

Operational Experience of Community-based Provision of Ready-to-use-food (RUTF) to Young Children with Severe Wasting in Urban Informal Settlements of Mumbai, India

Research Article

Jayaraman A*, Chanani S, More NS, Waingankar A, Fernandez A and Pantvaiddya S

Society for Nutrition, Education & Health Action, Mumbai, Maharashtra, India

***Corresponding author:** Anuja Jayaraman, Director- Research, SNEHA, Behind Bldg. No. 11, BMC Colony, Shastri Nagar, Santa Cruz (W), Mumbai- 400 054, India, Tel: (+91 22) 26614488 / 26606295 / 24040045; Email: anuja@snehamumbai.org

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Abstract

Background: In India, approximately 7.5 percent of children under five experience severe wasting (low weight-for-height), a measure of severe acute malnutrition (SAM). The WHO and UNICEF recommended the provision of ready-to-use therapeutic foods (RUTF) in community-based programs to treat uncomplicated severe acute malnutrition. In our first objective, we assess the process outcomes of community-based screening for severe wasting and provision of RUTF through community health workers. Second, we compare recovery outcomes of severely wasted children who reportedly consumed MNT with those who reported consuming none to insubstantial quantities of MNT.

Methods: The study follows a case series without a control methodology similar to other program reviews. To compare characteristics of children across treatment groups, we use Pearson's chi-squared tests and to examine recovery outcomes, 8-week anthropometric status is calculated.

Results: Among the 543 children followed up, out of the 338 (62%) who went to a health camp or the NRRC, 174 were confirmed as severely wasted by a doctor, passed an appetite test for MNT, and given a prescription for MNT. Among those who consumed MNT, nearly forty percent of the < 28 cups children remained severely wasted at the time of their anthropometric measurement closest to the 8-week mark as compared with 19% of the 28+ cups children. While a similar percentage of children (about one-quarter) across both groups had fully recovered to no longer being wasted, more children in the 28+ consumption group had shown improvement to moderate wasting (53 percent moderately wasted as compared to 36 percent in the < 28 cups group).

Conclusion: Implementation strategies to improve diagnosis of severe wasting, provision of RUTF, and compliance with RUTF dosages are required. However, the costs and efforts involved in effective coverage of MNT in large-scale community-based programs may not justify the potentially small improvements in recovery.

Keywords: Child Health, Ready-to-use therapeutic foods, Urban Health, Community-based nutrition program, Acute Malnutrition, Medical Nutrition Therapy, India

Abbreviations

SAM: severe acute malnutrition; RUTF: ready-to-use therapeutic foods; IAP: Indian Academy of Pediatrics; SNEHA: Society for Nutrition, Education and Health Action; ICDS: Integrated Child Development Services; MCGM: Municipal Corporation of Greater Mumbai; MNT: Medical Nutrition Therapy; NRRC: Nutritional Rehabilitation and Research Centre; LTMGH: Lokmanya Tilak Municipal General Hospital; WHZ: weight-for-height; HAZ:

height-for-age; WAZ: weight-for-age; ENA: Emergency Nutrition Assessment; CHWs: community health workers; SD: standard deviations; PPI: Progress out of Poverty Index; PPP: Purchasing Power Parity; TEM: technical error of measurement; CMAM: Community-based Management of Acute Malnutrition

Background

In India, approximately 7.5 percent of children under five experience severe wasting (low weight-for-height) [1], a measure of

severe acute malnutrition (SAM) strongly associated with mortality, morbidity, and impaired cognitive development [2]. The WHO and UNICEF recommended the provision of ready-to-use therapeutic foods (RUTF) in community-based programs to treat uncomplicated severe acute malnutrition. RUTF are energy-dense lipid pastes enhanced with micronutrients that do not require refrigeration or any close medical supervision to consume [3,4].

