Feeding (IYCF) and caring practices, and has its origins almost entirely during the first two to three years of life. Besides increasing risk of death and disease, under nutrition includes a wide array of effects in U5 population including, IUGR resulting in low birth weight babies, underweight, stunted, wasted children and less visible micronutrient deficiencies. The Lancet, "Maternal and Child Under nutrition" Special Series, January 2008 cites that focus is required on the "Window of Opportunity" from minus 9 to 24 months (i.e. from pregnancy to two years old) for high impact in reducing death, disease and avoiding irreversible harm. Under nutrition also results in repeated bouts of infectious diseases causing a heavy toll of preventable child deaths annually.

Within the country itself, malnutrition occurs unevenly, with the central state of Madhya Pradesh witnessing the very highest rates of underweight children under the age of three. As per NHFS-3 (2005-06) Madhya Pradesh has the highest burden of underweight (60%) and SAM (12.6%) children. Though the situation has improved with a decline of underweight children to 51.7% and severe wasting to 8.3% in U5 children (NIN 2010); suggesting that the State's efforts in curbing malnutrition have been fruitful. Likewise, there has also been a decline of 21.2 points in the U5MR, i.e. from 94.2 (NFHS III 2005-06) to 73 (SRS 2012).

Functioning of NRCs

At the centers nutritional and medical intervention (appropriate antibiotics, deworming tablets, iron supplementation, and micronutrients) is provided to the children. Severe malnourished children are recognized in their respective localities by the Anganwadi Workers (AWWs) and brought to the centers by the AWWs. An incentive of Rs 100 is provided to the AWW for counseling of the mother to stay at NRC for 14 days at the time of admission. At NRCs, the children are admitted and nutritionally rehabilitated for a minimum period of 14 days using therapeutic feeding diets (F-75, F-100 and lactose free diet) prepared using locally available foodstuff. If needed the children are medically rehabilitated as per the Indian Academy of Pediatrics (IAP) protocol for severe malnourished children. Supervised feeding of therapeutic diets is done by the NRC staff (Feeding Demonstrators and Cooks) and medical intervention is provided

Periodic Research

by the doctor in charge and the nurses at the centers. The mothers of the children are made to stay at the centers where counseling sessions focusing on health and nutrition aspects are conducted for them. The mothers are also provided hands on training on composition and preparation of the therapeutic diets and given compensation for daily wage loss as per guidelines during their stay at the NRCs.

The children are discharged after a minimum period of 14 days, provided the child does not show any obvious signs of infection or edema, has received the stipulated amount of micronutrients, is gaining at least 10 g/ kg/ day, and the mother has improved understanding of correct feeding practices. The children are again brought to the center by the AWWs on the designated follow-up dates at 15 days, 1 month, 3 months, and 6 months following discharge from the NRCs wherein the AWWs are paid an incentive of Rs. 100 for bringing the child for each follow-up visit. The mother also receives a sum of Rs. 70 to compensate for her daily wage loss. The same anthropometric measurements are taken on the follow-up visit and the child treated for medical conditions; the child is also readmitted if needed.

Objectives

1. Evaluate the effect of nutritional interventional measures undertaken at NRCs in improving the nutritional status of admitted children through review of select anthropometric indicators at the time of admission and discharge and during their stay at the centers.
2. Follow-up the study group after discharge to check the compliance level among beneficiaries to recommended follow-up visits and assess the effect on nutritional status through review of select anthropometric indicators following discharge.
3. Ascertain the awareness and knowledge amongst mothers of the admitted children regarding the practices followed at NRCs during their stay at the centers.

Review of Literature

Degrees of protein energy malnutrition-

Shaaban SY, Marzouk D, 2005 had conducted a cross-sectional study, in which group were classified into three groups according to their weight for age percentiles, underweight children, borderline malnourished children and normal weight children.

Odunaya SI, Oyewole AO, 2006 had stated that, the prevalence of PEM was 20.5% whereas the prevalence of underweight, wasting and stunting using the WHO/National centre for health statistics standards were 23.1%, 9%, and 26.7%.

Tripathi MS, Sharma V, 2006 had conducted the study which includes the classification of degrees of malnutrition as per IAP showed that majority of the subjects (66%) were under weight (Grade I and Grade II). Water lows classifications revealed that majority of these preschoolers were wasted (30%) and stunted (42%).

Hypothesis

1. NRC admitted children are nutritionally poor.

2. NRC provides nutrition care and health care practise.
3. NRC takes helps with UNICEF for malnourished children.

Materials and Methods

The present study was conducted in four NRCs (Bairagarh, Bairaseya, Jay Prakash, People hospital NRCs located Bhopal districts of Madhya Pradesh. At the time of initiation of the study, 4 functional NRCs. NRCs were purposive selected for the study. Owing to time constraints and the 60 days follow-up period involved, the study was conducted on a predecided sample size of 150 children aged between 0 and 60 months admitted to the selected NRCs. The study design was prospective, wherein 150 children were recruited from the four NRCs and were then followed up for the period of 60 days programs (incorporating four follow-up) to assess the nutritional status during the period of initial stay and the entire follow-up period using available records of anthropometric indicators of the admitted children recruited in the study at the NRCs.Children were recruited from the different NRCs depending upon the bed capacity and the patient turnover rate at the centers during the study period [Table 1]. The four selected NRCs were visited by the investigators at intervals of 14 days during the NRCs and all children admitted at that particular day of the visit were included in the study.

