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RESEARCH BRIEF

Improving access to treatment for severe acute malnutrition in Nigeria

Assessing low-literate community health workers' capacity to use simplified protocols and tools to treat severe acute malnutrition

Key messages

- With training and supportive supervision, community health workers (CHWs) in Nigeria, and similar settings, can acquire the knowledge and skills required to assess, identify and treat severe acute malnutrition (SAM) among under-fives, using simplified tools as a part of an integrated community case management programme.
- Access to SAM treatment should be enhanced at the community level by expanding CHWs' training and supervision to cover assessment, identification and treatment of SAM cases, using these simplified tools.
- Effective supervision of SAM treatment requires that CHWs' supervisors, community health extension workers, are also trained in managing SAM and that they too are supervised to ensure they deliver a high standard of supervision.

Community-oriented resource person using the adapted tools to diagnose and treat a young girl, Nigeria.

Background

Malaria, diarrhoea and pneumonia are leading causes of death among children under the age of five worldwide, and malnutrition is an underlying cause in half of these cases.[1] Although integrated community case management (iCCM) of childhood illnesses is recognised as a strategy for increasing access to life-saving treatment, malnutrition is not currently properly addressed in guidelines. Access to SAM treatment is usually limited to outpatient therapeutic centres and delivered using complicated protocols, undermining the drive for universal health coverage and underscoring the need for a community delivery model. Promising and cost-effective models exist;[2] however, adapting these for low-literacy settings has not been studied.

Since 2015, Malaria Consortium has been operating iCCM projects in Niger State that train CHWs – known as community-oriented resource persons (CORPs) – to treat malaria, diarrhoea and pneumonia, and to diagnose and refer on cases of severe illness, including SAM. Completing referral for patients with SAM is, however, a challenge, particularly as the very few hospitals in Niger State that offer care for SAM are located far from many rural communities.

Providing patients with SAM treatment in their own communities, alongside care for childhood diseases, could improve treatment coverage and reduce the number of children defaulting from treatment before the 8–12 week course is completed.[3] Unfortunately, Nigeria's National Policy on Food and Nutrition does not currently permit treatment of SAM by health workers at the community level; centres providing management of acute malnutrition and stabilisation are located at health facility level, where personnel with requisite skills and qualifications should be available.[4] The delivery of SAM treatment is, therefore, hampered by weak infrastructure, poorly trained staff and inadequate supplies.[5] This is coupled with the challenge of poor access to care due to remote communities' distance from healthcare providers and other high opportunity costs to seeking treatment.[6]

Therefore in 2017, Malaria Consortium, in partnership with the International Rescue Committee (IRC), Action Against Hunger, Concern Worldwide and Save the Children, conducted a multi-country feasibility study — under an Eleanor Cook Foundation RISE for Nutrition grant — to determine whether treatment for uncomplicated SAM could be integrated into national iCCM guidelines, with the use of job aids and tools that had been adapted for use by low-literate CHWs. IRC had previously tested and adapted these innovative and simplified tools in South Sudan.[7]

The goal of the study was to scale up these innovations in different contexts across Africa (Kenya, Mali, Malawi, Nigeria and South Sudan), thereby contributing to a wider evidence base on how to improve coverage of treatment while maintaining quality of care for uncomplicated SAM in areas with poor access to health services, through a global coalition.

Its primary objective was to determine whether low-literate CHWs in varying contexts could use the simplified tools to treat SAM without medical complications. Specifically, the study sought to:

1. determine how accurately low-literate CHWs could follow the simplified treatment protocol for managing uncomplicated SAM cases
2. determine whether the simplified protocol could perform up to the Sphere standard of a 75 percent recovery rate for SAM management in humanitarian settings
3. assess the acceptability of combined delivery of SAM and iCCM by key stakeholders such as caregivers, CHWs, community leaders, policy makers and programme implementers.

Malaria Consortium carried out the study in Nigeria between July 2017 and May 2018.

A community-oriented resource person calculates the appropriate ready-to-use therapeutic food dosage for a patient using the adapted tool, Nigeria.

