Management of Severe Acute Malnutrition in Day Care Settings : Findings from Innovative Public Private Partnership at Devbhumi Dwarka District, Gujarat

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Abstract:

Introduction : Severe Acute Malnutrition (SAM) is a major public health concern that is linked to a high mortality rate in children under the age of five. Government of Gujarat has expanded treatment network from government facilities to private institutions and non-governmental organizations through various initiative in an effort to address the issue of SAM. **Objective:** To assess the treatment outcome among SAM children (0-5 years) admitted at Niramay Bal Poshan Kendra, Jam Khambhalia, Devbhumi Dwarka District of Gujarat. **Method:** A longitudinal study was conducted among SAM children admitted at the Niramay Bal Poshan Kendra (Public Private Partnership model under Bal Poshan Yojana) which is a day care center providing treatment to SAM children for 14 days according to the protocol of NRC (Nutrition Rehabilitation Centre). Under Bal Poshan Yojana, RBSK medical officers screen children for SAM and refer them for treatment at empanelled NGO/Private institution. Total 1557 under five children were screened by them between 6th September 2021 and 5th February 2022. Out of them 121 SAM children were identified, 95 children could be mobilized at the study site (Niramay Bal Poshan Kendra). Out of 95 children, 76 SAM children completed the treatment along with all three follow up at the study site. The data of these 76 Children was analyzed. **Results:** Among 76 children, average weight gain was 566 grams at the time of discharge and 1000 grams at the time of third follow-up. An average weight gain for the cohort is 5.2 gram/kg/day. At the end of treatment, 92% children moved out of the SAM category at the completion of three follow-up, 55% moved to Moderate Acute Malnutrition and 37% to normal weight category. **Conclusion:** An average weight gain among the study population was satisfactory. Day care treatment model provides advantage of improved treatment completion rate and higher follow-up completion. Similar models of SAM treatment can help in effectively tackling menace of malnutrition in Gujarat.

Key Words : Child Day Care Centres, Child Malnutrition Treatment Centres, Public Private Partnership, Severe Acute Malnutrition.

Introduction:

Child malnutrition remains one of the life-threatening causes among under five children. A severely malnourished child has an 11-fold increased risk of dying from common childhood illnesses than a well-nourished child. Globally around one in five deaths among children under five are due to severe wasting.[1] According to the UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates, the global burden of child malnutrition remains an

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Gadhavi G, Bhavasar H, Rathod D, Khepatwal R, Desai V, Saha S, Qureshi A, Ratnu A. Management of Severe Acute Malnutrition in Day care settings: Findings from innovative Public Private Partnership in Devbhumi Dwarka District, Gujarat. Healthline. 2022; 13(4): 328-333.
	DOI : 10.51957/Healthline_466_2022	

alarming issue as there are 144 million (21.3%) children under five are stunted, 47 million (6.9%) are wasted and 38 million (5.6%) are overweight. It has also reported that India has 5,772,472 children under 5 years of age affected by severe wasting between 2017 and 2021, this proves that wasting is a critical public health emergency in India.[1]

As per National Family Health Survey 5, India has witnessed the marginal increase in severe wasting among 0-5 year children from 7.5% to 7.7% (NFHS 4). In the same time period, prevalence of stunting (38.4% to 35.5%) and underweight (35.8% to 32.1%) in children under 5 has been slightly declined.[2] There has been huge differences in SAM prevalence between different states. Maharashtra (10.9%), Gujarat (10.6%), Jammu & Kashmir (9.7%), Jharkhand (9.1%), Assam (9%) and Bihar (8.8) have highest SAM rates, higher than the national average (7.7%).[2] In Gujarat in particular, it has grown in comparison to NFHS 4 (9.5%).

In response to the burden of malnutrition, the Government of India has launched a flagship programme "POSHAN Abhiyaan" or "National Nutrition Mission" in 2018.[3] Currently children with severe acute malnutrition are admitted at facility based Nutritional Rehabilitation Centre (NRC) and managed with medical and therapeutic care. The community-based care has been linked with facility-based care; once discharged from the facility the SAM children are then enrolled into community-based program.

To mitigate the child malnutrition more effectively, Government of Gujarat (GoG) had implemented two approaches; Facility Based Management and Community Based Management of severely wasted children under the Mission Balam Sukham. Along with Government institutions, NGOs, universities, corporate social responsibility divisions of industries have come forward and taken up various initiatives to reduce the prevalence of SAM in India.

