# Outcome Assessment of Children Registered for Special Supplementary Nutrition Programme (SSNP) At Village Child Nutrition Centres (VCNCs) of Taluka Kalol, Gandhinagar

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## Abstract:

Introduction: As per the National Family Health Survey (NFHS) 3 in Gujarat, proportions of stunted, wasted and underweight children (< 5 years) were 52%, 19% & 45% respectively." Mission Balam Sukham" launched in January 2013 targeted undernourished children through supplementary feeds. Objectives: To study change in nutritional status after 1 month and 1 year after the enrolment at Village Child Nutrition Centres (VCNC). Method: Children (12 – 47 months) enrolled at 14 VCNCs from 2 PHCs of Gandhinagar were included in study. Demographic/ anthropometric information were taken by trained staff at start (day 0), completion of VCNC stay (1 month) and at 12 months. Data was analysed in MS excel 2007. Results: Of 193 children, based on "Weight ForAge (WFA)" at day 0; 130 (67.5%) were underweight; at1 month, proportion reduced to 61.8% (mean weight gain <5gram/kg/day). However, at 1 year, this proportion increased to69.1%. As per "Weight For Height (WFH)" at day 0,44.8% children were malnourished, at 1 month it reduced to 49.5% but increased to 52.6% at 1 year, it (40/76). Based on "Mid Upper Arm Circumference (MUAC)", 16.6% were undernourished at day 0. At 1 month, this proportion was 12.2% and at 1 year, it decreased further to 5.2%. Stunting, as assessed by "Height For Age (HFA)", was 77.9% at day 0, 74.2% at 1 month and 76.3% at 1 year. Conclusion: 3 criteria for under-nutrition (WFA, WFH & HFA) showed agreement amongst themselves while the MUAC did not. In general, children showed some improvement at end of VCNC stay but slumped back to under-nutrition at end of 1 year. Long term benefits of VCNC based intervention as per this study are not very encouraging.

Key words: Children, Nutritional status, Village Child Nutrition Center

## Introduction:

As per NFHS 3 (2005 – 06) in India, amongst <5 years children, 48% are stunted, 20% are wasted and 43% are underweight. <sup>[1]</sup>HUNGaMA report (2011) in same population also showed 42% underweight and 59% stunted. <sup>[2]</sup> In Gujarat, among similar children, these proportions were 52%, 19% and 45% respectively (NFHS 3). <sup>[3]</sup> Only 42% of children (6-23 months) are fed the recommended minimum times per day, 34% are fed from the minimum number of food groups and only 1 in 5 children are fed according to recommended Infant and Young Child Feeding (IYCF)practices. <sup>[3]</sup>

Keeping in view the high proportion of undernourished children in Gujarat, a 3 tier approach called "Mission Balam Sukham" (welfare of children) <sup>[4,5]</sup> - was launched in January 2013 for management of Severe Acute Malnutrition (SAM) and Moderate Acute Malnutrition (MAM) children. It comprises of following strategies:-

- 1. Village Child Nutrition Centers (VCNCs) at Anganwadi Kendra (AWKs): Children are admitted here and given supplementary nutrition 5 times a day for 30 days.
- 2. Child Malnutrition Treatment Centers (CMTCs) at identified Community Health Centres (CHCs): Children are referred (those who do not respond to intervention at VCNC or develop some illness for duration of 21 days) here from VCNC.
- **3.** Nutrition Rehabilitation Centres (NRCs) at district/medical college hospitals: Children are referred here from CMTCs for 25 days.

Above strategies result immediate improvement but the long term impact depends on the dietary/ feeding advices given to the care givers and also to what extent these advices are complied with. There is paucity of data on long term outcomes of undernourished children after being treated at such nutrition centres. Hence, this study was conducted to find out the outcome of undernourished children after being treated at VCNC (at end of one month) and thereafter at one year.

