

Counselling at the IYCF 1000 day room, Gambella, Ethiopia, 2017

## Management of acute malnutrition in infants less than six months in a South Sudanese refugee population in Ethiopia

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Location: *Ethiopia*

**What we know:** The World Health Organization (WHO) recommends that infants under six months old (U6m) with uncomplicated severe acute malnutrition (SAM) are treated in the community.

**What this article adds:** In 2015, GOAL integrated community-based management of acute malnutrition in infants U6m (C-MAMI) into primary healthcare services in two refugee camps in Gambella Region, Ethiopia. Existing mother-to-mother support groups (M2M) incorporated preventative and screening activities. Weekly contact points in blanket supplementary feeding programmes were leveraged to provide targeted individual counselling in a dedicated room to cases identified. Between January 2016 and January 2017, 3,436 infants U6m were screened and 259 SAM cases were successfully treated. C-MAMI is a feasible intervention in a resource-limited setting. The C-MAMI tool is effective but could be streamlined and made more user-friendly. The absence of a mid-upper arm circumference (MUAC)-based case definition for infants U6m creates screening challenges. Increased acute malnutrition prevalence at four and five months of age was observed, likely contributing to child burden of acute malnutrition. Development of programming tools, greater data collection and a more formal evaluation is planned.

### Introduction

Malnutrition is a major cause of death in children under five years old (U5). An estimated 45% (3.1 million) of annual child deaths can be attributed directly to, or have an underlying cause of, malnutrition (Black et al, 2013). The United Nations (UN) estimates that severe acute malnutrition (SAM) alone kills at least one million children U5 every year (WFP et al, 2007). A 2011 review estimated that 23% (3.8 million) of the overall SAM burden occurs in the under-six months-old age group (infants U6m) and a further 4.7 million infants U6m suffer from moderate acute malnutrition (MAM) (Kerac et al, 2011)<sup>1</sup>. A secondary data analysis of the admission profile and outcomes among infants U6m admitted to inpatient programmes for treatment found a greater risk of death during treatment in this age group (Grijalva-Eternod, 2017).

For decades this age group was considered less vulnerable to malnutrition due to the assumption that exclusive breastfeeding (EBF) protects against early malnutrition until approximately six months

of age. However, global prevalence of EBF is only 36% in the U6m age group; therefore millions of infants are exposed to risky feeding practices (such as contaminated water, prelacteal feeds and early introduction of inappropriate foods) that can cause diarrhoea, growth retardation and acute malnutrition (WHO, 2015). This blind spot means that infants U6m are often overlooked in community screenings for malnutrition, standard nutrition surveys (Lopriore et al, 2007) and treatment programmes. Challenges in their assessment and management also dissuade programmers from including them in surveys and interventions. The challenges include difficulties in measuring weight-for-length (WLZ) (length measurement requires greater skill and WLZ references not available for <45cm); absence of a community-screening tool such as mid-upper arm circumference (MUAC) for this age group (standard cut-offs are not established); and a lack of well-defined interventions.

<sup>1</sup> Estimates are based on a global SAM burden of 16.5 million children under five years old; more recent estimates

**Box 1** GOAL's nutrition programme activities

- Mass screening using MUAC every trimester.
- Systematic screening using MUAC and WHZ once per month prior to blanket supplementary feeding (BSF).
- Weekly blanket supplementary feeding programmes (BSFP) as mandated by UNHCR and ARRA for children 6-59m without acute malnutrition.
- Targeted supplementary feeding programmes (TSFP) for children 6-59m with MAM.
- Outpatient therapeutic programmes (OTP) for children 6-59m with non-complicated SAM.
- Stabilisation centres (SC) for children 0-59m with complicated acute malnutrition.
- Infant and young child feeding (IYCF) and maternal nutrition counselling for all families with children under two years of age and/or pregnant-lactating women (PLW).
- C-MAMI for infants 0-6m.
- Mother-to-mother groups (M2M).
- Community-based counselling and support for PLW and their husbands.
- Micro-gardening to promote dietary diversity.
- Various survey and assessment activities.

