

ORIGINAL ARTICLE

# Staff Competencies at Health Facilities Implementing an Outpatient Therapeutic Programme for Severely Acute Malnourished Children

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## ABSTRACT

**Background:** Malnutrition continues to be a major cause of disease burden, especially in low-income countries, killing millions of children. In order to reduce morbidity and mortality, the management of children with severe acute malnutrition (SAM) requires knowledgeable and skilled staff. In the study reported on in this article, we measured the level of knowledge of staff working in the outpatient therapeutic programme (OTP) in Lusaka, Zambia.

**Methods:** The study targeted healthcare workers managing SAM from five randomly selected health facilities of the 12 health centres that have been implementing the OTP since 2005. At facility level, staff were first listed and then randomly selected for interviews. Four members of staff were selected for the self-administered questionnaire, three for the in-depth interviews and three for observations.

**Findings:** Overall, the aggregated knowledge of the healthcare staff of integrated management of acute malnutrition procedures were slightly above 50%. Most staff could not correctly cite key knowledge segments to ensure that they would adequately manage SAM children.

**Conclusion:** There was average knowledge to manage SAM among the healthcare staff; this suggested a need to strengthen staff's knowledge base and skills in certain areas critical to manage SAM children adequately.

## INTRODUCTION

Malnutrition continues to be a major cause of disease burden, especially in low-income countries, killing millions of children. Despite substantial evidence that under-nutrition can be prevented with interventions,

providing great benefits to families and the economy, many developing countries continue to experience poor child growth rates, high morbidity and mortality.<sup>1,2,3,4</sup> About one-third of child deaths are nutrition-related.<sup>2,4</sup> The effects of under-nutrition are even more critical during pregnancy and the first two years of life when growth is at its fastest rate<sup>5</sup> and under-nutrition is likely to occur due to poor maternal nutrition status,<sup>6</sup> poor child feeding and disease.<sup>7,5,8</sup> If not promptly addressed in this critical window of opportunity, under-nutrition leads to irreversible damage.<sup>9,10</sup> Beyond the age of two, investments tend to offer fewer benefits to improving nutrition,<sup>3</sup> necessitating timely intervention. In Zambia, approximately 5% of children have severe malnutrition, 16% are underweight and 45% are stunted.<sup>7</sup>

One of the ways to reduce mortality among malnourished children is to implement focused management of malnutrition such as the integrated management of acute malnutrition (IMAM) programme.<sup>16</sup> This was designed for majority of severely acute malnourished (SAM) children (children with -3 SD weight-for-height indices) to be receiving treatment at home.<sup>11</sup> The programme has three components, namely an inpatient therapeutic programme (ITP), an outpatient therapeutic programme (OTP) and supplementary feeding and community mobilisation.<sup>16</sup> In Zambia, IMAM has been in existence since 2005.<sup>12</sup> Its main purpose is to reduce mortality among SAM children and to provide therapeutic feeds, resulting in improved growth.<sup>13,14</sup>

Empowering staff with knowledge and skills through training and orientation has been key to the sustainability and management of the IMAM programme. The empowerment of staff ensures the availability of a trained cadre that can pursue the goals of the programme.<sup>15</sup> In Zambia, however, there has been no critical evaluation of the programme particularly focusing on the knowledge of

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staff. The aim of the study reported on here was to measure the knowledge levels of healthcare staff working in the OTP of the IMAM programme in Lusaka, Zambia.

**METHODS**

**Population and sampling procedures**

The data stem from a cross-sectional study conducted at five health centres selected randomly from 12 health centres that have been implementing the OTP since 2005. The target groups were healthcare staff (nutritionists, nurses and community health workers) involved in the management of severe malnutrition who had worked in the OTP for three months or more. At health facility level, the aim was to randomly select four healthcare staff to fill in a self-administered questionnaire; however, in most cases, there were fewer than four staff who were sampled. Twelve staff randomly selected among key staff (in-charge, community-based therapeutic care [CTC] coordinator and nutritionist) were interviewed using an in-depth questionnaire as main guide. Observations were conducted on a maximum of three healthcare staff during OTP sessions.