Methodology

Study site

The study was implemented in Mariga and Rijau, two of the six local government areas (LGAs) in which iCCM was being implemented in Niger State at the time (see Figure 1). Based on projections from the 2006 census, in 2016 the two project LGAs had a combined population of 524,560 citizens, 104,912 of whom were children under five.[8] Most communities in these LGAs lacked easy access to potable water and electricity and were located far from health facilities.

The CORPs who were implementing iCCM in the LGAs were volunteers who had been nominated by their own communities to provide these services for children 2–59 months (see Table 1). They had already been trained to provide iCCM services and had been providing these services for more than two years. Quality of care was being assured through close supervision of the CORPs by community health extension workers (CHEWs), who were, in turn, being supervised by the LGAs' health teams.

Sample size

The sample size was calculated based on the Sphere standard of 75 percent recovery rate for SAM. One-sample non-inferiority was tested against this rate with the assumption that a rate that was up to an absolute 10 percent lower (i.e. at 65 percent) would be non-inferior, with an alpha value of 0.05, a power of 0.90 and a loss-to-follow-up rate of 10 percent. The latter was defined as loss to follow-up caused by the supply side, e.g. CORPs dropping out of the programme or stock-outs of ready-to-use therapeutic food (RUTF). Using the assumptions above, a minimum of 176 children were expected to be treated by 60 CORPs, at a minimum of two children per CORP.

Figure 1: Map of Niger State

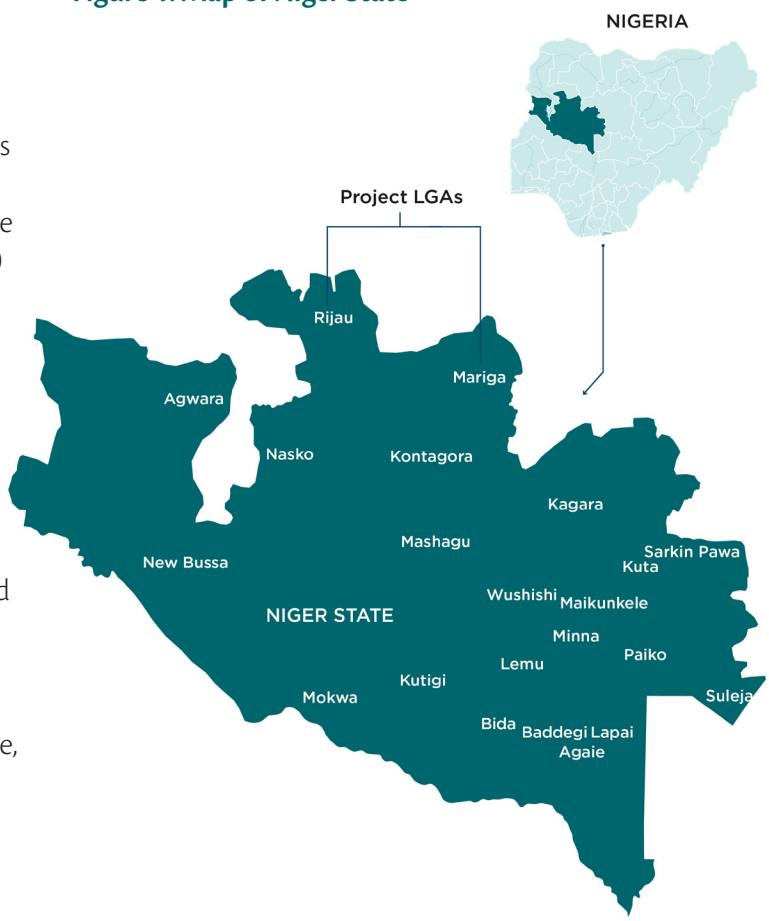


Table 1: Description of integrated community case management providers and locations

Number of CORPs	Rijau: 327 Mariga: 309
Literacy/education level of CORPs	Female: 62% no education Male: 40% no education
Type of remuneration (if any)	CHEWs: salary CORPs: none – voluntary, though transport costs are refunded
Number of households targeted with iCCM	Rijau: 49,791 Mariga: 56,402
Community members' average distance from a health facility	>5km
Target group for iCCM services	Children aged 2–59 months

Implementation

Stakeholder engagement

Malaria Consortium held initial meetings with national and state-level health authorities in July 2017 to get buy-in and obtain a waiver to allow CORPs to treat SAM cases at the community level instead of at outpatient therapeutic programme (OTP) centres. Stakeholders input into the study's protocol. In particular, they helped to define the referral system that would be used and safeguards that would be in place during the study.