**Table 1** Profile of interventions for infants U6m pre- and post-introduction of C-MAMI tool

Interventions targeting infants U6m pre-2015 introduction of C-MAMI	Interventions added or changed targeting infants U6m post introduction of C-MAMI
<ul style="list-style-type: none"> <li>• Advocacy for inclusion of infants U6m into camp nutrition policy.</li> <li>• Mother-to-mother support groups (M2M).</li> <li>• Clinical assessment and individual counselling without standardised guideline.</li> <li>• Increased identification of malnourished cases in the community and referral for treatment.</li> </ul>	<ul style="list-style-type: none"> <li>• Database monitoring acute malnutrition rates in infants U6m in Terkidi and Kule camps established and updated monthly.</li> <li>• Clinical assessment and individual counselling using standardised guideline in the form of the CMAMI tool.</li> </ul>

In 2013, the World Health Organization (WHO) released updated guidance for the management of SAM; for the first time, this recommended outpatient care for uncomplicated SAM in infants U6m. Following this, the management of acute malnutrition in infants (MAMI) Special Interest Group<sup>2</sup> developed the community-based management of acute malnutrition in infants (C-MAMI) tool, a decision tool for programmers to support the delivery of WHO recommendations. C-MAMI has a similar structure to integrated management of childhood illness (IMCI) decision tools and was developed as a starting point for programmers to build on. These two developments substantially contributed to the much-needed recognition that infants U6m are vulnerable to acute malnutrition and that a community-based model for their identification and care is needed.

### Overview of GOAL's refugee nutrition programme in Gambella, Ethiopia

In 2014, in response to the large influx of refugees from South Sudan, GOAL, in collaboration with UNHCR and ARRA<sup>3</sup>, began implementing nutrition programmes as the lead agency in two newly established refugee camps in the Gambella Region of Ethiopia: Tierkadi camp (total population of 70,334) and Kule camp (total population of 52,515) (UNHCR and ARRA, 2017). GOAL's nutrition intervention was based on the Gambella Nutrition Harmonisation Guidance Note (UNHCR and ARRA, 2014), summarised in Box 1.

While establishing the nutrition programme in 2014, GOAL noted high numbers of infants in the camps and observed suspected cases of malnutrition in infants attending weekly BSFP distributions with their mothers. In response, and in the light of the 2013 updated WHO SAM guidance, GOAL Ethiopia broadened its nutrition approach to include extremely vulnerable infants U6m (the MAMI group) for malnutrition prevention, identification and management.

### Nested management of acute malnutrition in infants (MAMI) component

Over a period of three years, a series of interventions was introduced into GOAL's nutrition

programme across the two refugee camps to address the needs of infants U6m. Initially, GOAL focused on identification using WLZ screening and provision of counselling through M2M, baby-friendly spaces and counselling at BSFP distributions. In 2015, C-MAMI was integrated into the primary healthcare services across the two camps to provide more systematic outpatient counselling and fill the gap in clinical care for outpatient MAMI management (see summary in Table 1).

#### Preventative actions

To undertake integrated MAMI activities, GOAL first leveraged contact time at weekly BSFPs, beginning in 2015. Here, IYCF counselling is delivered to all pregnant women and mothers of children under two years old, irrespective of their nutritional status and prior to the receipt of any rations, in the 'baby-friendly spaces/1,000 days of life room' (a large room situated close to a BSFP distribution point). Support includes open discussions held in a group setting, individual counselling and, where possible, women are linked to M2M groups close to their homestead. Infants U6m are evaluated weekly (including visual assessment, vaccination card check, referral for expanded programme of immunisation (EPI) if needed, breastfeeding support and checks on the wellbeing of mother and baby) and their anthropometric information is recorded monthly. If any problems are detected or issues with breastfeeding arise, the baby is screened more frequently.

M2M discussion groups are used in the camp community to convey positive messages and practices for the mother-child dyad. M2M groups help identify problem cases and refer them to the centre for support. GOAL has applied to conduct MUAC screening by mothers in the second half of 2017 in around 5,000 households. The camps are divided into zones, then sub-divided into blocks; there is at least one M2M group per block led by a trained lead-mother volunteer, hosting participants from around 10 to 20 neighbouring families. Refresher training is provided to lead mothers every three months. Refresher trainings are also provided to all GOAL recruits, many of whom are camp residents themselves, every six months.

Both the BSFP and M2M forums provide an opportunity for women and the GOAL IYCF counsellors to meet each other and form a relationship.

#### Identification and referral

Two types of screening and referral activities are conducted, as follows:

##### 1. Systematic screening

###### 1a. Systematic screening of the 6-59 months age group

This comprises a two-stage screening exercise to identify children considered at risk of acute malnutrition (defined by a MUAC of <13.5cm) and for those identified as 'at risk' to confirm their nutritional status using weight-for-height z-score (WHZ) / WLZ and MUAC. Those found to be suffering from acute malnutrition are defined by WHZ/WLZ <-2SD, MUAC <12.5cm and/or bilateral pitting oedema.