**Data management**

Data were collected using a self-administered questionnaire, in-depth interview and an observation tool, which were pretested. Data from the self-administered questionnaire were entered and analysed using the Statistical Package for Social Sciences (Chicago, Illinois, USA) version 16.0, guided by the OTP set standards. Quantitative data were transformed into frequencies, scale and composite of knowledge. A crude knowledge matrix (index) was constructed based on six knowledge components – thought to be key in the management of severely malnourished children, namely admission criteria (OTP and ITP), appetite test, referral, actions on failure to gain weight, and core operating principles. The ultimate was staff classified as having adequate or inadequate knowledge. It is referred to as a crude matrix, as the included knowledge factors are not universally agreed or approved by the programme officers as being the best six, but they are based on decisions researchers and programme officers frequently use in making management therapeutic decisions. The in-depth questions were transcribed manually, coded using a priori codes, clustered, put in themes, and then analysed manually. The data in the themes were organised according to questions across respondents and their answers. This allowed for identification of consistencies and differences.<sup>17</sup>

**Ethical approval**

Clearance to conduct the research was obtained from the University of Zambia Biomedical Research Ethics Committee (IRB 00001131 of IORG 0000774) and the Lusaka Urban District Health Management Team. In addition, participation in the programme was voluntary and based on informed oral consent.

**FINDINGS**

**Participation and distribution**

Overall, 21 healthcare staff were interviewed, the majority being women (Table 1). The mean age was 40 years (SD 10.4) and three-quarters attained secondary education or above. Fourteen had worked in the programme for more than one year and 16 were trained in CTC. In addition, 53.8% were trained for one day, while the longest training was for three days (15.4%). However, the recommended training for CTC is 3 days while a complete IMAM course is seven days<sup>26</sup>. There were no refusals in responding to the questionnaire.

**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Age of Respondent	18	21	54	40.22	10.367
Valid N (listwise)	18				

**Table 1: Distribution of staff members working in an OTP in Lusaka, Zambia**

Variable	Categories	Number	Percent age
Sex	Female	14	66.7
	Male	7	33.3
Age	<30 years	5	27.8
	31–45 years	5	27.8
	46–48 years	4	22.2
	>49 years	4	22.2
Education	Tertiary	8	40
	Secondary	8	40
	Primary	4	20
Length of service	>24 months	8	44.4
	between 13 and 24 months	6	33.3
	between 3 and 6 months	4	22.2
Trained in CTC	Yes	16	84.2
	No		

Note: The sample size was 21 and there were no refuses recorded.

**Knowledge of staff**

Aggregation of knowledge criteria: An assumption of the health workers' knowledge was made using a set criteria crude matrix to prioritise measure of knowledge based on anecdotal evidence of sensitivity. The aggregated knowledge criteria results showed that 52.4% (11) had sufficient knowledge and 47.6% (10) had inadequate knowledge to manage severely malnourished children.