Evidence on the effectiveness of RUTF in community-based programs is primarily from African settings with a few examples from South Asia, which has the greatest burden of child wasting [5-7]. A 2013 Cochrane review concluded that based on the limited evidence, definitive conclusions on the effectiveness of RUTF in comparison to standard diets or other RUTF formulations could not be reached [8]. In one large Indian randomized multi-center trial, locally produced RUTF performed better in recovery and weight gain than augmented home-prepared foods in community-based treatment of uncomplicated severe wasting. However, RUTF was insufficient to bring about recovery for over 40% of the severely wasted children, and among the recovered children, relapse rates were high [9]. The Indian Academy of Paediatrics (IAP) has recognized the potential benefits of RUTF in India, but has noted the urgent need for research on operationalization in diverse settings [10].

Given the immense challenge of child malnutrition in India, comprehensive and multi-sectoral approaches are required to prevent, treat, and sustain the recovery of children with acute malnutrition. From December 2011 through March 2016, the Society for Nutrition, Education and Health Action (SNEHA) implemented a community-based child nutrition program to prevent and treat wasting in urban informal settlements of Dharavi, Mumbai. The program was implemented in collaboration with the largest national child welfare program, the Integrated Child Development Services (ICDS) and with the Municipal Corporation of Greater Mumbai (MCGM). The intervention covered the service areas of 300 ICDS Anganwadis (child care centers), a population of approximately 300,000. Through screening, referral to public health facilities for immunization, deworming, treatment of complications, OPD care in medical camps, growth monitoring and home-based counseling, the program achieved a reduction of 19% in wasting levels in intervention areas [11].

As part of the program activities, eligible severely wasted children could access RUTF, as a supplement to their regular diets, called Medical Nutrition Therapy (MNT), produced by the Nutritional Rehabilitation and Research Centre (NRRC) at Lokmanya Tilak Municipal General Hospital (LTMGH). The Indian Institute of Technology Bombay and Toddler Food Partners (USA) formulated the MNT paste. An MNT cup (100 gram/540 kcal) consisted of milk powder, sugar, vegetable oil, peanut butter, vitamins, and minerals [12]. The objectives of this study are two-fold. Given the lack of operational evidence on multi-sectoral approaches to providing RUTF to severely wasted children at the community-level in urban informal settlements of India, we assess the process outcomes of RUTF through community health workers. Secondly, we compare recovery outcomes of severely wasted children who reportedly

consumed MNT (and other services) with severely wasted children who reported consuming none to insubstantial quantities of MNT (but also received other services).

Methods

Provision of MNT in the child nutrition program

Figure 1 provides an overview of the treatment and follow-up activities for children screened as wasted in the child nutrition program. Children that SNEHA CHWs and ICDS Anganwadi workers screened as wasted (severe or moderate) were referred to SNEHA community-based health camps. At the camp, a pediatrician confirmed the child's severe wasting status and then provided an appetite test for MNT to children over six months of age. Alternatively, children screened for severe wasting could go to the NRRC for a similar medical screening and MNT prescription. Most children (> 75 percent) utilized the SNEHA community-based health camps due to the nearer proximity to their homes as compared with the NRRC. MNT prescriptions provided by both the NRRC and SNEHA doctors were typically 1-2 cups daily over an 8-week period. SNEHA provided the MNT supplements free of cost to mothers and SNEHA community health workers (CHWs) ensured delivery of the cups to the homes of children and supervised mothers to feed MNT to the children who had received MNT prescriptions.

While all children were monitored for growth every month at ICDS Anganwadis, SNEHA CHWs took anthropometric measurements of severely wasted children more frequently, aiming for at least once a week. More detailed descriptions of activities are available in the program evaluation paper [11].

Data Collection

In August 2014, SNEHA began implementing a new tracking system for the MNT component of the program through CommCare, an Android-based mobile application designed for community health workers. During the screening, each child received a unique ID in the CommCare system, and along with their anthropometric information (weight and height), SNEHA CHWs collected some basic socio-economic information. The use of electronic data collection improved the monitoring of prescription, pick-up, delivery, and consumption of MNT for each child.