In Gujarat, NGO-run hospitals and private physicians have a long tradition of working with government agencies to provide maternal as well as paediatric healthcare and these public-private partnership models have been quite effective. The Chiranjeevi Yojana for improving institutional delivery and Bal Sakha Yojana for new born care are successful example for such partnership.[4,5]

Present study reveals the findings from the NGO providing facility-based nutrition care to the severely acute mal nourished children through an innovative approach. The NGO is funded by an industry (NAYARA Energy Ltd.), managed by academic institution (IIPHG), supported by district administration and implemented by NGO (Niramay Charitable Trust). Niramay Bal Poshan Kendra (Niramaya BPK) has been established as day care center under Bal Poshan Yojana (BPY) scheme since 6th September 2021 at Jam Khambhalia taluka of Devbhumi Dwarka District, Gujarat. The centre has dedicated 20 bedded wards, play area for the children, pantry and garden. Bal Poshan Yojana is an innovative public private partnership under Project Tushti to tap nongovernmental organization and private practitioners' expertise for treatment of SAM children with medical complication in Dwarka District.

Upon the admission at the centre, all the children were treated free of cost. The services include daily transport, daily consultation by a paediatrician and a medical officer, medicines (antibiotic, multivitamin supplements, anti-helminthics, and others deemed necessary by paediatrician), Therapeutic Nutrition (F-75, F-100 and EDNF - Energy Dense Nutritious Food), hot cooked meal for mothers and children, early childhood stimulus activities for children, child health and nutrition learnings for mother, compensation to the mother and transport back to home after the discharge. After the discharge from the centre, every child would be followed up for six weeks as per national treatment protocol.

A present study assesses the treatment outcome of SAM children who availed services at the Niramay Bal Poshan Kendra, Jam Khambhalia taluka of Devbhumi Dwarka District, Gujarat

Method:

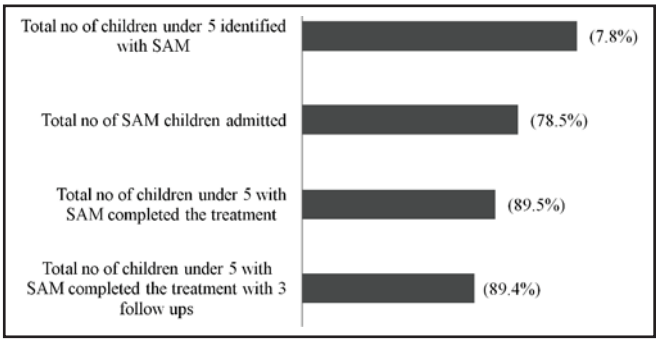
Present study analyses result of the children admitted at the Niramay Bal Poshan Kendra (Niramay BPK) during the period of 5 months from 6th September 2021 to 5th February,2022.

All children were screened by screening team of Niramay BPK at anganwadis across Jam Khambhalia taluka of Devbhumi Dwarka District. All SAM children identified were admitted and intimated to concerned RBSK medical officers immediately. All children were duly verified for presence of SAM by RBSK Medical Officer and Project Tushti team within 24 hours. At the end of treatment for 14 days, weight and height at the time of discharge were again verified by RBSK medical officer, Project Tushti team and Taluka Health Officers. Admission and discharge criteria were as per WHO protocols mentioned in following sections.

According to WHO protocols, any child under five years of age who has been diagnosed as wasted is further classified as Severe Acute Malnourished child (SAM) and Moderate Acute Malnourished child (MAM). A child who has very low weight-for-height/length (Z- score < -3 SD of the median WHO child growth standards), or a mid-upper arm circumference is < 115 mm, or there is a presence of nutritional oedema is diagnosed as a severe acute mal nutrition (SAM) and a child who has 70-80% of median weight-for- height (Z score of >-3SD to <-2 SD), or a mid-upper arm circumference is 116-125 mm and no oedema is classified as a case of moderate acute malnutrition (MAM).[6]

As shown in figure 1, total 1557 children under 5 years of age were screened for anthropometric measurement for weight, height, MUAC and age (using Infantometer, Stadiometer, Weighing Scale and a Measuring Tap). Out of it, 121(7.8%) children were diagnosed as SAM who were counselled for the treatment but 95 (79%) were turned up for the treatment and mobilized at the centre for the treatment. The majority; 85 of them (89%) have completed the treatment. Out of these 85 children, 76 have completed three follow-up till 15th April 2022. Current study recorded the socio-demographic profile these 76 children along with their Mean weight/MUAC gain. Their nutritional status was classified (SAM/SUW/MAM/MUW/Normal) on admission, at the time of discharge as well as during follow-up. Other variables such as successful mobilization rates, treatment completion rates and follow-up completion rates for the centre along with treatment outcome indicators also recorded.

