Evaluation of Growth Progress among Malnourished Children Attending Village Child Nutrition Centre (VCNC) Under Mission Balam Sukham at Ahmedabad District, Gujarat

Bhavesh Prajapati[1], Aparajita Shukla[2]

[1] Assistant Professor, Department of Community Medicine, Dr N D Desai Faculty of Medical Science and Research, Nadiad, Gujarat

[2] Professor and Head, Department of Community Medicine, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat

Correspondence : Dr. Bhavesh Prajapati, Email:drbhavesh89@gmail.com

Abstract:

Introduction: Government of Gujarat launched "Mission Balam Sukham" in the year 2012 to combat the malnutrition with three tier approach. At village level Village Child Nutrition Center (VCNC) runs at Anganwadi centers where children with Severe Acute Malnutrition (SAM) and Moderate Acute Malnutrition (MAM) children aged 6 months to 6 years without any medical complications are enrolled for 30 days and provided with the nutrition supplements as per standard protocol including micronutrients. **Objectives:** To study the growth progress among malnourished children after one month of intervention at VCNC. **Method:** A cross sectional study was conducted over one year period in selected VCNCs of Ahmedabad District. All the malnourished children admitted to these selected VCNCs during study period were included in the study. Data on weight status at admission and discharge, rate of weight gain, grade of malnutrition at entry and exit were collected from the records and analyzed using statistical software. **Results:** A total of 934 malnourished children were included in the study. A statistically significant difference was observed for weight at discharge (11.1 ± 2.07kg) and weight at admission (9.92 ± 1.77kg) for all the children. About 8.7 % children in urban and 16.5 % in rural area achieved the recommended weight gain of 5 grams/kg/day and the difference was statistically significant. In urban and rural area children who achieved the target (>15%) weight gain was 6.3% and 14.7%, respectively and this difference was statistically significant. **Conclusion:** In the current study, 7.3% children achieved the target (>15%) weight gain. Suggesting that VCNC supplementation for 1 month was not found adequate to give desired result.

Keywords: Malnutrition, Mission Balam Sukham, Nutritional Intervention, Village Child Nutrition Centre

Introduction:

Adequate nutrition is essential in early childhood to ensure healthy growth, proper organ formation and function, a strong immune system, and neurological, psychosocial and cognitive development.[1]

Malnutrition is both undernutrition and over-nutrition ranging from severe nutrient deficiencies to extreme obesity.[2] Undernourished children have significantly higher risk of infections which lead to higher morbidity and mortality. Children suffering from Severe Acute Malnutrition (SAM) are 9 times more likely to be died than well nourished children.[3] An inappropriate feeding practice is still believed to account for at least one-third of causes of malnutrition, and contributes significantly to morbidity and mortality, among children under five.[4]

Each year approximately 2.3 million deaths among 6-60 months aged children in developing countries are associated with malnutrition, which is about 41% of the total deaths in this age group.[5] More than half of all deaths before age five years in India are related to malnutrition. The National Family Health Survey-5 (NFHS-5) conducted during year of 2019-2020 showed that in Gujarat the prevalence of severe wasting is 10.6 percent among all children under-five years of age.[6] In of children under five years of age 39 percent are stunted and 39.7 percent are underweight.

Government of Gujarat has started "Mission Balam Sukham" to address and improve the nutritional status of the children.[7] There are two approaches for management of children under Mission Balam Sukham. First is Home or Community Based management and second one is Inpatient or Facility Based management. The integrated management of malnourished children is done through – 3 tier approach including Village Child Nutrition Center (VCNC), Child Malnutrition Treatment Center (CMTC), Nutrition Rehabilitation Center (NRC).[8]

At village level VCNC runs at anganwadi centers managed by Anganwadi Worker (AWW), Anganwadi Helper (AWH) and Accredited Social Health Activists (ASHA). Severe Acute Malnutrition (SAM) and Moderate Acute Malnutrition (MAM) children aged 6 months to 6 years without any medical complications are enrolled for 30 days. Nutrition supplements are given as per standard protocol including micro nutrients like Vitamin-A, Iron, folic acid and Zinc. Malnourished Children are provided 5 meals per day including 2 ICDS meals containing total 1000 kcal and 30 grams of proteins for 6 to 36 months age and 1270 kcal and 40 grams of proteins for 3-6 years of children. Parents of malnourished children are also counseled for home based care, health and sanitation.[9] This study has been taken up to evaluate the growth progress among malnourished children at these centers.