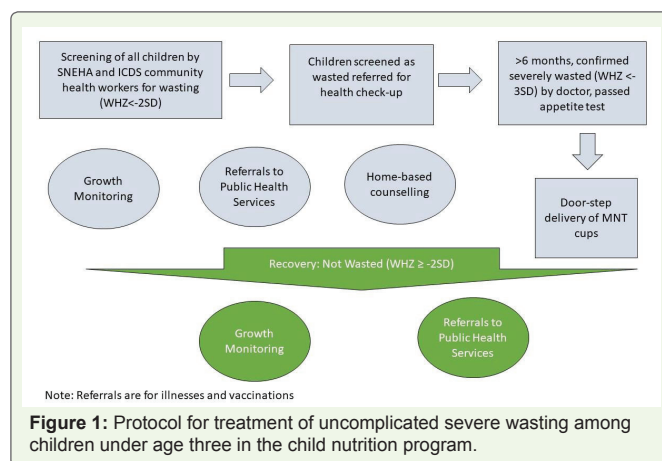


Figure 1: Protocol for treatment of uncomplicated severe wasting among children under age three in the child nutrition program.

SNEHA CHWs collected and updated anthropometric data in CommCare each time the child was measured. Children were categorized as severely wasted, moderately wasted, or not wasted based on WHO 2006 simplified weight-for-height/length field tables [13]. SNEHA CHWs were repeatedly trained in anthropometry with cross-checking of measurements by supervisors. After a child was screened as severely wasted, the SNEHA CHW entered details of whether the child went to a health camp or the NRRC, and if an MNT prescription had been given. Each time the SNEHA CHW delivered MNT cups to the child, she entered information on how many cups of MNT had been consumed since her last visit.

The protocol, questionnaires, and informed consent forms for the evaluation were reviewed and approved by the Institutional Ethics Committee of the Bandra Holy Family Medical Research Society, Mumbai.

Study Design

The study follows a case series without a control methodology similar to program reviews in Malawi [14,15], Myanmar [16], and tribal regions of central-eastern India [17]. The Malawi studies examined 8-week recovery outcomes of malnourished (moderate, severe, or oedematous) children enrolled in operational home-based therapy with RUTF, measuring both clinical status (defined as recovered, failed, died or dropped out) and weight gain. The Myanmar study similarly examined the effectiveness of a low-dose RUTF program by assessing clinical recovery and weight gain for children with uncomplicated SAM. The cohort study in tribal India examined program effectiveness of community-based treatment of severe acute malnutrition by assessing recovery to non-wasting status as well as average change in WHZ score.

Outcomes for children in this study are analyzed for the period between August 2014 and March 2016, when the monitoring system for MNT distribution was deployed on the Android phones. Children included in the study are all children aged 6-36 months and screened as severely wasted between August 2014 and January 2016 (to allow for 8-week follow-up).

While CHWs used the WHO field tables for identification of wasting, the analysis in this study utilizes anthropometric Z scores-WHZ (weight-for-height), HAZ (height-for-age), WAZ (weight-for-age)-calculated using Emergency Nutrition Assessment (ENA) software. The criteria for moderate wasting used in the study are children with weight-for-height/length z-scores (WHZ) lower than two standard deviations (SD) below the median WHO growth standards and equal to or above three SD below the median; severely wasted children have WHZ scores lower than three SD below the median WHO growth standards.

Excluded children were either: marked as an “incorrect” screening by the SNEHA CHW; residing in an unidentifiable Anganwadi location; screened with a WHZ score that was not approximately <-3 SD after calculating ENA z-scores; screened with a WHO outlier WHZ score; and marked as failing to pass the MNT appetite test.