#### Method:

**Study setting**: AWKs at 2 PHCs of Kalol block where VCNCs commenced from June – November 2013.

#### Study design: Prospective Study

**Study Method:** Total 14 VCNCs were selected which functioned for June - November 2013 (6 months) under 2 PHCs (Rancharda & Hajipur) in Kalol taluka, Gandhinagar and were selected due to the proximity to institute. On day 0,193 children (12 – 47 months) were enrolled in study. Due to the loss during follow up, numbers of children at the end of 1 month were 154. However, 26 children attended the VCNC for < 22 days and for 5 children, the exact attendance information was not available. So these 31 children were excluded from the study. Children included in the analysis were 123 at the end of VCNC stay and 97 (26 loss to follow up) at the end of 1 year.

Inclusion criteria were (1) child> 12 month of age but < 48 months of age and (2) child who was registered and attended any VCNC under study at least for 22 days out of 30 days prescribed stay.

Exclusion criteria were (1) child who was not registered or had attended the VCNC for <22 days, and (2) child who was < 12 months of age or had completed 48 months at the time of joining the VCNC (day 0) and (3) child whose parents were unwilling.

Anthropometric measurements of children enrolled under VCNCs: Weight, Height and Mid Upper Arm Circumference (MUAC) were recorded in all children at start of VCNC (day  $0\pm 2$  days), on completion of VCNC (day  $30\pm 2$  days) and 1 year after start of VCNC ( $\pm 2$  days) by trained paramedical workers during visits at VCNCs. Visits at 1 year were conducted at AWK. Weight was measured by digital weighing scale; height by making a child stand against a scale prepared using simple measure tape and MUAC by Shakir's (tri-coloured) MUAC tape. For the analysis of height parameters, only the children, whose height could be taken appropriately, were included. Children were classified for their under nutrition based on WHO child growth standards.<sup>[6]</sup>

**Qualitative component**: Observations during visit to VCNCs and Focussed Group Discussions (FGD) with Anganwadi workers (AWW) & mothers (1 each) were done to know their perceptions regarding VCNC.

**Data collection and analysis:** Data was collected by trained paramedic staff under direct supervision of investigators after receiving necessary training on a pre-designed questionnaire for basic information of child and anthropometric measurements. Data was entered and analysed using MS Excel 2007. Outcome variables i.e. weight, height & MUAC of children were analysed at 1 and 12 months in relation to baseline indicators (day 0).

**Ethical issues:** Study was undertaken after informing Taluka Health Officer (THO) Kalol and Medical Officers of respective PHCs. Study involved only collection of anthropometric information from the children after obtaining informed consent from parents. Study intended to evaluate long term effect and sustainability of an established public health intervention; hence no ethical clearance was sought. Care givers were informed that every child or parent have full right to discontinue from the study at any stage without giving any reason. All information (personal information & measurements) were kept confidential and used only for research purpose.

#### **Results:**

In the study population (n=193) at start of VCNC, 62 (32.1%) were in 12-23 months, 72 (37.3%) were in 24-35 months and 59 (30.6%) were in 36-47 months with mean age of 29.6 + 10.1 months. Female proportion was 53.4% and male being 46.6%.

Out of 193 children (based on WFA), 130 (67.5%) were underweight. Proportion of underweight children at 1 month reduced to 61.8%.

Zone as per WFA criteria	At start of VCNC No. (%)	At end of VCNC No. (%)	After 1 year of VCNC No. (%)
Green	63 (32.6)	47 (38.2)	30 (30.9)
Yellow- MUW	85(44.1)	44(35.8)	37 (38.2)
Red- SUW	45(23.3)	32 (26.0)	30 (30.9)
Total	193	123	97

#### Table 1: Zone wise distribution of children as per Weight For Age

Note: Children with z score up to - 2 SD are included in green, those with z-score between -2SD and -3SD in yellow and those with z-score below -3SD in the red zones.