There are two systematic screening points in the first screening stage: a) through ongoing, community-based, active case-finding by community health workers (CHWs); and b) prior to a BSFP distribution for all children attending (although the BSFP functions on a weekly basis, systematic screening occurs every four weeks).

Children aged 6-59 months identified with MUAC <13.5cm are referred to the second stage of screening, which involves reassessment at facility level, including WHZ or WLZ, and admission to the appropriate programme based on anthropometric or clinical criteria, as outlined in Table 2.

Children identified with MAM (MUAC <12.5cm and >-11.5cm) are referred to TSFP; children identified with SAM (MUAC <11.5 and/or WHZ <-3 and/or bilateral pitting oedema + / ++ ) are referred to OTP.

###### 1b. Systematic screening of U6m group

This comprises a two-stage, monthly screening exercise at a baby-friendly spaces/1,000 days of life room in conjunction with screening of all young children under two years of age prior to

<sup>2</sup> <http://www.enonline.net/ourwork/research/mami>

<sup>3</sup> A government agency, the Administration for Refugee and Returnee Affairs (ARRA) and United Nations High Commissioner for refugees.

**Table 2** Admission criteria for infants and children for different service streams, including the C-MAMI component

Children 6-59 months		Infants 0-6 months	
Programme	Admission criteria	Programme	Admission criteria
BSFP for MAM prevention	All non-malnourished children 6-59m NB: Service is also provided to PLW and chronic medical cases	IYCF & maternal nutrition counselling for maternal nutrition prevention	All carers of infants 0-6m and older children (6m-2yrs) receive IYCF counselling prior to BSFP ration distributions
TSFP for MAM cases	MUAC <12.5cm & >-11.5cm &/or WHZ >-3 & <-2 &/or (without complication and with appetite)	C-MAMI outpatient for uncomplicated MAM and SAM cases. <sup>5</sup>	MUAC <11cm in infants 2-6m (GOAL own criteria) &/or WLZ <-2 &/or Recent weight loss, failure to gain weight or visible wasting (without complications)
OTP for uncomplicated SAM cases	MUAC <-11.5 &/or WHZ <-3 &/or bilateral pitting oedema + / ++ (without complications and with appetite)		
SC for complicated SAM cases	MUAC <-11.5 &/or WHZ <-3 &/or bilateral pitting oedema + / ++ / +++ (AND with complications or anorexia)	Inpatient care for complicated SAM cases	MUAC <11cm in infants 2-6m GOAL own newly incorporated criteria) &/or WLZ <-3 (with complications; i.e. too weak to suckle effectively, BF failure, static weight or recent loss) Or bilateral pitting oedema + / ++ / +++

BSFP distribution. To identify infants aged 2-6 months at risk of acute malnutrition, a MUAC < 11cm is used. Additional criteria applied to the 0-2 months age group include bilateral pitting oedema, visible thinness, reported recent weight loss and/or reported feeding problems.

In this first systematic screening stage infants are assessed by a clinical worker. Infants considered at risk of malnutrition are then referred to the second stage of screening, which involves reassessment using WLZ and admission to the appropriate programme based on anthropometric or clinical criteria (as outlined in Table 2).

## 2. Mass screening

A mass-screening exercise is conducted roughly every three months for children aged 6-59 months using MUAC and checking for bilateral pitting oedema. Children measuring <12.5cm and >11.5cm are referred directly to the TSFP. Those measuring <11.5cm and/or with bilateral pitting oedema are referred to the OTP (complicated cases are referred to the SC). All non-acutely malnourished children aged 6-59 months are referred to the BSFP. The GOAL team has not yet started to include mass MUAC screening for infants during this activity as, from experience, this group are fully captured in the systematic screening described above and sufficiently catered for. The purpose of mass screenings is firstly to try to identify any cases of acute malnutrition that did not present with their mother at the BSFP or who were not identified through CHW active case-finding. Secondly, it gives camp managers an idea of the population of young children in the camp eligible for BSFP or TSFP. These different points of contact have allowed GOAL to identify a high proportion of acutely malnourished infants for referral to appropriate services.