Figure 1: Child Screening and Treatment Details (N=1557)



Results:

Total of 76 children completed 14 days day care treatment followed by six week follow-up. As per Table 1, 53% of SAM children were male. Only 4% children were below age of 6 months. Most of the children (51%) were between age six months to 24 months. Almost every child was born at facility (99%) and 26% were born by C-section. Most of the SAM child were born at term (84%) and most of them had early initiation of breastfeeding (68%),Exclusive breastfeeding for first six months (83%) and full immunization (80%). Low Birth Weight was documented in 41% of SAM children.

As per Table 2, significant increase in weight gain has been noted at the time of discharge and at the 3rd follow up. Mean weight gain from the period of admission to discharge and from the admission to

Table 1: Profile of SAM children who completed the treatment at study site (N=76)

Variables	n (%)
Gender	
Male	40 (53)
Female	36 (47)
Age in Months	
0-6	03 (4)
7-24	39 (51)
25-59	34 (45)
Place of Delivery	
Institutional	75 (99)
Home	01 (1)
Type of Delivery	
Normal	56 (74)
C-section	20 (26)
Early Initiation of Breast Feeding	
Yes	52 (68)
No	24(32)
Exclusive Breast Feeding	
Yes	63 (83)
No	13 (17)
Duration of Pregnancy	
Term	64 (84)
Pre-Term	12 (16)
Birth Weight	
Normal	34 (45)
Low Birth Weight	31 (41)
No data available	11 (14)
Full Immunization (n=69, children age 9 months or above)	
Full Immunization	56 (81.1)
Partial Immunization	13 (18.9)

follow up was 566 grams and 1000 grams respectively. An average weight gain was 7.3% at the time of discharge and 13.09% by the end of follow up. Average MUAC also improved by 4 mm at the time of discharge and 10 mm by end of the treatment.

Figure 2 highlights weight gain in percentage compared to baseline weight. More than one third of children (37%) gained 15% or more while 25% children gained weight between 10-15%. Only 5% children showed poor weight gain between 0-4%.

Figure 2: Percentage weight gain from the baseline among study population (N=76)

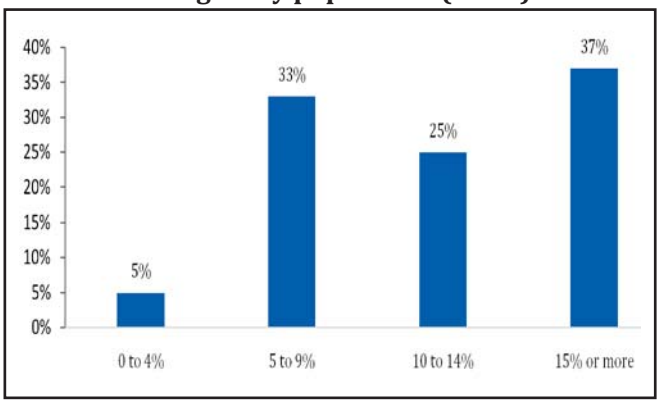


Figure 3: Nutritional status of participants at the time of Discharge

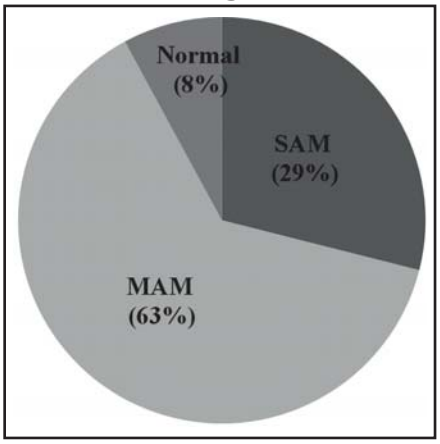


Figure 4: Nutritional status of participants at the time of follow-up

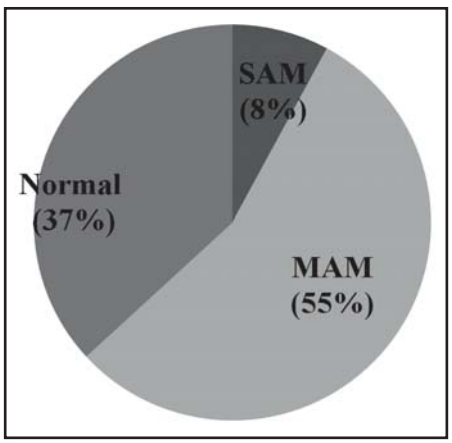


Table 2: Weight gain and MUAC of study participants (N=76)