Process Outcomes Assessed

To examine the operational outcomes of the program the study

includes: 1) the number of children who accessed a SNEHA health camp or the NRRC after being screened for severe wasting; 2) among those who followed through with the above referral, the number of children who subsequently were confirmed as severely wasted and given an MNT prescription. The study also evaluates effective coverage by examining the outcome of the number of children who consumed at least 28 cups of MNT within eight weeks of receiving their MNT prescription.

Recovery Outcomes Assessed

The study evaluates recovery to non-wasted and improvement to moderate wasting status during the 8-week MNT treatment phase (WHZ ≥ -2 SD). Additionally, the study measures mean weight gain per kilogram body weight per day (g kg⁻¹ day⁻¹) and mean change in WHZ score during the 8-week treatment period.

Statistical Analysis

To compare characteristics of children across treatment groups, we use Pearson's chi-squared tests (and Fisher's exact for counts less than 5) to compare the distribution of categorical variables and t-tests to compare means for continuous variables. To examine recovery outcomes, 8-week anthropometric status was calculated using the most recent height and weight measurements available closest to the exact date, eight weeks after the child was screened as severely wasted by the CHW. Weight gain (g kg⁻¹ day⁻¹) was calculated as the difference between the 8-week weight and screening weight, in grams, divided by the screening weight, in kilograms, divided by the number of days between measurements. For all 8-week follow-up measurements, children with WHO outlier z-scores (WHZ, WAZ, HAZ) were dropped from the analysis. We used the Progress out of Poverty Index (PPI) to measure poverty levels. It estimates the likelihood that a household is living below the international poverty line of \$2.16 per day Purchasing Power Parity (PPP). Designed to measure poverty in India, the 2008 PPI includes ten questions about household characteristics including occupation, number of children, and large and small assets.

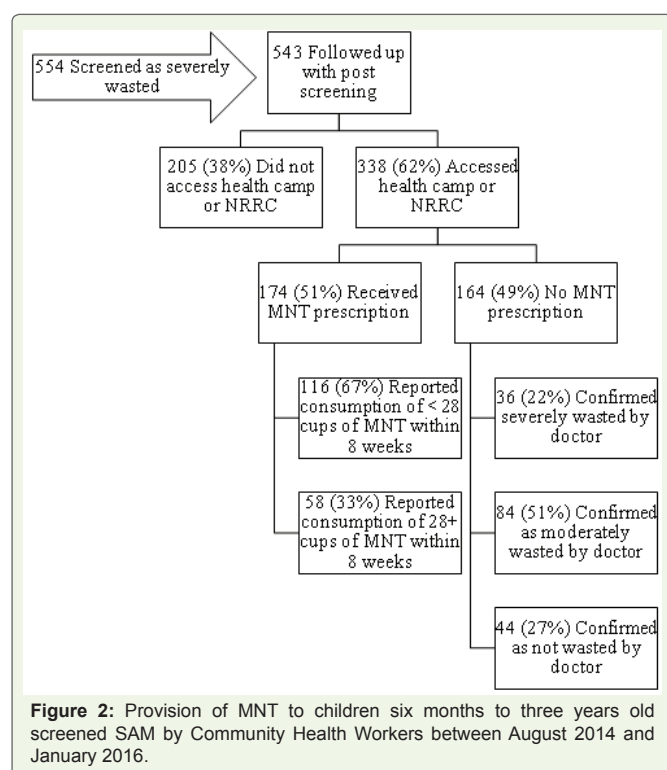
Results

Between August 2014 and January 2016, 663 children aged 6-36 months were screened as severely wasted by SNEHA CHWs and ICDS Anganwadi workers. Exclusions from this group included 55 children with screening WHZ scores inconsistent with a severe wasting nutritional status; 50 children marked as outliers according to WHO standards (WHZ, WAZ, and HAZ); and four children who failed the appetite test.

Process Outcomes

The final analysis included 554 children screened as severely wasted. CHWs were not able to follow up with eleven (2%) children after they were screened. Figure 2 depicts the process flow of children from screening through the provision of MNT.