### C-MAMI intervention

When an infant U6m is identified as acutely malnourished, he/she is referred to the outpatient department for assessment. Those with acute malnutrition and complications are referred to the SC for medical intervention and therapeutic feeding. Those with acute malnutrition without

complications are referred to the C-MAMI programme. Here counselling is provided by a female nurse, who troubleshoots breastfeeding issues with the mother and infant and provides individual counselling in line with the C-MAMI guidelines. The infant may be required to present daily if more intensive support is required to help rehabilitate the child and support the mother, or may be followed up on a weekly basis prior to BSFP distributions.

More intensive daily support takes place in a corner of the baby-friendly spaces/1,000 days of life room. Mothers receive food and breastfeeding support. If an infant requires a breastmilk substitute, the caregiver is taught how to prepare infant formula and how to feed using cup and spoon (bottles are never used)<sup>4</sup>. Where infant formula use is indicated, mothers are provided with on-site milk feeds and given milk supply for afternoon and overnight feeds at home.

On average, two infants attend daily at each of the four sites. The caregiver remains with the infant at all times. If limited progress is being made, such as continued issues with feeding, limited weight gain or illness, the infant is referred to the SC for more detailed investigation and, if appropriate, intensive intervention. If the infant reaches six months of age and is still malnourished, they are referred to the OTP or TSFP as appropriate. If their malnutrition has resolved they are discharged to BSFP, where the mother receives food support.

C-MAMI staff are female nurses and counsellors who speak Nuer, the language of the refugees. Staff receive formal training on IYCF and C-MAMI guidelines. There are also weekly on-the-job training and discussions facilitated by the programme manager, with case study reviews of individual cases.

Community outreach activities include active case-finding, referral, follow-up of CMAM absentees/non-responders (default rate for infants U6m is extremely low at close to 0%), sensitisation around the different services available, nutrition counselling and support for PLW and their hus-

bands to highlight the additional nutritional requirements during pregnancy and breastfeeding.

GOAL also supports the construction and maintenance of buildings and structures to support the delivery of facility-based activities. Micro-gardening is promoted in a selection of homesteads with beneficiaries registered in the CMAM programme to encourage improved dietary diversification. Annual nutrition SMART surveys are conducted in collaboration with UNHCR and partners.

### Success and challenges with integrated MAMI programming

Between January 2016 and January 2017, GOAL screened 3,436 infants U6m across the two refugee camps, taking weight, length and MUAC measures at contact points described above. This identified 259 acutely malnourished infants who were treated and cured in the C-MAMI programme (see Table 3 for age profile of admissions). Progress data, such as rates of weight gain, are not currently measured; there are plans to develop and implement individual record cards to capture this in the future. Some infants whose mothers died in childbirth or who are ill needed to stay for a longer period of up to six months. Any other type of 'non-responder' does not usually occur; if the infant is having another problem related to breastfeeding there is an intervention (referral to the SC or use of artificial milk according to strict protocols).

As a result of the MAMI programme, there is increased awareness of acute malnutrition in infants in the camp by both staff and residents. The intervention has identified infant feeding trends previously not well understood, such as higher rates of acute malnutrition amongst infants at four and five months of age. This enables better design and targeting of counselling

<sup>4</sup> As stipulated by the UNHCR SOP on BMS (UNHCR, 2015) and C-MAMI tool (IFE Core Group, 2015)

<sup>5</sup> C-MAMI Tool, Version 1.0, November 2015 Community management of uncomplicated acute malnutrition in infants < 6 months of age (C-MAMI)

**Table 3** Admission to C-MAMI by age in months

Age in months	# malnourished	Total # screened
1	33	595
2	48	813
3	45	720
4	62	653
5	71	655
<b>Totals</b>	<b>259</b>	<b>3436</b>

to address specific contributing issues. A nutrition causal analysis is planned in the camp in the coming months to investigate this further; one hypothesis is that early introduction of comple

The integration of acute malnutrition services for infants U6m into GOAL's wider CMAM programme took time. As there is no simple screening tool (such as MUAC) for infants U6m, it was difficult in the initial phase for staff to recognise the scale of the problem and therefore want to invest precious time in supporting this age group. However, over the past three years, numbers of infants screened and identified have slowly increased due to continued staff capacity-building and advocacy by GOAL staff for the inclusion of this group in the camp nutrition strategy.

Providing effective C-MAMI support when the mother has passed away is always problematic (these data are not currently captured). If a female caregiver is available, GOAL promotes wet nursing. Where no wet nurse is available, GOAL follows an agreed standard operating procedure for breast-milk substitutes for Gambella and the infant must attend the IYCF C-MAMI corner daily for cup and spoon-feeding.