However, at the end of 1 year, it got increased from 67.5% to 69.1% (Table 1). Till the end of 1 year, 62 underweight children including 22 severely underweight (SUW), 40 moderately underweight (MUW) could be followed. At the end of 1 month, out of 22 SUW, 17 remained SUW, 4 moved to MUW and 1 to Normal while out of 40 MUW, 31 remained MUW, 5 moved to SUW and 4 to normal. So total 22 were SUW, 35 were MUW and 5 were normal at end of 1 month (Figure 1). At end of 1 year, out of 22 SUW, 16 remained SUW, 3 moved to MUW and 3 to Normal and out of 40 MUW, 26 remained MUW, 12 downgraded to SUW and 2 moved to normal. So total 28 were SUW, 29 were MUW and 5 were normal at the end of 1 year. (Figure 1)

74 (60.2%) of eligible children showed weight gain during VCNC stay. Average weight gain in gm/ kg/ day was 1.4 gm/kg/day only. Only 2 children

#### Figure 1: Follow up status of UW children followed till 1 year (n=62) as per Weight For Age



gained weight between 5-10 g/kg/day, while for the rest, weight gain was <5 gm/kg/day. At start of VCNC mean weight of children (n= 97 who could be followed for 1 year) was  $9.79 \pm 1.80$  kg, at 1 month  $9.91 \pm 1.83$  kg and at end of 1 year of VCNC, it was  $11.06 \pm 1.86$  kg. The differences between the weights were statistically significant (on paired t test p<0.01).

Zone as per WFA criteria	At start of VCNC No. (%)	At end of VCNC No. (%)	After 1 year of VCNC No. (%)
Green	95 (55.2)	49(50.5)	36 (47.4)
Yellow- MAM	65 (37.8)	38 (39.2)	32 (42.1)
Red- SAM	12 (7.0)	10 (10.3)	8 (10.5)
Total	172 (100.0)	97 (100.0)	76 (100.0)

Table 2: Zone wise distribution of childrenas per Weight For Height

Note:

1. Children whose height could be measured properly were only taken into consideration.

2. Children with z score above -2 SD are included in green zone, with z-score between -2SD & -3SD are included in yellow zone and those with z-score below -3SD are included in red zone.

Based on "Weight for Height", 77/172 (44.8%) children (12 SAM & 65 MAM) were malnourished at day 0. The proportion of malnutrition at the end of 1 month increased to 49.5% and at end of a year to 52.6%. (Table 2) Till the end of 1 year, 33 malnourished children (4 SAM, 29 MAM) could be followed. At the end of VCNC, 7 moved to normal. At the end of 1 year, 5 children were normal, rest were still SAM/MAM. (Figure 2)

Figure 2: Follow up status of SAM & MAM children followed till 1 year (n= 33) as per Weight For Height



Based on "MUAC", 32 (16.6%) children were malnourished (6 SAM & 26 MAM) at start of VCNC. Overall proportion of malnutrition as per MUAC was 12.2% at the end of VCNC stay and further decreased to 5.2% at 1 year. (Table 3)

Table 3: Zone wise distribution of children as per MUAC criteria

Zone as per MUAC criteria	At start of VCNC No. (%)	At end of VCNC No. (%)	After 1 year of VCNC No. (%)
Green	161 (83.4)	108 (87.8)	92 (94.8)
Yellow- MAM	26 (13.5)	14 (11.4)	05 (5.2)
Red- SAM	06 (3.1)	01(0.8)	0
Total	193	123	97

Note: children with MUAC < 11.5 cm are in red zone; those with MUAC between 11.5 and 12.5 are in yellow and children with MUAC > 12.5 cm included in green zone.