**Table 2: Distribution of selected knowledge and practices among staff members working in an OTP in Lusaka, Zambia**

Variable	Yes or No	Freq	Percentage	Variable	Yes or No	Freq	Percentage
<b>1. Importance of CTC programme</b>				<b>7. Conducting appetite test</b>			
Empowers the community	Yes	17	81	To be conducted in a quiet place	Yes	6	28.6
	No	4	19		No	15	71.4
Increases programme ownership	Yes	7	33.3	Health worker should first explain to care givers the purpose of the test and how it will be conducted	Yes	20	95.2
	No	14	66.7		No	1	4.8
Increases programme coverage	Yes	8	38.1	The caregiver should first wash hands	Yes	20	95.2
	No	13	61.9		No	1	4.8
Strengthens case finding, referral, follow-up and monitoring of activities	Yes	18	85.7	Caregiver sits comfortably with baby on lap and offers the RUTF	Yes	16	76.2
	No	3	14.3		No	5	23.8
<b>2. Core operating principals</b>				Caregiver offers RUTF while encouraging the child to eat	Yes	15	71.4
Easy access	Yes	12	57.1		No	6	28.6
	No	9	42.9	Child should be offered plenty of water	Yes	18	85.7
Timeliness	Yes	8	38.1		No	3	14.3
	No	13	61.9	Amount taken should be measured when the child is through with eating	Yes	13	61.9
Capacity building	Yes	16	76.2		No	8	38.1
	No	5	23.8	<b>8. Importance of appetite test</b>			
Increased coverage	Yes	13	61.9	It is an important criteria for admission	Yes	10	47.6
	No	8	38.1		No	11	52.4
Sectorial integration	Yes	9	42.9		Yes	12	57.1
	No	12	57.1		No	9	42.9
<b>3. CTC components</b>				It indicates whether the child can be admitted to OTP		7	33.3
Community mobilisation	Yes	18	85.7			14	66.7
	No	3	14.3	It helps to know if the child's condition is improving, as it is done weekly	Yes	15	71.4
Inpatient facility (stabilisation centres)	Yes	7	33.3		No	6	28.6
	No	14	66.7	<b>9. Actions on Failure to Gain Weight</b>			
OTP	Yes	19	90.5	If below admission weight on Week 3, refer to outreach worker	Yes	5	23.8
	No	2	9.5		No	16	76.2
Supplementary feeding programme	Yes	18	85.7	If no weight gain by Week 5, refer to stabilisation centre (inpatient)	Yes	15	71.4
	No	3	14.3		No	6	28.6
Local food production	Yes	6	28.6	If no adequate weight gain by Week 8, investigate (home visit and/or laboratory)	Yes	14	66.7
	No	15	71.4		No	7	33.3
<b>4. Child referral</b>				<b>10. OTP key messages</b>			
Self-referral	Yes	3	14.3	What RUTF is	Yes	13	61.9
	No	18	85.7		No	8	38.1
Referral by community-based providers or volunteers	Yes	20	95.2	Feeding children with RUTF	Yes	17	81.0
	No	1	4.8		No	4	19.0
Mother-to-mother referral	Yes	6	28.6	Hygiene	Yes	18	85.7
	No	15	71.4		No	3	14.3
Referral by health facility or other nutritional programmes	Yes	20	95.2	Breastfeeding during illness	Yes	17	81.0
	No	1	4.8		No	4	19.0
<b>5. Admission criteria</b>				Caring for sick children	Yes	17	81.0
<b>a. OTP criteria</b>					No	4	19.0
Bilateral oedema (+ or ++) without complications	Yes	19	90.5	Feeding sick children	Yes	16	76.2%
	No	2	9.5		No	5	23.8
MUAC <11 cm	Yes	18	85.7	<b>11. Actions during follow-up</b>			
	No	3	14.3	Link patients with community worker	Yes	9	42.9
Weight for height, 3SD	Yes	8	38.1%		No	12	57.1
	No	13	61.9	Conduct home visits (caregivers are helped with child feeding when necessary)	Yes	20	95.2
Visible severe wasting	Yes	13	61.9%		No	1	4.8
	No	8	38.1				