205 (38%) of 543 children screened as severely wasted did not access either the SNEHA Health Camp or the NRRC. Without this further medical assessment, the child did not have the opportunity to get an MNT prescription through the child nutrition program.



Among the 338 children (62%) who went to a health camp or the NRRC, 174 were confirmed as severely wasted by a doctor, passed an appetite test for MNT, and given a prescription for MNT.

The doctor did not give 164 of the 338 children who accessed the health camp or NRRC an MNT prescription. Most of these children were not given prescriptions because they were no longer severely wasted by the time they reached the doctor; by the time they attended the health camp, 84 children were measured as moderately wasted (MAM) and 44 were measured as not wasted at all. The mean number of days that passed between screening to accessing the health camp or NRRC was 22 days for the 174 children that got MNT prescriptions; for the 164 children that did not get a prescription, the mean number of days that passed was 60 days. There were 36 children confirmed as severely wasted that did not receive an MNT prescription. The reasons for this could not be determined from the data.

Consumption of MNT

Since dosages were typically between 1-2 cups per day, we assessed consumption by grouping children based on whether they consumed at least half (28 cups) of a minimum 8-week dose (56 cups) within eight weeks from the date of prescription. Reported compliance with consumption of prescribed MNT varied considerably across children who received MNT prescriptions. 116 (67%) of the children who got MNT prescriptions reported total consumption of fewer than 28 cups (Figure 2).

Among the children screened as severely wasted by CHWs, Table 1 compares the characteristics of children across the groups of children according to process outcomes (No Health Check-up, MNT, No-MNT). No Health Check-up children were more likely to be

firstborns-44 percent as compared with 36 (MNT) and 27 (No-MNT) percent. This group was also less likely (78 percent as compared to 81 (MNT) and 82 (No-MNT) percent) to be living below the \$2.16/day/PPP poverty line.

The MNT group had significantly worse screening nutritional status for stunting (mean HAZ of -2.48) and underweight (mean WAZ of -3.73) status, as compared with No Health Check-up and No-MNT groups. The No Health Check-up group had the highest mean wasting (-3.57 WHZ) screening status.

To assess whether children who consumed more MNT had better recovery outcomes as compared with those who did not consume substantial quantities of MNT, we narrowed the analysis to the 174 children who were confirmed as severely wasted by a doctor and received an MNT prescription. Table 2 compares the characteristics of the two consumption groups (<28 cups and 28+ cups). Characteristics of both groups were generally similar; none of the observed differences, such as gender and poverty levels, were significant.

Figure 3 and Table 3 compare the recovery outcomes for the 28+ cups and <28 cups groups. Nutritional recovery status was significantly different (at p-value <0.02). Nearly forty percent of the <28 cups children remained severely wasted at the time of their anthropometric measurement closest to the 8-week mark as compared with 19 percent of the 28+ cups children. While a similar percentage of children (about one-quarter) across both groups had fully recovered to no longer being wasted, more children in the 28+

Table 1: Characteristics of children aged six months to three years screened as severely wasted by CHWs from August 2014 through January 2016.