Additional workload for nursing staff to implement the C-MAMI protocol is a challenge. The C-MAMI guideline is lengthy, taking 20-40 minutes per individual; nursing staff have this additional responsibility but no additional resources. There is a lack of trained female nurses who speak the Nuer language and the remoteness and harsh nature of camp locations make it difficult to recruit staff.

### Lessons learned and next steps

GOAL is in the early stages of addressing MAMI needs among refugees in Ethiopia. Despite a shortage of funds to apply MAMI activities, over the past three years GOAL has used resources wisely to integrate MAMI into existing nutrition programming. Early lessons learned include:

#### *The C-MAMI protocol is time-consuming but effective!*

The first version of the C-MAMI tool has proven effective in Gambella, Ethiopia. The tool has supported clinicians to provide systematic counselling for mothers with malnourished infants. However, the tool is lengthy and creates an additional workload for nursing staff in an area where recruitment of nurses is difficult. Based on GOAL's experience, we believe there is scope for further refinement of the C-MAMI tool to improve its efficiency and user-friendliness.

### *Absence of community case definition for U6m age group makes identification challenging*

The absence of a case definition for MUAC screening of infants U6m means that these infants are not included in mass screening exercises. Full growth-monitoring, including age, gender, weight and length, is currently required. This is labour-intensive and time-consuming in limited resource and literacy settings. The absence of a MUAC cut-off for this group also means it is regularly excluded from nutrition surveys, as an additional sample size would be needed to calculate GAM and SAM rates accurately. There is, however, scope for developing a nutrition survey sample-size calculation application which accounts for the inclusion of infants U6m, while allowing for representative MUAC and WHZ score malnutrition prevalence to be calculated.

### *There is potential for C-MAMI to reduce the number of infants entering CMAM at age six months*

Although not yet empirically measured, we observe that the early identification of acute malnutrition in infants U6m will reduce the number of SAM cases with complications presenting at six months, once MUAC screening is applied. GOAL's data in Gambella reveal a trend in increasing GAM and SAM rates at four and five months of age. If these infants are not identified until six months old, when conventional MUAC screening can be applied, it is likely they will have significantly deteriorated. Considering this, GOAL has been using MUAC <11cm in infants aged 2-6 months as an additional means of trying to identify wasting. This is an area GOAL will continue to investigate further in 2017.

GOAL's experience has been that, where a comprehensive nutrition programme is already in existence, it is entirely feasible to include C-MAMI activities, with limited resources (both personnel and monetary), allowing for the identification and management of non-complicated malnutrition in infants U6m, challenges notwithstanding. In Gambella, leveraging existing contact points has been key.

### Recommendations for C-MAMI programming and next steps

Based on the lessons learned, we believe the following steps are required to move towards improved integration and scale-up of C-MAMI services:

1. A simpler, more concise C-MAMI protocol to allow for quick triage and more efficient counselling of infants U6m with uncomplicated SAM.
2. Development of C-MAMI monitoring tools such as admission cards and reporting templates.
3. The broadening of nutrition programming to include 0-59 months as the target group for survey, assessment and curative nutrition (currently this age group is only considered for IYCF and the '1,000-days' approach).
4. A simple case definition for identification

of infants with acute malnutrition in a community setting, as exhaustive weight for length screening is not feasible in low-resource and low-literacy settings.

GOAL will continue to advocate for and support the inclusion of infants in the management of acute malnutrition programming by consciously broadening target groups from 6-59 months to 0-59 months in nutrition programme strategies, proposals, implementation plans and evaluations. The provision of C-MAMI support in refugee contexts in Ethiopia will continue, alongside investigations into trends, such as the higher rates of acute malnutrition in infants aged four to five months. GOAL is trialling newly designed C-MAMI admission cards and plans to develop a programme monitoring toolkit to support a seamless transition from C-MAMI to CMAM. GOAL is also hoping to undertake a more formal evaluation of the C-MAMI tool implementation in collaboration with Save the Children and others to inform a second version of the C-MAMI tool. At a global level, GOAL will continue to work with and contribute to the MAMI Special Interest Group and partner with academic institutions to conduct quantitative and qualitative research into barriers and boosters to C-MAMI service provision and uptake.

<sup>6</sup> London School of Hygiene and Tropical Medicine (LSHTM), the Kenya Medical Research Institute (KEMRI)/Wellcome Trust Research Programme, Emergency Nutrition Network (ENN) and the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr).

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