Contextualisation of protocol and tools

Using a human-centred design approach, the simplified SAM treatment protocol and tools that had been designed by IRC and used in South Sudan in 2016 were pretested with selected CORPs in Niger State between 17th and 28th July 2017 and adapted based on their feedback. As a result, major revisions were made to render the tools more user-friendly for the CORPs and compliant with the Nigerian SAM treatment protocol and culture of the study areas. Revisions included:

- amending the colours used in the mid-upper arm circumference (MUAC) tape (i.e. adding in a deep red and switching the orange to pink) and in the weighing scale (i.e. changing the deep red that was used to depict severity requiring referral to bright red to align with the colour coding for severity that the CORPs were already using)
- reducing the treatment period from 16 to 12 weeks to comply with the national community-based management of acute malnutrition guidelines
- incorporating contextual pictures into the simplified protocol (see Figure 2).

The final tools are shown in Figures 3–6.

Figure 2: Simplified severe acute malnutrition treatment protocol

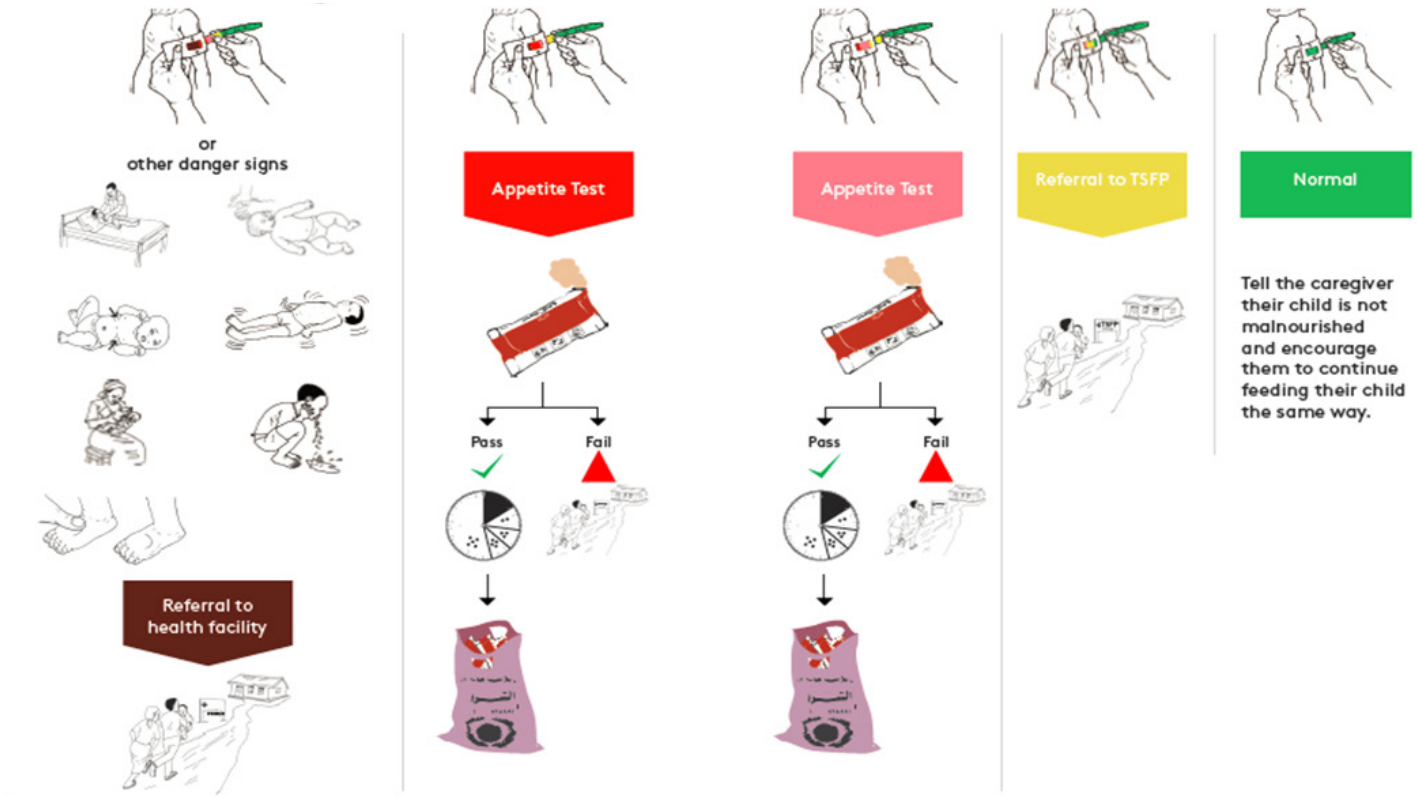


Figure 3: Mid-upper arm circumference tape

Figure 4: Ready-to-use therapeutic food dosage scale

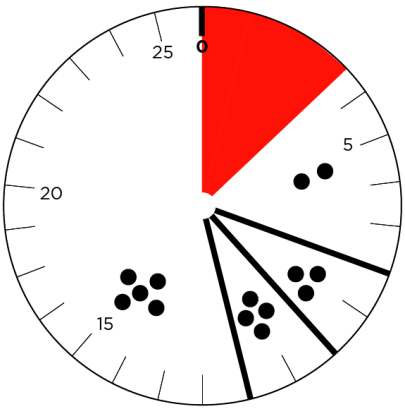
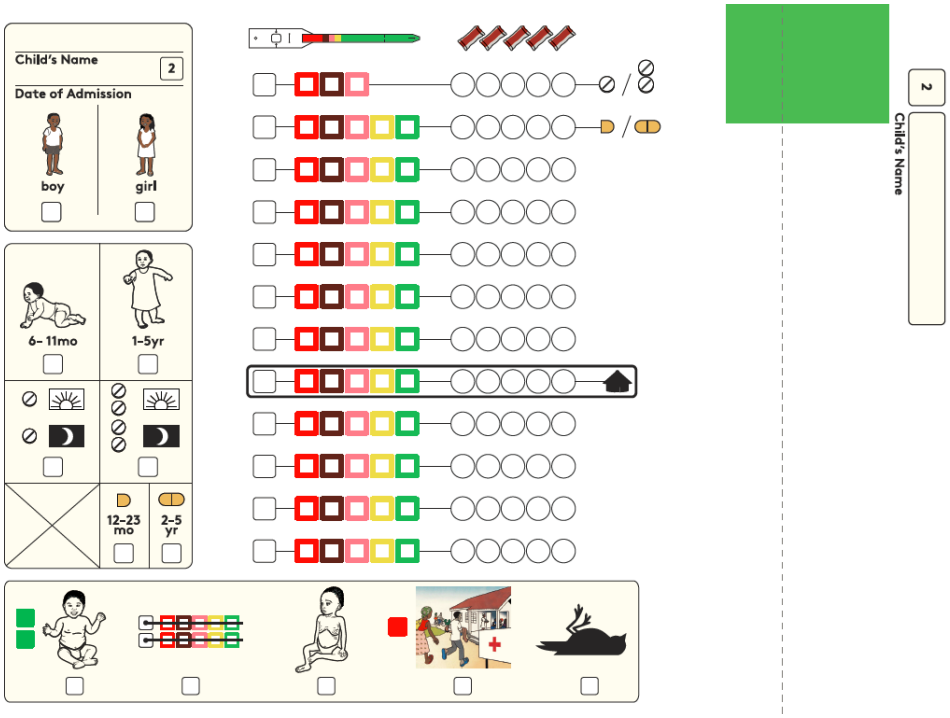


Figure 5: Ready-to-use therapeutic food dosage calculator

Figure 6: Patient register



Selection of community health workers and supervisors for training

Of the 687 CORPs present in the study sites, all met the section criteria and, therefore, were eligible to participate. The criteria included having: participated in iCCM for more than a year; benefitted from iCCM training within six months prior to the study; actively treated iCCM cases (as shown in monthly reports); and resided and worked in a community that was more than five kilometres from a functional health facility.