Indicator	Admission	Discharge	Third Follow-up
Mean weight ± SD(Grams)	7839 ±1935	8405±2115	8839 ± 1983
Mean MUAC ± SD(Centimetres)	11.7 ± 0.8	12.1 ± 0.8	12.7 ± 0.8
Average weight gain in Grams (Mean±SD)	NA	566 ± 389	1000 ± 499
Average weight gain in%	NA	7.3%	13.9%

Table 3: Categories of weight gain (Grams/Kg/Day) among study participants (N=76)

Category	n (%)
Children did not improve (< 1gram/kg/day)	8 (11%)
Poor catch up growth (1 to 5 gram/kg/day)	30 (39%)
Moderate catch up growth (5-10 gram/kg/day)	32 (42%)
Good catch up growth (>10 gram/kg/day)	6 (8%)
Average weight gain in 76 children	**5.2 gram/ kg/day**

As per table 3, weight gain in grams/kg/day at the time of discharge provides information on catch-up growth in children. Most of the children showed moderate catch up growth (42%), while 8% children showed good catch up growth of >10 grams/kg/day. One in ten SAM child(11%) did not improve weight and 39% children showed poor catch up growth.. Average weight gain for the cohort is 5.2 gram/kg/day for 76 children analysed.

Most important programmatic indicator for any malnutrition treatment program is to see how many children have come out of the severe malnutrition or moderate malnutrition to normal weight category. As per figure 3, 71% (54 out of 76 children) had moved from the SAM to either the MAM (63%) or Normal Category (8%) at the time of discharge. The improvement continued in follow up period as well with 92% children moving out of SAM to MAM (55%) and normal weight(37%) category (Figure 4).

Discussion:

SAM prevalence rate for the centre is found to be around 8%. Most of the socio demographic indicators are in line with the various NRC centres across country.[7-9] Previous studies have found that 3 follow-up completion rate to be around 77% compared to 89.4% in present study.[10]

Average weight gain under the program is 5.2 gram/kg/day for the study cohort. This is comparatively better than large study published from similar settings registering average weight gain to be 3.44 gram/kg/day.[10] At least 50% children had moderate catch up growth (5 gram/kg/day) in present study as compared to a study in which 21.2% achieved moderate catch up growth.[10] Nearly one fourth of children (71%) moved out of Severe malnutrition at the end of two week treatment ate centre. Nine out of ten children (92%) moved out of the SAM by the completion of eight weeks treatment.

Present study also highlights that day care setting for SAM children can also achieve findings almost similar to most of NRC studies with 14 days of indoor admissions.[8,9] This is important in improving participants' compliance in completing treatment and follow-up. Patient oriented services such as daily pick-up and drop to the house, daily wage loss payment and permission to bring young siblings have also contributed to the improved treatment completion rate.

Limitation:

Present study is based on a sample size of 76 children who have completed treatment at the centre. A study with larger sample size may provide

better results. Multivariate analysis for factors responsible for the adequate weight gain would have provided more details on causation of malnutrition.

Conclusion:

Average weight gain among the study cohort was 5.2 gram/kg/day. Around 71% children had moved from the SAM to either the MAM (63%) or Normal Category (8%) at the time of discharge. The improvement continued in follow up period as well. Present study has highlighted that day care model of care provides results comparable to 14 days indoor care model. Furthermore, present model of PPP between Government-Corporates-Academia-NGO provides sustainable model for malnutrition management in India. Scaling up such interventions across the state and country can help in reaching out to maximum number of children suffering from SAM and help them come out of the vicious cycle of malnutrition and gain normal growth cycle for improved physical and cognitive development.

Declaration:

Bal Poshan Yojana: A Novel Approach to Facility-Based Severe Acute Malnutrition Management. Cureus 14(8): e28124. DOI 10.7759/cureus.28124 has been published by Soni J, Sheikh F, Umallawala T M, Qureshi, Saha S and Ratnu A. (August 17, 2022) based on the data from three Bal Poshan Yojana centers empanelled under the scheme. Current manuscript analyzed the data from a single center i.e. Niramay Bal Poshan Kendra, Devbhumi Dwarka. This data has not been used in the above cited article and is being used for the first time.

Funding: Nil

Conflict of Interest: Nil

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