Till the end of 1 year, 14 malnourished children (3 SAM, 11 MAM) could be followed. At the end of 1 year, 11 moved to normal and 3 remained MAM. (Figure 3)

### Figure 3: Follow up status of SAM& MAM children followed till 1 year (n= 14) as per MUAC



At start of VCNC, mean MUAC of children (n= 97 who could be followed for 1 year) was 13.67 + 1.08 cm, at 1 month 13.71 + 1.01cm and at end of 1 year of VCNC, it was 14.06 + 0.99 cm. The difference between the MUAC at start and end of VCNC was not significant (p>0.05). But it was significant between start and end of VCNC to end of 1 year (on paired t test p<0.01). Stunting was analysed by "Height for Age" criteria which showed 134 (77.9%) children were stunted at start of VCNC. At the end of 1 month stay at VCNC,

Table 4: Zone wise distribution of children as per HFA criteria

Zone as per H/A criteria	At start of VCNC No. (%)	At end of VCNC No. (%)	After 1 year of VCNC No. (%)
Green	38 (22.1)	25 (25.8)	18 (23.7)
Yellow	53 (30.8)	36 (37.1)	23 (30.3)
Red	81 (47.1)	36 (37.1)	35 (46.0)
Total	172	97	76

Notes: 1. Children whose height could be measured properly were only taken into consideration. 2. Children with z-score more than - 2 SD are included in green zone, those with z-score between -2SD and -3SD are included in yellow zone and Children with z-score < -3SD are included in red zone.

proportion of stunting was decreased to 74.2% while at the end of 1 year, it was 76.3%.(Table 4)

At start of VCNC mean height of children (n= 76 whose height could be taken properly and who could be followed for 1 year) was 83.4 + 8.4 cm, at 1 month 84.1+8.2 cm and at end of 1 year of VCNC, it was 90.2 + 7.6 cm. The differences between the heights from start to end of 1 month and to end of 1 year were statistically significant (on paired t test p<0.01).

# Major Findings of FGD with AWWs

- Regarding timings of VCNC, AWWs felt that it was not convenient for themselves, children as well as for their mothers to stay for 9 am to 5 pm.
- On enquiring out of 5 meals how many meals children take, they mentioned that most children were unable to take all 5 meals; usually they take 3 meals. Rest they may take to home which whether child ate or not, cannot be confirmed.
- The reasons why children are not attending VCNC regularly were mothers do not bring their children or if mothers were laborers, they took children along.

 On additional benefit of giving 5 times meals over regular 3 times meals of AWK, they opined that providing 3 meals as per routine schedule is enough.

## **Major Findings of FGD with Mothers**

- Regarding staying for 9 to 5 at VCNC, they said that usually children do not sit for this period and they did not have time to sit with them for this long time.
- Regarding changes in weight of child after VCNC, they were not much aware about it.

## Discussion:

In this study, mean age of children (n=193) admitted at VCNC was  $29.6 \pm 10.1$  months with female proportion being 53.4%. A study conducted in NRC in MP<sup>[7]</sup>, the mean age for the admitted children was  $23.9 \pm 13.7$  months with girls being about 52%.

Proportion of underweight children at 1 month reduced from 67.5% to 61.8%. However, at the end of 1 year, it got increased to 69.1% (Table 1). 60.2% of eligible children showed weight gain after 1 month of VCNC stay with average weight gain of 1.4 gm/kg/day which is considered to be poor as per the WHO Guidelines for the inpatient treatment of SAM child. <sup>[8]</sup>In a study done at Vadodara <sup>[9]</sup>, 83.7% children gained weight after 1 month of attending VCNC with mean weight gain of 1.56 gram/kg/day. Even though the weight gain per day was not satisfactory, the differences between the weights at start and end of VCNC and at the end of 1 year were statistically significant in the present study. Average weight gain difference for 1<sup>st</sup> month was not found statistically significant in Vadodara study.<sup>[9]</sup> However, in MP study <sup>[7]</sup>, difference in mean weights at admission and discharge was statistically significant.