	Screened with Severe Wasting (Total)		No Health camp/ NRRC Attendance		Received MNT Prescription		Did not receive MNT Prescription	
Total	543		205		174		164	
	N	%	N	%	N	%	N	%
Gender: Female	235	43.3	91	44.4	74	42.5	70	42.7
Age								
6-11 months	160	29.5	65	31.7	48	27.6	47	28.7
12-23 months	265	48.8	93	45.4	89	51.1	83	50.6
24-36 months	118	21.7	47	22.9	37	21.3	34	20.7
Joint Family	218	43.9	79	45.4	75	45.7	64	40.5
Birth Order**								
First	182	36.1	82	44.1	59	36.2	41	26.5
Second	189	37.5	64	34.4	66	40.5	59	38.1
Third or Higher	79	15.7	40	15.6	38	11.7	55	20
Ownership of home (not rental)	230	46.4	87	50	73	44.5	70	44.3
% Mean likelihood below the \$2.16/Day/PPP Line*	80.2 (78.9-81.6)		78.0 (75.6-80.5)		81.4 (75.6-80.5)		81.5 (79.2-83.7)	
Mean CHW Screening HAZ ***	-2.00 (-2.17-1.83)		-1.58 (-1.87-1.29)		-2.48 (-2.70-2.27)		-2.01 (-2.30-1.72)	
Mean CHW Screening WAZ***	-3.52 (-3.60-3.43)		-3.35 (-3.49-3.22)		-3.73 (-3.84-3.61)		-3.50 (-3.65-3.35)	
Mean CHW Screening WHZ*	-3.51 (-3.55-3.46)		-3.57 (-3.64-3.51)		-3.48 (-3.54-3.42)		-3.47 (-3.54-3.40)	

*p-value <= .05; **p-value <= .01; ***p-value <= .001

Table 2: Characteristics of severely wasted children aged six months to three years and prescribed MNT from August 2014 through January 2016.

	Consumed <28 Cups		Consumed 28+ Cups	
	N	%	N	
Total	116		58	
Gender: Female	52	44.8	Gender: Female	52
Age			Age	
6-11 months	33	28.4	6-11 months	33
12-23 months	62	53.4	12-23 months	62
24-36 months	21	18.1	24-36 months	21
Joint Family	52	49.1	Joint Family	52
Birth Order			Birth Order	
First	40	37.4	First	40
Second	45	42.1	Second	45
Third or Higher	22	20.6	Third or Higher	22
Home Ownership	51	48.1	Home Ownership	51
Experiencing Diarrhea	26	23	Experiencing Diarrhea	26
Prescribed Antibiotics	35	31	Prescribed Antibiotics	35
% Mean likelihood below the \$2.16/Day/PPP Line	79.9 (77.1- 82.8)		84.1 (80.4- 87.9)	
CHW Screening HAZ score	-2.37 (-2.63- -2.12)		-2.70 (-3.11- -2.29)	
CHW Screening WAZ score	-3.68 (-3.82- -3.54)		-3.83 (-4.05- -3.62)	
CHW Screening WHZ score	-3.48 (-3.55- -3.41)		-3.48 (-3.61- -3.35)	

Table 3: Recovery outcomes among children prescribed MNT from August 2014 through January 2016.

8-week Status	n	Consumed <28 Cups (N= 116)		n	Consumed 28+ Cups (N=58)	
		Mean rate of weight gain (g/kg/d)	Mean change in WHZ score		Mean rate of weight gain(g/ kg/d)	Mean change in WHZ score
Recovered (Normal)	28	4.59 (3.14- 6.03)	2.02 (1.78- 2.26)	16	3.57 (2.78- 4.37)	1.98 (1.71- 2.25)
Recovered (MAM)	42	1.95 (1.68- 2.22)	0.90 (0.78- 1.01)	31	2.21 (1.73- 2.69)	0.86 (0.65- 1.08)
Non-recovered (SAM)	46	1.98 (0.19- 3.78)	0.17 (0.06- 0.29)	11	0.65 (0.09- 1.21)	-0.15 (-0.40- 0.10)

consumption group had shown improvement to moderate wasting (53% moderately wasted as compared to 36% in the <28 cups group).