Method:

It was a Cross Sectional study conducted during the period from November 2016 to November 2017 in selected VCNCs of Ahmedabad District. All 80 VCNCs registered under urban and rural field practice area of community medicine department were selected for data collection. All the malnourished children within the age of 6 months to 6 years were included. Children above the age of 6 years or having any disease or complication were excluded from study. Total 934 malnourished children admitted to these selected VCNCs during study period were included. Data on weight status at admission and after one month of admission, rate of weight gain (acceptable weight gain is 15% or more from the baseline weight after one month of admission), grade of malnutrition at entry and exit were collected from the records. The Data collected was entered in Microsoft excel worksheet and analyzed using statistical software. The Z-score of anthropometric data was calculated using the new international reference population released by the WHO.[10] Chi-square test was used to assess the difference between the frequency distributions and t test was used to compare difference between the means. Ethical Clearance from Institutional Review Board of the Medical College has been obtained.

Results:

Total 934 malnourished children aged 6 months to 6 years from 80 VCNCs were selected from both urban and rural area and their baseline data and follow up data was collected to evaluate growth progress. Growth progress among malnourished children was analyzed based on their age, sex and malnutrition grade.

With regards to age distribution majority of children (50.2%) were in age group of 37 to 60 months followed by 13 to 36 months' age group (46.6%) and 6 to 12 months' age group (3.2%). (Figure 1) Out of total children, 53.1% were girls and 46.9% were boys.

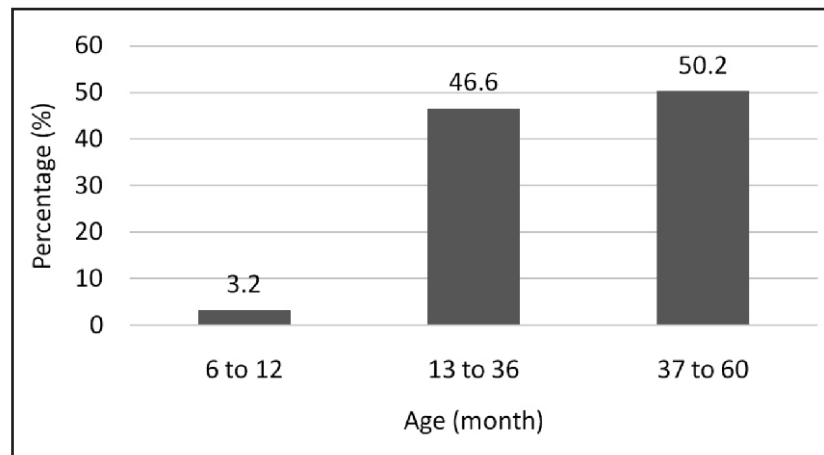**Figure 1: Age wise distribution of children (N=934)**

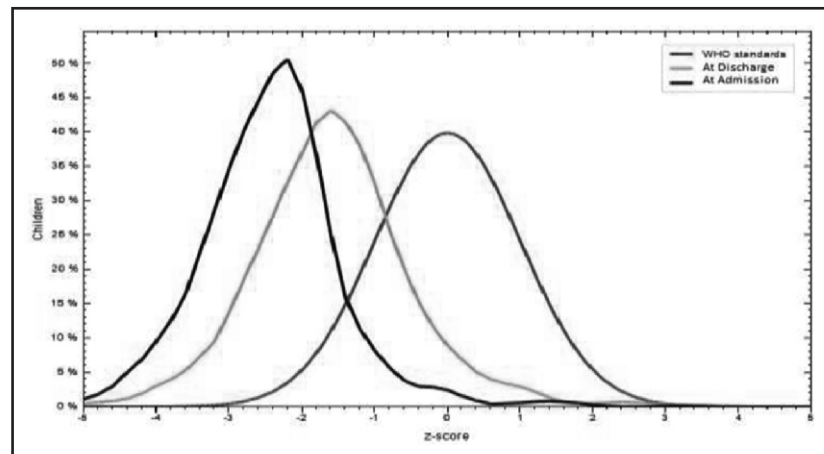**Figure 2: Z-score for weight for age at admission and discharge (N=934)**

Table 1: Age, Gender and Malnutrition grade wise distribution of children (N=934)