The study sites consisted of 20 wards that served as administrative units for primary healthcare delivery. To ensure that activities were spread across the wards, with the assumption that one CORP would treat a minimum of two SAM cases and that 80 percent would pass the pre-selection test, 80 CORPs were randomly selected (four from each ward) to participate in training. Similarly, 20 supervisors were selected (one per ward) at a ratio of a maximum of four CORPs to one supervisor. These supervisors were CHEWs who were involved in supervising CORPs delivering iCCM.

Training of field staff on simplified protocol and tools

Training of master trainers: over two weeks, IRC trained the Project Manager and State iCCM Coordinator as master trainers. The trainees then cascaded this training – which covered the simplified SAM tools and protocol – down to nine project and government staff. The training was delivered via adult-learning, and practical and participatory training approaches including: a guide, modules and step-by-step delivery activities.

Training of supervisors: 28 supervisors — including CHEWs, primary healthcare directors, iCCM focal points, and nutrition officers in the study areas — were trained to supervise SAM activities to ensure that high quality care was delivered. The two-day training — which covered the simplified SAM tools and protocol — sought to prepare the supervisors for their roles during the study, i.e. for facilitating CORPs' training, providing direct supervision and overseeing commodity management. Supportive supervision was emphasised as a major tool for improving the quality of care and services CORPs provided.

Training of CORPs: 60 CORPs were required to reach the target of 176 SAM cases treated. Initially, 80 CORPs (eight women and 72 men) were trained in batches for six days in each LGA, with a trainer to trainee ratio of 1:3. Trainers used both classroom and practical demonstrations, focusing on use of the simplified SAM tools and protocol and emphasising how these should be integrated into existing iCCM services at the community level. The majority of the CORPs trained passed the competency test (i.e. attained 90 percent or higher) after having completed a second round of training – for initial post-training test results, see Table 2.

Table 2: Post-training assessment scores

Criteria	Mariga LGA (40)	Rijau LGA (40)	Total
Number of CORPs who scored ≥ 90%	17	31	48
Number of CORPs who scored ≥ 85%	26	35	61
Number of CORPs who scored ≥ 80%	33	37	70

Table 3: Mid-upper arm circumference tape colour codes and associated treatment actions

Colour codes	Action
Red: <9cm	Refer to nearest nutrition clinic – likely to need inpatient care
Dark red: 9–<10.25cm	Treatment by CORP if the child passes the appetite test
Pink: 10.25–<11.5cm	Treatment by CORP if the child passes the appetite test
Yellow: 11.5–<12.5cm	Nutrition counselling
Green: ≥12.5cm	No nutrition treatment

Establishment of supply chain

Malaria Consortium procured and dispensed a total of 400 cartons (each containing 150 pieces) of RUTF to CORPs for treating SAM cases. Metal boxes were provided to keep the RUTF packs safe from rats and unauthorised persons.

Initial stock of RUTF, amoxicillin (for treating the symptoms of pneumonia) and enough albendazole (for treating intestinal worms) to treat two SAM cases were supplied to the CORPs. Thereafter, stocks of these commodities were pre-positioned at the health facilities in which supervisors were based (i.e. following the existing iCCM commodity supply mechanism). Supervisors were responsible for ensuring that the supplies were delivered to CORPs' houses and, as such, conducted stock checks and identified shortfalls or when restocking was required at each supervision visit.

Treatment of severe acute malnutrition cases by community health workers

Each child that visited a CORP who had been trained in the new protocol and tools was assessed using the new iCCM guidelines (i.e. the existing 14 danger signs for which CORPs routinely screen, plus a new appetite test). If children had any of these signs or failed the appetite test during their first visit to a CORP they were disqualified from the study and if they were found to have any of these signs or failed the appetite test at a later visit they were referred on to appropriate health facilities for treatment. Children who were without any danger signs but fell into the 'malnutrition zone' of the MUAC were recruited into the study.