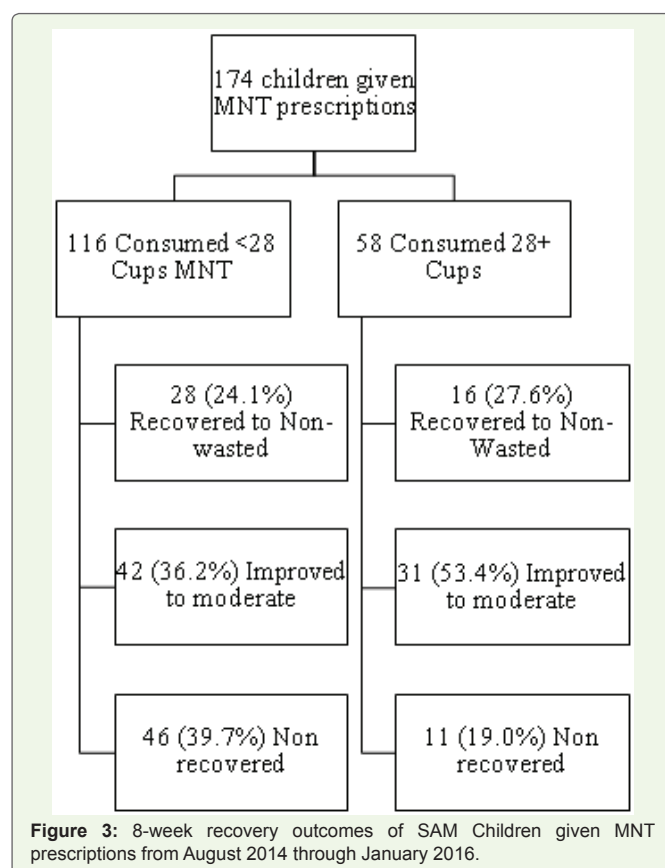
Discussion

This study demonstrates the challenges of effective implementation of RUTF in large-scale community-based programs in urban informal settlements. Over one-third of children screened as severely wasted did not seek out health care at the health camp or NRRC. Temporary and permanent migration of families and children may have played a role in poor access of the health camp or NRRC. In the intervention communities, the program experienced high levels of movement internally within the informal settlement, and externally to other parts of Mumbai and India. This challenge to service provision has been observed in other maternal and child health programs working in urban areas of Bangladesh [18]. A lack of positive health-seeking behavior by caregivers of children screened as severely wasted reflects the community-wide perception that malnutrition is not an illness that requires medical intervention. This challenge, well-documented in a qualitative study of poor coverage in a CMAM program in Bihar [19], has been a critical aspect of the intervention design where the first counseling session ("I am a good mother") given to the mother of a wasted child focuses on appreciating the caregiver.

Additionally, in urban informal settlements of Mumbai, community-level public health services are often underutilized in favor of the private sector or tertiary hospitals because residents often perceive public services negatively or as inferior [20]. The characteristics of children who did not access the health camp or NRRC suggest they may be better-off and perhaps caregivers have sought alternative care through private practitioners. The child nutrition program should further explore the health-seeking behavior of caregivers whose children have been screened for wasting and ensure that caregivers are well-informed about the quality of care provided through public services.

About half of the children who followed-up with SNEHA or NRRC medical screening were not severely malnourished by the time they attended. The two possible reasons for the discrepancy between the SNEHA CHW screening status and confirmation status are 1) the long time that elapses between screening as severely wasted and the child's access of a health check-up for confirmation 2) measurement error by CHWs during screening.

With respect to the time lag in accessing the health camp or



NRRC, the staffing of one single pediatrician was inadequate; for most households, the health camp was available in a nearby area approximately only once a month. Thus, the staffing of additional pediatricians and an increase in the frequency and locations of health camps could have improved access and more timely confirmation and treatment of severely wasted children.

Measurement errors in screening are an expected challenge in community-based screening for wasting by CHWs [21]. Along with the usual challenges of maintenance of equipment, proper positioning, and clothing removal, urban informal settlements have uneven flooring, poor light, crowding and noise that can also affect the quality of anthropometry taken. CHWs received intensive training on anthropometry including standardization tests to calculate the technical error of measurement (TEM). Supervisors monitored regular calibration of electronic baby weighing scales (manufactured by Nitiraj Engineers Pvt. Ltd., accuracy of ± 10 grams) and conducted frequent cross-checks of anthropometry data collected.