YELLOW Classification			
Age (Months)	Boys	Girls	Total
6 - 12	10 (3%)	10 (2.8%)	20 (2.9%)
13 – 36	165 (50%)	157 (43.1%)	322(46.4%)
37 - 60	155 (47%)	197 (54.1%)	352 (50.7%)
Total	330 (100%)	364 (100%)	694 (100%)
RED Classification			
Age (Months)	Boys	Girls	Total
6 - 12	5 (4.6%)	5 (3.8%)	10 (4.2%)
13 – 36	52 (48.2%)	61 (46.2%)	113 (47.08%)
37 - 60	51 (47.2%)	66 (50%)	117 (48.75%)
Total	108 (100%)	132 (100%)	240 (100%)

Table 2: Mean weight of children at time of admission and discharge (N=934)

Gender	Weight at Admission (Mean ± SD)	Weight at Discharge (Mean ± SD)	p value (paired t test)
Boys(n=438)	9.98 ± 1.76	11.17 ± 2.15	< 0.0001
Girls(n=496)	9.87 ± 1.79	11.05 ± 2.0	< 0.0001
Total(n=934)	9.92 ± 1.77	11.1 ± 2.07	< 0.0001

Table 3: Average weight gain (gm/kg/day) of the children (N= 934)

Area	Average weight gain (gm/kg/day)		
	Not Acceptable (<5 gm/kg/day)	Acceptable (≥5 gm/kg/day)	Total
Urban	753 (91.3%)	72 (8.7%)	825 (100%)
Rural	91 (83.5%)	18 (16.5%)	109 (100%)
Total	844 (90.4%)	90 (9.6%)	934 (100%)

Chi-square value = 5.83, df = 1, p value = 0.015

Table 4: Percentage of weight gain from base line among the children (N=934)

Area	Average weight gain (%)		
	Acceptable (≥15%)	Not Acceptable (<15%)	Total
Urban	52 (6.3%)	773 (93.7%)	825 (100%)
Rural	16 (14.7%)	93 (85.3%)	109 (100%)
Total	68 (7.3%)	866 (92.7%)	934 (100%)

Chi-square value = 8.8, df = 1, p value = 0.003

Children whose weight for age Z-score is below the three standard deviations (<-3 SD) are considered in red classification and children whose weight for age Z-score is below -2 SD are considered in yellow classification according to WHO growth chart.[10] According to WHO growth standards, 694(74.3%) children including 330 boys and 364 girls were in yellow classification and 240 (25.7%) children including 108 boys and 132 girls were in red classification. In both yellow and red category majority of children were in 37 to 60 month age group followed by 13 to 36 month and 6 to 12 month age group. (Table 1)

All children's baseline weight was compared with weight measured at the end of 1 month. An average weight gain was calculated and compared. Table 2 shows mean weight of children at the time of admission and discharge. A statistically significant difference was observed for weight at discharge (11.1 ± 2.07) and weight at admission (9.92 ± 1.77) for all the children (t=31.24, p<0.0001). The observed difference of mean weight of 438 boys at the time of admission (9.98 ± 1.76 kg) and discharge (11.17 ± 2.15 kg) was statistically significant (t=33.47, p<0.0001). The difference of mean weight of 496 girls at the time of admission (9.87 ± 1.79 kg) and discharge (11.05 ± 2.0 kg) was statistically significant (t=33.44, p<0.0001). There was no obvious difference of weight gain between boys and girls.(Table 2)

VCNC performance indicators include average weight gain of minimum 5 gm/kg/day. Of the total 934 children, about 9.6% of children achieved the recommended weight gain of 5 g/kg/day, with the average weight gain being 7.89 ± 4.49 g/kg/day. Among them 8.7 % children in urban and 16.5 % in rural area achieved the recommended weight gain with the average weight gain being 7.33 ± 3.9 g/kg/day and 10.12 ± 5.96 g/kg/day respectively. The difference in weight gain between children in urban and rural area was statistically significant. (Table 3)

VCNC guideline has taken 15% or more weight gain from the baseline weight as significant weight gain among the malnourished children. At the end of every month, numbers of children were calculated who gained the 15% or more of baseline weight. Out of total 934 children, only 7.3% children achieved the target (>15%) weight gain. In urban and rural area children who achieved the target (>15%) weight gain was 6.3% and 14.7%, respectively and this difference was statistically significant.(Table 4)

Z-score for weight for age criteria was calculated using WHO anthro software. An average difference in Z-score for weight for age was calculated and compared at the end of month. As shown Figure 2, there was Z-score increment among children was observed after one month.