The children were managed using both the iCCM chart (to classify and treat a fever, a cough or difficulty with breathing and/or diarrhoea) and the simplified SAM protocol and tools. CORPs observed areas of overlap — such as giving only one dosage of amoxicillin if a child had both SAM and fast breathing, or not giving oral rehydration salts and zinc when a child has SAM and diarrhoea— based on their training. The additional colours present in the simplified MUAC tape helped CORPs to monitor a child's progression or regression during treatment (see Table 3).

CORPs treated consenting SAM cases using RUTF, amoxicillin and albendazole as prescribed and aided by the simplified protocol and tools respectively. The maximum treatment period for any admitted case was 12 weeks. CORPs recorded children's progress, selecting from the following possible outcomes:

- cured: child had two consecutive green MUAC readings
- default: child missed two weeks of treatment[i]
- non-response: child did not reach a green MUAC reading by the end of the 12 weeks
- referred: child was referred to health facility for further treatment
- death: child passed away while undergoing treatment.[ii]

Supervision and assessment of community health workers

Each CORP was supervised and assessed weekly, with supervisors observing CORPs, filling out performance score sheets, completing progress forms for each SAM case to monitor treatment progression, and recording/reconciling RUTF, amoxicillin and albendazole stocks.

Data collection and analysis

Quantitative data: CORPs' demographic information was collected at the outset of the project, while children's was captured at enrolment. Thereafter, the following data was recorded weekly: progress data for children being treated for SAM (i.e. malnutrition status, treatment outcomes and number of weeks in treatment), which was captured in treatment registers; stock records; and CORPs' performance scores. Treatment outcomes, expressed in percentages, were tabulated and stratified by key child characteristics such as age and severity of malnutrition at enrolment.

Qualitative data: in April 2018, Malaria Consortium conducted 12 focus group discussions (FGDs) with CORPs and caregivers and 21 in-depth interviews with policy makers, nutrition programme implementers and community leaders to determine the acceptability of the project. Their responses were categorised according to the following pre-determined themes: training, supervision, protocol, tools, RUTF and supply chain, and CORPs' workload, motivation and competence.

i CORPS actively visited defaulters' homes to ascertain and document the reasons behind children missing treatment.

ii To mitigate this risk, CORPs were supervised weekly after training, and children with danger signs were referred on immediately.

Results

Demographic characteristics of community health workers

As Table 4 shows, roughly equal numbers of CORPs were assessed in the two LGAs, the majority of whom were male (96 percent) and aged 18–35 (67 percent). A large proportion (70 percent) had completed senior secondary level education, could read without any difficulty (69 percent) and had been working as a CORP for between three and four years (61 percent).

Table 4: Background and demographic characteristics of community-oriented resource persons

	n=67	Percentage
LGA		
Mariga	34	50.7
Rijau	33	49.3
Sex		
Male	64	95.5
Female	3	4.5
Age (years)		
18–35	45	67.2
36–50	15	22.4
50–60	6	9
60+	1	1.5
Education		
Primary	5	7.5
Junior secondary	8	11.9
Senior secondary	47	70.1
Other e.g. Koranic education	7	10.4
Ability to read		
With some difficulty	21	31.3
Without any difficulty	46	68.7
Experience working as a CORP (years)		
1–2	26	38.8
3–4	41	61.2

Community-oriented resource persons' treatment and supervision record

As Table 5 shows, a small proportion (10 percent) of CORPs did not see or treat any case of SAM throughout the study period. While a majority (79 percent) treated less than 10 children each, a small proportion (10 percent) treated between 11 and 20 eligible children.