The process outcomes also indicate low levels of reported MNT consumption once a child had received a prescription. Other studies in India have similarly found challenges in adherence to RUTF consumption [22]; in the Indian RUTF trial, peer supporters had to visit children several times a day to assist in feeding [9]. While SNEHA CHWs provided regular delivery of MNT cups to the homes of malnourished children, further research is needed to understand the obstacles to consumption of RUTF. Anecdotally, CHWs noted challenges in MNT consumption related to poor palatability and caregiver concerns about the child's likelihood of getting diarrhea from a government-produced supplement.

The 8-week recovery outcomes for children prescribed MNT indicate that fewer children remained severely malnourished if they were more compliant with MNT consumption. Compared with Sphere Minimum Standards for Outpatient Therapeutic Care in Community-based Management of Acute Malnutrition (CMAM) [23], if we consider recovery as moving out of severe wasting (into moderate or not wasted status), then the 28+ cups group meets the standard for recovery rate (recovery rate $>75\%$). If we consider the recovery rate as 15% weight gain, often used in traditional CMAM programs, 24% (28 of 116) of the <28 cups group gained at least 15% of their weight and 38% (22 of 58) of the 28+ children gained at least 15% (Table 3). Without randomization, causality cannot be determined, but the results suggest that there may be benefits to MNT consumption in improving the recovery rates of severely wasted children. The greater percentage of 28+ children who moved into moderate wasting status indicates that while MNT (in amounts often less than the minimum prescribed dosage) may not help the child into the not wasted status sooner, it may have facilitated children moving out of the most vulnerable category of severe wasting.

Other Indian studies of community-based treatment of acute malnutrition have also experienced poor recovery rates as compared with those achieved by African programs. Small samples observed in community-based programs in Chandigarh and central-eastern tribal regions achieved recovery rates (using a 15% weight gain criteria) of 46% and 58% respectively [17]. The Indian RUTF multi-

center trial found that recovery rates (using $WHZ \geq -2$ SD) for the two intervention arms using RUTF were 34.8% and 40.7% after eight weeks [9]. The authors posit that recovery was likely slower among Indian children as compared with their African counterparts due to the different nature of acute malnutrition among Indian children who usually experience Marasmus rather than Kwashiorkor. Our study supports the experts who advocate that, for Indian children, the persistent and widespread nature of malnutrition requires a more sustained and comprehensive approach [7, 24, 25].

Due to the challenge of compliance and the amount of resources that would be required to ensure compliance and implement effectively, SNEHA has discontinued the use of MNT. Additionally, there was little prospect for longer-term sustainability through integration with ICDS. ICDS currently provides take-home-rations to all children, and there is no plan for ICDS to focus specifically on supplements for acute malnutrition.

Limitations

This study shares the operational experience of a community-based program to distribute a locally produced RUTF-one component among many other activities that were aimed to reduce and prevent wasting. For comparison of recovery outcomes, children were not randomly assigned to MNT consumption and non-consumption arms; children consuming <28 cups are likely to have other characteristics that affect recovery outcomes other than those identified in the study. Overall compliance with MNT consumption in this program was low and thus sample sizes are small, limiting statistical precision and we could not compare recovery outcomes at further disaggregated levels of consumption [11]. Due to these limitations, further research would be required to make conclusions about the efficacy of using RUTF to treat severe acute wasting as compared with nutrient-rich foods prepared at home.

Conclusion

The study provides insight into the operational challenges and successes of community-based provision of RUTF in a large-scale multi-sectoral community-based program in urban informal settlements of India. Further implementation strategies to improve diagnosis of severe wasting, provision of RUTF, and compliance with RUTF dosages are required. This includes tailoring the palatability of the product to meet children's needs. However, the costs and efforts involved in effective coverage of MNT in large-scale community-based programs may not justify the potentially small improvements in recovery.

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