Based on "Weight for Height", 77/172 (44.8%) children were malnourished at day 0. The proportion of malnutrition at the end of 1 month increased to 49.5% and at end of a year to 52.6% (Table 3). Out of 77, 33 could be followed till end of 1 year; of which only 7 (21.2%) moved to normal rest were still malnourished (figure 2). In a study in Vadodara <sup>[9]</sup>, according to weight for height criteria total 40/ 98

(40.8%) were malnourished in VCNC. At the end of 3 months 21(52.5%) children improved their malnutrition.

Based on "MUAC", 32 (16.6%) children were malnourished at start of VCNC. Overall proportion of malnutrition as per MUAC was 12.2% at the end of VCNC stay and further decreased to 5.2% at 1 year (Table 4). At start of VCNC mean MUAC of children (n= 97 who could be followed for 1 year) was  $13.67 \pm 1.08$ cm, at 1 month 13.71 ± 1.01cm (average increase being 0.4 cm) and at end of 1 year of VCNC, it was 14.06  $\pm$  0.99 cm (average increase being 0.39 cm). The difference between the MUAC at start and end of VCNC was not significant. But it was significant between start and end of VCNC to end of 1 year. In a study in Vadodara <sup>[9]</sup>, among children admitted at VCNC, average increase in MUAC was 0.1489+0.3347 cm with no statistical significant difference over 3 months. In a study of MP<sup>[6]</sup>, mean MUAC at admission was 11.32 ± 1.18 cm and at discharge it was 11.94 ± 1.38 cm with statistically significant difference where, quite lower MUAC at admission may be because children admitted at NRC are those who have severe malnutrition.

134 (77.9%) children were stunted at start of VCNC. At the end of 1 month stay at VCNC, this proportion decreased to 74.2% while at the end of 1 year, it was 76.3%. (Table 5) The differences between the heights from start to end of 1 month and to end of 1 year were statistically significant (p<0.01).

In a study from Maharashtra <sup>[10]</sup>, out of total severely and moderately acute malnourished children admitted to VCDC, 76% got improved in total but still the individual indicators showed a piteous picture.

Qualitative findings similar to present study were found in a study at Vadodara <sup>[9]</sup> that it was difficult to make the children sit at Anganwadi centre without their parent (s) from 9 am - 5 pm. Mothers were less willing to be with their child for this much time because they leave their other children at home or had to go to farms during the sowing season. They also concluded that short term VCNC supplementary nutrition was helpful to borderline malnourished children to overcome/improve their malnutrition grades in short period. Over a 3 months or long term period, VCNC supplementation for 1 month was not found adequate to give sustained result.

#### Conclusion & Recommendations:

- Role of VCNC in this study in improving nutritional status of SUW/SAM and MUW/MAM children need a re-look; none of the outcomes, immediate and long term were promising.
- Reduction in weight at 1 year suggests focus was on feeding for instant gains and not on sustaining healthy eating habits. Hence along with the food supplementation, due importance is needed for parental counseling to improve food habits at home.
- Being easy to assess and most sensitive to detect under nutrition & impact of intervention, WFA was best indicator.
- Perceptions of beneficiaries and providers on VCNC were that it is good strategy but needs modifications to make it convenient for both the stakeholders in terms of timings. As per the AWWs, further strengthening the routine supplementary nutrition program at AWC is equally beneficial rather than starting a separate new program.
- AWCs reporting improvement in the nutritional status of children can be showcased and incentivize to motivate them to work effectively for malnutrition.
- It may be noted that assessment of nutritional status of these children is based purely on the anthropometric indicators.

#### Limitations:

- 1. Children who were out of village on day of visit or migrated could not be followed up.
- 2. Actual number of hours of stay, number of meals and the quantity consumed by a child was not monitored.
- 3. Height was measured using simple measure tape with which it was difficult to measure height in uncooperative child leading to reduced denominator for HFA & WFH.

### **Declaration:**

Funding: Nil

# Conflict of Interest: Nil

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