Table 5: Proportion of eligible children treated by community-oriented resource persons

	n=67	Percentage
None	7	10.4
Less than 10	53	79.1
11–20	7	10.4

Demographic characteristics of enrolled children

As Table 6 shows, the male to female ratio of the children enrolled in the study was 53:47. Mothers were children's primary caregiver in most instances (86 percent), and a large proportion of these had no form of education (68 percent). The majority of the children had been breastfed (88 percent), and their median age and MUAC measurement at enrolment were 15 months and 11cm respectively.

Table 6: Background and demographic characteristics of study enrollees

	n	Percentage
Child's sex		
Male	152	52.8
Female	136	47.2
Mother's age (years)		
<20	9	3.1
20–29	148	51.6
30–39	106	36.9
40–49	20	7
50+	3	1.4
Unknown	2	0.7
Mother's level of education		
None	196	68.1
Primary	14	4.9
Secondary	8	2.8
Other	70	24.2
Child's primary caregiver		
Mother	246	85.4
Father	33	11.4
Grandmother	7	2.4
Sibling	1	0.4
Other	1	0.4
Has the child ever breastfed?		
Yes	255	88.5
No	32	11.1
Unknown	1	0.4
Has the child received treatment for iCCM illnesses in the last four months?		
Yes	6	2.1
No	282	97.9
Mother's number of pregnancies		
Median	4	-
Mean	4.7	-
Interquartile range (IQR)	2–7	-
Range	1–5	-
Number of under-fives in the household		
Median	2	-
Mean	3.3	-
IQR	2–3	-
Range	0–18	-

Child's age at enrolment (months)		
Median	15	-
Mean	17	-
Range	6–59	-
IQR	12–24	-
Child's MUAC score at enrolment (cm)		
Median	11	-
Mean	10.8	-
IQR	10.5–11.2	-
Range	8–11.5	-
Child's MUAC colour at enrolment		
Dark red (should be 9–10.25)		
Median	10	-
Mean	9.9	-
IQR	9.5–10.2	-
Range	8–11.3	-
Pink (should be 10.25–11.5)		
Median	11.1	-
Mean	11	-
IQR	10.8–11.2	-
Range	9.2–11.5	-

Treatment outcomes

Of the 303 children enrolled for treatment of SAM, treatment outcomes were available for 288 (96 percent). As Tables 7 and 8 indicate, excluding those referred on for treatment at a health facility (15 percent), the project had a 73 percent cure rate and a five percent non-response rate. While there was no record of a death during the study, 54 children (22 percent) defaulted. The most common reason given for this during active follow up was that the caregiver had not wished to continue with the treatment or had sought alternative care elsewhere (36 percent) — often this was related to a strongly held social norm that viewed SAM as a spiritual condition that was not treatable by CORPs; other reasons included familial relocation and out of town travel.

Table 7: Treatment outcomes

Outcome	Excluding referred cases		Including referred cases	
	n=255	Percentage	n=288	Percentage
Cured	180	73.4	180	62.5
Non-response	11	4.5	11	3.8
Default	54	22	54	18.8
Death	0	0	0	0
Referred	-	-	43	14.8

Table 8: Reasons for default and referral

	n	Percentage
Reasons for default (n=54)		
Caregiver decided not to continue care/seek care elsewhere	16	36
Relocation	6	14
Other	2	5
Unknown/missing	20	46
Reasons for referral (n=43)		
Failed appetite test	24	56
Four consecutive weeks in deep red on the MUAC scale	1	2
Four consecutive weeks in pink on the MUAC scale	10	23
Developed a danger sign	3	7
Oedema	1	2
Unknown/missing	4	9

Acceptability of the intervention

FGDs indicated that community members felt positively about the feasibility study, having seen improvements in the health of their children. However, some caregivers reported feeling that the CORPs had been biased in determining who should receive treatment.

CORPs expressed general positivity towards the feasibility study, listing reasons such as the child's recovery, free care, and shorter distances to be travelled to reach care. They reported being more respected and better recognised by the community members than before the study.

Discussion

The project successfully trained 80 CORPs to treat SAM. That a higher proportion of CORPs met the post-training competency cut-off point in Rijau than in Mariga could be due to higher literacy levels among residents of the former. Lessons from implementation indicate that the 'brush-up' training was crucial; it sufficiently increased the performance of the CORPs who had not passed the original competency test.