<b>a. Inpatient programme</b>				Refer patients when necessary			
Bilateral oedema+++	Yes	17	81.0	Yes	17	81.0	
	No	4	19.0	No	4	19.0	
MUAC <11 cm with complications	Yes	16	76.2	Give feedback to health facilities			
	No	5	23.8	Yes	18	85.7	
Weight-for-height Z score <3SD with complications	Yes	9	42.9	No	3	14.3	
	No	12	57.1	<b>12. Discharge from OTP</b>			
Visible severe wasting with complication	Yes	10	47.6	Cured			
	No	11	52.4	Yes	21	100.0	
For children <6 months unable to breastfeed or weight-for-height (W/H) <3	Yes	5	23.8	No	0	0	
	No	16	76.2	Defaulted (absent 3 consecutive weeks)			
<b>6. Cure criteria</b>				Died (died during the time registered in OTP)			
>80% weight for height and no oedema for two consecutive weighings	Yes	11	52.4	Yes	12	57.1	
	No	10	47.6	No	9	42.9	
No oedema for 2 consecutive weeks and clinically	Yes	20	95.2	Transferred to inpatient care (condition has deteriorated)			
	No	1	4.8	Yes	6	28.6	
Two months in OTP and MUAC >11.0 cm and 15% weight gain and clinically well	Yes	14	66.7	No	15	71.4	
	No	7	33.3				

N=21, MUAC: Mid-upper arm circumference, RUTF: Ready-to-use therapeutic feed

**Importance of the programme:** The majority of the respondents of the self-administered questionnaire regarded the IMAM programme as important, as they said it empowered the community (81%) and strengthened case findings, referral, follow-up and monitoring of activities (85.7%) (Table 2). The respondents of the in-depth interview felt that OTP was one of the child survival programmes that reduce mortality, especially among severely malnourished children. This was perceived through its role in reducing malnutrition, helping malnourished children to quickly gain weight and quick weight recovery among HIV-positive children.

Reduction in case referrals decongesting the stabilisation centres (in this case the University Teaching Hospital) was also cited by four staff members. Community empowerment and increased knowledge of staff of the IMAM programme through various training and orientation sessions were cited by some staff, as in the quote below:

... help in children's survival and also increases knowledge to the caretakers of every kind. It helps people to prevent malnutrition by health education provided...

Healthcare staff felt that the OTP provides additional foods to children for families that were food insecure, helping to maintain the weights of children. One respondent said:

“It supports families with children who are undernourished by providing food.”

**Core operating principles:** These are principles that govern the delivery of CTC services to intended beneficiaries with fairness and according to need<sup>19</sup>. The majority of the respondents of the self-administered questionnaire cited the principle of capacity building (76.2%, n=16) followed by increased coverage (61.9%, n=13), easy access (57.1%, n=12), sectorial integration (42.9%, n=9) and timeliness (38.1%, n=8). Twenty-five per cent (5) of the respondents were able to cite all five principles (Table 3).

**Table 3: Distribution of knowledge scales for six crude matrix criteria among staff members working in an OTP in Lusaka, Zambia**

<b>1. Core operating principles scale</b>		
	Frequency	Percentage
None	1	4.8
One only	6	28.6
Two only	2	9.5
Three only	5	23.8
Four only	2	9.5
All five correct	5	23.8
<b>2. Admission criteria</b>		
<b>a. for inpatient children</b>		
None	2	9.5
One only	3	14.3
Two only	4	19.0
Three only	5	23.8
Four only	5	23.8
All five correct	2	9.5
<b>b. in the OTP</b>		
One only	2	9.5
Two only	6	28.6
Three only	8	38.1
All four	5	23.8
<b>3. Referral of children</b>		
One only	2	9.5
Two only	12	57.1
Three only	5	23.8
All four	2	9.5
<b>4. Steps on appetite test put on a scale</b>		
One only	1	4.8
Three only	2	9.5
Four only	2	9.5
Five correct	6	28.6
Six correct	7	33.3
Seven correct	3	14.3
<b>5. Failure to gain weight for children</b>		
None	2	9.5
One only	8	38.1
Two only	7	33.3
All three	4	19.0
<b>6. Cure criteria</b>		
One only	6	28.6
Two only	6	28.6
All three	9	42.9
Total	21	100.0

N=21, scales according to categories of components

**Referral of children:** Most of the respondents of the self-administered questionnaire were able to list referral by community-based providers or volunteers (95.2%, n=20) and by health facility or other nutritional programmes (95.2%, n=20) as ways they refer children to OTP. Twenty-eight per cent (6) and 14.3% (3) identified mother-to-mother and self-referral respectively. Furthermore, 23.8% members of staff were able to identify all the referral components (Table 3). Similarly, referral by facility was the commonly known factor by the respondents of the in-depth interview. A few mentioned referral by the community-based providers and mother-to-mother. None of the participants mentioned staff referral or other nutritional programmes.