Figure 01

Sampling & enrollment of study participants-

Purposive sampling technique was used for data collection. In total 150 samples were collected from four different NRCs established in four different hospitals of Bhopal.

Data coding and data analysis

Recorded data were quantified and were entered into excel sheet later data was export into advance statistical software (SPSS v19) for further analysis and testing of hypothesis applying appropriate statistical tests to assess pre and post intervention during admission in NRC.

Table 1 Representation of Sample

Name of NRC	Sample selected
Bairagarh	40
Bairaseya	40
Jay Prakash	40
Peoples	30

Selected nutrition rehabilitation centers and

corresponding study subjects Weight at the time of admission and discharge and daily weights were recorded from the NRC registers; average weight gain was calculated to see if it was in accordance with the available guidelines.Appropriate statistical tests were applied to ascertain any significant difference between the mean weights at discharge and the mean weight at admission for the study group. In addition, the MUAC and grades of malnutrition at admission and discharge were also recorded and the average duration of stay at the centers studied to establish any difference amongst the different age groups.

The children included in the study were followed up for 60 days program to observe the compliance during the follow-up period; follow-up records at the centers were analyzed to calculate the number of subjects with loss of weight at each follow-up visit, and the mean loss of weight compared to the previous follow-up visit.

Results

Effect on selected anthropometric Indicators of the admitted children during stay at the NRCs.

Table 2: Output Indicator

Indicators	Frequency of children
Cured	86
Death	2
Non Responder	51
Defaulter/LAMA	11

The results of variable Output Indicator from NRC SAM Chart. The results depict that 86 children out of 150 were cured, 51 children were non responder, 02 died and 11 children were found LAMA or defaulter.

Table 3: Age of Children admitted in NRC

Category of age	Frequency of children in

	each age category
< 6 months	9
6 to 12 months	38
13 to 24 months	63
25 to 36 months	21
37 to 58 months	19

Table 4: Height of Children

Category of Height	Frequency of children in each age category
<60 cm	20
61 to 80 cm	110
81 & above	20

Table 5: Weight of Children

Category of Weight	Frequency of children in each age category
Upto 5 kgs	31
5.05 to 8.05 kgs	95
8.06 & above	24

Table 6: Analysis of the admitted children based on MUAC

Category of age	Frequency of children in each age category
Children age less than 6 months	9
< 10	14
10.1 to 12.9	118
13 & above	9

Analysis of follow-up data

Table: 07

Two-Sample Kolmogorov-Smirnov Test comparing the first day and 14th day change of Weight of children admitted to NRC.

Admission to NRC	N	Mean	Standard deviation	Value of 'Z'	Significance
1st Follow up check up	133	6.98	2.098	0.588	<0.05
4th Follow up check up	119	7.11	2.082		

Significant value at 0.05- 0.69,Significant value at 0.01- 0.70

The **Two-Sample Kolmogorov-Smirnov 'Z' Test** was calculated to see the difference between 1st follow up check up and 4th follow up check up change in weight of the children follow up check up in NRC. The result of the Z-test showed that the mean difference between the average weight of 1st follow up check up of children (M=6.98) and 4th follow up check up of children (M=7.11). A difference in standard deviation of 0.101. However, the 1st follow up check up the number of children were 133, which was reduced to 119 at 4th follow up check up. However, after looking to the calculated value of Z= 0.588 the results of weight difference is found statistically significant at 0.01. It was also noted from the table values of Z test that the calculated value of 'Z' is more than the given table values at 0.05 & 0.01 significant level. Hence, it can be said that children follow up check up in NRC gain weight because of proper nutritional and health care.

Table: 08

Two-Sample Kolmogorov-Smirnov Test comparing the first day and 14th day change of W/H-L Z_SCORE (SD) of children admitted to NRC

Admission to NRC	N	Mean	Standard deviation	Value of 'Z'	Significance
1st Follow up check up	121	-2.35	.972	1.14	<0.05
4th Follow up check up	104	-2.04	.924		

Significant value at 0.05- 0.92,Significant value at 0.01- 0.92

The **Two-Sample Kolmogorov-Smirnov 'Z' Test** was calculated to see the difference between 1st

Periodic Research

follow up check up and 4th follow up check up change in W/H-LZ_SCORE(SD) of the children follow up check up in NRC. The result of the Z-test showed that the mean difference between the average W/H-LZ_SCORE(SD) of 1st follow up check up of children (M=-2.35) and 4th follow up check up of children (M=-2.04).A difference in standard deviation of 0.101. However, the 1st follow up check up the number of children were 121, which was reduced to 104 at day

4th follow up check up. However, after looking to the calculated value of Z= 1.14 the results of W/H-LZ_SCORE(SD) difference is found statistically significant at 0.01. It was also noted from the table values of Z test that the calculated value of 'Z' is more than the given table values at 0.05 & 0.01 significant level. Hence, it can be said that children follow up check up in NRC gain W/H-LZ_SCORE (SD) because of proper nutritional and health care.