There was concern that attaining an adequate sample size of children to enable validation the use of the tools might be difficult due to the low numbers of cases identified in this region prior to the study. However, within a short period of the study having commenced, CORPs had seen almost double the number of children anticipated in the sample size calculation. This either suggests that the malnutrition burden had been underestimated in this area or that malnutrition had not been perceived to be a serious public health problem.[9]

The cure rate of the enrolled SAM cases (73 percent) is close to and, indeed, non-inferior to the minimum Sphere standard for treatment of SAM of 75 percent.[10] A 2016 assessment of OTPs conducted in a similar setting in Nigeria revealed a much lower cure rate of 58 percent.[11]

The study's mortality rate (zero percent) was also lower than Sphere's recommended limit of <10 percent, potentially due to the relatively high referral rate (15 percent) of participating CORPs. These positive outcomes may be attributable to the simplicity of the protocol and tools, as well as quality of training and supervision they received.

Nonetheless, it is worth noting that supervisors suspected that some SAM cases had been wrongly referred, particularly because they identified that some appetite tests had not been properly conducted. The study's default rate (22 percent) was also found to be high compared to the Sphere standard (15 percent); however, OTPs' default rates can be as high as 40 percent and all the factors that usually contribute to a high OTP default rate[11] — such as OTP centres being far from caregivers, caregivers having to tackle difficult terrain to reach such centres, and there being a poor and costly transportation network locally — were not present in the study sites. Indeed, caregivers who participated in FGDs specifically mentioned appreciating their proximity to treatment centres (i.e. CORPs' houses). Furthermore, the fact that RUTF and CORPs' services were free and SAM treatment highly desirable in caregivers' eyes suggests that defaults were due to reasons unrelated to quality, access and cost of treatment (e.g. caregivers preferring to seek alternative, often spiritual, means of treatment).

Findings indicate that acceptance was high among caregivers, and that CORPs felt motivated and happy due to the visible results of the treatment they were providing. The complaints of some caregivers that CORPs had been selective and discriminatory might be due to the fact that CORPs objectively determined whether children were eligible for SAM treatment according to the protocol, to which caregivers were not privy.

There are a few limitations to bear in mind when interpreting the results of the study. Firstly, its scope did not include assessment of the effect of the extra requirements of SAM management on the quality of care of other diseases covered under the existing iCCM programme, nor on CORPs' overall workload. Secondly, the study did not track the outcomes of the CORPs' referrals. Further research is needed to fill these evidence gaps.

Conclusion

The research demonstrated that with training and supportive supervision CORPs in Nigeria can acquire the knowledge and skills required to assess, identify and treat SAM among under-fives, and refer cases using simplified tools, as part of an iCCM programme.

A community-oriented resource person assessing a young boy's nutritional status using the adapted MUAC tape, Nigeria.

Recommendations

1. A similar study should be conducted elsewhere in Nigeria to determine whether the simplified protocol and tools are feasible, acceptable and safe to roll out in different settings. The effect of the extra requirements of SAM management on the workload of volunteers (CORPs) should also be examined.

2. Based on the findings of these studies, the Federal Ministry of Health could consider a phased implementation of the simplified protocol and tools for SAM management at the community level. This would enable their feasibility, acceptability and safety to be determined at a larger scale and in multiple settings, and could subsequently feed into a policy review.

3. It is likely that any expansion that may occur would need to be accompanied by strengthened referral systems and mechanisms to facilitate a comprehensive continuum of care. This would be determined during phased implementation.

4. It is likely that the scope of CORPs training could be expanded to cover assessment, identification and treatment of SAM cases using the simplified protocol and tools at the community level. This would be determined during phased implementation.

5. Implementation of community level management of SAM using these simplified tools must involve effective supervision and an uninterrupted supply of commodities if a high quality of care is to be ensured. This should be assessed through phased implementation.

6. Given the higher volume of SAM cases encountered during the study than had been estimated based on known statistics, it is recommended that the state commissions an evaluation of the true burden of SAM, especially seeking to include hard-to-reach communities in such calculations.

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