**Admission criteria:** All members of the healthcare staff were at least aware that there was a criterion to use to admit children to the programme. The most commonly known OTP criteria by the respondents of the self-administered questionnaire were bilateral oedema (whose severity in depth is measured as plus one or two inches) without complications (90.5%, n=19) and MUAC of less than 11 cm (85.7%, n=18). As for inpatient criteria, it was identified as bilateral oedema plus three (81%, n=17) and MUAC of less than 11 cm with complications (76.2%, n=16) (Table 2). Furthermore, 23.8% (5) and 14.3% (3) of staff were able to list all criteria for OTP and inpatients respectively. Almost all respondents to the in-depth-interview mentioned MUAC of less than 11 cm and the presence of mild or moderate oedema with no complications as OTP admission criteria for SAM.

**Appetite test:** The commonly known step (95.2%, n=20) was that health workers needed to explain to caregivers the purpose of the test and hygiene practices (Table 2), while the least known step was that an appetite test needs to be conducted in a quiet place. Even so, only 14.3% (3) of the respondents knew all the steps. Furthermore, 71.4% (15) felt that it was important to carry out an appetite test, as it helps to know whether the child's condition is improving. Nine per cent were able to recognise all the elements of importance in the appetite test (Table 3).

Observations revealed that none of the staff conducted the appetite test in a quiet place. However, 25% of the respondents did explain to the caretakers the purpose of the appetite test and the process of conducting it before carrying out the exercise. Furthermore, 62.5% reminded the caretakers to wash their hands prior to offering RUTF to their children. None of the staff, offered water to children while eating RUTF and only one measured the amount of RUTF the child took. A total of 13 healthcare

staff were observed when giving RUTF and of these, 10 (76.9%) gave the correct amount of RUTF to children. However respondents to the in-depth interview displayed inadequate knowledge of the steps of appetite test. Using client-based sorting of responses, two of the respondents mentioned two points out of the expected seven points and four cited one point each.

**Actions on failure to gain weight:** All 21 respondents agreed that there were children who failed to gain weight during the time they were admitted in the OTP. Seventy one per cent (15) reported that the absence or the inadequate weight by week 5 would warrant referral of the child to the in-patient stabilization centre. Fourteen (66.7%) respondents were of the view that inadequate weight gain by week 8 should lead to further investigations, whilst five (23.8%) stated that the child's weight by week 3 below weight at admission would require referral to an outreach worker. Nineteen per cent (4) of staff recognised all the key actions to be taken when a child fails to gain weight (Table 3). Respondents to the in-depth interview said that children not gaining weight would necessitate further investigations, but none of them were able to indicate the actual period needed before investigations.

**Health and nutrition education:** Respondents to both self-administered questionnaire and in-depth interview reported that health education was given to caregivers in their health facilities. Hygiene was the most taught message (85.7%, n=17) in both groups, while explaining the meaning of RUTF was the least considered (61.9%, n=13). The aspect of breastfeeding during illness was not mentioned by either groups. Healthcare workers felt that health education played an important role in preventing and reducing levels of malnutrition. It is a conduit to imparting knowledge to both mothers and caretakers in ensuring continuation of care after discharge from the OTP

#### Practices of healthcare workers

Observations showed low skills in examining for oedema. About 7.1% repeated the thumb-placing exercise on the lower leg, while 25.0% did not conduct the examination using the recommended steps (used visual check).

Observing for MUAC measurements revealed that 68.8% made an effort to find the half-way point of the arm before placing the tape on the arm. A further 56.3% ensured that the arm was hanging down the side of the body and was relaxed. The majority of the staff (93.8%) took measurements at midpoint between the shoulder and the tip of the elbow.