Table:09

Two-Sample Kolmogorov-Smirnov Test comparing the first day and 14th day change of MUAC of children admitted to NRC

Admission to NRC	N	Mean	Standard deviation	Value of 'Z'	Significance
1st Follow up check up	126	12.10	5.906	1.43	>0.01*
4th Follow up check up	111	11.98	1.467		

Significant value at 0.05- 0.92 ,Significant value at 0.01- 0.92

The **Two-Sample Kolmogorov-Smirnov 'Z' Test** was calculated to see the difference between 1st follow up check up and 4th follow up check up change in MUAC of the children in NRC. The result of the Z-test showed that the mean difference between the average MUAC of 1st follow up check up of children (M=12.10) and 4th follow up check up of children (M=11.92).A difference in standard deviation of 0.101. However, the 1st follow up check up the number of children were 126, which was reduced to 111 at 4th follow up check up. However, after looking to the calculated value of Z= 1.43 the results of MUAC difference is found statistically significant at 0.01. It was also noted from the table values of Z test that the calculated value of 'Z' is more than the given table values at 0.05 & 0.01 significant level. Hence, it can be said that children follow up check up in NRC gain MUAC because of proper nutritional and health care.

Discussion

The study findings show that a major proportion of the admitted children belonged to the marginalized population groups. The findings are in accordance with that of NFHS-III, which states that children belonging to the SC, ST, and OBC and that those with illiterate mothers have the highest rates of malnutrition.

The mothers attending the centers had limited knowledge regarding the basic concepts of nutrition, the Government Health Programmes on nutrition and the composition and preparation of therapeutic feeds at the centers. Mothers are specifically kept at the centers so that they can so that they can be integrated into the effective care of the children and are taught the preparation of the therapeutic diets from locally available material. Surprisingly, this fact is often ignored and at the centers and much attention is paid to the improvement in nutritional status of the children, which is essentially considered to be the criteria of the success of the programme.

Thus NRCs cannot be the only tool to combat malnutrition; the study results show that the NRCs have had a positive impact on the selected anthropometric indicators of severe malnourished children but lag behind in the educational aspect and ensuring proper follow-up visits. Linking of NRCs with

the community-based Core Model of Management of severe malnourished children needs to be put into place as soon as possible.

Conclusion

The NRCs were effective in improving the condition of admitted children, but the effects were not sustained following discharge due to high drop-out rate and lack of adequate parental awareness. There is an urgent need to link these centers with community-based models for follow-up and improve health education measures to maintain the gains achieved.

This model is the current protocol envisaged by the World Health Organization and provides a framework for an integrated Public Health response to curb malnutrition, treating most patients with severe malnutrition at home with inpatient care being reserved for those with acute complications, thereby minimizing the cost to families and maximizing access to treatment.

References

1. Chaudhury M. Madhya Pradesh: Epicentre of hunger. NDTV. [Last accessed on 2009 Aug 20]. Available from: http://www.ndtv.com/news/india/madhya_pradesh epicentre_of_hunger.php .
2. Bal Shakti Yojna. Government of Madhya Pradesh, Innovative Schemes and Programme Interventions under NRHM, Department of Public Health and Family Welfare, Bhopal. [Last accessed on 2009 Aug 20]. Available from: http://www.mp.gov.in/health/nrhm/Innovativenrhm .pdf .
3. Bhatnagar S, Lodha R, Choudhury P, Sachdev HP, Shah N, Narayan S, et al. IAP guidelines 2006 on hospital based management of severely malnourished children (adapted from the WHO Guidelines) Indian Pediatr. 2007;44:443–61.
4. Bal Shakti. New York, USA: UNICEF; 2008. Guidelines for Management of severely Malnourished Children at Nutrition Rehabilitation Centers. Government of Madhya Pradesh.
5. Golden M, Grellety Y. Guidelines for the Integrated Management of the severely malnourished. (Draft copy) 2008
6. Agarwal A. Social classification: The need to

Periodic Research

update in the present scenario. Indian J Community Med. 2008;33:50–1. [PMC free article]

7. Park K. 20th ed. Jabalpur: Banarsidas Bhanot; c2009. Textbook of Preventive and Social Medicine. Preventive Medicine in Obstetrics, Pediatrics and Geriatrics: Growth Charts used in India; pp. 470–1. Chapter.

8. Secretariat health Services; Government of Madhya Pradesh: Guidelines to improve services in functioning of Nutrition Rehabilitation Centers. No R.C.H/09/5734; 30.06.09.

9. Mumbai: IIPS, ORC Macro; 2005. International Institute of Population Sciences. National Family Health Survey –3.

10. Savadogo L, Zoetaba I, Donnen P, Hennart P, Sondo BK, Dramaix M. Management of severe acute malnutrition in an urban nutritional rehabilitation center in Burkina Faso. Rev Epidemiol Sante Publique. 2007;55:265–74.