Discussion:

Demographic data showed a share of girls (53%) in children admitted to the program and half of the children admitted into the program were less than 3 years of age. Similar findings were observed by Pandya VP et al.[11] This has major public health implications for the prevention and reversal of acute malnutrition and also suggests that active case-detection strategies may benefit from focusing on this age group. In this study, 7.3% of children who completed the treatment were cured. Cured rate in studies done by Pandya VP et al[11] was in the acceptable range but in ours and other study by Zalavadiya et al.[12] it was below the acceptable range.

A review study involving thirty-three studies of community-based rehabilitation for malnourished children were examined and summarized concluded that eleven (33%) programs were considered effective. Effectiveness was defined as mortality of less than 5% and an average weight gain of at least 5 g/kg/day. High energy intakes (> 150 kcal/kg/day), high protein intakes (4–6 g/kg/day), and provision of micronutrients are essential for success.[13] The result suggests that short term VCNC supplementary nutrition was helpful to borderline malnourished children to overcome/improve their malnutrition grades in short period.

Sanghvi J. et al[14] study done at Madhya Pradesh studied Predicators for Weight Gain in Children treated for Severe Acute Malnutrition showed that other than therapeutic diet, factors such as occurrence of recurrent infections, presence of systemic illness, and socioeconomic status play an important role in deciding the weight gain in children treated for SAM. To reduce childhood malnutrition due emphasis should be given in improving the knowledge and practice of mothers on appropriate infant and young child feeding practices.[14]

Conclusion:

In the current study, 7.3% children achieved the target (>15%) weight gain. There was no obvious difference of weight gain between boys and girls. The number of children who achieved the target (>15%) weight gain was significantly higher in rural than urban area. VCNC supplementation for 1 month was not found adequate to give sustained result. Extension of VCNC intervention to longer than one month may give the better and sustained malnutrition improvement. Evaluation after six months of intervention including compliance of continued feeding at home is also recommended.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Black R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., De Onis, M., Ezzati, M., & Rivera, J. (2008). Maternal and child undernutrition: global and regional exposures and health consequences. The lancet 2008; 371(9608):243-60.

2. Kandala NB, Madungu TP, Emina JBO, Nazita KPD, Cappuccio FP, Malnutrition among children under the age of five in the Democratic Republic of Congo (DRC): does geographic location matter? BMC Public Health. 2011;11:261.

3. Report by Core committee, High court of Karnataka. Comprehensive Master Action Plan on Prevention of Malnutrition of Children in the State of Karnataka. Karnataka, India: altawform; 2013. p1-2.

4. World Health Organization. Childhood nutrition and progress in implementing the International Code of Marketing of Breast-milk Substitutes. Report by the Secretariat. A55/14. Geneva: World Health Organization, 2002.

5. Sahu SK, Kumar SG, Bhat BV, Premarajan KC, Sarkar S, Roy G, et al., Malnutrition among under-five children in India and strategies for control. J Nat ScBiol Med. 2015;6:18-23.

6. National Family Health Survey-4 (NFHS-4) Reports 2015-16. International Institute for Population Sciences, December 2017.

7. Mission BalamSukham. Available at:http://nrhm.gujarat. gov.in/mission balam sukham. htm. Accessed on July 21st, 2014.

8. Guidelines for Management of Severe Acute Malnutrition (SAM) Children at Nutrition Rehabilitation Center. Department of Health & Family Welfare, Government of Gujarat; 2012.

9. Guidelines on Management of Bal Shaktim Kendra (Village Child Nutrition Center) at the level of Anganwadi. Health and family welfare department, Government of Gujarat; 2012.

10. WHO. WHO Child Growth Standards: Methods and development: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age. WHO; Geneva: 2006.

11. Pandya VP et al., Studying the effectiveness of mixed models of community based and institutional based interventions for management of severe acute malnourished children. Int J Res Med Sci. 2015, Jul;3(7):1758-1764

12. Zalavadiya et.al., Evaluation of growth progress among malnourished children attending village child nutrition centre (vcnc) under the programme 'mission balamsukham' in a tribal area of western india.Int J Cur Res Rev | Vol 8,Issue 9,May 2016,31-39.

13. Ashworth A. Efficacy and effectiveness of community-based treatment of severe malnutrition 2006.

14. Sanghvi J, Mehta S, Kumar R. Predicators for weight gain in children treated for severe acute malnutrition: A prospective study at nutritional rehabilitation center. ISRN Pediatrics. 2014;2014:5.