Weight measurements: All 16 healthcare staff observed ensured that children were weighed wearing the minimum clothes. Adjusting the scale to 0 was observed in 13 healthcare staff. Of these, 61.5% adjusted the scale before weighing the child. Further observations were made to see how children were placed on the scale. It was noted that 93.8% of the 16 healthcare staff ensured that the children were hanging freely and 56.3% placed the scale at eye level. All 16 staff members recorded the weight measurements to the nearest 0.1 kg.

Health education: Of the staff, 64.3% offered some health education, while 35.7% did not. Of those who offered health education, 22.2% gave education on five of the six messages and 22.2% gave education on four.

## DISCUSSION

This study has revealed that overall; the knowledge of the healthcare workers in OTPs in Lusaka on procedures according to the IMAM set criteria was good. Most Healthcare workers (HCW) were conversant with the admission criteria, able to conduct an appetite test, delivered education messages and take steps when a child was not gaining weight. The fact that healthcare workers had good knowledge on IMAM was enough to determine its impact on both skills and attitude. In addition, measurement bias due to influence of social setting<sup>20</sup> might have been a critical challenge in deciding the knowledge level. This is because it is possible that bias may have been introduced if consultation between respondents occurred, especially as some of the volunteers could not read adequately. If this had occurred, it could have resulted in over-estimating the knowledge of staff.<sup>20,21</sup>

The poor knowledge in community-referral systems, mother-to-mother and self-referrals might be an indication of an inadequate case finding exercise in communities where severely malnourished children are only identified when they come to the outpatient department. This is in line with the findings reported elsewhere, namely that most SAM children were being referred from health facilities.<sup>18</sup>

The low knowledge of the admission criteria for children younger than six months may be an indication of poor screening in this group. This may be exacerbated by poor nutrition assessment techniques (staff using visual checks for oedema, not ensuring good arm position when taking MUAC, not putting the scale at eye level when taking weight and poor posture in height taking) which could affect measurement accuracy<sup>22,23</sup> and is therefore likely to result in children being wrongly admitted to the OTP. Low knowledge and poor practice of the appetite test may mean that caretakers are not helped in feeding their

children, which might further lead to wrong admission of children and/or poor referral. Although not used singly, the appetite test also helps to determine where the child can be admitted in the OTP or ITP for management.<sup>19</sup>

The possession of key competencies among healthcare staff has shown to have a positive effect on clinical practices.<sup>24,25</sup> In this study, inadequate knowledge (overall score = 19% of staff knowing all criteria) of which actions to carry out when a child fails to gain weight, activities of outreach follow-up and low consideration of health education, especially of breastfeeding, may have entailed that inadequate actions were taken by both healthcare staff and caregivers working with children to help them recover quickly. This may result in intergeneration and irreversible consequences such as stunting and metabolic disorders, which manifest later in life, and even the deaths of children who could have been saved.<sup>1,2,3,4,5</sup> Poor knowledge of staff in breastfeeding may be linked to the lack of breastfeeding for more than half of the children aged 6 to 24 months admitted to the OTP reported elsewhere.<sup>18</sup>

The discharge criterion for cure was well known by both groups. The respondents of the in-depth interview also were able to cite all key factors of cure. Proper discharge reduces relapses and deaths in the community.<sup>19</sup>

## CONCLUSION

The study was able to show evidence of the knowledge levels of healthcare staff working in the OTP in the five health facilities studied. It was clear that the knowledge of staff was average, indicating that gaps still existed that, if not addressed, will give rise to the IMAM programme not providing expected results. Therefore, government and partners (non-governmental organisations, community service organisations and the United Nations) need to consider putting more investment into capacity building for staff to ensure that they support the goals of the programme adequately. The study had limited data to support detailed analysis hence a detailed research that correlates the knowledge and skills of OTP staff to actual performance of children may be required to support programme management and supervision.

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